SWV axioms

SWV001-0.ax Program verification axioms
predecessor(successor(x)) $= x$ cnf(predecessor_successor, axiom)
successor(predecessor(x)) $= x$ cnf(successor_predecessor, axiom)
predecessor(x) = predecessor(y) $\Rightarrow$ $x = y$ cnf(well_defined_predecessor, axiom)
successor(x) = successor(y) $\Rightarrow$ $x = y$ cnf(well_defined_successor, axiom)
predecessor(x) $< x$ cnf(predecessor_less_than, axiom)
$x <$ successor(x) cnf(less_than_successor, axiom)
($x < y$ and $y < z$) $\Rightarrow$ $x < z$ cnf(transitivity_of_less_than, axiom)
$x < y$ or $y < x$ or $x = y$ cnf(all_related, axiom)
$\neg\, x < x$ cnf(x_not_less_than_x, axiom)
$x < y$ $\Rightarrow$ $\neg\, y < x$ cnf(anti_symmetry_of_less_than, axiom)
($x = y$ and $x < z$) $\Rightarrow$ $y < z$ cnf(equal_and_less_than_transitivity$_1$, axiom)
($x = y$ and $z < x$) $\Rightarrow$ $z < y$ cnf(equal_and_less_than_transitivity$_2$, axiom)

SWV002-0.ax Program verification axioms
These "clauses arose in a natural manner from work done in program verification" [MOW76] p.779.
q_1(vj, vt, vx) $\Rightarrow$ q_2(vj, e(vx, n_1), vx) cnf(clause$_1$, axiom)
q_2(vj, vt, vx) $\Rightarrow$ q_3(successor(n_1), vt, vWhat) cnf(clause$_2$, axiom)
(q_3(vj, vt, vx) and vj $\leq n$) $\Rightarrow$ q_4(vj, vt, vx) cnf(clause$_3$, axiom)
q_3(vj, vt, vx) $\Rightarrow$ (vj $\leq n$ or q_7(vj, vt, vx)) cnf(clause$_4$, axiom)
(q_4(vj, vt, vx) and d(vj) and e(vx, vj) $\leq$ vt) $\Rightarrow$ q_6(vj, vt, vx) cnf(clause$_5$, axiom)
(q_4(vj, vt, vx) and d(vj)) $\Rightarrow$ (e(vx, vj) $\leq$ vt or q_5(vj, vt, vx)) cnf(clause$_6$, axiom)
(q_5(vj, vt, vx) and d(vj)) $\Rightarrow$ q_6(vj, e(vx, vj), vx) cnf(clause$_7$, axiom)
q_6(vj, vt, vx) $\Rightarrow$ q_3(successor(vj), vt, vx) cnf(clause$_8$, axiom)
($n_1 \leq x$ and $x \leq n$) $\Rightarrow$ $d(x)$ cnf(definition_of_d$_1$, axiom)
$d(x)$ $\Rightarrow$ $\neg\, n_1 \leq x$ cnf(definition_of_d$_2$, axiom)
$d(x)$ $\Rightarrow$ $x \leq n$ cnf(definition_of_d$_3$, axiom)
$d(n_1)$ cnf(one_is_d, axiom)
$d(n)$ cnf(n_is_d, axiom)
$n_1 \leq n$ cnf(clause$_9$, axiom)
(ub(w_1, x, y, z) and $w_1 \leq w_2$) $\Rightarrow$ ub(w_2, x, y, z) cnf(clause$_{10}$, axiom)
(ub(w, x, y, z_1) and successor(z_1) $= z_2$ and $d(z_2)$ and $e(x, z_2) \leq w$) $\Rightarrow$ ub(w, x, y, z_2) cnf(clause$_{11}$, axiom)
$\neg$ successor(x) $\leq x$ cnf(successor_not_less_or_equal, axiom)
$x \leq$ successor(x) cnf(less_or_equal_than_successor, axiom)
$x \leq x$ cnf(less_or_equal_reflexivity, axiom)
($x \leq y$ and $y \leq x$) $\Rightarrow$ $x = y$ cnf(less_or_equal_implies_equal, axiom)
($x \leq y$ and $y \leq z$) $\Rightarrow$ $x \leq z$ cnf(transitivity_of_less_or_equal, axiom)
$x = y$ $\Rightarrow$ $x \leq y$ cnf(equal_implies_less_or_equal, axiom)

SWV005-4.ax Cryptographic protocol axioms for Yahalom, simplified
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) $\Rightarrow$ c_in(v_X, c_Message_Oa
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c.
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_Yahalom_OSpy__analz__shrK$_0$, axiom)
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) and c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))) $\Rightarrow$
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c.
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_Yahalom_OSpy__see__shrK$_0$, axiom)
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) and c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))) $\Rightarrow$
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_

SWV007+0.ax Priority queue checker: quasi-order set with bottom element
$\forall u, v, w$: (($u < v$ and $v < w$) $\Rightarrow$ $u < w$) fof(transitivity, axiom)
$\forall u, v$: ($u < v$ or $v < u$) fof(totality, axiom)

$\forall u$: $u < u$ fof(reflexivity, axiom)
$\forall u, v$: (strictly_less_than(u, v) $\iff$ ($u < v$ and $\neg\, v < u$))   fof(stricly_smaller_definition, axiom)
$\forall u$: bottom $< u$ fof(bottom_smallest, axiom)

SWV007+1.ax Priority queue checker: priority queues
Priority queues are inductively defined.
$\neg$ isnonempty_pq(create_pq)   fof(ax$_6$, axiom)
$\forall u, v$: isnonempty_pq(insert_pq(u, v))   fof(ax$_7$, axiom)
$\forall u$: $\neg$ contains_pq(create_pq, u)   fof(ax$_8$, axiom)
$\forall u, v, w$: (contains_pq(insert_pq(u, v), w) $\iff$ (contains_pq(u, w) or $v = w$))   fof(ax$_9$, axiom)
$\forall u, v$: (issmallestelement_pq(u, v) $\iff$ $\forall w$: (contains_pq(u, w) $\Rightarrow$ $v < w$))   fof(ax$_{10}$, axiom)
$\forall u, v$: remove_pq(insert_pq(u, v), v) $= u$ fof(ax$_{11}$, axiom)
$\forall u, v, w$: ((contains_pq(u, w) and $v \neq w$) $\Rightarrow$ remove_pq(insert_pq(u, v), w) = insert_pq(remove_pq(u, w), v))   fof(ax$_{12}$, axio
$\forall u, v$: ((contains_pq(u, v) and issmallestelement_pq(u, v)) $\Rightarrow$ findmin_pq_eff(u, v) $= u$)   fof(ax$_{13}$, axiom)
$\forall u, v$: ((contains_pq(u, v) and issmallestelement_pq(u, v)) $\Rightarrow$ findmin_pq_res(u, v) $= v$)   fof(ax$_{14}$, axiom)
$\forall u, v$: ((contains_pq(u, v) and issmallestelement_pq(u, v)) $\Rightarrow$ removemin_pq_eff(u, v) = remove_pq(u, v))   fof(ax$_{15}$, axiom)
$\forall u, v$: ((contains_pq(u, v) and issmallestelement_pq(u, v)) $\Rightarrow$ removemin_pq_res(u, v) $= v$)   fof(ax$_{16}$, axiom)
$\forall u, v, w$: insert_pq(insert_pq(u, v), w) = insert_pq(insert_pq(u, w), v)   fof(ax$_{17}$, axiom)

SWV007+2.ax Priority queue checker: system of lower bounds
$\neg$ isnonempty_slb(create_slb)   fof(ax$_{18}$, axiom)
$\forall u, v, w$: isnonempty_slb(insert_slb(u, pair(v, w)))   fof(ax$_{19}$, axiom)
$\forall u$: $\neg$ contains_slb(create_slb, u)   fof(ax$_{20}$, axiom)
$\forall u, v, w, x$: (contains_slb(insert_slb(u, pair(v, x)), w) $\iff$ (contains_slb(u, w) or $v = w$))   fof(ax$_{21}$, axiom)
$\forall u, v$: $\neg$ pair_in_list(create_slb, u, v)   fof(ax$_{22}$, axiom)
$\forall u, v, w, x, y$: (pair_in_list(insert_slb(u, pair(v, x)), w, y) $\iff$ (pair_in_list(u, w, y) or ($v = w$ and $x = y$)))   fof(ax$_{23}$, axiom)
$\forall u, v, w$: remove_slb(insert_slb(u, pair(v, w)), v) $= u$ fof(ax$_{24}$, axiom)
$\forall u, v, w, x$: (($v \neq w$ and contains_slb(u, w)) $\Rightarrow$ remove_slb(insert_slb(u, pair(v, x)), w) = insert_slb(remove_slb(u, w), pair(v, x
$\forall u, v, w$: lookup_slb(insert_slb(u, pair(v, w)), v) $= w$ fof(ax$_{26}$, axiom)
$\forall u, v, w, x$: (($v \neq w$ and contains_slb(u, w)) $\Rightarrow$ lookup_slb(insert_slb(u, pair(v, x)), w) = lookup_slb(u, w))   fof(ax$_{27}$, axiom
$\forall u$: update_slb(create_slb, u) = create_slb   fof(ax$_{28}$, axiom)
$\forall u, v, w, x$: (strictly_less_than(x, w) $\Rightarrow$ update_slb(insert_slb(u, pair(v, x)), w) = insert_slb(update_slb(u, w), pair(v, w)))   f
$\forall u, v, w, x$: ($w < x$ $\Rightarrow$ update_slb(insert_slb(u, pair(v, x)), w) = insert_slb(update_slb(u, w), pair(v, x)))   fof(ax$_{30}$, axiom)

SWV007+3.ax Priority queue checker: checked priority queues
This axiom set fully describes checked priority queues. Checked priority queues are defined as triples of a "priority queue pretender", a system of lower bounds and Boolean value that keep track of errors.
$\forall u$: succ_cpq(u, u)   fof(ax$_{31}$, axiom)
$\forall u, v, w$: (succ_cpq(u, v) $\Rightarrow$ succ_cpq(u, insert_cpq(v, w)))   fof(ax$_{32}$, axiom)
$\forall u, v, w$: (succ_cpq(u, v) $\Rightarrow$ succ_cpq(u, remove_cpq(v, w)))   fof(ax$_{33}$, axiom)
$\forall u, v$: (succ_cpq(u, v) $\Rightarrow$ succ_cpq(u, findmin_cpq_eff(v)))   fof(ax$_{34}$, axiom)
$\forall u, v$: (succ_cpq(u, v) $\Rightarrow$ succ_cpq(u, removemin_cpq_eff(v)))   fof(ax$_{35}$, axiom)
$\forall u, v$: check_cpq(triple(u, create_slb, v))   fof(ax$_{36}$, axiom)
$\forall u, v, w, x, y$: ($y < x$ $\Rightarrow$ (check_cpq(triple(u, insert_slb(v, pair(x, y)), w)) $\iff$ check_cpq(triple(u, v, w))))   fof(ax$_{37}$, axiom
$\forall u, v, w, x, y$: (strictly_less_than(x, y) $\Rightarrow$ (check_cpq(triple(u, insert_slb(v, pair(x, y)), w)) $\iff$ \$false))   fof(ax$_{38}$, axiom)
$\forall u, v, w, x$: (contains_cpq(triple(u, v, w), x) $\iff$ contains_slb(v, x))   fof(ax$_{39}$, axiom)
$\forall u, v$: (ok(triple(u, v, bad)) $\iff$ \$false)   fof(ax$_{40}$, axiom)
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ w = bad)   fof(ax$_{41}$, axiom)
$\forall u, v, w, x$: insert_cpq(triple(u, v, w), x) = triple(insert_pqp(u, x), insert_slb(v, pair(x, bottom)), w)   fof(ax$_{42}$, axiom)
$\forall u, v, w, x$: ($\neg$ contains_slb(v, x) $\Rightarrow$ remove_cpq(triple(u, v, w), x) = triple(u, v, bad))   fof(ax$_{43}$, axiom)
$\forall u, v, w, x$: ((contains_slb(v, x) and lookup_slb(v, x) $< x$) $\Rightarrow$ remove_cpq(triple(u, v, w), x) = triple(remove_pqp(u, x), remove
$\forall u, v, w, x$: ((contains_slb(v, x) and strictly_less_than(x, lookup_slb(v, x))) $\Rightarrow$ remove_cpq(triple(u, v, w), x) = triple(remove_p
$\forall u, v$: findmin_cpq_eff(triple(u, create_slb, v)) = triple(u, create_slb, bad)   fof(ax$_{46}$, axiom)
$\forall u, v, w, x$: (($v \neq$ create_slb and $\neg$ contains_slb(v, findmin_pqp_res(u))) $\Rightarrow$ findmin_cpq_eff(triple(u, v, w)) = triple(u, update_s
$\forall u, v, w, x$: (($v \neq$ create_slb and contains_slb(v, findmin_pqp_res(u)) and strictly_less_than(findmin_pqp_res(u), lookup_slb(v, fi
findmin_cpq_eff(triple(u, v, w)) = triple(u, update_slb(v, findmin_pqp_res(u)), bad))   fof(ax$_{48}$, axiom)
$\forall u, v, w, x$: (($v \neq$ create_slb and contains_slb(v, findmin_pqp_res(u)) and lookup_slb(v, findmin_pqp_res(u)) $<$ findmin_pqp_res
findmin_cpq_eff(triple(u, v, w)) = triple(u, update_slb(v, findmin_pqp_res(u)), w))   fof(ax$_{49}$, axiom)
$\forall u, v$: findmin_cpq_res(triple(u, create_slb, v)) = bottom   fof(ax$_{50}$, axiom)
$\forall u, v, w, x$: ($v \neq$ create_slb $\Rightarrow$ findmin_cpq_res(triple(u, v, w)) = findmin_pqp_res(u))   fof(ax$_{51}$, axiom)
$\forall u$: removemin_cpq_eff(u) = remove_cpq(findmin_cpq_eff(u), findmin_cpq_res(u))   fof(ax$_{52}$, axiom)

$\forall u$: removemin_cpq_res(u) = findmin_cpq_res(u)   fof(ax_{53}, axiom)

SWV007+4.ax Priority queue checker: implementation function, Pi, Pi#

$\forall u, v$: i(triple(u, create_slb, v)) = create_pq   fof(ax_{54}, axiom)

$\forall u, v, w, x, y$: i(triple(u, insert_slb(v, pair(x, y)), w)) = insert_pq(i(triple(u, v, w)), x)   fof(ax_{55}, axiom)

$\forall u, v$: (pi_sharp_remove(u, v) $\iff$ contains_pq(u, v))   fof(ax_{56}, axiom)

$\forall u, v$: (pi_remove(u, v) $\iff$ pi_sharp_remove(i(u), v))   fof(ax_{57}, axiom)

$\forall u, v$: (pi_sharp_find_min(u, v) $\iff$ (contains_pq(u, v) and issmallestelement_pq(u, v)))   fof(ax_{58}, axiom)

$\forall u$: (pi_find_min(u) $\iff$ $\exists v$: pi_sharp_find_min(i(u), v))   fof(ax_{59}, axiom)

$\forall u, v$: (pi_sharp_removemin(u, v) $\iff$ (contains_pq(u, v) and issmallestelement_pq(u, v)))   fof(ax_{60}, axiom)

$\forall u$: (pi_removemin(u) $\iff$ $\exists v$: pi_sharp_find_min(i(u), v))   fof(ax_{61}, axiom)

$\forall u$: (phi(u) $\iff$ $\exists v$: (succ_cpq(u, v) and ok(v) and check_cpq(v)))   fof(ax_{62}, axiom)

SWV008∧0.ax ICL logic based upon modal logic based upon simple type theory

rel: \$i $\rightarrow$ \$i $\rightarrow$ \$o   thf(rel_type, type)

icl_atom: (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_atom_type, type)

icl_atom = (λp: \$i $\rightarrow$ \$o: (mbox@rel@p))   thf(icl_atom, definition)

icl_princ: (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_princ_type, type)

icl_princ = (λp: \$i $\rightarrow$ \$o: p)   thf(icl_princ, definition)

icl_and: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_and_type, type)

icl_and = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (mand@a@b))   thf(icl_and, definition)

icl_or: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_or_type, type)

icl_or = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (mor@a@b))   thf(icl_or, definition)

icl_impl: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_impl_type, type)

icl_impl = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (mbox@rel@(mimpl@a@b)))   thf(icl_impl, definition)

icl_true: \$i $\rightarrow$ \$o   thf(icl_true_type, type)

icl_true = mtrue   thf(icl_true, definition)

icl_false: \$i $\rightarrow$ \$o   thf(icl_false_type, type)

icl_false = mfalse   thf(icl_false, definition)

icl_says: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_says_type, type)

icl_says = (λa: \$i $\rightarrow$ \$o, s: \$i $\rightarrow$ \$o: (mbox@rel@(mor@a@s)))   thf(icl_says, definition)

iclval: (\$i $\rightarrow$ \$o) $\rightarrow$ \$o   thf(iclval_decl_type, type)

iclval = (λx: \$i $\rightarrow$ \$o: (mvalid@x))   thf(icl_s4_valid, definition)

SWV008∧1.ax ICL notions of validity wrt S4

$\forall a$: \$i $\rightarrow$ \$o: (mvalid@(mimpl@(mbox@rel@a)@a))   thf(refl_axiom, axiom)

$\forall b$: \$i $\rightarrow$ \$o: (mvalid@(mimpl@(mbox@rel@b)@(mbox@rel@(mbox@rel@b))))   thf(trans_axiom, axiom)

SWV008∧2.ax ICL∧=> logic based upon modal logic

icl_impl_princ: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(icl_impl_princ_type, type)

icl_impl_princ = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (mbox@rel@(mimpl@a@b)))   thf(icl_impl_princ, definition)

SWV010∧0.ax Translation from Binder Logic (BL) to CS4

princ_inj: individuals $\rightarrow$ \$i $\rightarrow$ \$o   thf(princ_inj, type)

bl_atom: (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_atom_decl, type)

bl_princ: (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_princ_decl, type)

bl_and: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_and_decl, type)

bl_or: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_or_decl, type)

bl_impl: (\$i $\rightarrow$ \$o) $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_impl_decl, type)

bl_all: (individuals $\rightarrow$ \$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_all_decl, type)

bl_true: \$i $\rightarrow$ \$o   thf(bl_true_decl, type)

bl_false: \$i $\rightarrow$ \$o   thf(bl_false_decl, type)

bl_says: individuals $\rightarrow$ (\$i $\rightarrow$ \$o) $\rightarrow$ \$i $\rightarrow$ \$o   thf(bl_says_decl, type)

bl_atom = (λp: \$i $\rightarrow$ \$o: (cs4_atom@p))   thf(bl_atom, definition)

bl_princ = (λp: \$i $\rightarrow$ \$o: (cs4_atom@p))   thf(bl_princ, definition)

bl_and = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (cs4_and@a@b))   thf(bl_and, definition)

bl_or = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (cs4_or@a@b))   thf(bl_or, definition)

bl_impl = (λa: \$i $\rightarrow$ \$o, b: \$i $\rightarrow$ \$o: (cs4_impl@a@b))   thf(bl_impl, definition)

bl_all = (λa: individuals $\rightarrow$ \$i $\rightarrow$ \$o: (cs4_all@a))   thf(bl_all, definition)

bl_true = cs4_true   thf(bl_true, definition)

bl_false = cs4_false   thf(bl_false, definition)

bl_says = (λk: individuals, a: \$i $\rightarrow$ \$o: (cs4_box@(cs4_impl@(bl_princ@(princ_inj@k))@a)))   thf(bl_says, definition)

bl_valid: (\$i → \$o) → \$o   thf(bl_valid_decl, type)
bl_valid = mvalid   thf(bl_valid_def, definition)
loca: individuals   thf(loca_decl, type)
cs4_valid@(cs4_all@λk: individuals: (cs4_impl@(princ_inj@k)@(princ_inj@loca)))   thf(loca_strength, axiom)

SWV013-0.ax Lists in Separation Logic
Axioms for proving entailments between separation logic formulas with list predicates.
sep(s, sep(t, sigma)) = sep(t, sep(s, sigma))   cnf(associative_commutative, axiom)
sep(lseg(x, x), sigma) = sigma   cnf(normalization, axiom)
¬ heap(sep(next(nil, y), sigma))   cnf(wellformedness$_1$, axiom)
heap(sep(lseg(nil, y), sigma)) ⇒ y = nil   cnf(wellformedness$_2$, axiom)
¬ heap(sep(next(x, y), sep(next(x, z), sigma)))   cnf(wellformedness$_3$, axiom)
heap(sep(next(x, y), sep(lseg(x, z), sigma))) ⇒ $x = z$ cnf(wellformedness$_4$, axiom)
heap(sep(lseg(x, y), sep(lseg(x, z), sigma))) ⇒ ($x = y$ or $x = z$)   cnf(wellformedness$_5$, axiom)
heap(sep(next(x, y), sep(lseg(y, z), sigma))) ⇒ ($x = y$ or heap(sep(lseg(x, z), sigma)))   cnf(unfolding$_2$, axiom)
heap(sep(lseg(x, y), sep(lseg(y, nil), sigma))) ⇒ heap(sep(lseg(x, nil), sigma))   cnf(unfolding$_3$, axiom)
heap(sep(lseg(x, y), sep(lseg(y, z), sep(next(z, w), sigma)))) ⇒ heap(sep(lseg(x, z), sep(next(z, w), sigma)))   cnf(unfolding
heap(sep(lseg(x, y), sep(lseg(y, z), sep(lseg(z, w), sigma)))) ⇒ ($z = w$ or heap(sep(lseg(x, z), sep(lseg(z, w), sigma))))   cnf(

SWV problems

SWV001-1.p PV1
These "clauses arose in a natural manner from work done in program verification" [MOW76] p.779.
(x=y and less_or_equalish(x, z)) ⇒ less_or_equalish(y, z)   cnf(less_or_equal_substitution$_1$, axiom)
(x=y and less_or_equalish(z, x)) ⇒ less_or_equalish(z, y)   cnf(less_or_equal_substitution$_2$, axiom)
($q_1(x, y, z)$ and less_or_equalish(x, y)) ⇒ $q_2(x, y, z)$ cnf(clause$_1$, axiom)
$q_1(x, y, z)$ ⇒ (less_or_equalish(x, y) or $q_3(x, y, z)$)   cnf(clause$_2$, axiom)
$q_2(x, y, z)$ ⇒ $q_4(x, y, y)$ cnf(clause$_3$, axiom)
$q_3(x, y, z)$ ⇒ $q_4(x, y, x)$ cnf(clause$_4$, axiom)
less_or_equalish(x, x)   cnf(less_or_equal_reflexivity, axiom)
(less_or_equalish(x, y) and less_or_equalish(y, x)) ⇒ x=y cnf(less_or_equal_implies_equal, axiom)
(less_or_equalish(x, y) and less_or_equalish(y, z)) ⇒ less_or_equalish(x, z)   cnf(transitivity_of_less_or_equal, axiom)
less_or_equalish(x, y) or less_or_equalish(y, x)   cnf(all_less_or_equal, axiom)
x=y ⇒ less_or_equalish(x, y)   cnf(equal_implies_less_or_equal, axiom)
$q_1(a, b, c)$ cnf(clause$_5$, negated_conjecture)
($q_4(a, b, w)$ and less_or_equalish(a, w) and less_or_equalish(b, w)) ⇒ ¬ less_or_equalish(w, a)   cnf(clause$_6$, negated_conjectu
($q_4(a, b, w)$ and less_or_equalish(a, w) and less_or_equalish(b, w)) ⇒ ¬ less_or_equalish(w, b)   cnf(clause$_7$, negated_conjectu

SWV002-1.p E1
include('Axioms/SWV001-0.ax')
$\neg\, n < j$ cnf(clause$_1$, negated_conjecture)
$k < j$ cnf(clause$_2$, negated_conjecture)
$\neg\, k < i$ cnf(clause$_3$, negated_conjecture)
$i < n$ cnf(clause$_4$, negated_conjecture)
$a(j) < a(k)$ cnf(clause$_5$, negated_conjecture)
($x < j$ and $a(x) < a(k)$) ⇒ $x < i$ cnf(clause$_6$, negated_conjecture)
($1 < i$ and $a(x) < a$(predecessor(i))) ⇒ ($x < i$ or $n < x$)   cnf(clause$_7$, negated_conjecture)
($1 < x$ and $x < i$) ⇒ ¬ $a(x) < a$(predecessor(x))   cnf(clause$_8$, negated_conjecture)
$\neg\, q < i$ cnf(clause$_9$, negated_conjecture)
$\neg\, j < q$ cnf(clause$_{10}$, negated_conjecture)
$a(q) < a(j)$ cnf(clause$_{11}$, negated_conjecture)

SWV003-1.p E2
include('Axioms/SWV001-0.ax')
$\neg\, n < j$ cnf(clause$_1$, negated_conjecture)
$k < j$ cnf(clause$_2$, negated_conjecture)
$\neg\, k < i$ cnf(clause$_3$, negated_conjecture)
$i < n$ cnf(clause$_4$, negated_conjecture)
$a(j) < a(k)$ cnf(clause$_5$, negated_conjecture)
($x < j$ and $a(x) < a(k)$) ⇒ $x < i$ cnf(clause$_6$, negated_conjecture)
($1 < i$ and $a(x) < a$(predecessor(i))) ⇒ ($x < i$ or $n < x$)   cnf(clause$_7$, negated_conjecture)

$(1 < x \text{ and } x < i) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_8$, negated_conjecture)
$j < i$ cnf(clause$_9$, negated_conjecture)

SWV004-1.p E3
include('Axioms/SWV001-0.ax')
$\neg\, n < j$ cnf(clause$_1$, negated_conjecture)
$k < j$ cnf(clause$_{23}$, negated_conjecture)
$\neg\, k < i$ cnf(clause$_4$, negated_conjecture)
$i < n$ cnf(clause$_5$, negated_conjecture)
$a(j) < a(k)$ cnf(clause$_6$, negated_conjecture)
$a(q) < a(k)$ cnf(clause$_7$, negated_conjecture)
$(x < j \text{ and } a(x) < a(k)) \Rightarrow x < i$ cnf(clause$_8$, negated_conjecture)
$(1 < i \text{ and } a(x) < a(\text{predecessor}(i))) \Rightarrow (x < i \text{ or } n < x)$ cnf(clause$_9$, negated_conjecture)
$(1 < x \text{ and } x < i) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_{10}$, negated_conjecture)
$\neg\, q < i$ cnf(clause$_{11}$, negated_conjecture)
$\neg\, j < q$ cnf(clause$_{12}$, negated_conjecture)

SWV005-1.p E4
include('Axioms/SWV001-0.ax')
$\neg\, n < k$ cnf(clause$_1$, negated_conjecture)
$\neg\, k < l$ cnf(clause$_2$, negated_conjecture)
$\neg\, k < i$ cnf(clause$_3$, negated_conjecture)
$l < n$ cnf(clause$_4$, negated_conjecture)
$1 < l$ cnf(clause$_5$, negated_conjecture)
$a(k) < a(\text{predecessor}(l))$ cnf(clause$_6$, negated_conjecture)
$(x < \text{successor}(n) \text{ and } a(x) < a(k)) \Rightarrow x < l$ cnf(clause$_7$, negated_conjecture)
$(1 < l \text{ and } a(x) < a(\text{predecessor}(l))) \Rightarrow (x < l \text{ or } n < x)$ cnf(clause$_8$, negated_conjecture)
$(1 < x \text{ and } x < l) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_9$, negated_conjecture)

SWV006-1.p E5
include('Axioms/SWV001-0.ax')
$\neg\, n < m$ cnf(clause$_1$, negated_conjecture)
$i < m$ cnf(clause$_2$, negated_conjecture)
$i < n$ cnf(clause$_3$, negated_conjecture)
$\neg\, i < 1$ cnf(clause$_4$, negated_conjecture)
$a(i) < a(m)$ cnf(clause$_5$, negated_conjecture)
$(x < \text{successor}(n) \text{ and } a(x) < a(m)) \Rightarrow x < i$ cnf(clause$_6$, negated_conjecture)
$(1 < i \text{ and } a(x) < a(\text{predecessor}(i))) \Rightarrow (x < i \text{ or } n < x)$ cnf(clause$_7$, negated_conjecture)
$(1 < x \text{ and } x < i) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_8$, negated_conjecture)

SWV007-1.p E6
include('Axioms/SWV001-0.ax')
$\neg\, n < k$ cnf(clause$_1$, negated_conjecture)
$\neg\, k < i$ cnf(clause$_2$, negated_conjecture)
$i < n$ cnf(clause$_3$, negated_conjecture)
$\neg\, n < m$ cnf(clause$_4$, negated_conjecture)
$i < m$ cnf(clause$_5$, negated_conjecture)
$\neg\, i < 1$ cnf(clause$_6$, negated_conjecture)
$k \neq m$ cnf(clause$_7$, negated_conjecture)
$a(m) < a(k)$ cnf(clause$_8$, negated_conjecture)
$(1 < x \text{ and } x < i) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_9$, negated_conjecture)
$(1 < x \text{ and } a(x) < a(\text{predecessor}(i))) \Rightarrow (x < i \text{ or } n < x)$ cnf(clause$_{10}$, negated_conjecture)
$(x < \text{successor}(n) \text{ and } a(x) < a(k)) \Rightarrow x < i$ cnf(clause$_{11}$, negated_conjecture)

SWV008-1.p E7
include('Axioms/SWV001-0.ax')
$\neg\, n < l$ cnf(clause$_1$, negated_conjecture)
$1 < l$ cnf(clause$_2$, negated_conjecture)
$a(l) < a(\text{predecessor}(l))$ cnf(clause$_3$, negated_conjecture)
$(1 < n \text{ and } a(x) < a(\text{predecessor}(n))) \Rightarrow (x < n \text{ or } n < x)$ cnf(clause$_4$, negated_conjecture)
$(1 < x \text{ and } x < n) \Rightarrow \neg\, a(x) < a(\text{predecessor}(x))$ cnf(clause$_5$, negated_conjecture)

SWV009-1.p A condition from Hoare's FIND program

$x \leq y$ or less(y, x) cnf(clause$_1$, negated_conjecture)
less(j, i) cnf(clause$_2$, negated_conjecture)
$m \leq p$ cnf(clause$_3$, negated_conjecture)
$p \leq q$ cnf(clause$_4$, negated_conjecture)
$q \leq n$ cnf(clause$_5$, negated_conjecture)
$(m \leq x$ and less(x, i) and less(j, y) and $y \leq n) \Rightarrow a(x) \leq a(y)$ cnf(clause$_6$, negated_conjecture)
$(m \leq x$ and $x \leq y$ and $y \leq j) \Rightarrow a(x) \leq a(y)$ cnf(clause$_7$, negated_conjecture)
$(i \leq x$ and $x \leq y$ and $y \leq n) \Rightarrow a(x) \leq a(y)$ cnf(clause$_8$, negated_conjecture)
$\neg a(p) \leq a(q)$ cnf(clause$_9$, negated_conjecture)

SWV010+1.p Fact 1 of the Neumann-Stubblebine analysis
a_holds(key(at, t)) fof(a_holds_key_at_for_t, axiom)
party_of_protocol(a) fof(a_is_party_of_protocol, axiom)
message(sent(a, b, pair(a, an_a_nonce))) fof(a_sent_message_i_to_b, axiom)
a_stored(pair(b, an_a_nonce)) fof(a_stored_message_i, axiom)
$\forall u, v, w, x, y, z$: ((message(sent(t, a, triple(encrypt(quadruple(y, z, w, v), at), x, u))) and a_stored(pair(y, z))) $\Rightarrow$ (message(sent
b_holds(key(bt, t)) fof(b_hold_key_bt_for_t, axiom)
party_of_protocol(b) fof(b_is_party_of_protocol, axiom)
fresh_to_b(an_a_nonce) fof(nonce_a_is_fresh_to_b, axiom)
$\forall u, v$: ((message(sent(u, b, pair(u, v))) and fresh_to_b(v)) $\Rightarrow$ (message(sent(b, t, triple(b, generate_b_nonce(v), encrypt(triple(u
$\forall v, x, y$: ((message(sent(x, b, pair(encrypt(triple(x, v, generate_expiration_time(y)), bt), encrypt(generate_b_nonce(y), v)))) and
b_holds(key(v, x))) fof(b_accepts_secure_session_key, axiom)
t_holds(key(at, a)) fof(t_holds_key_at_for_a, axiom)
t_holds(key(bt, b)) fof(t_holds_key_bt_for_b, axiom)
party_of_protocol(t) fof(t_is_party_of_protocol, axiom)
$\forall u, v, w, x, y, z, x_1$: ((message(sent($u$, t, triple(u, v, encrypt(triple(w, x, y), z)))) and t_holds(key(z, u)) and t_holds(key(x_1, w)))
message(sent(t, w, triple(encrypt(quadruple(u, x, generate_key(x), y), x_1), encrypt(triple(w, generate_key(x), y), z), v)))) fo

SWV010-1.p Fact 1 of the Neumann-Stubblebine analysis
message(sent(a, b, pair(a, an_a_nonce))) cnf(a_sent_message_i_to_b$_3$, axiom)
a_stored(pair(b, an_a_nonce)) cnf(a_stored_message_i$_4$, axiom)
(a_stored(pair(a, b)) and message(sent(t, a, triple(encrypt(quadruple(a, b, c, d), at), e, f)))) $\Rightarrow$ message(sent(a, a, pair(e, encry
fresh_to_b(an_a_nonce) cnf(nonce_a_is_fresh_to_b$_9$, axiom)
(fresh_to_b(b) and message(sent(a, b, pair(a, b)))) $\Rightarrow$ message(sent(b, t, triple(b, generate_b_nonce(b), encrypt(triple(a, b, genera
t_holds(key(at, a)) cnf(t_holds_key_at_for_a$_{13}$, axiom)
t_holds(key(bt, b)) cnf(t_holds_key_bt_for_b$_{14}$, axiom)
(message(sent(a, t, triple(a, b, encrypt(triple(c, d, e), f)))) and t_holds(key(g, c)) and t_holds(key(f, a))) $\Rightarrow$ message(sent(t, c,

SWV011+1.p Fact 2 of the Neumann-Stubblebine analysis
a_holds(key(at, t)) fof(a_holds_key_at_for_t, axiom)
party_of_protocol(a) fof(a_is_party_of_protocol, axiom)
message(sent(a, b, pair(a, an_a_nonce))) fof(a_sent_message_i_to_b, axiom)
a_stored(pair(b, an_a_nonce)) fof(a_stored_message_i, axiom)
b_holds(key(bt, t)) fof(b_hold_key_bt_for_t, axiom)
party_of_protocol(b) fof(b_is_party_of_protocol, axiom)
fresh_to_b(an_a_nonce) fof(nonce_a_is_fresh_to_b, axiom)
t_holds(key(at, a)) fof(t_holds_key_at_for_a, axiom)
t_holds(key(bt, b)) fof(t_holds_key_bt_for_b, axiom)
party_of_protocol(t) fof(t_is_party_of_protocol, axiom)
b_holds(key(generate_key(an_a_nonce), a)) fof(ax$_1$, axiom)
message(sent(a, b, pair(encrypt(triple(a, generate_key(an_a_nonce), generate_expiration_time(an_a_nonce)), bt), encrypt(genera
a_holds(key(generate_key(an_a_nonce), b)) fof(ax$_3$, axiom)
message(sent(t, a, triple(encrypt(quadruple(b, an_a_nonce, generate_key(an_a_nonce), generate_expiration_time(an_a_nonce)), a
message(sent(b, t, triple(b, generate_b_nonce(an_a_nonce), encrypt(triple(a, an_a_nonce, generate_expiration_time(an_a_nonce)),
b_stored(pair(a, an_a_nonce)) fof(ax$_6$, axiom)
$\exists u$: (a_holds(key(u, b)) and b_holds(key(u, a))) fof(co$_1$, conjecture)

SWV011-1.p Fact 2 of the Neumann-Stubblebine analysis
b_holds(key(generate_key(an_a_nonce), a)) cnf(ax1$_{11}$, axiom)
a_holds(key(generate_key(an_a_nonce), b)) cnf(ax3$_{13}$, axiom)
a_holds(key(a, b)) $\Rightarrow$ $\neg$ b_holds(key(a, a)) cnf(co1$_{17}$, negated_conjecture)

SWV012-1.p Fact 3 of the Neumann-Stubblebine analysis
party_of_protocol(a) cnf(a_is_party_of_protocol$_2$, axiom)
message(sent(a, b, pair(a, an_a_nonce))) cnf(a_sent_message_i_to_b$_3$, axiom)
a_stored(pair(b, an_a_nonce)) cnf(a_stored_message_i$_4$, axiom)
(a_stored(pair(a, b)) and message(sent(t, a, triple(encrypt(quadruple(a, b, c, d), at), e, f)))) $\Rightarrow$ message(sent(a, a, pair(e, encry
party_of_protocol(b) cnf(b_is_party_of_protocol$_8$, axiom)
fresh_to_b(an_a_nonce) cnf(nonce_a_is_fresh_to_b$_9$, axiom)
(fresh_to_b(b) and message(sent(a, b, pair(a, b)))) $\Rightarrow$ message(sent(b, t, triple(b, generate_b_nonce(b), encrypt(triple(a, b, genera
t_holds(key(at, a)) cnf(t_holds_key_at_for_a$_{13}$, axiom)
t_holds(key(bt, b)) cnf(t_holds_key_bt_for_b$_{14}$, axiom)
party_of_protocol(t) cnf(t_is_party_of_protocol$_{15}$, axiom)
(message(sent(a, t, triple(a, b, encrypt(triple(c, d, e), f)))) and t_holds(key(g, c)) and t_holds(key(f, a))) $\Rightarrow$ message(sent(t, c,
message(sent(a, b, c)) $\Rightarrow$ intruder_message(c) cnf(intruder_can_record$_{17}$, axiom)
intruder_message(pair(a, b)) $\Rightarrow$ intruder_message(a) cnf(intruder_decomposes_pairs$_{18}$, axiom)
intruder_message(pair(a, b)) $\Rightarrow$ intruder_message(b) cnf(intruder_decomposes_pairs$_{19}$, axiom)
intruder_message(triple(a, b, c)) $\Rightarrow$ intruder_message(a) cnf(intruder_decomposes_triples$_{20}$, axiom)
intruder_message(triple(a, b, c)) $\Rightarrow$ intruder_message(b) cnf(intruder_decomposes_triples$_{21}$, axiom)
intruder_message(triple(a, b, c)) $\Rightarrow$ intruder_message(c) cnf(intruder_decomposes_triples$_{22}$, axiom)
intruder_message(quadruple(a, b, c, d)) $\Rightarrow$ intruder_message(a) cnf(intruder_decomposes_quadruples$_{23}$, axiom)
intruder_message(quadruple(a, b, c, d)) $\Rightarrow$ intruder_message(b) cnf(intruder_decomposes_quadruples$_{24}$, axiom)
intruder_message(quadruple(a, b, c, d)) $\Rightarrow$ intruder_message(c) cnf(intruder_decomposes_quadruples$_{25}$, axiom)
intruder_message(quadruple(a, b, c, d)) $\Rightarrow$ intruder_message(d) cnf(intruder_decomposes_quadruples$_{26}$, axiom)
(intruder_message(b) and intruder_message(a)) $\Rightarrow$ intruder_message(pair(a, b)) cnf(intruder_composes_pairs$_{27}$, axiom)
(intruder_message(c) and intruder_message(b) and intruder_message(a)) $\Rightarrow$ intruder_message(triple(a, b, c)) cnf(intruder_
(intruder_message(d) and intruder_message(c) and intruder_message(b) and intruder_message(a)) $\Rightarrow$ intruder_message(quad
(intruder_holds(key(b, c)) and intruder_message(encrypt(a, b)) and party_of_protocol(c)) $\Rightarrow$ intruder_message(b) cnf(intru
(intruder_message(a) and party_of_protocol(c) and party_of_protocol(b)) $\Rightarrow$ message(sent(b, c, a)) cnf(intruder_message_s
(intruder_message(a) and party_of_protocol(b)) $\Rightarrow$ intruder_holds(key(a, b)) cnf(intruder_holds_key$_{32}$, axiom)
(intruder_holds(key(b, c)) and intruder_message(a) and party_of_protocol(c)) $\Rightarrow$ intruder_message(encrypt(a, b)) cnf(intr

SWV019-1.p Maximal array element
$x_1 < a$ or $b < x_1$ or in_array_bounds(array, x_1) cnf(in_bounds, axiom)
successor(x) < successor(y) $\Rightarrow$ $x < y$ cnf(predecessor_less, axiom)
($x < y$ and $y < z$) $\Rightarrow$ $x < z$ cnf(transitivity_of_less, axiom)
$x <$ successor(x) cnf(successor_greater, axiom)
in_array_bounds(array, index_of_maximal) $\Rightarrow$ maximal_value = array_value_at(array, index_of_maximal) cnf(this_is_maxin
index_of_maximal < an_index cnf(maximal_before_somewhere, axiom)
¬ an_index < a cnf(somewhere_above_lower_bound, axiom)
¬ b < an_index cnf(somewhere_below_upper_bound, axiom)
¬ index_of_maximal < a cnf(maximal_above_lower_bound, axiom)
(in_array_bounds(array, an_index) and index_of_maximal < successor(an_index) and in_array_bounds(array, index_of_maximal
array_value_at(array, index_of_maximal)) $\Rightarrow$ (successor(an_index) < a or successor(b) < successor(an_index) or index_of_max
a) cnf(prove_this, negated_conjecture)

SWV020-1.p Program verification axioms
include('Axioms/SWV001-0.ax')

SWV021-1.p Show that the add function is commutative.
A proof obligation formulated as a satisfiability problem. Given the definition of "add" on successor-naturals, show that no two terms t1 and t2 can be found such that add(t1,t2) /= add(t2,t1). In other words, show that adding the negation of that as a clause is still consistent.
$n_0 \neq s(x)$ cnf(zero_is_not_s, axiom)
$s(x) = s(y)$ $\Rightarrow$ $x = y$ cnf(successor_is_injective, axiom)
$n_0 + y = y$ cnf(definition_add$_0$, axiom)
$s(x) + y = s(x + y)$ cnf(definition_add_s, axiom)
$x + y = y + x$ cnf(consistency_of_add_commutative, negated_conjecture)

SWV022+1.p Unsimplified proof obligation gauss_init_0001
Proof obligation emerging from the init-safety verification for the gauss program. init-safety ensures that each variable or individual array element has been assigned a defined value before it is used.
include('Axioms/SWV003+0.ax')

init = init fof(gauss_init$_{0001}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)
succ(n_0) = n_1 fof(successor$_1$, axiom)
succ(succ(n_0)) = n_2 fof(successor$_2$, axiom)
succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV023+1.p Unsimplified proof obligation gauss_init_0005
Proof obligation emerging from the init-safety verification for the gauss program. init-safety ensures that each variable or individual array element has been assigned a defined value before it is used.
include('Axioms/SWV003+0.ax')
(i0_init = init and sigma_init = init and $\forall a$: (($n_0 \leq a$ and $a \leq n_2$) $\Rightarrow$ $\forall b$: (($n_0 \leq b$ and $b \leq n_3$) $\Rightarrow$ a_select$_3$(simplex7_init, b,
init)) and $\forall c$: (($n_0 \leq c$ and $c \leq n_3$) $\Rightarrow$ a_select$_2$(s_values7_init, c) = init)) $\Rightarrow$ true fof(gauss_init$_{0005}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)

$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV040+1.p Unsimplified proof obligation gauss_init_0073
Proof obligation emerging from the init-safety verification for the gauss program. init-safety ensures that each variable or individual array element has been assigned a defined value before it is used.
include('Axioms/SWV003+0.ax')
$(n_0 \le \text{pv}_{1374} \text{ and } \text{pv}_{1374} \le n_3 \text{ and } \forall a$: $((n_0 \le a \text{ and } a \le n_2) \Rightarrow \forall b$: $((n_0 \le b \text{ and } b \le -\text{pv}_{1374}) \Rightarrow$ a_select$_3$(simplex7_init, b,
init))) $\Rightarrow$ (init = init and $\forall c$: $((n_0 \le c \text{ and } c \le n_2) \Rightarrow \forall d$: $((n_0 \le d \text{ and } d \le -(n_1 + \text{pv}_{1374})) \Rightarrow$ a_select$_3$(tptp_update$_3$(tptp
init))) fof(gauss_init$_{0073}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \le x \text{ and } x \le n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV043+1.p Unsimplified proof obligation cl5_nebula_norm_0001
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
true $\Rightarrow$ true fof(cl5_nebula_norm$_{0001}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)

gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_4) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_5) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_1) \Rightarrow (x = n_0$ or $x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_2) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_3) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3))$ fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV045+1.p Unsimplified proof obligation cl5_nebula_norm_0007
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
(pv$_{76}$ $= n_0 + -n_{135300}$=a_select$_3$(q, pv$_{77}$, pv$_{25}$) and $n_0 \leq$ pv$_{25}$ and pv$_{25} \leq -n_5$) $\Rightarrow$ true fof(cl5_nebula_norm$_{0007}$, conjectur
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)

gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV047+1.p Unsimplified proof obligation cl5_nebula_norm_0013
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
(pv$_{78} = n_0 + -n_{135300}$=a_select$_3$($q$, pv$_{79}$, pv$_{35}$) and pv$_{82} = n_0 + -n_{135300}$=times($-a_select_2$($x$, pv$_{83}$), times($-a_select_2$($x$, pv$_{83}$),
pv$_{35}$ and pv$_{35} \leq -n_5$) $\Rightarrow$ true fof(cl5_nebula_norm$_{0013}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)

succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV052+1.p Unsimplified proof obligation cl5_nebula_norm_0028
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
(pv$_{86}$ = n_0+−pv$_{73}$=divide(abs(−a_select$_2$(mu, pv$_{87}$)), abs(a_select$_2$(mu, pv$_{87}$))+abs(a_select$_2$(muold, pv$_{87}$))) and $n_0 \leq$ pv$_{73}$ and pv$_{73} \leq -n_5$) $\Rightarrow$ pv$_{86}$+divide(abs(−a_select$_2$(mu, pv$_{73}$)), abs(a_select$_2$(mu, pv$_{73}$))+abs(a_select$_2$(muold, pv$_{73}$))) = n_0+−(n_1+pv$_{73}$)=divide(abs(−a_select$_2$(mu, pv$_{87}$)), abs(a_select$_2$(mu, pv$_{87}$))+abs(a_select$_2$(muold, pv$_{87}$))) fof(cl5_nebula_
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)
succ(n_0) = n_1 fof(successor$_1$, axiom)
succ(succ(n_0)) = n_2 fof(successor$_2$, axiom)
succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV054+1.p Unsimplified proof obligation cl5_nebula_norm_0034
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
($n_0 \leq$ pv$_{10}$ and pv$_{10} \leq -n_{135300}$) $\Rightarrow$ true fof(cl5_nebula_norm$_{0034}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)

gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV056+1.p Unsimplified proof obligation cl5_nebula_norm_0040
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
($n_0 \leq \mathrm{pv}_{25}$ and $\mathrm{pv}_{25} \leq -n_5$) $\Rightarrow$ ($n_0 = n_0 + -n_0$=a_select$_3(q, \mathrm{pv}_{77}, \mathrm{pv}_{25})$ and $n_0 \leq \mathrm{pv}_{25}$ and $\mathrm{pv}_{25} \leq -n_5$) fof(cl5_nebula_n
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)

$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV057+1.p Unsimplified proof obligation cl5_nebula_norm_0043
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \mathrm{pv}_{62}$ and $\mathrm{pv}_{62} \leq -n_5) \Rightarrow$ true fof(cl5_nebula_norm$_{0043}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV058+1.p Unsimplified proof obligation cl5_nebula_norm_0046
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
$\neg$ geq(pv$_{72}$, tptp_float_0$_{001}$) $\Rightarrow$ true fof(cl5_nebula_norm$_{0046}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)

$\mathrm{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\mathrm{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\mathrm{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\mathrm{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV059+1.p Unsimplified proof obligation cl5_nebula_norm_0049
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
$\mathrm{geq}(\mathrm{pv}_{72}, \mathrm{tptp\_float\_0}_{001}) \Rightarrow ((\neg\, \mathrm{gt}(n_1+\mathrm{loopcounter}, n_1) \Rightarrow \mathrm{true}) \text{ and } (\mathrm{gt}(n_1+\mathrm{loopcounter}, n_1) \Rightarrow \mathrm{true}))$ fof(cl5_nebula
$\mathrm{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\mathrm{gt}(n_4, \mathrm{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_5, \mathrm{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_0, \mathrm{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_1, \mathrm{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_2, \mathrm{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_3, \mathrm{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\mathrm{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\mathrm{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\mathrm{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\mathrm{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\mathrm{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\mathrm{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\mathrm{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\mathrm{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV060+1.p Unsimplified proof obligation cl5_nebula_array_0001

Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
true $\Rightarrow$ true fof(cl5_nebula_array$_{0001}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV061+1.p Unsimplified proof obligation cl5_nebula_array_0002
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
true $\Rightarrow$ (($\neg$ gt(loopcounter, n_1) $\Rightarrow$ true) and (gt(loopcounter, n_1) $\Rightarrow$ true)) fof(cl5_nebula_array$_{0002}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)

$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV063+1.p Unsimplified proof obligation cl5_nebula_array_0004
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{10} \text{ and } n_0 \leq \text{pv}_{43} \text{ and } \text{pv}_{10} \leq -n_{135300} \text{ and } \text{pv}_{43} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{10} \text{ and } n_0 \leq \text{pv}_{43} \text{ and } \text{pv}_{10} \leq -n_{135300} \text{ and } \text{pv}_{43} \leq -n_5)$ fof(cl5_nebula_array$_{0004}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_{135300}, n_4)$ fof(gt_135300$_4$, axiom)
$\text{gt}(n_{135300}, n_5)$ fof(gt_135300$_5$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_{135300}, \text{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_{135300}, n_2)$ fof(gt_135300$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\text{gt}(n_{135300}, n_3)$ fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV065+1.p Unsimplified proof obligation cl5_nebula_array_0006
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \mathrm{pv}_{10}$ and $n_0 \leq \mathrm{pv}_{53}$ and $\mathrm{pv}_{10} \leq -n_{135300}$ and $\mathrm{pv}_{53} \leq -n_5) \Rightarrow (n_0 \leq n_0$ and $n_0 \leq \mathrm{pv}_{10}$ and $n_0 \leq \mathrm{pv}_{53}$ and $\mathrm{pv}_{10} \leq -n_{135300}$ and $\mathrm{pv}_{53} \leq -n_5)$ fof(cl5_nebula_array$_{0006}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_4) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_5) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_1) \Rightarrow (x = n_0$ or $x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_2) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_3) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3))$ fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV066+1.p Unsimplified proof obligation cl5_nebula_array_0007
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \mathrm{pv}_{10}$ and $n_0 \leq \mathrm{pv}_{53}$ and $\mathrm{pv}_{10} \leq -n_{135300}$ and $\mathrm{pv}_{53} \leq -n_5) \Rightarrow (n_0 \leq \mathrm{pv}_{10}$ and $n_0 \leq \mathrm{pv}_{53}$ and $\mathrm{pv}_{10} \leq -n_{135300}$ and $\mathrm{pv}_{53} \leq -n_5)$ fof(cl5_nebula_array$_{0007}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)

$\mathrm{gt}(n_2, \mathrm{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_3, \mathrm{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\mathrm{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\mathrm{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\mathrm{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\mathrm{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\mathrm{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\mathrm{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\mathrm{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\mathrm{gt}(n_{135300}, n_2)$ fof(gt_135300$_2$, axiom)
$\mathrm{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\mathrm{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\mathrm{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\mathrm{gt}(n_{135300}, n_3)$ fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV068+1.p Unsimplified proof obligation cl5_nebula_array_0009
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \mathrm{pv}_{10} \text{ and } \mathrm{pv}_{10} \leq -n_{135300}) \Rightarrow \text{true}$ fof(cl5_nebula_array$_{0009}$, conjecture)
$\mathrm{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\mathrm{gt}(n_{135300}, n_4)$ fof(gt_135300$_4$, axiom)
$\mathrm{gt}(n_{135300}, n_5)$ fof(gt_135300$_5$, axiom)
$\mathrm{gt}(n_4, \mathrm{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_5, \mathrm{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_{135300}, \mathrm{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_0, \mathrm{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_1, \mathrm{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_2, \mathrm{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_3, \mathrm{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\mathrm{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\mathrm{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\mathrm{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\mathrm{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\mathrm{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\mathrm{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\mathrm{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)

gt(n_{135300}, n_2)   fof(gt_135300$_2$, axiom)
gt(n_3, n_2)   fof(gt_3$_2$, axiom)
gt(n_4, n_3)   fof(gt_4$_3$, axiom)
gt(n_5, n_3)   fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3)   fof(gt_135300$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$))   fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$))   fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$)   fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$))   fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$))   fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$))   fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV069+1.p Unsimplified proof obligation cl5_nebula_array_0010
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
($n_0 \leq \mathrm{pv}_{10}$ and $\mathrm{pv}_{10} \leq -n_{135300}$) $\Rightarrow$ ($n_0 \leq n_0$ and $n_0 \leq \mathrm{pv}_{10}$ and $n_0 \leq -n_5$ and $\mathrm{pv}_{10} \leq -n_{135300}$)   fof(cl5_nebula_array$_{00}$
gt(n_5, n_4)   fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4)   fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5)   fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$)   fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$)   fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$)   fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$)   fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$)   fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$)   fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$)   fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0)   fof(gt_4$_0$, axiom)
gt(n_5, n_0)   fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0)   fof(gt_135300$_0$, axiom)
gt(n_1, n_0)   fof(gt_1$_0$, axiom)
gt(n_2, n_0)   fof(gt_2$_0$, axiom)
gt(n_3, n_0)   fof(gt_3$_0$, axiom)
gt(n_4, n_1)   fof(gt_4$_1$, axiom)
gt(n_5, n_1)   fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1)   fof(gt_135300$_1$, axiom)
gt(n_2, n_1)   fof(gt_2$_1$, axiom)
gt(n_3, n_1)   fof(gt_3$_1$, axiom)
gt(n_4, n_2)   fof(gt_4$_2$, axiom)
gt(n_5, n_2)   fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2)   fof(gt_135300$_2$, axiom)
gt(n_3, n_2)   fof(gt_3$_2$, axiom)
gt(n_4, n_3)   fof(gt_4$_3$, axiom)
gt(n_5, n_3)   fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3)   fof(gt_135300$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$))   fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$))   fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$)   fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$))   fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$))   fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$))   fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)

$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV070+1.p Unsimplified proof obligation cl5_nebula_array_0011
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{10} \text{ and } \text{pv}_{10} \leq -n_{135300}) \Rightarrow (n_0 \leq \text{pv}_{10} \text{ and } \text{pv}_{10} \leq -n_{135300})$ fof(cl5_nebula_array$_{0011}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_{135300}, n_4)$ fof(gt_135300$_4$, axiom)
$\text{gt}(n_{135300}, n_5)$ fof(gt_135300$_5$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_{135300}, \text{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_{135300}, n_2)$ fof(gt_135300$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\text{gt}(n_{135300}, n_3)$ fof(gt_135300$_3$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV071+1.p Unsimplified proof obligation cl5_nebula_array_0012
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{21} \text{ and } n_0 \leq \text{pv}_{23} \text{ and } \text{pv}_{21} \leq -n_5 \text{ and } \text{pv}_{23} \leq -n_{135300}) \Rightarrow (n_0 \leq \text{pv}_{21} \text{ and } n_0 \leq \text{pv}_{23} \text{ and } \text{pv}_{21} \leq -n_5 \text{ and } \text{pv}_{23} \leq -n_{135300})$ fof(cl5_nebula_array$_{0012}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_{135300}, n_4)$ fof(gt_135300$_4$, axiom)
$\text{gt}(n_{135300}, n_5)$ fof(gt_135300$_5$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_{135300}, \text{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)

$\mathrm{gt}(n_1, \mathrm{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_2, \mathrm{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_3, \mathrm{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\mathrm{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\mathrm{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\mathrm{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\mathrm{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\mathrm{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\mathrm{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\mathrm{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\mathrm{gt}(n_{135300}, n_2)$ fof(gt_135300$_2$, axiom)
$\mathrm{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\mathrm{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\mathrm{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\mathrm{gt}(n_{135300}, n_3)$ fof(gt_135300$_3$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\mathrm{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\mathrm{succ}(\mathrm{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\mathrm{succ}(\mathrm{succ}(\mathrm{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV072+1.p Unsimplified proof obligation cl5_nebula_array_0013
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \mathrm{pv}_{21} \text{ and } \mathrm{pv}_{21} \leq -n_5) \Rightarrow (n_0 \leq \mathrm{pv}_{21} \text{ and } \mathrm{pv}_{21} \leq -n_5)$ fof(cl5_nebula_array$_{0013}$, conjecture)
$\mathrm{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\mathrm{gt}(n_4, \mathrm{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_5, \mathrm{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_0, \mathrm{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_1, \mathrm{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_2, \mathrm{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_3, \mathrm{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\mathrm{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\mathrm{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\mathrm{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\mathrm{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\mathrm{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\mathrm{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\mathrm{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\mathrm{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\mathrm{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\mathrm{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\mathrm{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\mathrm{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\mathrm{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\mathrm{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)

$\forall x$: $((n_0 \leq x$ and $x \leq n_5) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_1) \Rightarrow (x = n_0$ or $x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_2) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_3) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3))$ fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)
succ(n_0) = n_1 fof(successor$_1$, axiom)
succ(succ(n_0)) = n_2 fof(successor$_2$, axiom)
succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV073+1.p Unsimplified proof obligation cl5_nebula_array_0014
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31}$ and $n_0 \leq \text{pv}_{35}$ and $\text{pv}_{31} \leq -n_5$ and $\text{pv}_{35} \leq -n_{135300}) \Rightarrow (n_0 \leq \text{pv}_{31}$ and $n_0 \leq \text{pv}_{35}$ and $\text{pv}_{31} \leq -n_5$ and $\text{pv}_{35} \leq -n_{135300})$ fof(cl5_nebula_array$_{0014}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_4) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_5) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_1) \Rightarrow (x = n_0$ or $x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_2) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x$ and $x \leq n_3) \Rightarrow (x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3))$ fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)
succ(n_0) = n_1 fof(successor$_1$, axiom)
succ(succ(n_0)) = n_2 fof(successor$_2$, axiom)
succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV074+1.p Unsimplified proof obligation cl5_nebula_array_0015
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.

include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31} \text{ and } n_0 \leq \text{pv}_{36} \text{ and } \text{pv}_{31} \leq -n_5 \text{ and } \text{pv}_{36} \leq -n_{135300}) \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } n_0 \leq \text{pv}_{36} \text{ and } \text{pv}_{31} \leq -n_5 \text{ and } \text{pv}_{36} \leq -n_{135300})$ fof(cl5_nebula_array$_{0015}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_{135300}, n_0) fof(gt_135300$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_{135300}, n_1) fof(gt_135300$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_{135300}, n_2) fof(gt_135300$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
gt(n_{135300}, n_3) fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV075+1.p Unsimplified proof obligation cl5_nebula_array_0016
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31} \text{ and } n_0 \leq \text{pv}_{37} \text{ and } \text{pv}_{31} \leq -n_5 \text{ and } \text{pv}_{37} \leq -n_{135300}) \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } n_0 \leq \text{pv}_{37} \text{ and } \text{pv}_{31} \leq -n_5 \text{ and } \text{pv}_{37} \leq -n_{135300})$ fof(cl5_nebula_array$_{0016}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_{135300}, n_4) fof(gt_135300$_4$, axiom)
gt(n_{135300}, n_5) fof(gt_135300$_5$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_{135300}, tptp_minus$_1$) fof(gt_135300_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)

$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_{135300}, n_0)$ fof(gt_135300_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_{135300}, n_1)$ fof(gt_135300_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_{135300}, n_2)$ fof(gt_135300_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\text{gt}(n_{135300}, n_3)$ fof(gt_135300_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain_4, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain_5, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain_0, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain_1, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain_2, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain_3, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor_4, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor_5, axiom)
$\text{succ}(n_0) = n_1$ fof(successor_1, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor_2, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor_3, axiom)

SWV076+1.p Unsimplified proof obligation cl5_nebula_array_0017
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5)$ fof($\text{cl5\_nebula\_array}_{0017}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus_1, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus_1, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus_1, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus_1, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus_1, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus_1, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain_4, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain_5, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain_0, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain_1, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain_2, axiom)

$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV077+1.p Unsimplified proof obligation cl5_nebula_array_0018
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5 \text{ and } (n_0 \neq \text{pv}_{40} \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5)) \text{ and } (n_0 = \text{pv}_{40} \Rightarrow \text{true}))$ fof(cl5_nebula_array$_{0018}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV078+1.p Unsimplified proof obligation cl5_nebula_array_0019
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5) \Rightarrow ((n_0 \neq \text{pv}_{70} \Rightarrow (n_0 \leq \text{pv}_{31} \text{ and } \text{pv}_{31} \leq -n_5)) \text{ and } (n_0 = \text{pv}_{70} \Rightarrow \text{true}))$ fof(cl5_nebula_a
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)

$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV079+1.p Unsimplified proof obligation cl5_nebula_array_0020
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{51} \text{ and } \text{pv}_{51} \leq -n_5) \Rightarrow (n_0 \leq n_0 \text{ and } n_0 \leq \text{pv}_{51} \text{ and } n_0 \leq \text{uniform\_int\_rnd}(n_1, -(-n_{135300})) \text{ and } \text{pv}_{51} \leq -n_5 \text{ and } \text{uniform\_int\_rnd}(n_1, -(-n_{135300})) \leq -n_{135300})$ fof(cl5_nebula_array$_{0020}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_{135300}, n_4)$ fof(gt_135300_4, axiom)
$\text{gt}(n_{135300}, n_5)$ fof(gt_135300_5, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_{135300}, \text{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_{135300}, n_0)$ fof(gt_135300_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_{135300}, n_1)$ fof(gt_135300_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_{135300}, n_2)$ fof(gt_135300_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\text{gt}(n_{135300}, n_3)$ fof(gt_135300_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)

$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV080+1.p Unsimplified proof obligation cl5_nebula_array_0021
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{56} \text{ and } \text{pv}_{56} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{56} \text{ and } \text{pv}_{56} \leq -n_5)$ fof(cl5_nebula_array$_{0021}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV081+1.p Unsimplified proof obligation cl5_nebula_array_0022
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{57} \text{ and } \text{pv}_{57} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{57} \text{ and } \text{pv}_{57} \leq -n_5)$ fof(cl5_nebula_array$_{0022}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)

gt(n_4, n_0) fof(gt_4_0, axiom)
gt(n_5, n_0) fof(gt_5_0, axiom)
gt(n_1, n_0) fof(gt_1_0, axiom)
gt(n_2, n_0) fof(gt_2_0, axiom)
gt(n_3, n_0) fof(gt_3_0, axiom)
gt(n_4, n_1) fof(gt_4_1, axiom)
gt(n_5, n_1) fof(gt_5_1, axiom)
gt(n_2, n_1) fof(gt_2_1, axiom)
gt(n_3, n_1) fof(gt_3_1, axiom)
gt(n_4, n_2) fof(gt_4_2, axiom)
gt(n_5, n_2) fof(gt_5_2, axiom)
gt(n_3, n_2) fof(gt_3_2, axiom)
gt(n_4, n_3) fof(gt_4_3, axiom)
gt(n_5, n_3) fof(gt_5_3, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)
succ(n_0) = n_1 fof(successor$_1$, axiom)
succ(succ(n_0)) = n_2 fof(successor$_2$, axiom)
succ(succ(succ(n_0))) = n_3 fof(successor$_3$, axiom)

SWV082+1.p Unsimplified proof obligation cl5_nebula_array_0023
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
($n_0 \leq \mathrm{pv}_{58}$ and $\mathrm{pv}_{58} \leq -n_5$) $\Rightarrow$ ($n_0 \leq \mathrm{pv}_{58}$ and $\mathrm{pv}_{58} \leq -n_5$) fof(cl5_nebula_array$_{0023}$, conjecture)
gt(n_5, n_4) fof(gt_5_4, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4_0, axiom)
gt(n_5, n_0) fof(gt_5_0, axiom)
gt(n_1, n_0) fof(gt_1_0, axiom)
gt(n_2, n_0) fof(gt_2_0, axiom)
gt(n_3, n_0) fof(gt_3_0, axiom)
gt(n_4, n_1) fof(gt_4_1, axiom)
gt(n_5, n_1) fof(gt_5_1, axiom)
gt(n_2, n_1) fof(gt_2_1, axiom)
gt(n_3, n_1) fof(gt_3_1, axiom)
gt(n_4, n_2) fof(gt_4_2, axiom)
gt(n_5, n_2) fof(gt_5_2, axiom)
gt(n_3, n_2) fof(gt_3_2, axiom)
gt(n_4, n_3) fof(gt_4_3, axiom)
gt(n_5, n_3) fof(gt_5_3, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) = n_4 fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) = n_5 fof(successor$_5$, axiom)

$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV083+1.p Unsimplified proof obligation cl5_nebula_array_0024
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{66} \text{ and } \text{pv}_{66} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{66} \text{ and } \text{pv}_{66} \leq -n_5)$ fof(cl5_nebula_array$_{0024}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV084+1.p Unsimplified proof obligation cl5_nebula_array_0025
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{67} \text{ and } \text{pv}_{67} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{67} \text{ and } \text{pv}_{67} \leq -n_5)$ fof(cl5_nebula_array$_{0025}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)

$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV085+1.p Unsimplified proof obligation cl5_nebula_array_0026
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{pv}_{68} \text{ and } \text{pv}_{68} \leq -n_5) \Rightarrow (n_0 \leq \text{pv}_{68} \text{ and } \text{pv}_{68} \leq -n_5)$ fof(cl5_nebula_array$_{0026}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV086+1.p Unsimplified proof obligation cl5_nebula_array_0027

Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg$ geq(pv_{65}, tptp_float_0_{001}) $\Rightarrow$ true fof(cl5_nebula_array$_{0027}$, conjecture)
gt(n_5, n_4) fof(gt_5_4, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4_0, axiom)
gt(n_5, n_0) fof(gt_5_0, axiom)
gt(n_1, n_0) fof(gt_1_0, axiom)
gt(n_2, n_0) fof(gt_2_0, axiom)
gt(n_3, n_0) fof(gt_3_0, axiom)
gt(n_4, n_1) fof(gt_4_1, axiom)
gt(n_5, n_1) fof(gt_5_1, axiom)
gt(n_2, n_1) fof(gt_2_1, axiom)
gt(n_3, n_1) fof(gt_3_1, axiom)
gt(n_4, n_2) fof(gt_4_2, axiom)
gt(n_5, n_2) fof(gt_5_2, axiom)
gt(n_3, n_2) fof(gt_3_2, axiom)
gt(n_4, n_3) fof(gt_4_3, axiom)
gt(n_5, n_3) fof(gt_5_3, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV087+1.p Unsimplified proof obligation cl5_nebula_array_0028
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
geq(pv_{65}, tptp_float_0_{001}) $\Rightarrow$ (($\neg$ gt(n_1+loopcounter, n_1) $\Rightarrow$ true) and (gt(n_1+loopcounter, n_1) $\Rightarrow$ true)) fof(cl5_nebula
gt(n_5, n_4) fof(gt_5_4, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4_0, axiom)
gt(n_5, n_0) fof(gt_5_0, axiom)
gt(n_1, n_0) fof(gt_1_0, axiom)
gt(n_2, n_0) fof(gt_2_0, axiom)
gt(n_3, n_0) fof(gt_3_0, axiom)
gt(n_4, n_1) fof(gt_4_1, axiom)
gt(n_5, n_1) fof(gt_5_1, axiom)
gt(n_2, n_1) fof(gt_2_1, axiom)
gt(n_3, n_1) fof(gt_3_1, axiom)
gt(n_4, n_2) fof(gt_4_2, axiom)
gt(n_5, n_2) fof(gt_5_2, axiom)

$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV088+1.p Unsimplified proof obligation cl5_nebula_array_0029
Proof obligation emerging from the array-safety verification for the cl5_nebula program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\text{geq}(-n_{135300}, n_0) \Rightarrow \text{true}$ fof(cl5_nebula_array$_{0029}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_{135300}, n_4)$ fof(gt_135300$_4$, axiom)
$\text{gt}(n_{135300}, n_5)$ fof(gt_135300$_5$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_{135300}, \text{tptp\_minus}_1)$ fof(gt_135300_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_{135300}, n_0)$ fof(gt_135300$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_{135300}, n_1)$ fof(gt_135300$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_{135300}, n_2)$ fof(gt_135300$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\text{gt}(n_{135300}, n_3)$ fof(gt_135300$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV126+1.p Unsimplified proof obligation thruster_init_0001

Proof obligation emerging from the init-safety verification for the thruster program. inuse-safety ensures that each sensor reading passed as an input to the Kalman filter algorithm is actually used during the computation of the output estimate.

include('Axioms/SWV003+0.ax')
$\text{init} = \text{init}$ fof($\text{thruster\_init}_{0001}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus_1, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus_1, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus_1, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus_1, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus_1, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus_1, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain_4, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain_5, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain_0, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain_1, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain_2, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain_3, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor_4, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor_5, axiom)
$\text{succ}(n_0) = n_1$ fof(successor_1, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor_2, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor_3, axiom)

SWV133+1.p Simplified proof obligation gauss_array_0003

Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.

include('Axioms/SWV003+0.ax')
$(\neg\, \text{a\_select}_2(\text{s\_values}_7, \text{pv}_{1325}) \leq \text{a\_select}_2(\text{s\_values}_7, \text{s\_worst}_7) \text{ and } n_0 \leq \text{s\_best}_7 \text{ and } n_0 \leq \text{s\_sworst}_7 \text{ and } n_0 \leq \text{s\_worst}_7 \text{ and } n_2$ $\text{pv}_{1325} \text{ and } \text{s\_best}_7 \leq n_3 \text{ and } \text{s\_sworst}_7 \leq n_3 \text{ and } \text{s\_worst}_7 \leq n_3 \text{ and } \text{pv}_{1325} \leq n_3 \text{ and } \text{a\_select}_2(\text{s\_values}_7, \text{pv}_{1325}) \leq$ $\text{a\_select}_2(\text{s\_values}_7, \text{s\_best}_7)) \Rightarrow n_0 \leq \text{pv}_{1325}$ fof($\text{gauss\_array}_{0003}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus_1, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus_1, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus_1, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus_1, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus_1, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus_1, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)

gt(n_2, n_1)   fof(gt_2$_1$, axiom)
gt(n_3, n_1)   fof(gt_3$_1$, axiom)
gt(n_4, n_2)   fof(gt_4$_2$, axiom)
gt(n_5, n_2)   fof(gt_5$_2$, axiom)
gt(n_3, n_2)   fof(gt_3$_2$, axiom)
gt(n_4, n_3)   fof(gt_4$_3$, axiom)
gt(n_5, n_3)   fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$))   fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$))   fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$)   fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$))   fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$))   fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$))   fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV134+1.p Simplified proof obligation gauss_array_0004
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
($\neg$ a_select$_2$(s_values$_7$, pv$_{1325}$) $\leq$ a_select$_2$(s_values$_7$, s_worst$_7$) and $n_0 \leq$ s_best$_7$ and $n_0 \leq$ s_sworst$_7$ and $n_0 \leq$ s_worst$_7$ and n_2
pv$_{1325}$ and s_best$_7$ $\leq n_3$ and s_sworst$_7$ $\leq n_3$ and s_worst$_7$ $\leq n_3$ and pv$_{1325}$ $\leq n_3$ and a_select$_2$(s_values$_7$, pv$_{1325}$) $\leq$
a_select$_2$(s_values$_7$, s_best$_7$) and a_select$_2$(s_values$_7$, pv$_{1325}$) $\leq$ a_select$_2$(s_values$_7$, s_sworst$_7$)) $\Rightarrow$ $n_0 \leq$ pv$_{1325}$ fof(gauss_ar
gt(n_5, n_4)   fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$)   fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$)   fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$)   fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$)   fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$)   fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$)   fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0)   fof(gt_4$_0$, axiom)
gt(n_5, n_0)   fof(gt_5$_0$, axiom)
gt(n_1, n_0)   fof(gt_1$_0$, axiom)
gt(n_2, n_0)   fof(gt_2$_0$, axiom)
gt(n_3, n_0)   fof(gt_3$_0$, axiom)
gt(n_4, n_1)   fof(gt_4$_1$, axiom)
gt(n_5, n_1)   fof(gt_5$_1$, axiom)
gt(n_2, n_1)   fof(gt_2$_1$, axiom)
gt(n_3, n_1)   fof(gt_3$_1$, axiom)
gt(n_4, n_2)   fof(gt_4$_2$, axiom)
gt(n_5, n_2)   fof(gt_5$_2$, axiom)
gt(n_3, n_2)   fof(gt_3$_2$, axiom)
gt(n_4, n_3)   fof(gt_4$_3$, axiom)
gt(n_5, n_3)   fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$))   fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$))   fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$)   fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$))   fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$))   fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$))   fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV135+1.p Simplified proof obligation gauss_array_0005

Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{s\_best}_7 \text{ and } n_0 \leq \text{s\_sworst}_7 \text{ and } n_0 \leq \text{s\_worst}_7 \text{ and } n_2 \leq \text{pv}_{1325} \text{ and } \text{s\_best}_7 \leq n_3 \text{ and } \text{s\_sworst}_7 \leq n_3 \text{ and } \text{s\_worst}_7 \leq n_3 \text{ and } \text{pv}_{1325} \leq n_3) \Rightarrow n_0 \leq \text{pv}_{1325}$ fof(gauss_array$_{0005}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x: ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV136+1.p Simplified proof obligation gauss_array_0006
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{s\_best}_7 \text{ and } n_0 \leq \text{s\_sworst}_7 \text{ and } n_0 \leq \text{s\_worst}_7 \text{ and } n_2 \leq \text{pv}_{1325} \text{ and } \text{s\_best}_7 \leq n_3 \text{ and } \text{s\_sworst}_7 \leq n_3 \text{ and } \text{s\_worst}_7 \leq n_3 \text{ and } \text{pv}_{1325} \leq n_3 \text{ and } \text{a\_select}_2(\text{s\_values}_7, \text{pv}_{1325}) \leq \text{a\_select}_2(\text{s\_values}_7, \text{s\_best}_7)) \Rightarrow n_0 \leq \text{pv}_{1325}$ fof(gauss_array$_{0006}$, co
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)

$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain_4, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain_5, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain_0, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain_1, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain_2, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain_3, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor_4, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor_5, axiom)
$\text{succ}(n_0) = n_1$ fof(successor_1, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor_2, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor_3, axiom)

SWV137+1.p Simplified proof obligation gauss_array_0007
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$(n_0 \leq \text{s\_best}_7 \text{ and } n_0 \leq \text{s\_sworst}_7 \text{ and } n_0 \leq \text{s\_worst}_7 \text{ and } n_2 \leq \text{pv}_{1325} \text{ and } \text{s\_best}_7 \leq n_3 \text{ and } \text{s\_sworst}_7 \leq n_3 \text{ and } \text{s\_worst}_7 \leq n_3 \text{ and } \text{pv}_{1325} \leq n_3 \text{ and } \text{a\_select}_2(\text{s\_values}_7, \text{pv}_{1325}) \leq \text{a\_select}_2(\text{s\_values}_7, \text{s\_best}_7) \text{ and } \text{a\_select}_2(\text{s\_values}_7, \text{pv}_{1325}) \leq \text{a\_select}_2(\text{s\_values}_7, \text{s\_worst}_7)) \Rightarrow n_0 \leq \text{pv}_{1325}$ fof(gauss_array_0007, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus_1, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus_1, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus_1, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus_1, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus_1, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus_1, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain_4, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain_5, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain_0, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain_1, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain_2, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain_3, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor_4, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor_5, axiom)
$\text{succ}(n_0) = n_1$ fof(successor_1, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor_2, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor_3, axiom)

SWV138+1.p Simplified proof obligation gauss_array_0008
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.

include('Axioms/SWV003+0.ax')
($n_0 \leq$ s_best$_7$ and $n_0 \leq$ s_sworst$_7$ and $n_0 \leq$ s_worst$_7$ and $n_2 \leq$ pv$_{1325}$ and s_best$_7 \leq n_3$ and s_sworst$_7 \leq n_3$ and s_worst$_7 \leq$ n_3 and pv$_{1325} \leq n_3$ and gt(a_select$_2$(s_values$_7$, pv$_{1325}$), a_select$_2$(s_values$_7$, s_best$_7$))) $\Rightarrow$ $n_0 \leq$ pv$_{1325}$ fof(gauss_array$_{0008}$, c
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_4$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$)) fof(finite_domain$_4$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_5$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$ or $x = n_4$ or $x = n_5$)) fof(finite_domain$_5$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_0$) $\Rightarrow$ $x = n_0$) fof(finite_domain$_0$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_1$) $\Rightarrow$ ($x = n_0$ or $x = n_1$)) fof(finite_domain$_1$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_2$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$)) fof(finite_domain$_2$, axiom)
$\forall x$: (($n_0 \leq x$ and $x \leq n_3$) $\Rightarrow$ ($x = n_0$ or $x = n_1$ or $x = n_2$ or $x = n_3$)) fof(finite_domain$_3$, axiom)
succ(succ(succ(succ(n_0)))) $= n_4$ fof(successor$_4$, axiom)
succ(succ(succ(succ(succ(n_0))))) $= n_5$ fof(successor$_5$, axiom)
succ(n_0) $= n_1$ fof(successor$_1$, axiom)
succ(succ(n_0)) $= n_2$ fof(successor$_2$, axiom)
succ(succ(succ(n_0))) $= n_3$ fof(successor$_3$, axiom)

SWV145+1.p Simplified proof obligation gauss_array_0015
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg$ tptp_float_0$_{001} \leq$ tptp_float_0$_{001}$ $\Rightarrow$ $n_0 \leq$ s_best$_7$ fof(gauss_array$_{0015}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)

$\text{gt}(n_4, n_3)$ $\text{fof}(\text{gt\_4}_3, \text{axiom})$
$\text{gt}(n_5, n_3)$ $\text{fof}(\text{gt\_5}_3, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ $\text{fof}(\text{finite\_domain}_4, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ $\text{fof}(\text{finite\_domain}_5, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ $\text{fof}(\text{finite\_domain}_0, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ $\text{fof}(\text{finite\_domain}_1, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ $\text{fof}(\text{finite\_domain}_2, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ $\text{fof}(\text{finite\_domain}_3, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ $\text{fof}(\text{successor}_4, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ $\text{fof}(\text{successor}_5, \text{axiom})$
$\text{succ}(n_0) = n_1$ $\text{fof}(\text{successor}_1, \text{axiom})$
$\text{succ}(\text{succ}(n_0)) = n_2$ $\text{fof}(\text{successor}_2, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ $\text{fof}(\text{successor}_3, \text{axiom})$

SWV146+1.p Simplified proof obligation gauss_array_0016
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg\, \text{tptp\_float\_0}_{001} \leq \text{tptp\_float\_0}_{001} \Rightarrow n_0 \leq \text{s\_sworst}_7$ $\text{fof}(\text{gauss\_array}_{0016}, \text{conjecture})$
$\text{gt}(n_5, n_4)$ $\text{fof}(\text{gt\_5}_4, \text{axiom})$
$\text{gt}(n_4, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_4\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_5, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_5\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_0, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_0\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_1, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_1\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_2, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_2\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_3, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_3\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_4, n_0)$ $\text{fof}(\text{gt\_4}_0, \text{axiom})$
$\text{gt}(n_5, n_0)$ $\text{fof}(\text{gt\_5}_0, \text{axiom})$
$\text{gt}(n_1, n_0)$ $\text{fof}(\text{gt\_1}_0, \text{axiom})$
$\text{gt}(n_2, n_0)$ $\text{fof}(\text{gt\_2}_0, \text{axiom})$
$\text{gt}(n_3, n_0)$ $\text{fof}(\text{gt\_3}_0, \text{axiom})$
$\text{gt}(n_4, n_1)$ $\text{fof}(\text{gt\_4}_1, \text{axiom})$
$\text{gt}(n_5, n_1)$ $\text{fof}(\text{gt\_5}_1, \text{axiom})$
$\text{gt}(n_2, n_1)$ $\text{fof}(\text{gt\_2}_1, \text{axiom})$
$\text{gt}(n_3, n_1)$ $\text{fof}(\text{gt\_3}_1, \text{axiom})$
$\text{gt}(n_4, n_2)$ $\text{fof}(\text{gt\_4}_2, \text{axiom})$
$\text{gt}(n_5, n_2)$ $\text{fof}(\text{gt\_5}_2, \text{axiom})$
$\text{gt}(n_3, n_2)$ $\text{fof}(\text{gt\_3}_2, \text{axiom})$
$\text{gt}(n_4, n_3)$ $\text{fof}(\text{gt\_4}_3, \text{axiom})$
$\text{gt}(n_5, n_3)$ $\text{fof}(\text{gt\_5}_3, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ $\text{fof}(\text{finite\_domain}_4, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ $\text{fof}(\text{finite\_domain}_5, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ $\text{fof}(\text{finite\_domain}_0, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ $\text{fof}(\text{finite\_domain}_1, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ $\text{fof}(\text{finite\_domain}_2, \text{axiom})$
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ $\text{fof}(\text{finite\_domain}_3, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ $\text{fof}(\text{successor}_4, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ $\text{fof}(\text{successor}_5, \text{axiom})$
$\text{succ}(n_0) = n_1$ $\text{fof}(\text{successor}_1, \text{axiom})$
$\text{succ}(\text{succ}(n_0)) = n_2$ $\text{fof}(\text{successor}_2, \text{axiom})$
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ $\text{fof}(\text{successor}_3, \text{axiom})$

SWV147+1.p Simplified proof obligation gauss_array_0017
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg\, \text{tptp\_float\_0}_{001} \leq \text{tptp\_float\_0}_{001} \Rightarrow n_0 \leq \text{s\_worst}_7$ $\text{fof}(\text{gauss\_array}_{0017}, \text{conjecture})$
$\text{gt}(n_5, n_4)$ $\text{fof}(\text{gt\_5}_4, \text{axiom})$
$\text{gt}(n_4, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_4\_tptp\_minus}_1, \text{axiom})$
$\text{gt}(n_5, \text{tptp\_minus}_1)$ $\text{fof}(\text{gt\_5\_tptp\_minus}_1, \text{axiom})$

$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV148+1.p Simplified proof obligation gauss_array_0018
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg \text{tptp\_float\_0}_{001} \leq \text{tptp\_float\_0}_{001} \Rightarrow \text{s\_best}_7 \leq n_3$ fof(gauss_array$_{0018}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)

$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV149+1.p Simplified proof obligation gauss_array_0019
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg$ tptp_float_0$_{001}$ $\leq$ tptp_float_0$_{001}$ $\Rightarrow$ s_sworst$_7$ $\leq n_3$ fof(gauss_array$_{0019}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)
gt(n_1, n_0) fof(gt_1$_0$, axiom)
gt(n_2, n_0) fof(gt_2$_0$, axiom)
gt(n_3, n_0) fof(gt_3$_0$, axiom)
gt(n_4, n_1) fof(gt_4$_1$, axiom)
gt(n_5, n_1) fof(gt_5$_1$, axiom)
gt(n_2, n_1) fof(gt_2$_1$, axiom)
gt(n_3, n_1) fof(gt_3$_1$, axiom)
gt(n_4, n_2) fof(gt_4$_2$, axiom)
gt(n_5, n_2) fof(gt_5$_2$, axiom)
gt(n_3, n_2) fof(gt_3$_2$, axiom)
gt(n_4, n_3) fof(gt_4$_3$, axiom)
gt(n_5, n_3) fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV150+1.p Simplified proof obligation gauss_array_0020
Proof obligation emerging from the array-safety verification for the gauss program. array-safety ensures that each access to an array element is within the specified upper and lower bounds of the array.
include('Axioms/SWV003+0.ax')
$\neg$ tptp_float_0$_{001}$ $\leq$ tptp_float_0$_{001}$ $\Rightarrow$ s_worst$_7$ $\leq n_3$ fof(gauss_array$_{0020}$, conjecture)
gt(n_5, n_4) fof(gt_5$_4$, axiom)
gt(n_4, tptp_minus$_1$) fof(gt_4_tptp_minus$_1$, axiom)
gt(n_5, tptp_minus$_1$) fof(gt_5_tptp_minus$_1$, axiom)
gt(n_0, tptp_minus$_1$) fof(gt_0_tptp_minus$_1$, axiom)
gt(n_1, tptp_minus$_1$) fof(gt_1_tptp_minus$_1$, axiom)
gt(n_2, tptp_minus$_1$) fof(gt_2_tptp_minus$_1$, axiom)
gt(n_3, tptp_minus$_1$) fof(gt_3_tptp_minus$_1$, axiom)
gt(n_4, n_0) fof(gt_4$_0$, axiom)
gt(n_5, n_0) fof(gt_5$_0$, axiom)

$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV151+1.p Simplified proof obligation cl5_nebula_norm_0001
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
$\forall a\colon ((n_0 \leq a \text{ and } a \leq \text{tptp\_minus}_1) \Rightarrow n_0{+}n_4{=}\text{a\_select}_3(q, a, \text{tptp\_sum\_index}) = n_1)$ fof(cl5_nebula_norm$_{0001}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5_4, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4_0, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5_0, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1_0, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2_0, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3_0, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4_1, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5_1, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2_1, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3_1, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4_2, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5_2, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3_2, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4_3, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x\colon ((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)

$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV152+1.p Simplified proof obligation cl5_nebula_norm_0002
Proof obligation emerging from the norm-safety verification for the cl5_nebula program. norm-safety ensures that the contents of certain one-dimensional arrays add up to one.
include('Axioms/SWV003+0.ax')
$\forall a$: $((n_0 \leq a \text{ and } a \leq \text{tptp\_minus}_1) \Rightarrow n_0{+}n_4{=}\text{a\_select}_3(q, a, \text{tptp\_sum\_index}) = n_1)$ fof(cl5_nebula_norm$_{0002}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)
$\text{gt}(n_3, n_1)$ fof(gt_3$_1$, axiom)
$\text{gt}(n_4, n_2)$ fof(gt_4$_2$, axiom)
$\text{gt}(n_5, n_2)$ fof(gt_5$_2$, axiom)
$\text{gt}(n_3, n_2)$ fof(gt_3$_2$, axiom)
$\text{gt}(n_4, n_3)$ fof(gt_4$_3$, axiom)
$\text{gt}(n_5, n_3)$ fof(gt_5$_3$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0)))) = n_4$ fof(successor$_4$, axiom)
$\text{succ}(\text{succ}(\text{succ}(\text{succ}(\text{succ}(n_0))))) = n_5$ fof(successor$_5$, axiom)
$\text{succ}(n_0) = n_1$ fof(successor$_1$, axiom)
$\text{succ}(\text{succ}(n_0)) = n_2$ fof(successor$_2$, axiom)
$\text{succ}(\text{succ}(\text{succ}(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV165+1.p Simplified proof obligation cl5_nebula_init_0001
Proof obligation emerging from the init-safety verification for the cl5_nebula program. init-safety ensures that each variable or individual array element has been assigned a defined value before it is used.
include('Axioms/SWV003+0.ax')
$\forall a$: $((n_0 \leq a \text{ and } a \leq \text{tptp\_minus}_1) \Rightarrow \text{uninit} = \text{init})$ fof(cl5_nebula_init$_{0001}$, conjecture)
$\text{gt}(n_5, n_4)$ fof(gt_5$_4$, axiom)
$\text{gt}(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$\text{gt}(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$\text{gt}(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$\text{gt}(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$\text{gt}(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$\text{gt}(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$\text{gt}(n_4, n_0)$ fof(gt_4$_0$, axiom)
$\text{gt}(n_5, n_0)$ fof(gt_5$_0$, axiom)
$\text{gt}(n_1, n_0)$ fof(gt_1$_0$, axiom)
$\text{gt}(n_2, n_0)$ fof(gt_2$_0$, axiom)
$\text{gt}(n_3, n_0)$ fof(gt_3$_0$, axiom)
$\text{gt}(n_4, n_1)$ fof(gt_4$_1$, axiom)
$\text{gt}(n_5, n_1)$ fof(gt_5$_1$, axiom)
$\text{gt}(n_2, n_1)$ fof(gt_2$_1$, axiom)

$gt(n_3, n_1)$ fof(gt_3_1, axiom)
$gt(n_4, n_2)$ fof(gt_4_2, axiom)
$gt(n_5, n_2)$ fof(gt_5_2, axiom)
$gt(n_3, n_2)$ fof(gt_3_2, axiom)
$gt(n_4, n_3)$ fof(gt_4_3, axiom)
$gt(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$succ(succ(succ(succ(n_0)))) = n_4$ fof(successor$_4$, axiom)
$succ(succ(succ(succ(succ(n_0))))) = n_5$ fof(successor$_5$, axiom)
$succ(n_0) = n_1$ fof(successor$_1$, axiom)
$succ(succ(n_0)) = n_2$ fof(successor$_2$, axiom)
$succ(succ(succ(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV189+1.p Simplified proof obligation cl5_nebula_init_0121
Proof obligation emerging from the init-safety verification for the cl5_nebula program. init-safety ensures that each variable or individual array element has been assigned a defined value before it is used.
include('Axioms/SWV003+0.ax')
$\forall a$: $((n_0 \leq a \text{ and } a \leq n_4) \Rightarrow \text{a\_select}_3(\text{center\_init}, a, n_0) = \text{init}) \Rightarrow \forall b$: $((n_0 \leq b \text{ and } b \leq \text{tptp\_minus}_1) \Rightarrow \forall c$: $((n_0 \leq c \text{ and } c \leq n_4) \Rightarrow \text{a\_select}_3(\text{q\_init}, b, c) = \text{init}))$ fof(cl5_nebula_init$_{0121}$, conjecture)
$gt(n_5, n_4)$ fof(gt_5_4, axiom)
$gt(n_4, \text{tptp\_minus}_1)$ fof(gt_4_tptp_minus$_1$, axiom)
$gt(n_5, \text{tptp\_minus}_1)$ fof(gt_5_tptp_minus$_1$, axiom)
$gt(n_0, \text{tptp\_minus}_1)$ fof(gt_0_tptp_minus$_1$, axiom)
$gt(n_1, \text{tptp\_minus}_1)$ fof(gt_1_tptp_minus$_1$, axiom)
$gt(n_2, \text{tptp\_minus}_1)$ fof(gt_2_tptp_minus$_1$, axiom)
$gt(n_3, \text{tptp\_minus}_1)$ fof(gt_3_tptp_minus$_1$, axiom)
$gt(n_4, n_0)$ fof(gt_4_0, axiom)
$gt(n_5, n_0)$ fof(gt_5_0, axiom)
$gt(n_1, n_0)$ fof(gt_1_0, axiom)
$gt(n_2, n_0)$ fof(gt_2_0, axiom)
$gt(n_3, n_0)$ fof(gt_3_0, axiom)
$gt(n_4, n_1)$ fof(gt_4_1, axiom)
$gt(n_5, n_1)$ fof(gt_5_1, axiom)
$gt(n_2, n_1)$ fof(gt_2_1, axiom)
$gt(n_3, n_1)$ fof(gt_3_1, axiom)
$gt(n_4, n_2)$ fof(gt_4_2, axiom)
$gt(n_5, n_2)$ fof(gt_5_2, axiom)
$gt(n_3, n_2)$ fof(gt_3_2, axiom)
$gt(n_4, n_3)$ fof(gt_4_3, axiom)
$gt(n_5, n_3)$ fof(gt_5_3, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_4) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4))$ fof(finite_domain$_4$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_5) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3 \text{ or } x = n_4 \text{ or } x = n_5))$ fof(finite_domain$_5$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_0) \Rightarrow x = n_0)$ fof(finite_domain$_0$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_1) \Rightarrow (x = n_0 \text{ or } x = n_1))$ fof(finite_domain$_1$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_2) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2))$ fof(finite_domain$_2$, axiom)
$\forall x$: $((n_0 \leq x \text{ and } x \leq n_3) \Rightarrow (x = n_0 \text{ or } x = n_1 \text{ or } x = n_2 \text{ or } x = n_3))$ fof(finite_domain$_3$, axiom)
$succ(succ(succ(succ(n_0)))) = n_4$ fof(successor$_4$, axiom)
$succ(succ(succ(succ(succ(n_0))))) = n_5$ fof(successor$_5$, axiom)
$succ(n_0) = n_1$ fof(successor$_1$, axiom)
$succ(succ(n_0)) = n_2$ fof(successor$_2$, axiom)
$succ(succ(succ(n_0))) = n_3$ fof(successor$_3$, axiom)

SWV233+1.p Protocol attack problem
$\forall e_1, e_2$: $((\text{knows}(\text{encrypt}(e_1, e_2)) \text{ and } \text{knows}(e_2')) \Rightarrow \text{knows}(e_1))$ fof(encrypt_equation, axiom)
$\forall e_1, e_2$: $((\text{knows}(\text{symmetric\_encrypt}(e_1, e_2)) \text{ and } \text{knows}(e_2)) \Rightarrow \text{knows}(e_1))$ fof(symmetric_encrypt_equation, axiom)

$\forall e, k$: ((knows(sign(e, k')) and knows(k)) $\Rightarrow$ knows(e)) fof(sign_equation, axiom)
$\forall e_1, e_2$: ((knows(e_1) and knows(e_2)) $\Rightarrow$ (knows(concatenate(e_1, e_2)) and knows(encrypt(e_1, e_2)) and knows(symmetric_encry
$\forall e_1, e_2$: (knows(concatenate(e_1, e_2)) $\Rightarrow$ (knows(e_1) and knows(e_2))) fof(construct_message$_2$, axiom)
$\forall e$: (knows(e) $\Rightarrow$ (knows(head(e)) and knows(tail(e)) and knows(hash(e)))) fof(construct_message$_3$, axiom)
$\forall e, k$: decrypt(encrypt(e, k), k') $= e$ fof(decrypt_axiom, axiom)
$\forall e, k$: symmetric_decrypt(symmetric_encrypt(e, k), k) $= e$ fof(symmetric_decrypt_axiom, axiom)
$\forall e, k$: extract(sign(e, k'), k) $= e$ fof(sign_axiom, axiom)
$\forall x, y$: head(concatenate(x, y)) $= x$ fof(head_axiom, axiom)
$\forall x, y$: tail(concatenate(x, y)) $= y$ fof(tail_axiom, axiom)
$\forall x$: first(x) $=$ head(x) fof(first_axiom, axiom)
$\forall x$: second(x) $=$ head(tail(x)) fof(second_axiom, axiom)
$\forall x$: third(x) $=$ head(tail(tail(x))) fof(third_axiom, axiom)
$\forall x$: fourth(x) $=$ head(tail(tail(tail(x)))) fof(fourth_axiom, axiom)
$\forall x, y$: ((knows(x) and knows(y)) $\Rightarrow$ knows(mac(x, y))) fof(symmac_axiom, axiom)
knows(k_ca) and knows(k_a$'$) and knows(k_a) fof(previous_knowledge, axiom)
$\forall$init$_1$, init$_2$, init$_3$, resp$_1$, resp$_2$: (knows(concatenate(n, concatenate(k_c, sign(concatenate(c, concatenate(k_c, eol)), k_c$'$)))) and
s and second(extract(decrypt(resp$_1$, k_c$'$), second(extract(resp$_2$, k_ca)))) $= n$) $\Rightarrow$ knows(symmetric_encrypt(secret, first(extra
init$_2$) $\Rightarrow$ knows(concatenate(encrypt(sign(concatenate(kgen(init$_2$), concatenate(init$_1$, eol)), k_s$'$), init$_2$), sign(concatenate(s, c
knows(secret) fof(attack, conjecture)

SWV234+2.p 4758 typecast attack
Mike Bond's version of a model for the 4758 typecast attack.
$\forall u, v$: ((public(u) and public(v)) $\Rightarrow$ public(xor(u, v))) fof(ability_to_xor, axiom)
$\forall u$: (public(u) $\Rightarrow$ public(kp(u))) fof(kp_set, axiom)
$\forall u, v$: ((public(u) and public(v)) $\Rightarrow$ public(enc(u, v))) fof(ability_to_encrypt, axiom)
$\forall u, v$: ((public(u) and public(v)) $\Rightarrow$ public(enc(u^{-1}, v))) fof(ability_to_decrypt, axiom)
$\forall u, v$: ((public(u) and public(v)) $\Rightarrow$ public(enc(enc(xor(data, km)$^{-1}$, u), v))) fof(encrypt_data_cmd, axiom)
$\forall u, v, w$: ((public(v) and public(enc(xor(u, v), w)) and public(enc(xor(km, imp), u))) $\Rightarrow$ public(enc(xor(km, v), w))) fof(k
$\forall u, v, w$: ((public(kp(v)) and public(w) and public(enc(xor(km, kp(v)), u))) $\Rightarrow$ public(enc(xor(km, v), xor(u, w)))) fof(key
$\forall u, v, w$: enc(u, enc(u^{-1}, v)) $= v$ fof(encrypt_decrypt_cancel, axiom)
$\forall u, v, w$: xor(u, v) $=$ xor(v, u) fof(xor_commutes, axiom)
$\forall u, v, w$: xor(u, xor(v, w)) $=$ xor(xor(u, v), w) fof(xor_assosciative, axiom)
$\forall u, v, w$: xor(u, u) $= z$ fof(xor_self_cancel, axiom)
$\forall u, v, w$: xor(u, z) $= u$ fof(xor_zero, axiom)
public(imp) fof(initial_knowledge$_1$, axiom)
public(data) fof(initial_knowledge$_2$, axiom)
public(z) fof(initial_knowledge$_3$, axiom)
public(pin) fof(initial_knowledge$_4$, axiom)
public(enc(xor(kek, pin), pp)) fof(initial_knowledge$_5$, axiom)
public(k_3) fof(initial_knowledge$_6$, axiom)
public(enc(xor(km, kp(imp)), xor(kek, k_3))) fof(initial_knowledge$_7$, axiom)
public(a) fof(initial_knowledge$_8$, axiom)
public(enc(xor(km, imp), xor(kek, xor(pin, data)))) fof(initial_knowledge$_9$, axiom)
public(enc(pp, a)) fof(co$_1$, conjecture)

SWV237+1.p Visa Security Module (VSM) attack
This models the API of the Visa Security Module (VSM). The conjecture allows the discovery of Bond's attack.
$\forall u, v$: enc($i(u)$, enc(u, v)) $= v$ fof(enc_dec_cancel, axiom)
$\forall u, v$: enc(u, enc($i(u), v$)) $= v$ fof(dec_enc_cancel, axiom)
$\forall u$: $i(i(u)) = u$ fof(double_inverse_cancel, axiom)
$\forall u$: ($p(u) \Rightarrow p(i(u))$) fof(keys_are_symmetric, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(tmk, enc(i(enc(i(zcmk), v)), u)))) fof(key_translate_from_ZCMK_to_TMK, a
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(i(enc(i(zcmk), v)), enc(i(tmk), u)))) fof(key_translate_from_TMK_to_ZCMK
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(wk, enc(i(tmk), u)))) fof(receive_working_key_from_switch, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(enc(i(tmk), v), enc(i(tmk), u)))) fof(encrypt_a_PIN_derivation_key_under_a_
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(enc(i(tmk), v), enc(i(tc), u)))) fof(encrypt_a_stored_comms_key, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(tc, u))) fof(encrypt_clear_key_as_Tcomms_key, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(enc(i(tc), u), v))) fof(data_encrypt, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(i(enc(i(tc), u)), v))) fof(data_decrypt, axiom)
$\forall u, v, w$: (($p(u)$ and $p(v)$ and $p(w)$) $\Rightarrow$ p(enc(enc(i(wk), w), enc(i(enc(i(tmk), v)), u)))) fof(data_translate_PIN_from_local

$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{wk}), w), \mathrm{enc}(i(\mathrm{enc}(i(\mathrm{wk}), v)), u))))$ fof(data_translate_between_intercha
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{wk}), v), \mathrm{enc}(i(\mathrm{lp}), u))))$ fof(data_translate_PIN_from_local_storage_to_i
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(u, v)))$ fof(attacker_can_encrypt, axiom)
$p(\mathrm{enc}(\mathrm{tmk}, \mathrm{pp}))$ fof(intruder_knows$_1$, axiom)
$p(\mathrm{enc}(\mathrm{wk}, w))$ fof(intruder_knows$_2$, axiom)
$p(\mathrm{enc}(w, t_1))$ fof(intruder_knows$_3$, axiom)
$p(\mathrm{enc}(\mathrm{lp}, t_2))$ fof(intruder_knows$_4$, axiom)
$p(\mathrm{enc}(\mathrm{tc}, k))$ fof(intruder_knows$_5$, axiom)
$p(\mathrm{kk})$ fof(intruder_knows$_6$, axiom)
$p(i(\mathrm{kk}))$ fof(intruder_knows$_7$, axiom)
$p(a)$ fof(intruder_knows$_8$, axiom)
$p(\mathrm{enc}(\mathrm{pp}, a))$ fof(co$_1$, conjecture)

SWV238+1.p Visa Security Module (VSM) attack denied
This file models the API of the Visa Security Module (VSM). In this version, the command that Visa removed to try to prevent Bond's attack has been commented out. So the problem is now to prove the attack is not possible.
$\forall u, v$: $\mathrm{enc}(i(u), \mathrm{enc}(u, v)) = v$ fof(enc_dec_cancel, axiom)
$\forall u, v$: $\mathrm{enc}(u, \mathrm{enc}(i(u), v)) = v$ fof(dec_enc_cancel, axiom)
$\forall u$: $i(i(u)) = u$ fof(double_inverse_cancel, axiom)
$\forall u$: $(p(u) \Rightarrow p(i(u)))$ fof(keys_are_symmetric, axiom)
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{tmk}, \mathrm{enc}(i(\mathrm{enc}(i(\mathrm{zcmk}), v)), u))))$ fof(key_translate_from_ZCMK_to_TMK, a
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(i(\mathrm{enc}(i(\mathrm{zcmk}), v)), \mathrm{enc}(i(\mathrm{tmk}), u))))$ fof(key_translate_from_TMK_to_ZCMK
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{wk}, \mathrm{enc}(i(\mathrm{tmk}), u))))$ fof(receive_working_key_from_switch, axiom)
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{tmk}), v), \mathrm{enc}(i(\mathrm{tmk}), u))))$ fof(encrypt_a_PIN_derivation_key_under_a_
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{tmk}), v), \mathrm{enc}(i(\mathrm{tc}), u))))$ fof(encrypt_a_stored_comms_key, axiom)
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{tc}), u), v)))$ fof(data_encrypt, axiom)
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(i(\mathrm{enc}(i(\mathrm{tc}), u)), v)))$ fof(data_decrypt, axiom)
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{wk}), w), \mathrm{enc}(i(\mathrm{enc}(i(\mathrm{tmk}), v)), u))))$ fof(data_translate_PIN_from_local
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{wk}), w), \mathrm{enc}(i(\mathrm{enc}(i(\mathrm{wk}), v)), u))))$ fof(data_translate_between_intercha
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(\mathrm{enc}(i(\mathrm{wk}), v), \mathrm{enc}(i(\mathrm{lp}), u))))$ fof(data_translate_PIN_from_local_storage_to_i
$\forall u, v, w$: $((p(u)$ and $p(v)$ and $p(w)) \Rightarrow p(\mathrm{enc}(u, v)))$ fof(attacker_can_encrypt, axiom)
$p(\mathrm{enc}(\mathrm{tmk}, \mathrm{pp}))$ fof(intruder_knows$_1$, axiom)
$p(\mathrm{enc}(\mathrm{wk}, w))$ fof(intruder_knows$_2$, axiom)
$p(\mathrm{enc}(w, t_1))$ fof(intruder_knows$_3$, axiom)
$p(\mathrm{enc}(\mathrm{lp}, t_2))$ fof(intruder_knows$_4$, axiom)
$p(\mathrm{enc}(\mathrm{tc}, k))$ fof(intruder_knows$_5$, axiom)
$p(\mathrm{kk})$ fof(intruder_knows$_6$, axiom)
$p(i(\mathrm{kk}))$ fof(intruder_knows$_7$, axiom)
$p(a)$ fof(intruder_knows$_8$, axiom)
$p(\mathrm{enc}(\mathrm{pp}, a))$ fof(co$_1$, conjecture)

SWV239-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
(c_lessequals(c_Message_Oanalz(v_H), c_Message_Oanalz(v_H_H), tc_set(tc_Message_Omsg)) and c_lessequals(c_Message_Oana
c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G_H, v_H_H, tc_Message_C
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
$\neg$ c_lessequals(c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G, v

SWV239-2.p Cryptographic protocol problem for messages
$\neg$ c_lessequals(c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G, v
c_in(v_X, c_Message_Oanalz(c_Message_Oanalz(v_H)), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Or
(c_lessequals(c_Message_Oanalz(v_H), c_Message_Oanalz(v_H_H), tc_set(tc_Message_Omsg)) and c_lessequals(c_Message_Oana
c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G_H, v_H_H, tc_Message_C
c_in(c_Main_OsubsetI$_{-1}$(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a)) cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI$_{-1}$(v_A, v_B, t_a), v_B, t_a) $\Rightarrow$ c_lessequals(v_A, v_B, tc_set(t_a)) cnf(cls_Set_OsubsetI$_1$, axiom)
c_lessequals(v_A, v_A, tc_set(t_a)) cnf(cls_Set_Osubset__refl$_0$, axiom)

SWV240-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')

include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
(c_lessequals(c_Message_Oanalz(v_H), c_Message_Oanalz(v_H_H), tc_set(tc_Message_Omsg)) and c_lessequals(c_Message_Oana
c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G_H, v_H_H, tc_Message_C
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
$\neg$ c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v

SWV240-2.p Cryptographic protocol problem for messages
$\neg$ c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v
c_in(v_X, v_H, tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
(c_lessequals(c_Message_Oanalz(v_H), c_Message_Oanalz(v_H_H), tc_set(tc_Message_Omsg)) and c_lessequals(c_Message_Oana
c_lessequals(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Oanalz(c_union(v_G_H, v_H_H, tc_Message_C
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_B, t_a) $\Rightarrow$ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)
c_lessequals(v_A, v_A, tc_set(t_a))   cnf(cls_Set_Osubset__refl$_0$, axiom)

SWV241-2.p Cryptographic protocol problem for messages
c_in(v_X, v_H, tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
(c_in(v_X, c_Message_Oanalz(v_G), tc_Message_Omsg) and c_lessequals(v_G, c_Message_Oanalz(v_H), tc_set(tc_Message_Omsg
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz__trans$_0$, axiom)
c_in(v_a, c_insert(v_b, v_A, t_a), t_a) $\Rightarrow$ (c_in(v_a, v_A, t_a) or v_a = v_b)   cnf(cls_Set_OinsertE$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_B, t_a) $\Rightarrow$ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)
c_in(v_Y, c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conject
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
$\neg$ c_in(v_Y, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjecture)

SWV242-2.p Cryptographic protocol problem for messages
c_lessequals(v_G, c_Message_Oanalz(v_G_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conjecture)
c_lessequals(v_H, c_Message_Oanalz(v_H_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_1$, negated_conjecture)
c_lessequals(v_H, c_Message_Oanalz(c_union(v_G_H, v_H_H, tc_Message_Omsg)), tc_set(tc_Message_Omsg)) $\Rightarrow$ $\neg$ c_lessequals(
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) $\Rightarrow$ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_lessequals(v_A, c_union(v_A, v_B, t_a), tc_set(t_a))   cnf(cls_Set_OUn__upper1$_0$, axiom)
c_lessequals(v_B, c_union(v_A, v_B, t_a), tc_set(t_a))   cnf(cls_Set_OUn__upper2$_0$, axiom)
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) $\Rightarrow$ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se

SWV243-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_Message_Osynth(v_H)) $\neq$ c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)

SWV243-2.p Cryptographic protocol problem for messages
c_Message_Oanalz(c_Message_Osynth(v_H)) $\neq$ c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_union(v_y, c_emptyset, t_a) = v_y   cnf(cls_Set_OUn__empty__right$_0$, axiom)

SWV244-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) $\Rightarrow$ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) $\Rightarrow$ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(v_X, c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjec
$\neg$ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M

SWV244-2.p Cryptographic protocol problem for messages
c_in(v_X, c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjec

¬ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUnE$_0$, axiom)

SWV245-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)), tc_Me
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
¬ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M

SWV245-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
¬ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_X, c_Message_Osynth(v_H),
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUnE$_0$, axiom)

SWV246-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)), tc_Me
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
¬ c_in(v_Y, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M

SWV246-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
¬ c_in(v_Y, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_Y, c_Message_Osynth(v_H),
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUnE$_0$, axiom)

SWV247-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)), tc_Mes
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_
c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_M
¬ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M

SWV247-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_X, c_Message_Osynth(v_H), t

(c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oanalz(v_H), tc_Message_Omsg) and c_in(c_Message_Omsg_OKey(c_Mes
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_ODecrypt__dest$_0$, axiom)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ c_in(c_Message_Omsg_OKey(v_K), v_H, tc_
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUnE$_0$, axiom)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth
c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_M
¬ c_in(v_X, c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), tc_M

SWV248-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_O
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
¬ c_lessequals(c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), c

SWV248-2.p Cryptographic protocol problem for messages
¬ c_lessequals(c_union(c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), c_Message_Osynth(v_G), tc_Message_Omsg), c
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Message_Oanalz_OInj$_0$,
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_Message_Osynth_OInj$_0$
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(c_Main_OsubsetI$_1$(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI$_1$(v_A, v_B, t_a), v_B, t_a) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)

SWV249-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_Message_Oanalz(c_Message_Osynth(v_H)) = c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Osynth(v_G), c_Message_Osynth(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_G)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), c

SWV249-2.p Cryptographic protocol problem for messages
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_G)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), c
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
class_Orderings_Oorder(t_a) ⇒ c_lessequals(v_x, v_x, t_a)   cnf(cls_Orderings_Oorder__class_Oaxioms__1$_0$, axiom)
c_union(c_minus(v_B, v_A, tc_set(t_a)), v_A, t_a) = c_union(v_B, v_A, t_a)   cnf(cls_Set_OUn__Diff__cancel2$_0$, axiom)
c_union(v_A, c_minus(v_B, v_A, tc_set(t_a)), t_a) = c_union(v_A, v_B, t_a)   cnf(cls_Set_OUn__Diff__cancel$_0$, axiom)
c_union(c_insert(v_a, v_B, t_a), v_C, t_a) = c_insert(v_a, c_union(v_B, v_C, t_a), t_a)   cnf(cls_Set_OUn__insert__left$_0$, axiom)
c_union(v_A, c_insert(v_a, v_B, t_a), t_a) = c_insert(v_a, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUn__insert__right$_0$, axiom)
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Set_OUn__subset__iff$_0$, ax
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_B, v_C, tc_set(t_a))   cnf(cls_Set_OUn__subset__iff$_1$, ax
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_Oinsert__subset$_1$, axio
(c_in(v_x, v_B, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a))   cnf(cls_S

(c_lessequals(v_B, v_A, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ v_A = v_B   cnf(cls_Set_Osubset__antisym$_0$, a
class_Orderings_Oorder(tc_set(t_1))   cnf(clsarity_set$_2$, axiom)

SWV250-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_Message_Oanalz(c_Message_Osynth(v_H)) = c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Osynth(v_G), c_Message_Osynth(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_G)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_x, c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conject
c_in(v_x, c_Message_Oanalz(c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), v_H, tc_Message_Omsg)), tc_Message_Omsg)
¬ c_in(v_x, c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), tc_M

SWV250-2.p Cryptographic protocol problem for messages
c_in(v_x, c_Message_Oanalz(c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), v_H, tc_Message_Omsg)), tc_Message_Omsg)
¬ c_in(v_x, c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), c_Message_Oanalz(c_union(v_G, v_H, tc_Message_Omsg)), tc_M
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUn__iff$_1$, axiom)
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUn__iff$_2$, axiom)

SWV251-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_Message_Oanalz(c_Message_Osynth(v_H)) = c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Osynth(v_G), c_Message_Osynth(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_G)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_x, c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conject
¬ c_in(v_x, c_Message_Oanalz(c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), v_H, tc_Message_Omsg)), tc_Message_Omsg

SWV251-2.p Cryptographic protocol problem for messages
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_M
c_union(c_minus(v_B, v_A, tc_set(t_a)), v_A, t_a) = c_union(v_B, v_A, t_a)   cnf(cls_Set_OUn__Diff__cancel2$_0$, axiom)
c_union(v_A, c_minus(v_B, v_A, tc_set(t_a)), t_a) = c_union(v_A, v_B, t_a)   cnf(cls_Set_OUn__Diff__cancel$_0$, axiom)
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Set_OUn__subset__iff$_0$, ax
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_B, v_C, tc_set(t_a))   cnf(cls_Set_OUn__subset__iff$_1$, ax
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_in(v_x, v_B, t_a) ⇒ c_minus(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) = c_minus(v_A, v_B, tc_set(t_a))   cnf(cls_Set_Oinsert
(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a)   cnf(cls_Set_OsubsetD$_0$, axiom)
(c_lessequals(v_B, v_A, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ v_A = v_B   cnf(cls_Set_Osubset__antisym$_0$, a
c_lessequals(v_A, v_A, tc_set(t_a))   cnf(cls_Set_Osubset__refl$_0$, axiom)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_G)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_x, c_Message_Oanalz(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conject
¬ c_in(v_x, c_Message_Oanalz(c_union(c_Message_Osynth(c_Message_Oanalz(v_G)), v_H, tc_Message_Omsg)), tc_Message_Omsg

SWV252-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')

include('Axioms/SWV005-1.ax')
c_Message_Oanalz(c_union(c_Message_Oanalz(v_G), v_H, tc_Message_Omsg)) = c_Message_Oanalz(c_union(v_G, v_H, tc_Messa
c_Message_Oanalz(c_Message_Osynth(v_H)) = c_union(c_Message_Oanalz(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oanalz(c_union(c_Message_Osynth(v_G), v_H, tc_Message_Omsg)) = c_union(c_Message_Oanalz(c_union(v_G, v_H,
c_in(v_X, v_G, tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Messag
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c

SWV252-2.p Cryptographic protocol problem for messages
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c
c_Message_Oanalz(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oanalz__parts$_0$, axiom)
c_lessequals(c_Message_Oanalz(v_G), c_Message_Oanalz(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Oana
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_0$, axiom)
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opar
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opar
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
class_Orderings_Oorder(t_a) ⇒ c_lessequals(v_x, v_x, t_a) cnf(cls_Orderings_Oorder__class_Oaxioms__1$_0$, axiom)
c_union(c_minus(v_B, v_A, tc_set(t_a)), v_A, t_a) = c_union(v_B, v_A, t_a) cnf(cls_Set_OUn__Diff__cancel2$_0$, axiom)
c_union(v_A, c_minus(v_B, v_A, tc_set(t_a)), t_a) = c_union(v_A, v_B, t_a) cnf(cls_Set_OUn__Diff__cancel$_0$, axiom)
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_A, v_C, tc_set(t_a)) cnf(cls_Set_OUn__subset__iff$_0$, ax
c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t_a)) ⇒ c_lessequals(v_B, v_C, tc_set(t_a)) cnf(cls_Set_OUn__subset__iff$_1$, ax
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) ⇒ c_in(v_x, v_B, t_a) cnf(cls_Set_Oinsert__subset$_0$, axiom)
c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) ⇒ c_lessequals(v_A, v_B, tc_set(t_a)) cnf(cls_Set_Oinsert__subset$_1$, axi
(c_in(v_x, v_B, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) cnf(cls_S
(c_lessequals(v_B, v_A, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ v_A = v_B cnf(cls_Set_Osubset__antisym$_0$, a
class_Orderings_Oorder(tc_set(t_1)) cnf(clsarity_set$_2$, axiom)

SWV253-2.p Cryptographic protocol problem for messages
v_K = v_K_H ⇒ c_Message_OinvKey(v_K) ≠ c_Message_OinvKey(v_K_H) cnf(cls_conjecture$_0$, negated_conjecture)
c_Message_OinvKey(v_K) = c_Message_OinvKey(v_K_H) or v_K = v_K_H cnf(cls_conjecture$_1$, negated_conjecture)
c_Message_OinvKey(c_Message_OinvKey(v_y)) = v_y cnf(cls_Message_OinvKey_A_IinvKey_Ay_J_A_61_61_Ay$_0$, axiom)

SWV254-2.p Cryptographic protocol problem for messages
(class_Orderings_Oorder(t_a) and c_lessequals(v_n, v_m, t_a)) ⇒ c_SetInterval_OatLeastLessThan(v_m, v_n, t_a) =
c_emptyset cnf(cls_SetInterval_OatLeastLessThan__empty$_0$, axiom)
c_SetInterval_OatLeastLessThan(v_m, c_Suc(v_m), tc_nat) = c_insert(v_m, c_emptyset, tc_nat) cnf(cls_SetInterval_OatLeas
c_emptyset ≠ c_insert(v_a, v_A, t_a) cnf(cls_Set_Oempty__not__insert$_0$, axiom)
c_lessequals(v_U, v_x(v_U), tc_nat) cnf(cls_conjecture$_0$, negated_conjecture)
v_x(v_U) = v_nat cnf(cls_conjecture$_1$, negated_conjecture)
class_Orderings_Oorder(tc_nat) cnf(clsarity_nat$_3$, axiom)

SWV255-2.p Cryptographic protocol problem for messages
c_lessequals(v_U, v_xb(v_U), tc_nat) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_U), c_Message_Oparts(c_insert(v_msg$_1$, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) =
¬ c_lessequals(v_x, v_U, tc_nat) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_U), c_Message_Oparts(c_insert(v_msg$_2$, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) =
¬ c_lessequals(v_xa, v_U, tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_xb(v_U)), c_Message_Oparts(c_insert(v_msg$_2$, c_emptyset, tc_Message_Omsg)), tc_Message_O
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_k, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_1$, axiom)

SWV256-2.p Cryptographic protocol problem for messages
¬ c_lessequals(c_Message_Oparts(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_conj
c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opar

SWV257-2.p Cryptographic protocol problem for messages
¬ c_lessequals(c_Message_Oparts(v_H), c_Message_Oparts(c_Message_Oanalz(v_H)), tc_set(tc_Message_Omsg)) cnf(cls_conj
c_lessequals(v_H, c_Message_Oanalz(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__increasing$_0$, axiom)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M

SWV258-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
c_in(v_c, c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), tc_Message_Omsg) ⇒ (c_in(v_c, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_Message_Oparts(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__idem$_0$, axiom)
c_in(v_X, c_Message_Oparts(c_Message_Oparts(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_O
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opa
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opa
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))

SWV258-2.p Cryptographic protocol problem for messages
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opa
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opa
(c_in(v_x, v_B, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a))   cnf(cls_S
c_lessequals(v_A, v_A, tc_set(t_a))   cnf(cls_Set_Osubset__refl$_0$, axiom)

SWV259-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
c_in(v_c, c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), tc_Message_Omsg) ⇒ (c_in(v_c, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_Message_Oparts(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__idem$_0$, axiom)
c_in(v_X, c_Message_Oparts(c_Message_Oparts(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_O
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opa
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opa
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(v_H), c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_set(tc_Message_Omsg))

SWV259-2.p Cryptographic protocol problem for messages
¬ c_lessequals(c_Message_Oparts(v_H), c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_set(tc_Message_Omsg))
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opa
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Opa
c_lessequals(c_insert(v_x, v_A, t_a), v_B, tc_set(t_a)) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_Oinsert__subset$_1$, axi
c_lessequals(v_A, v_A, tc_set(t_a))   cnf(cls_Set_Osubset__refl$_0$, axiom)

SWV260-2.p Cryptographic protocol problem for messages
c_in(v_Y, c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conject
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_Y, c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conje
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_a, c_insert(v_b, v_A, t_a), t_a) ⇒ (c_in(v_a, v_A, t_a) or v_a = v_b)   cnf(cls_Set_OinsertE$_0$, axiom)
c_in(c_Main_OsubsetI$_{-1}$(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI$_{-1}$(v_A, v_B, t_a), v_B, t_a) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)
(c_in(v_X, c_Message_Oparts(v_G), tc_Message_Omsg) and c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts__trans$_0$, axiom)

SWV261-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_lessequals(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_H
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_C
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se

c_in(v_X, v_G, tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_

SWV261-2.p Cryptographic protocol problem for messages
c_in(v_X, v_G, tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_
c_lessequals(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_H
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUnCI$_1$, axiom)
c_in(v_a, c_insert(v_b, v_A, t_a), t_a) ⇒ (c_in(v_a, v_A, t_a) or v_a = v_b)   cnf(cls_Set_OinsertE$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_B, t_a) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se

SWV262-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)) = c_union(c_Message_Oparts(c_insert(v_X, c_emptyset, tc_Message_O
c_union(c_union(v_A, v_B, t_a), v_C, t_a) = c_union(v_A, c_union(v_B, v_C, t_a), t_a)   cnf(cls_Set_OUn__assoc$_0$, axiom)
c_Message_Oparts(c_insert(v_X, c_insert(v_Y, v_H, tc_Message_Omsg), tc_Message_Omsg)) ≠ c_union(c_union(c_Message_Opar

SWV262-2.p Cryptographic protocol problem for messages
c_Message_Oparts(c_insert(v_X, c_insert(v_Y, v_H, tc_Message_Omsg), tc_Message_Omsg)) ≠ c_union(c_union(c_Message_Opar
c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)) = c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_Messa
c_union(c_emptyset, v_y, t_a) = v_y   cnf(cls_Set_OUn__empty__left$_0$, axiom)
c_union(c_insert(v_a, v_B, t_a), v_C, t_a) = c_insert(v_a, c_union(v_B, v_C, t_a), t_a)   cnf(cls_Set_OUn__insert__left$_0$, axiom)

SWV263-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
c_Message_Oagent_OServer ≠ c_Message_Oagent_OFriend(v_nat_H)   cnf(cls_Message_Oagent_Odistinct__1__iff1$_0$, axiom)
c_Message_Oagent_OFriend(v_nat_H) ≠ c_Message_Oagent_OServer   cnf(cls_Message_Oagent_Odistinct__2__iff1$_0$, axiom)
c_Message_Oagent_OServer ≠ c_Message_Oagent_OSpy   cnf(cls_Message_Oagent_Odistinct__3__iff1$_0$, axiom)
c_Message_Oagent_OSpy ≠ c_Message_Oagent_OServer   cnf(cls_Message_Oagent_Odistinct__4__iff1$_0$, axiom)
c_Message_Oagent_OFriend(v_nat) ≠ c_Message_Oagent_OSpy   cnf(cls_Message_Oagent_Odistinct__5__iff1$_0$, axiom)
c_Message_Oagent_OSpy ≠ c_Message_Oagent_OFriend(v_nat)   cnf(cls_Message_Oagent_Odistinct__6__iff1$_0$, axiom)
c_Message_Oagent_OFriend(v_nat) = c_Message_Oagent_OFriend(v_nat_H) ⇒ v_nat = v_nat_H   cnf(cls_Message_Oagent_O
c_Message_Omsg_OAgent(v_agent) = c_Message_Omsg_OAgent(v_agent_H) ⇒ v_agent = v_agent_H   cnf(cls_Message_Oms
c_Message_Omsg_ONumber(v_nat) = c_Message_Omsg_ONumber(v_nat_H) ⇒ v_nat = v_nat_H   cnf(cls_Message_Omsg_O
c_Message_Omsg_ONonce(v_nat) = c_Message_Omsg_ONonce(v_nat_H) ⇒ v_nat = v_nat_H   cnf(cls_Message_Omsg_Oinje
c_Message_Omsg_OKey(v_nat) = c_Message_Omsg_OKey(v_nat_H) ⇒ v_nat = v_nat_H   cnf(cls_Message_Omsg_Oinject__4
c_Message_Omsg_OHash(v_msg) = c_Message_Omsg_OHash(v_msg_H) ⇒ v_msg = v_msg_H   cnf(cls_Message_Omsg_Oinje
c_Message_Omsg_OMPair(v_msg$_1$, v_msg$_2$) = c_Message_Omsg_OMPair(v_msg1_H, v_msg2_H) ⇒ v_msg$_1$ = v_msg1_H   cn
c_Message_Omsg_OMPair(v_msg$_1$, v_msg$_2$) = c_Message_Omsg_OMPair(v_msg1_H, v_msg2_H) ⇒ v_msg$_2$ = v_msg2_H   cn
c_Message_Omsg_OCrypt(v_nat, v_msg) = c_Message_Omsg_OCrypt(v_nat_H, v_msg_H) ⇒ v_nat = v_nat_H   cnf(cls_Mess
c_Message_Omsg_OCrypt(v_nat, v_msg) = c_Message_Omsg_OCrypt(v_nat_H, v_msg_H) ⇒ v_msg = v_msg_H   cnf(cls_Mes
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts_OInj$_0$,
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, v_G, tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjecture)

SWV263-2.p Cryptographic protocol problem for messages
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, v_G, tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts_OInj$_0$,

(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a)   cnf(cls_Set_OsubsetD$_0$, axiom)

SWV264-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conject
¬ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_3$, negated_conjecture)
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV265-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conject
¬ c_in(v_Y, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_3$, negated_conjecture)
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc

SWV266-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjectu
¬ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_3$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV267-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
c_in(v_c, c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), tc_Message_Omsg) ⇒ (c_in(v_c, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_Message_Oparts(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__idem$_0$, axiom)
c_lessequals(v_H, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_Message_Oparts__increasing$_0$, axiom)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_X, c_Message_Oparts(c_Message_Oparts(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Om
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conje
¬ c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_1$, negated_conjecture)

SWV267-2.p Cryptographic protocol problem for messages
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conje
¬ c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_1$, negated_conjecture)
c_lessequals(v_H, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_Message_Oparts__increasing$_0$, axiom)
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se

SWV268-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
c_in(v_c, c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)), tc_Message_Omsg) ⇒ (c_in(v_c, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_Message_Oparts(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__idem$_0$, axiom)
c_lessequals(v_H, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_Message_Oparts__increasing$_0$, axiom)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_X, c_Message_Oparts(c_Message_Oparts(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Om
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_lessequals(v_A, v_C, tc_set(t_a))   cnf(cls_Se
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_1$, negated_con

SWV268-2.p Cryptographic protocol problem for messages
c_lessequals(v_G, c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg))   cnf(cls_conjecture$_1$, negated_con
c_Message_Oparts(c_Message_Oparts(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__idem$_0$, axiom)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M

SWV269-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M

c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Osynth__increasing$_0$, axiom)
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec

SWV269-2.p Cryptographic protocol problem for messages
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_2$, axiom)

SWV270-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Osynth__increasing$_0$, axiom)
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(c_Message_Osynth(v_H)), tc_Message_Omsg) cnf(cls_conjectu
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Me
¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec

SWV270-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Me
¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_X, c_Message_Osynth(v_H),
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_1$, axiom)
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_2$, axiom)

SWV271-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Osynth__increasing$_0$, axiom)
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(c_Message_Osynth(v_H)), tc_Message_Omsg) cnf(cls_conjectu
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Me
¬ c_in(v_Y, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec

SWV271-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Me
¬ c_in(v_Y, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg) cnf(cls_conjec
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_Y, c_Message_Osynth(v_H),
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_1$, axiom)
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_2$, axiom)

SWV272-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Osynth__increasing$_0$, axiom)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(c_Message_Osynth(v_H)), tc_Message_Omsg) cnf(cls_conjectu
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Mes

¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg)   cnf(cls_conjec

SWV272-2.p Cryptographic protocol problem for messages
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Mes
¬ c_in(v_X, c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), tc_Message_Omsg)   cnf(cls_conjec
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(v_X, c_Message_Osynth(v_H), t
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a))   cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUn__iff$_1$, axiom)
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a)   cnf(cls_Set_OUn__iff$_2$, axiom)

SWV273-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-1.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg))   cnf(cls_Message_Osynth__increasing$_0$, axiom)
¬ c_lessequals(c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), c_Message_Oparts(c_Message_Osy

SWV273-2.p Cryptographic protocol problem for messages
¬ c_lessequals(c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg), c_Message_Oparts(c_Message_Osy
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) ⇒ c_lessequals(v_G, c_Message_Opar
c_lessequals(v_H, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg))   cnf(cls_Message_Osynth__increasing$_0$, axiom)
(c_lessequals(v_B, v_C, tc_set(t_a)) and c_lessequals(v_A, v_C, tc_set(t_a))) ⇒ c_lessequals(c_union(v_A, v_B, t_a), v_C, tc_set(t
c_lessequals(v_A, v_A, tc_set(t_a))   cnf(cls_Set_Osubset__refl$_0$, axiom)

SWV274-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, c_Message_Osynth(c_Message_Osynth(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_O
(c_in(v_X, c_Message_Osynth(v_G), tc_Message_Omsg) and c_lessequals(v_G, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_Message_Osynth__trans$_0$, axiom)
c_in(v_Y, c_Message_Osynth(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conject
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_Y, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjecture)

SWV274-2.p Cryptographic protocol problem for messages
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_Message_Osynth_OInj$_0$
(c_in(v_X, c_Message_Osynth(v_G), tc_Message_Omsg) and c_lessequals(v_G, c_Message_Osynth(v_H), tc_set(tc_Message_Omsg
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_Message_Osynth__trans$_0$, axiom)
c_in(v_a, c_insert(v_b, v_A, t_a), t_a) ⇒ (c_in(v_a, v_A, t_a) or v_a = v_b)   cnf(cls_Set_OinsertE$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_B, t_a) ⇒ c_lessequals(v_A, v_B, tc_set(t_a))   cnf(cls_Set_OsubsetI$_1$, axiom)
c_in(v_Y, c_Message_Osynth(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg)   cnf(cls_conjecture$_0$, negated_conject
c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_Y, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_conjecture$_2$, negated_conjecture)

SWV275-1.p Cryptographic protocol problem for messages
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV004-0.ax')
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Osynth(v_G), c_Message_Osynth(v_H), tc_set(tc_M
¬ c_lessequals(c_insert(v_X, c_Message_Osynth(v_H), tc_Message_Omsg), c_Message_Osynth(c_insert(v_X, v_H, tc_Message_Oms

SWV275-2.p Cryptographic protocol problem for messages
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg)   cnf(cls_Message_Osynth_OInj$_0$

c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Osynth(v_G), c_Message_Osynth(v_H), tc_set(tc_M
c_in(v_a, v_B, t_a) ⇒ c_in(v_a, c_insert(v_b, v_B, t_a), t_a) cnf(cls_Set_OinsertCI$_0$, axiom)
c_in(v_x, c_insert(v_x, v_B, t_a), t_a) cnf(cls_Set_OinsertCI$_1$, axiom)
c_in(v_a, c_insert(v_b, v_A, t_a), t_a) ⇒ (c_in(v_a, v_A, t_a) or v_a = v_b) cnf(cls_Set_OinsertE$_0$, axiom)
(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a) cnf(cls_Set_OsubsetD$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_A, t_a) or c_lessequals(v_A, v_B, tc_set(t_a)) cnf(cls_Set_OsubsetI$_0$, axiom)
c_in(c_Main_OsubsetI_1(v_A, v_B, t_a), v_B, t_a) ⇒ c_lessequals(v_A, v_B, tc_set(t_a)) cnf(cls_Set_OsubsetI$_1$, axiom)
¬ c_lessequals(c_insert(v_X, c_Message_Osynth(v_H), tc_Message_Omsg), c_Message_Osynth(c_insert(v_X, v_H, tc_Message_Oms

SWV276-1.p Cryptographic protocol problem for events
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_OkeysFor(v_G), c_Message_OkeysFor(v_H), tc_set
c_in(v_X, v_G, tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) cnf(cls_conjecture$_0$, nega
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) cnf(cls_conjecture$_2$, neg
¬ c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_conjecture$_3$,

SWV276-2.p Cryptographic protocol problem for events
c_in(v_K, c_Message_OkeysFor(c_Message_Osynth(v_H)), tc_nat) ⇒ (c_in(v_K, c_Message_OkeysFor(v_H), tc_nat) or c_in(c_M
c_in(v_K, c_Message_OkeysFor(c_Message_Osynth(v_H)), tc_nat) ⇒ (c_in(v_K, c_Message_OkeysFor(v_H), tc_nat) or v_K =
c_Message_OinvKey(v_sko__uhi(v_H, v_K))) cnf(cls_Event_OkeysFor__synth_H$_1$, axiom)
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes
c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_Message_OinvKey(c_Message_OinvKey(v_y)) = v_y cnf(cls_Message_OinvKey_A_IinvKey_Ay_J_A_61_61_Ay$_0$, axiom)
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_OkeysFor(v_G), c_Message_OkeysFor(v_H), tc_set
c_Message_OkeysFor(c_union(v_H, v_H_H, tc_Message_Omsg)) = c_union(c_Message_OkeysFor(v_H), c_Message_OkeysFor(v_H
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_0$, axiom)
c_in(v_X, v_G, tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message
c_Message_Oparts(c_Message_Osynth(v_H)) = c_union(c_Message_Oparts(v_H), c_Message_Osynth(v_H), tc_Message_Omsg)
c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg)) = c_union(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_Messa
(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a) cnf(cls_Set_OsubsetD$_0$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_c, v_A, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_1$, axiom)
c_in(v_c, v_B, t_a) ⇒ c_in(v_c, c_union(v_A, v_B, t_a), t_a) cnf(cls_Set_OUn__iff$_2$, axiom)
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) cnf(cls_conjecture$_0$, nega
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) cnf(cls_conjecture$_2$, neg
¬ c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_conjecture$_3$,

SWV277-1.p Cryptographic protocol problem for events
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_OkeysFor(v_G), c_Message_OkeysFor(v_H), tc_set
c_in(v_X, v_G, tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Message
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(c_Message_OinvKey(v_K)), c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_conjecture$_1$,
¬ c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(v_H)), tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oanalz(v_H)), tc_nat) cnf(cls_conjecture$_3$, negated_conjecture)
¬ c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(v_G)), tc_nat) cnf(cls_conjecture$_4$, negated_conjecture)

SWV277-2.p Cryptographic protocol problem for events

c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_OkeysFor(v_G), c_Message_OkeysFor(v_H), tc_set
(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a) cnf(cls_Set_OsubsetD$_0$, axiom)
¬ c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(v_H)), tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oanalz(v_H)), tc_nat) cnf(cls_conjecture$_3$, negated_conjecture)

SWV278-1.p Cryptographic protocol problem for events
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
c_lessequals(c_Message_Oanalz(v_H), c_Message_Oparts(v_H), tc_set(tc_Message_Omsg)) cnf(cls_Message_Oanalz__subset__
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_OkeysFor(v_G), c_Message_OkeysFor(v_H), tc_set
c_in(v_X, v_G, tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), c_union(c_Messag
c_lessequals(v_G, v_H, tc_set(tc_Message_Omsg)) ⇒ c_lessequals(c_Message_Oparts(v_G), c_Message_Oparts(v_H), tc_set(tc_M
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(c_Message_OinvKey(c_Message_OinvKey(v_K_H))), c_Message_Oparts(v_H), tc_Message_Omsg)
¬ c_in(c_Message_OinvKey(v_K_H), c_Message_OkeysFor(c_Message_Oparts(v_H)), tc_nat) cnf(cls_conjecture$_2$, negated_con
c_in(c_Message_Omsg_OKey(v_K_H), c_Message_Oanalz(v_H), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjecture)
¬ c_in(c_Message_OinvKey(v_K_H), c_Message_OkeysFor(c_Message_Oparts(v_G)), tc_nat) cnf(cls_conjecture$_4$, negated_con

SWV278-2.p Cryptographic protocol problem for events
¬ c_in(c_Message_Omsg_OKey(c_Message_OinvKey(c_Message_OinvKey(v_K_H))), c_Message_Oparts(v_H), tc_Message_Omsg)
c_in(c_Message_Omsg_OKey(v_K_H), c_Message_Oanalz(v_H), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes
c_Message_OinvKey(c_Message_OinvKey(v_y)) = v_y cnf(cls_Message_OinvKey_A_IinvKey_Ay_J_A_61_61_Ay$_0$, axiom)

SWV279-2.p Cryptographic protocol problem for public
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Event_Oused(v_H), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture
c_in(v_Y, c_Event_Oused(v_H), tc_Message_Omsg) ⇒ ¬ c_in(v_X, c_Event_Oused(v_H), tc_Message_Omsg) cnf(cls_conjectu
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_X, c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ c_lessequals(c_Message_Oparts(c_insert(v_X, c_emptyset, tc_Message_O
c_in(v_x, c_insert(v_x, v_A, t_a), t_a) cnf(cls_Set_Oinsert_iff$_1$, axiom)
(c_in(v_c, v_A, t_a) and c_lessequals(v_A, v_B, tc_set(t_a))) ⇒ c_in(v_c, v_B, t_a) cnf(cls_Set_OsubsetD$_0$, axiom)

SWV280-1.p Cryptographic protocol problem for public
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_lessequals(v_n, c_plus(v_n, v_m, tc_nat), tc_nat) cnf(cls_Nat_Ole__add1$_0$, axiom)
c_lessequals(v_n, c_plus(v_m, v_n, tc_nat), tc_nat) cnf(cls_Nat_Ole__add2$_0$, axiom)
c_less(v_m, c_Suc(v_n), tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_0$, axiom)
c_lessequals(v_m, v_n, tc_nat) ⇒ c_less(v_m, c_Suc(v_n), tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_1$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)

SWV280-2.p Cryptographic protocol problem for public
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) cnf(cls_conjecture$_0$, negated_conjecture)
c_lessequals(v_n, c_plus(v_n, v_m, tc_nat), tc_nat) cnf(cls_Nat_Ole__add1$_0$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na

SWV281-1.p Cryptographic protocol problem for public
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_lessequals(v_n, c_plus(v_n, v_m, tc_nat), tc_nat) cnf(cls_Nat_Ole__add1$_0$, axiom)
c_lessequals(v_n, c_plus(v_m, v_n, tc_nat), tc_nat) cnf(cls_Nat_Ole__add2$_0$, axiom)

c_less(v_m, c_Suc(v_n), tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_0$, axiom)
c_lessequals(v_m, v_n, tc_nat) ⇒ c_less(v_m, c_Suc(v_n), tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_1$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na
v_U = v_V or c_in(c_Message_Omsg_ONonce(v_V), c_Event_Oused(v_evs_H), tc_Message_Omsg) or c_in(c_Message_Omsg_ONo

SWV281-2.p Cryptographic protocol problem for public
v_U = v_V or c_in(c_Message_Omsg_ONonce(v_V), c_Event_Oused(v_evs_H), tc_Message_Omsg) or c_in(c_Message_Omsg_ONo
c_List_Olist_ONil ≠ c_List_Olist_OCons(v_a_H, v_list_H, t_a) cnf(cls_List_Olist_Odistinct__1$_0$, axiom)
c_lessequals(v_n, c_plus(v_m, v_n, tc_nat), tc_nat) cnf(cls_Nat_Ole__add2$_0$, axiom)
c_plus(v_m, v_k, tc_nat) = c_plus(v_n, v_k, tc_nat) ⇒ v_m = v_n cnf(cls_Nat_Onat__add__right__cancel$_0$, axiom)
c_plus(c_0, v_y, tc_nat) = v_y cnf(cls_Nat_Oop_A_L_Oadd__0$_0$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na

SWV282-1.p Cryptographic protocol problem for public
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_lessequals(v_n, c_plus(v_n, v_m, tc_nat), tc_nat) cnf(cls_Nat_Ole__add1$_0$, axiom)
c_lessequals(v_n, c_plus(v_m, v_n, tc_nat), tc_nat) cnf(cls_Nat_Ole__add2$_0$, axiom)
c_less(v_m, c_Suc(v_n), tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_0$, axiom)
c_lessequals(v_m, v_n, tc_nat) ⇒ c_less(v_m, c_Suc(v_n), tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_1$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na
v_U = v_W or v_V = v_W or v_U = v_V or c_in(c_Message_Omsg_ONonce(v_W), c_Event_Oused(v_evs_H_H), tc_Message_Om

SWV282-2.p Cryptographic protocol problem for public
v_U = v_W or v_V = v_W or v_U = v_V or c_in(c_Message_Omsg_ONonce(v_W), c_Event_Oused(v_evs_H_H), tc_Message_Om
c_Binomial_Obinomial(v_y, c_Suc(c_0)) = v_y cnf(cls_Binomial_Obinomial__1$_0$, axiom)
c_Binomial_Obinomial(c_Suc(v_n), c_Suc(v_k)) = c_plus(c_Binomial_Obinomial(v_n, v_k), c_Binomial_Obinomial(v_n, c_Suc(v_
c_Binomial_Obinomial(v_n, c_0) = c_1 cnf(cls_Binomial_Obinomial__n__0$_0$, axiom)
c_1 = c_Suc(c_0) cnf(cls_Nat_OOne__nat__def$_0$, axiom)
c_minus(v_m, v_n, tc_nat) = c_0 ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Odiff__is__0__eq$_0$, axiom)
c_minus(v_m, v_m, tc_nat) = c_0 cnf(cls_Nat_Odiff__self__eq__0$_0$, axiom)
c_lessequals(v_n, c_plus(v_n, v_m, tc_nat), tc_nat) cnf(cls_Nat_Ole__add1$_0$, axiom)
c_less(v_n, c_Suc(v_n), tc_nat) cnf(cls_Nat_OlessI$_0$, axiom)
c_lessequals(v_m, v_n, tc_nat) ⇒ c_less(v_m, c_Suc(v_n), tc_nat) cnf(cls_Nat_Oless__Suc__eq__le$_1$, axiom)
c_lessequals(c_plus(v_k, v_m, tc_nat), c_plus(v_k, v_n, tc_nat), tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Onat__a
¬ c_less(c_plus(v_j, v_i, tc_nat), v_i, tc_nat) cnf(cls_Nat_Onot__add__less2$_0$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_evs), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_sko__urX(v_evs), v_U, tc_na
c_Finite__Set_Ocard(c_SetInterval_OatMost(v_u, tc_nat), tc_nat) = c_Suc(v_u) cnf(cls_SetInterval_Ocard__atMost$_0$, axiom)

SWV283-2.p Cryptographic protocol problem for public
c_in(c_Message_Omsg_ONonce(v_U), c_Message_Oparts(c_insert(v_msg, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) ⇒
¬ c_lessequals(v_sko__upX(v_msg), v_U, tc_nat) cnf(cls_Message_Omsg__Nonce__supply$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_k, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_1$, axiom)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_list), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_x, v_U, tc_nat) cnf(cls_
c_lessequals(v_W, v_xd(v_W), tc_nat) or c_lessequals(v_U, v_xd(v_U), tc_nat) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_xd(v_X)), c_Event_Oused(v_list), tc_Message_Omsg) or c_in(c_Message_Omsg_ONonce(v_xd(v

SWV284-1.p Cryptographic protocol problem for shared
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
c_in(c_Message_Omsg_ONonce(v_U), c_Message_Oparts(c_insert(v_msg, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) ⇒
¬ c_lessequals(v_sko__upX(v_msg), v_U, tc_nat) cnf(cls_Message_Omsg__Nonce__supply$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_k, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat) cnf(cls_Nat_Oadd__leE$_1$, axiom)
¬ c_in(c_Message_Omsg_ONonce(v_N), c_Message_Oparts(c_Event_OinitState(v_B)), tc_Message_Omsg) cnf(cls_Shared_ON
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Shared_OshrK(v_A)), c_Event_Oknows(c_Mes
c_Shared_OshrK(v_x) = c_Shared_OshrK(v_y) ⇒ v_x = v_y cnf(cls_Shared_O_91_124_AshrK_Ax_A_61_AshrK_Ay_59_Ax_

(c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oanalz(v_H), tc_Message_Omsg) and c_in(c_Message_Omsg_OKey(v_K),
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg)   cnf(cls_Shared_Oanalz__Decrypt_H__dest$_0$, axiom)
c_in(c_Message_Omsg_OKey(c_Shared_OshrK(v_A)), c_Event_OinitState(v_A), tc_Message_Omsg)   cnf(cls_Shared_OshrK__
c_in(c_Message_Omsg_OKey(c_Shared_OshrK(v_A)), c_Event_Oused(v_evs), tc_Message_Omsg)   cnf(cls_Shared_OshrK__in_
c_lessequals(v_U, v_x(v_U), tc_nat)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_list), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_N, v_U, tc_nat)   cnf(cls_
c_in(c_Message_Omsg_ONonce(v_x(v_U)), c_Event_Oused(v_list), tc_Message_Omsg) or c_in(c_Message_Omsg_ONonce(v_x(v_U

SWV284-2.p Cryptographic protocol problem for shared
c_lessequals(v_U, v_x(v_U), tc_nat)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Message_Omsg_ONonce(v_U), c_Event_Oused(v_list), tc_Message_Omsg) ⇒ ¬ c_lessequals(v_N, v_U, tc_nat)   cnf(cls_
c_in(c_Message_Omsg_ONonce(v_x(v_U)), c_Event_Oused(v_list), tc_Message_Omsg) or c_in(c_Message_Omsg_ONonce(v_x(v_U
c_in(c_Message_Omsg_ONonce(v_U), c_Message_Oparts(c_insert(v_msg, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) ⇒
¬ c_lessequals(v_sko__upX(v_msg), v_U, tc_nat)   cnf(cls_Message_Omsg__Nonce__supply$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_k, v_n, tc_nat)   cnf(cls_Nat_Oadd__leE$_0$, axiom)
c_lessequals(c_plus(v_m, v_k, tc_nat), v_n, tc_nat) ⇒ c_lessequals(v_m, v_n, tc_nat)   cnf(cls_Nat_Oadd__leE$_1$, axiom)

SWV287-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v
c_in(c_Event_Oevent_OSays(v_B_H, v_A, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_M
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(v_U, c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_3$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_4$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_5$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(v_B_H, v_A, c_Message_Om
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Oms
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
(c_in(v_B, c_Event_Obad, tc_Message_Oagent) or c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_ONotes

SWV288-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Oms
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v
c_in(c_Event_Oevent_OSays(v_B_H, v_A, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_3$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_

SWV288-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v
c_in(c_Event_Oevent_OSays(v_B_H, v_A, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_3$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Mess
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Oms

SWV291-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')

(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v
(c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Omsg_OMPair(c_Mes
v_X and v_B = v_Ba) ⇒ v_A ≠ c_Message_Oagent_OSpy cnf(cls_conjecture$_6$, negated_conjecture)

SWV291-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)

SWV293-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Me
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(

SWV293-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_NA, c_Me
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(c_Event_Oevent_OSays(v_sko__usf(v_B, v_X, v_evs), v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) c
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa

SWV295-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c_Messag
¬ c_in(c_Message_Omsg_ONonce(v_NAa), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectu
v_NA = c_Message_Omsg_ONonce(v_NAa) cnf(cls_conjecture$_5$, negated_conjecture)
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV298-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_3$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message_Omsg_OMPair(
c_in(c_Event_Oevent_OSays(v_Aa, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_
v_U = c_Message_Omsg_ONonce(v_NB) ⇒ v_B ≠ v_Ba cnf(cls_conjecture$_7$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or v_B = v_C) cnf(cls_OtwayRees_Ounique__NA__dest$_0$, axiom)

SWV299-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_3$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NB), c_Message_Omsg_OMPair(
c_in(c_Event_Oevent_OSays(v_Aaa, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_Ono__nonce__OR1__OR2__dest$_0$, axiom)

SWV300-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_4$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_Aaa, v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c_Message_Omsg_OMI
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OKey(v_K))), c_Me
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OKey(v_K))), c_Mess
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Osynth(c_Message_Oanalz(v_H)), tc_Message_Omsg) ⇒ c_in(v_X, c_Mes
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Osynth(v_H), tc_Message_Omsg) cnf(cls_Message_Osynth_OInj$_0$
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)

SWV302-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
c_Message_Omsg_ONonce(v_NBa) cnf(cls_conjecture$_{13}$, negated_conjecture)
(c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Message_Omsg_ONonce(v_NBa), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectu
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(v_NB, c_Message_Omsg_OKey(v_K))), c_Messa
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_I
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV305-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')

(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message

SWV305-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)

SWV306-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_1$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(c_Message_Omsg_ONonce(v_NAa), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectu
v_A = v_Aa cnf(cls_conjecture$_3$, negated_conjecture)
v_NA = c_Message_Omsg_ONonce(v_NAa) cnf(cls_conjecture$_4$, negated_conjecture)
v_A = v_Aa cnf(cls_conjecture$_5$, negated_conjecture)
v_B = v_Ba cnf(cls_conjecture$_6$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(c_Messag
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message

SWV306-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(c_Message_Omsg_ONonce(v_NAa), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectu
v_NA = c_Message_Omsg_ONonce(v_NAa) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(c_Messag
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV307-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)

c_in(v_evs$_2$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectur
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_2$)), tc_Message_Omsg) cnf(cls_conjecture$_3$, ne
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_A_H = v_Aa cnf(cls_conjecture$_5$, negated_conjecture)
v_NA = c_Message_Omsg_ONonce(v_NB) cnf(cls_conjecture$_6$, negated_conjecture)
v_NA_H = c_Message_Omsg_ONonce(v_NAa) cnf(cls_conjecture$_7$, negated_conjecture)
v_A = v_Ba cnf(cls_conjecture$_8$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message

SWV307-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectur
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_NA = c_Message_Omsg_ONonce(v_NB) cnf(cls_conjecture$_6$, negated_conjecture)
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV308-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_4$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
v_Ba ≠ c_Message_Oagent_OServer cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_Ba, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c
c_in(c_Event_Oevent_OGets(v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c_Message_Omsg_OMPair(v_
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA_H, c_Message_Omsg_OMPair(v_NA, c_M
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message

SWV309-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M

SWV310-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M

SWV312-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M

SWV313-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
(c_in(v_B, c_Event_Obad, tc_Message_Oagent) or c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_ONotes

c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(v_NB, c_
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Event_Oknows(c_Message_Oagent_OSpy, v_evs), tc_Message_Omsg) cnf(cls_conjecture

SWV313-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(v_NB, c_
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Event_Oknows(c_Message_Oagent_OSpy, v_evs), tc_Message_Omsg) cnf(cls_conjecture
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) cnf(cls_Message_Oanalz_OInj$_0$,
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
(c_in(v_B, c_Event_Obad, tc_Message_Oagent) or c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_ONotes

SWV314-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
(c_in(v_B, c_Event_Obad, tc_Message_Oagent) or c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_ONotes
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(v_NB, c_
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg)

SWV314-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_M
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(v_NB, c_
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
(c_in(v_B, c_Event_Obad, tc_Message_Oagent) or c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_ONotes

SWV315-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(c_Event_Oevent_OSays(v_sko__usf(v_B, v_X, v_evs), v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OM
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_OtwayRees_OO
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn

c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Eve
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp

SWV315-2.p Cryptographic protocol problem for Otway Rees
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ c_in(c_Message_Omsg_OKey(v_K), v_H, tc_
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oknows(c_Mess
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)
c_in(v_a, v_A, t_a) ⇒ c_in(v_a, c_insert(v_b, v_A, t_a), t_a) cnf(cls_Set_Oinsert__iff$_2$, axiom)

SWV317-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_Public_OshrK(v_A) = v_KAB or c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_7$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oused(v_evs), tc_Message_Omsg) cnf(cls_Public_OshrK__in__

SWV318-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_0$, axiom)
c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)) =
c_Message_Oparts(v_H) cnf(cls_Message_Oparts__cut__eq$_0$, axiom)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(c_Event_Oevent_OSays(v_sko__usf(v_B, v_X, v_evs), v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) c
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oknows(c_Mess
c_in(v_a, v_A, t_a) ⇒ c_in(v_a, c_insert(v_b, v_A, t_a), t_a) cnf(cls_Set_Oinsert__iff$_2$, axiom)
c_in(v_evs$_4$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message_Omsg_OMPair(v_X,
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp

SWV319-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(c_Event_Oevent_OSays(v_sko__usf(v_B, v_X, v_evs), v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) c
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OM
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_OtwayRees_OOR
c_in(v_evso, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)

c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{2}$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{3}$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Eve
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_Public_OshrK(v_A) ≠ v_K   cnf(cls_conjecture$_{5}$, negated_conjecture)
c_Public_OshrK(v_A) = v_K or c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{6}$, negated_conjecture)

SWV319-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{2}$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{3}$, negated_conjecture)
c_Public_OshrK(v_A) = v_K or c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{6}$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Mes
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc

SWV320-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_Oa
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(c_Event_Oevent_OSays(v_sko__usf(v_B, v_X, v_evs), v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_OtwayRees_OSpy__analz__shrK$_{0}$, axiom)
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) and c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))) ⇒
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_OtwayRees_OSpy__see__shrK$_{0}$, axiom)
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) and c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))) ⇒
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_{1}$, negated_conjecture)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{2}$, negated_conjecture)

SWV320-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_
c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_{1}$, negated_conjecture)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{2}$, negated_conjecture)
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_OtwayRees_OSpy__see__shrK$_{0}$, axiom)

SWV321-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_{0}$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg)   cn
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_
c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{2}$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Eve

c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp

SWV321-2.p Cryptographic protocol problem for Otway Rees
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ c_in(c_Message_Omsg_OKey(v_K), v_H, tc_
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oknows(c_Mess
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)
c_in(v_a, v_B, t_a) ⇒ c_in(v_a, c_insert(v_b, v_B, t_a), t_a) cnf(cls_Set_OinsertCI$_0$, axiom)

SWV322-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
c_in(v_evs$_3$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Eve
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_Public_OshrK(v_A) ≠ v_KAB cnf(cls_conjecture$_6$, negated_conjecture)
c_Public_OshrK(v_A) = v_KAB or c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_7$, negated_conjecture)

SWV322-2.p Cryptographic protocol problem for Otway Rees
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_Public_OshrK(v_A) = v_KAB or c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_7$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oused(v_evs), tc_Message_Omsg) cnf(cls_Public_OshrK__in__

SWV323-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
c_in(v_evs$_4$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
v_B ≠ c_Message_Oagent_OServer cnf(cls_conjecture$_1$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_M
c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message_Omsg_OMPair(v_X,
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Eve
c_in(v_A, c_Event_Obad, tc_Message_Oagent) ⇒ ¬ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_in
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSp

SWV324-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
c_in(v_evso, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_M
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)

c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_A, c_Event_Obad, tc_Message_Oagent) $\Rightarrow$ c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Ev
c_in(v_A, c_Event_Obad, tc_Message_Oagent) $\Rightarrow$ c_Public_OshrK(v_A) $\neq$ v_K cnf(cls_conjecture$_5$, negated_conjecture)
c_Public_OshrK(v_A) = v_K or c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_6$, negated_conjecture)

SWV324-2.p Cryptographic protocol problem for Otway Rees
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_M
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_3$, negated_conjecture)
c_Public_OshrK(v_A) = v_K or c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_6$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) $\Rightarrow$ c_in(v_X, c_Message_Oa
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc

SWV325-1.p Cryptographic protocol problem for Otway Rees
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_B $\neq$ v_C cnf(cls_conjecture$_5$, negated_conjecture)
(c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_
v_B = v_C cnf(cls_conjecture$_6$, negated_conjecture)

SWV325-2.p Cryptographic protocol problem for Otway Rees
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_B $\neq$ v_C cnf(cls_conjecture$_5$, negated_conjecture)
(c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_
v_B = v_C cnf(cls_conjecture$_6$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) $\Rightarrow$ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
c_in(v_c, c_union(v_A, v_B, t_a), t_a) $\Rightarrow$ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)

SWV326-2.p Cryptographic protocol problem for Otway Rees
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc
$\neg$ c_in(c_Message_Omsg_ONonce(v_NAa), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_2$, negated_conjectu
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_Ba cnf(cls_conjecture$_{21}$, negated_conjecture)
v_A = v_Aa cnf(cls_conjecture$_3$, negated_conjecture)
v_Ba = v_C $\Rightarrow$ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v
v_NA = c_Message_Omsg_ONonce(v_NAa) cnf(cls_conjecture$_5$, negated_conjecture)

SWV327-1.p Cryptographic protocol problem for Otway Rees

include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-2.ax')
(c_in(v_evs, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_OtwayRees_OSpy__see__shrK__D__dest$_0$, axiom)
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_4$, c_OtwayRees_Ootway, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
v_Ba ≠ c_Message_Oagent_OServer cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_Ba, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c
c_in(c_Event_Oevent_OGets(v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NAa), c_Message_Omsg_OMPair(v_
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_O
v_B ≠ v_C cnf(cls_conjecture$_7$, negated_conjecture)
(c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg_OMPair(v_NA, c_Message_Omsg_OMPair(c_Message_
v_B = v_C cnf(cls_conjecture$_8$, negated_conjecture)

SWV328-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_Omsg
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Om
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_5$, negated_conjecture)
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB))) = v_X and v_B = v_Ba) ⇒ v_A ≠ c_Message_Oagent_OSpy cnf(cls_conjecture$_8$, negated_conjecture)

SWV328-2.p Cryptographic protocol problem for Yahalom
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_Omsg
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)

SWV329-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_Omsg
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes

c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_On
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_5$, negated_conjecture)
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_C
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB))) = v_X and v_B =
v_Ba) ⇒ v_A ≠ c_Message_Oagent_OSpy cnf(cls_conjecture$_8$, negated_conjecture)

SWV329-2.p Cryptographic protocol problem for Yahalom
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_On
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_5$, negated_conjecture)
¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_C
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) ⇒ (c_in(c_Message_Omsg_OCrypt(v_K
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes
c_in(v_c, c_union(v_A, v_B, t_a), t_a) ⇒ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUn__iff$_0$, axiom)
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c.
c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_Yahalom_OSpy__analz__shrK$_0$, axiom)

SWV330-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_Omsg)
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_On
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_5$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB))) = v_X and v_B =
v_Ba) ⇒ v_A ≠ c_Message_Oagent_OSpy cnf(cls_conjecture$_8$, negated_conjecture)

SWV330-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon

SWV331-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Message
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_Omsg
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_6$, negated_conjecture)

¬ c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_(
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon

SWV331-2.p Cryptographic protocol problem for Yahalom
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_3$), tc_Message_Omsg)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent
(c_in(v_K, c_Message_OsymKeys, tc_nat) and c_in(c_Message_Omsg_OCrypt(v_K, v_X), v_H, tc_Message_Omsg)) ⇒ c_in(v_K,
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs))), tc_nat) and c_in(v_K, c
c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs), tc_Message_Omsg)   cnf(cls_Yahalom_Onew__keys__not__used$_0$, ax

SWV332-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_0$, negated_conjecture)
v_Aa ≠ c_Message_Oagent_OServer   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(v_U = v_X and v_B = v_Ba) ⇒ v_A ≠ v_Aa   cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Om
c_in(c_Event_Oevent_OSays(v_Aa, v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg)   cnf(cls_conjecture$_5$, ne
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Or
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV333-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_0$, negated_conjecture)
v_Aa ≠ c_Message_Oagent_OServer   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(v_U = v_X and v_B = v_Ba) ⇒ v_A ≠ v_Aa   cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Om
c_in(c_Event_Oevent_OSays(v_Aa, v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg)   cnf(cls_conjecture$_5$, ne
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Or
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV333-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon

SWV334-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')

include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-6.ax')
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
v_Aa $\neq$ c_Message_Oagent_OServer cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_{10}$, negated_conjecture)
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
(v_NB = v_NBa and v_K = v_Ka and v_U = v_X and v_B = v_Ba) $\Rightarrow$ v_A $\neq$ v_Aa cnf(cls_conjecture$_{12}$, negated_conjectu
c_in(v_Ka, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Om
c_in(c_Event_Oevent_OSays(v_Aa, v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg) cnf(cls_conjecture$_5$, ne
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent
c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Om

SWV334-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_U, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(v_Xa, c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONon

SWV335-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-3.ax')
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_O
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_U, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_

SWV335-2.p Cryptographic protocol problem for Yahalom
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf)), tc_Message_O
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Mes
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Osynth(v_H), tc_Message_Omsg) $\Rightarrow$ (c_in(v_X, c_Message_Osynth(v_H), t
(c_in(v_Z, c_Message_Oparts(c_insert(v_X, v_H, tc_Message_Omsg)), tc_Message_Omsg) and c_in(v_X, c_Message_Osynth(c_Mes
c_in(v_Z, c_union(c_Message_Osynth(c_Message_Oanalz(v_H)), c_Message_Oparts(v_H), tc_Message_Omsg), tc_Message_Omsg)
c_in(c_Message_Omsg_ONonce(v_n), c_Message_Osynth(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(c_Message_Omsg_ONonce(v_n), v_H,
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
c_in(v_c, c_union(v_A, v_B, t_a), t_a) $\Rightarrow$ (c_in(v_c, v_B, t_a) or c_in(v_c, v_A, t_a)) cnf(cls_Set_OUnE$_0$, axiom)

SWV336-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-3.ax')
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_1$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Message
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagent
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O

¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_U, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_
(v_NB = v_NBa and v_W = v_NA and v_K = v_KAB and v_V = v_B) ⇒ v_U ≠ v_A cnf(cls_conjecture$_8$, negated_conject

SWV336-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_U, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_

SWV337-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-2.ax')
include('Axioms/SWV006-0.ax')
include('Axioms/SWV006-3.ax')
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
v_A ≠ c_Message_Oagent_OServer cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Omsg_ONonce(v_
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg) cnf(cls_conjecture$_5$, ne
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_O
¬ c_in(c_Message_Omsg_OCrypt(v_K, c_Message_Omsg_ONonce(v_NB)), c_Message_Oparts(c_Event_Oknows(c_Message_Oagen
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_U, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_

SWV337-2.p Cryptographic protocol problem for Yahalom
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_O
¬ c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_U, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oanalz(v_H), tc
c_in(v_c, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_c, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mess
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), v_X), c_Message_Oan
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Public_OCrypt
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c
(c_in(v_A, c_Event_Obad, tc_Message_Oagent) or c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Om
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet

SWV338-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) and c_in(v_X, c_Message_Os
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) or c_in(c_Message_Omsg_OI
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evsf, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oparts(c_insert(v_X, c_emptyset, tc_Message_Omsg)), tc_Message_Omsg) c
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evsf), tc_Message_Omsg) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf), tc_Message_
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_nat) ⇒ c_in(c_Mess

SWV338-2.p Cryptographic protocol problem for Yahalom
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) and c_in(v_X, c_Message_Os
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) or c_in(c_Message_Omsg_OI
c_in(v_y, c_Message_OsymKeys, tc_nat) ⇒ c_Message_OinvKey(v_y) = v_y cnf(cls_Public_OinvKey__K$_0$, axiom)
c_union(v_y, v_y, t_a) = v_y cnf(cls_Set_OUn__absorb$_0$, axiom)
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_X, c_Message_Osynth(c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_Message_Omsg) cn

¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evsf), tc_Message_Omsg) cnf(cls_conjecture$_{4}$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf), tc_Message.
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evsf))), tc_nat) ⇒ c_in(c_Mess

SWV339-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) and c_in(v_X, c_Message_Os
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) or c_in(c_Message_Omsg_OI
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_{0}$, negated_conjecture)
c_in(v_evs$_{3}$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_{1}$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_{3}$), tc_Message_Omsg) cnf(cls_conjecture$_{2}$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_{3}$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Message
v_K ≠ v_KAB cnf(cls_conjecture$_{5}$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_{3}$), tc_Message_Omsg) cnf(cls_conjecture$_{6}$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_{3}$))), tc_nat) ⇒ c_in(c_Mess
v_K = c_Public_OshrK(v_B) or v_K = c_Public_OshrK(v_A) cnf(cls_conjecture$_{8}$, negated_conjecture)

SWV339-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_{3}$), tc_Message_Omsg) cnf(cls_conjecture$_{6}$, negated_conjecture)
v_K = c_Public_OshrK(v_B) or v_K = c_Public_OshrK(v_A) cnf(cls_conjecture$_{8}$, negated_conjecture)
c_in(c_Message_Omsg_OKey(c_Public_OshrK(v_A)), c_Event_Oused(v_evs), tc_Message_Omsg) cnf(cls_Public_OshrK__in__u

SWV340-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_insert(v_X, v_G, tc_Message_Omsg))), tc_nat) and c_in(v_X, c_Message_Os
(c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_union(v_G, v_H, tc_Message_Omsg))), tc_nat) or c_in(c_Message_Omsg_OI
c_in(v_K, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_{0}$, negated_conjecture)
c_in(v_evs$_{4}$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_{1}$, negated_conjecture)
c_in(v_K, c_Message_OkeysFor(c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_{4}$))), tc_nat) ⇒ c_in(c_Mess
v_A ≠ c_Message_Oagent_OServer cnf(cls_conjecture$_{2}$, negated_conjecture)
c_in(v_Ka, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_{3}$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg
c_in(c_Event_Oevent_OSays(v_A, v_B, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Omsg_ONonce(v_
c_in(v_X, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_{4}$)), tc_Message_Omsg) cnf(cls_conjecture$_{6}$, ne
¬ c_in(c_Message_Omsg_OKey(v_K), c_Message_Oparts(c_insert(v_X, c_insert(c_Message_Omsg_OCrypt(v_Ka, c_Message_Omsg
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_{4}$), tc_Message_Omsg) cnf(cls_conjecture$_{8}$, negated_conjecture)
v_K = v_Ka cnf(cls_conjecture$_{9}$, negated_conjecture)

SWV340-2.p Cryptographic protocol problem for Yahalom
c_in(v_evs$_{4}$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_{1}$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), c_Message_Omsg
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs$_{4}$), tc_Message_Omsg) cnf(cls_conjecture$_{8}$, negated_conjecture)
v_K = v_Ka cnf(cls_conjecture$_{9}$, negated_conjecture)
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_{0}$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_{0}$, axiom)

(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet

SWV341-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs_3), tc_Message_Omsg) cnf($cls\_conjecture_1$, negated_conjecture)
c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs_3)), tc_Message_Omsg)
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes

SWV342-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs_3), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf($cls\_Message\_Oparts\_OInj_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf($cls\_Message\_Oparts\_\_analz_0$, axiom)

SWV343-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs_3), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjecture)
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf($cls\_Message\_Oparts\_OInj_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf($cls\_Message\_Oparts\_\_analz_0$, axiom)

SWV344-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Message_Omsg_OKey(v_K), c_Event_Oused(v_evs_3), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Message_O
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf($cls\_Message\_Oparts\_OInj_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf($cls\_Message\_Oparts\_\_analz_0$, axiom)

SWV345-2.p Cryptographic protocol problem for Yahalom
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
v_nb = v_nb_H cnf($cls\_Yahalom\_Ounique\_\_session\_\_keys\_\_dest_3$, axiom)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf($cls\_conjecture_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
v_nb ≠ c_Message_Omsg_ONonce(v_NB) cnf($cls\_conjecture_7$, negated_conjecture)

SWV346-2.p Cryptographic protocol problem for Yahalom
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServe
v_na = v_na_H cnf($cls\_Yahalom\_Ounique\_\_session\_\_keys\_\_dest_2$, axiom)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf($cls\_conjecture_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
v_na ≠ c_Message_Omsg_ONonce(v_NA) cnf($cls\_conjecture_7$, negated_conjecture)

SWV347-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')

include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
$\neg$ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg)   cnf(cls_conjecture$_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
$\neg$ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV347-2.p Cryptographic protocol problem for Yahalom
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_S_H, c_Message_Omsg_C
(c_in(v_nb, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) or v_A_H = v_A)   cnf
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O

SWV348-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_O
c_in(c_Message_Omsg_OKey(v_K), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg)
c_in(v_evs$_4$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
v_Aa $\neq$ c_Message_Oagent_OServer   cnf(cls_conjecture$_3$, negated_conjecture)
c_in(v_K, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_Aa), c_Message_Om
c_in(c_Event_Oevent_OSays(v_Aa, v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_4$)), tc_Message_Omsg)   cnf(cls_conjecture$_7$, ne
$\neg$ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes

SWV349-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_C

¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message
(v_U = c_Message_Omsg_OKey(v_K) and v_NA = v_NB) ⇒ v_NB ≠ v_NBa   cnf(cls_conjecture$_9$, negated_conjecture)

SWV349-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message

SWV350-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message
v_U = c_Message_Omsg_OKey(v_K) ⇒ v_NA ≠ v_NAa   cnf(cls_conjecture$_9$, negated_conjecture)

SWV350-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message

SWV351-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
(v_U = c_Message_Omsg_OKey(v_K) and v_NA = v_NAa) ⇒ v_NB ≠ v_NBa   cnf(cls_conjecture$_{10}$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_O
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_insert(c_Message_Omsg_OKey(v_K), c_Event_Oknows(c_Message_O

SWV351-2.p Cryptographic protocol problem for Yahalom
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Message

SWV352-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')

¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_C
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc_Message_O
(v_U = c_Message_Omsg_OKey(v_K) and v_NA = v_NB) ⇒ v_NB ≠ v_NBa   cnf(cls_conjecture$_8$, negated_conjecture)

SWV353-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_C
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc_Message_O
v_U = c_Message_Omsg_OKey(v_K) ⇒ v_NA ≠ v_NAa   cnf(cls_conjecture$_8$, negated_conjecture)

SWV353-2.p Cryptographic protocol problem for Yahalom
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_C
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc_Message_O
v_U = c_Message_Omsg_OKey(v_K) ⇒ v_NA ≠ v_NAa   cnf(cls_conjecture$_8$, negated_conjecture)
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServ
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Message
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_S_H, c_Message_Omsg_C
(c_in(v_nb, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) or v_NA_H = v_NA)

SWV354-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evso, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OSays(c_Message_Oagent_OServer, v_Aa, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_C
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evso)), tc_Message_O
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_insert(c_Message_Omsg_OKey(v_K), c_Event_Oknows(c_Message_C
(v_U = c_Message_Omsg_OKey(v_K) and v_NA = v_NAa) ⇒ v_NB ≠ v_NBa   cnf(cls_conjecture$_9$, negated_conjecture)

SWV355-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')

include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs$_1$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjectur
$\neg$ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_1$)), tc_Message_O

SWV355-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) $\Rightarrow$ c_in(v_X, c_Event_Okno
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_1$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjectur
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes

SWV356-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs$_2$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjectur
c_in(c_Event_Oevent_OGets(v_B, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_A), c_Message_Omsg_ONonce(v_NA))
$\neg$ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
$\neg$ c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_M
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_2$)), tc_Message_Om

SWV356-2.p Cryptographic protocol problem for Yahalom
$\neg$ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjectur
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_2$)), tc_Message_Om
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) $\Rightarrow$ c_in(v_c, c_Event_Oused
c_in(v_X, c_Message_Oanalz(v_H), tc_Message_Omsg) $\Rightarrow$ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Mes

SWV357-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
$\neg$ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
$\neg$ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs$_2$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
$\neg$ c_in(c_Message_Omsg_ONonce(v_NBa), c_Event_Oused(v_evs$_2$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjectu
c_in(c_Event_Oevent_OGets(v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce(v_NI
$\neg$ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa

¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs_2)), tc_Message_O
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_8$, negated_conjecture)

SWV357-2.p Cryptographic protocol problem for Yahalom
c_in(v_evs_2, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf($cls\_conjecture_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce(v_NB
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs_2)), tc_Message_O
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet

SWV358-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_1$, negated_conjecture)
c_in(v_evs_2, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf($cls\_conjecture_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs_2), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjectur
c_in(c_Event_Oevent_OGets(v_Ba, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Aa), c_Message_Omsg_ONonce(v_NA
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs_2)), tc_Message_O
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_8$, negated_conjecture)

SWV358-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Event_Okno
c_in(v_c, c_Message_Oparts(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) ⇒ c_in(v_c, c_Event_Oused
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(c_Message_Omsg_OCrypt(v_K, v_X), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf($cls\_Message\_Oparts\_OInj_0$,
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Event_Oused(v_evs_2), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjectur
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes

SWV359-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_1$, negated_conjecture)
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_{11}$, negated_conjecture)
c_in(v_evs_3, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf($cls\_conjecture_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs_3), tc_Message_Omsg) cnf($cls\_conjecture_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf($cls\_conjecture_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs_3)), tc_Message_O
c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf($cls\_conjecture_9$, negated_conjecture)

SWV359-2.p Cryptographic protocol problem for Yahalom

c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Event_Okno
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_0$, axiom)
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Oms
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O

SWV360-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_9$, negated_conjecture)

SWV360-2.p Cryptographic protocol problem for Yahalom
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_S_H, c_Message_Omsg_C
(c_in(v_nb, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) or v_B_H = v_B) cnf(
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_9$, negated_conjecture)

SWV361-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_Ba, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa

c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV361-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Event_Okno
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg)   cnf(cls_Message_Oparts_OInj$_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H)   cnf(cls_Message_Oparts__analz$_0$, axiom)
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg)   cnf(cls_Yahalom_OGet
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O

SWV362-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_Ba, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{11}$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg)   cnf(cls_conjecture$_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat)   cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV362-2.p Cryptographic protocol problem for Yahalom
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_S_H, c_Message_Omsg_C
(c_in(v_nb, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) or v_A_H = v_A)   cnf
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent))   cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_9$, negated_conjecture)

SWV363-1.p Cryptographic protocol problem for Yahalom
include('Axioms/MSC001-0.ax')
include('Axioms/MSC001-1.ax')
include('Axioms/SWV005-0.ax')
include('Axioms/SWV005-2.ax')
include('Axioms/SWV005-3.ax')
include('Axioms/SWV005-4.ax')
include('Axioms/SWV005-5.ax')
include('Axioms/SWV005-7.ax')
¬ c_in(v_A, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_0$, negated_conjecture)
¬ c_in(v_B, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_1$, negated_conjecture)
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent)   cnf(cls_conjecture$_{11}$, negated_conjecture)

c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_in(c_Message_Omsg_OKey(v_KAB), c_Event_Oused(v_evs$_3$), tc_Message_Omsg) cnf(cls_conjecture$_3$, negated_conjecture
c_in(v_KAB, c_Message_OsymKeys, tc_nat) cnf(cls_conjecture$_4$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
¬ c_in(c_Event_Oevent_ONotes(c_Message_Oagent_OSpy, c_Message_Omsg_OMPair(c_Message_Omsg_ONonce(v_NA), c_Messa
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O
c_in(v_Aa, c_Event_Obad, tc_Message_Oagent) cnf(cls_conjecture$_9$, negated_conjecture)

SWV363-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OSays(v_A, v_B, v_X), c_List_Oset(v_evs, tc_Event_Oevent), tc_Event_Oevent) ⇒ c_in(v_X, c_Event_Okn
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oparts(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oparts(v_H), tc
c_in(v_X, v_H, tc_Message_Omsg) ⇒ c_in(v_X, c_Message_Oparts(v_H), tc_Message_Omsg) cnf(cls_Message_Oparts_OInj$_0$,
c_Message_Oparts(c_Message_Oanalz(v_H)) = c_Message_Oparts(v_H) cnf(cls_Message_Oparts__analz$_0$, axiom)
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Message_Omsg_OCrypt(c_Public_OshrK(v_B), c
c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Oms
c_in(v_evs$_3$, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_2$, negated_conjecture)
c_in(c_Event_Oevent_OGets(c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_Ba), c_Messag
c_in(c_Event_Oevent_OSays(v_B, c_Message_Oagent_OServer, c_Message_Omsg_OMPair(c_Message_Omsg_OAgent(v_B), c_Mes
¬ c_in(c_Message_Omsg_ONonce(v_NB), c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs$_3$)), tc_Message_O

SWV364-2.p Cryptographic protocol problem for Yahalom
c_in(c_Event_Oevent_OGets(v_A, c_Message_Omsg_OMPair(c_Message_Omsg_OCrypt(c_Public_OshrK(v_A), v_Y), v_X)), c_Lis
c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) cnf(cls_conjecture$_1$, negated_conjecture)
¬ c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_conjecture$_2$, n
c_in(c_Message_Omsg_OMPair(v_X, v_Y), c_Message_Oanalz(v_H), tc_Message_Omsg) ⇒ c_in(v_Y, c_Message_Oanalz(v_H), tc
(c_in(v_evs, c_Yahalom_Oyahalom, tc_List_Olist(tc_Event_Oevent)) and c_in(c_Event_Oevent_OGets(v_B, v_X), c_List_Oset(v_e
c_in(v_X, c_Message_Oanalz(c_Event_Oknows(c_Message_Oagent_OSpy, v_evs)), tc_Message_Omsg) cnf(cls_Yahalom_OGet

SWV365+1.p Priority queue checker: lemma_I_s base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, x, y$: $i(\text{triple}(u, \text{create\_slb}, x)) = i(\text{triple}(v, \text{create\_slb}, y))$ fof(l1_co, conjecture)

SWV366+1.p Priority queue checker: lemma_I_s induction
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u$: $(\forall v, w, x, y$: $i(\text{triple}(v, u, x)) = i(\text{triple}(w, u, y)) \Rightarrow \forall z, x_1, x_2, x_3, x_4, x_5$: $i(\text{triple}(z, \text{insert\_slb}(u, \text{pair}(x_4, x_5)), x_2)) = i(\text{triple}(x_1, \text{insert\_slb}(u, \text{pair}(x_4, x_5)), x_3)))$ fof(l2_co, conjecture)

SWV367+1.p Priority queue checker: lemma_contains_s_I_remove base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w$: $(\text{contains\_pq}(i(\text{triple}(u, \text{create\_slb}, v)), w) \Rightarrow i(\text{remove\_cpq}(\text{triple}(u, \text{create\_slb}, v), w)) = \text{remove\_pq}(i(\text{triple}(u, \text{create}$

SWV368+1.p Priority queue checker: lemma_contains_s_I_remove induction
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x$: $(\text{contains\_cpq}(\text{triple}(u, v, w), x) \iff \text{contains\_pq}(i(\text{triple}(u, v, w)), x))$ fof(l3_li$_{56}$, lemma)

∀u: (∀v, w, x: (contains_pq(i(triple(v, u, w)), x) ⇒ i(remove_cpq(triple(v, u, w), x)) = remove_pq(i(triple(v, u, w)), x)) ⇒
∀y, z, x_1, x_2, x_3: (contains_pq(i(triple(y, insert_slb(u, pair(x_2, x_3)), z)), x_1) ⇒ i(remove_cpq(triple(y, insert_slb(u, pair(x_2, x_3))
remove_pq(i(triple(y, insert_slb(u, pair(x_2, x_3)), z)), x_1))) fof(l4_co, conjecture)

SWV369+1.p Priority queue checker: lemma_contains_s_I base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
∀u, v, w: (contains_cpq(triple(u, create_slb, v), w) ⟺ contains_pq(i(triple(u, create_slb, v)), w)) fof(l5_co, conjecture)

SWV370+1.p Priority queue checker: lemma_contains_s_I induction
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
∀u: (∀v, w, x: (contains_cpq(triple(v, u, w), x) ⟺ contains_pq(i(triple(v, u, w)), x)) ⇒ ∀y, z, x_1, x_2, x_3: (contains_cpq(triple
contains_pq(i(triple(y, insert_slb(u, pair(x_1, x_2)), z)), x_3))) fof(l6_co, conjecture)

SWV371+1.p Priority queue checker: lemma_pi_min_elem
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
∀u, v, w: (phi(findmin_cpq_eff(triple(u, v, w))) ⇒ contains_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w)))) fof(l7_l_8,
∀u, v, w: (phi(findmin_cpq_eff(triple(u, v, w))) ⇒ issmallestelement_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w))))
∀u, v, w: (phi(findmin_cpq_eff(triple(u, v, w))) ⇒ pi_sharp_find_min(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w)))) fo

SWV372+1.p Priority queue checker: lemma_contains_cpq_min_elem
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
∀u, v, w, x: (contains_cpq(triple(u, v, w), x) ⟺ contains_pq(i(triple(u, v, w)), x)) fof(l8_li_{56}, lemma)
∀u, v, w: (¬contains_cpq(triple(u, v, w), findmin_cpq_res(triple(u, v, w))) ⇒ ¬ok(findmin_cpq_eff(triple(u, v, w)))) fof(l8_l
∀u, v, w: (¬ok(triple(u, v, w)) ⇒ ¬phi(triple(u, v, w))) fof(l8_lX, lemma)
∀u, v, w: (phi(findmin_cpq_eff(triple(u, v, w))) ⇒ contains_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w)))) fof(l8_co

SWV372+2.p Priority queue checker: lemma_contains_cpq_min_elem
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
∀u, v, w, x: (contains_cpq(triple(u, v, w), x) ⟺ contains_pq(i(triple(u, v, w)), x)) fof(l8_li_{56}, lemma)
∀u, v, w: (ok(findmin_cpq_eff(triple(u, v, w))) ⇒ (v ≠ create_slb and contains_slb(v, findmin_pqp_res(u)) and lookup_slb(v, fin
findmin_pqp_res(u))) fof(l9_l_{10}, lemma)
∀u, v, w: (¬ok(triple(u, v, w)) ⇒ ∀x, y, z: (succ_cpq(triple(u, v, w), triple(x, y, z)) ⇒ ¬ok(triple(x, y, z)))) fof(l11_l_{12}, lem
∀u, v, w: (phi(findmin_cpq_eff(triple(u, v, w))) ⇒ contains_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w)))) fof(l8_co

SWV373+1.p Priority queue checker: lemma_not_contains_min_not_ok
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (ok(findmin_cpq_eff(triple(u, v, w))) ⇒ (v ≠ create_slb and contains_slb(v, findmin_pqp_res(u)) and lookup_slb(v, fin
findmin_pqp_res(u))) fof(l9_l_{10}, lemma)
∀u, v, w: (¬contains_cpq(triple(u, v, w), findmin_cpq_res(triple(u, v, w))) ⇒ ¬ok(findmin_cpq_eff(triple(u, v, w)))) fof(l9_c

SWV374+1.p Priority queue checker: lemma_ok_find_min

include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: (ok(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ ($v \neq$ create_slb and contains_slb(v, findmin_pqp_res(u)) and lookup_slb(v, fin
findmin_pqp_res(u))) fof(l10_co, conjecture)

SWV375+1.p Priority queue checker: lemma_not_ok_not_phi
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ $\neg$ ok(triple(x, y, z)))) fof(l11_l$_{12}$, lem
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ phi(triple(u, v, w))) fof(l11_co, conjecture)

SWV376+1.p Priority queue checker: lemma_not_ok_persistence
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) $\Rightarrow$ $\neg$ ok(im_succ_cpq(triple(x, y, z))))) $\Rightarrow$
$\forall x_1, x_2, x_3$: ($\neg$ ok(triple(x_1, x_2, x_3)) $\Rightarrow$ $\forall x_4, x_5, x_6$: (succ_cpq(triple(x_1, x_2, x_3), triple(x_4, x_5, x_6)) $\Rightarrow$ $\neg$ ok(triple(x_4, x_5, x_6))))
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(im_succ_cpq(triple(u, v, w)))) fof(l12_l$_{13}$, lemma)
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ $\neg$ ok(triple(x, y, z)))) fof(l12_co, con

SWV377+1.p Priority queue checker: lemma_not_ok_persistence_induction step 1
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(insert_cpq(triple(u, v, w), x))) fof(l13_co, conjecture)

SWV378+1.p Priority queue checker: lemma_not_ok_persistence_induction step 2
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(remove_cpq(triple(u, v, w), x))) fof(l14_co, conjecture)

SWV379+1.p Priority queue checker: lemma_not_ok_persistence_induction step 3
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(findmin_cpq_eff(triple(u, v, w)))) fof(l15_co, conjecture)

SWV380+1.p Priority queue checker: lemma_not_ok_persistence_induction step 4
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(remove_cpq(triple(u, v, w), x))) fof(l16_l$_{14}$, lemma)
$\forall u, v, w$: ($\neg$ ok(triple(u, v, w)) $\Rightarrow$ $\neg$ ok(removemin_cpq_eff(triple(u, v, w)))) fof(l16_co, conjecture)

SWV381+1.p Priority queue checker: lemma_min_elem_smallest
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x$: (contains_cpq(triple(u, v, w), x) $\iff$ contains_pq(i(triple(u, v, w)), x)) fof(l17_li$_{56}$, lemma)
$\forall u, v, w$: ($\exists x$: (contains_cpq(triple(u, v, w), x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ $\neg$ phi(findmin_cpq
$\forall u, v, w$: (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ issmallestelement_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w))))

SWV381+2.p Priority queue checker: lemma_min_elem_smallest
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')

include('Axioms/SWV007+4.ax')
$\forall u, v, w, x$: (contains_cpq(triple(u, v, w), x) $\iff$ contains_pq(i(triple(u, v, w)), x)) fof(l17_li$_{56}$, lemma)
$\forall u, v, w$: (($\neg$ check_cpq(triple(u, v, w)) or $\neg$ ok(triple(u, v, w))) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_cpq(triple(x, y, z))))) fof(l19_l$_{20}$, lemma)
$\forall u, v$: (contains_slb(u, v) $\Rightarrow$ $\exists w$: pair_in_list(u, v, w)) fof(l45_li$_{4647}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and $x < w$) $\Rightarrow$ $\exists y$: (pair_in_list(update_slb(u, x), v, y) and $x <$ y)) fof(l45_l$_{49}$, lemma)
$\forall u, v, w$: (check_cpq(triple(u, v, w)) $\iff$ $\forall x, y$: (pair_in_list(v, x, y) $\Rightarrow$ $y < x$)) fof(l43_li$_{4142}$, lemma)
$\forall u, v, w$: (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ issmallestelement_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w))))

SWV381+3.p Priority queue checker: lemma_min_elem_smallest
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x$: (contains_cpq(triple(u, v, w), x) $\iff$ contains_pq(i(triple(u, v, w)), x)) fof(l17_li$_{56}$, lemma)
$\forall u, v, w$: (($\neg$ check_cpq(triple(u, v, w)) or $\neg$ ok(triple(u, v, w))) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_cpq(triple(x, y, z))))) fof(l19_l$_{20}$, lemma)
$\forall u, v, w$: ((contains_slb(u, v) and strictly_less_than(v, w)) $\Rightarrow$ (pair_in_list(update_slb(u, w), v, w) or $\exists x$: (pair_in_list(update_sl
x))) fof(l44_l$_{45}$, lemma)
$\forall u, v, w$: (check_cpq(triple(u, v, w)) $\iff$ $\forall x, y$: (pair_in_list(v, x, y) $\Rightarrow$ $y < x$)) fof(l43_li$_{4142}$, lemma)
$\forall u, v, w$: (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ issmallestelement_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w))))

SWV381+4.p Priority queue checker: lemma_min_elem_smallest
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x$: (contains_cpq(triple(u, v, w), x) $\iff$ contains_pq(i(triple(u, v, w)), x)) fof(l17_li$_{56}$, lemma)
$\forall u, v, w$: ($\neg$ check_cpq(triple(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_c
$\forall u, v, w$: ($\exists x$: (contains_cpq(triple(u, v, w), x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ $\neg$ check_cpq(findm
$\forall u, v, w$: (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ issmallestelement_pq(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w))))

SWV382+1.p Priority queue checker: lemma_not_min_elem_not_phi
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w$: ($\neg$ check_cpq(triple(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_c
$\forall u, v, w$: ($\exists x$: (contains_cpq(triple(u, v, w), x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ $\neg$ check_cpq(findm
$\forall u, v, w$: ($\exists x$: (contains_cpq(triple(u, v, w), x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ $\neg$ phi(findmin_cpq

SWV383+1.p Priority queue checker: lemma_not_check_not_phi
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: (($\neg$ check_cpq(triple(u, v, w)) or $\neg$ ok(triple(u, v, w))) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_cpq(triple(x, y, z))))) fof(l19_l$_{20}$, lemma)
$\forall u, v, w$: ($\neg$ check_cpq(triple(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ ($\neg$ ok(triple(x, y, z)) or $\neg$ check_c

SWV384+1.p Priority queue checker: lemma_not_min_elem_not_check_induction
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x, y, z$: (succ_cpq(triple(u, v, w), triple(x, y, z)) $\Rightarrow$ (($\neg$ check_cpq(triple(x, y, z)) or $\neg$ ok(triple(x, y, z))) $\Rightarrow$ ($\neg$ check_cpq(im_succ_cpq(triple(x, y, z))) or $\neg$ ok(im_succ_cpq(triple(x, y, z)))))) $\Rightarrow$ $\forall x_1, x_2, x_3$: (($\neg$ check_cpq(triple(x_1, x_2, x
$\forall x_4, x_5, x_6$: (succ_cpq(triple(x_1, x_2, x_3), triple(x_4, x_5, x_6)) $\Rightarrow$ ($\neg$ ok(triple(x_4, x_5, x_6)) or $\neg$ check_cpq(triple(x_4, x_5, x_6)))))
$\forall u, v, w$: (($\neg$ check_cpq(triple(u, v, w)) or $\neg$ ok(triple(u, v, w))) $\Rightarrow$ ($\neg$ check_cpq(im_succ_cpq(triple(u, v, w))) or $\neg$ ok(im_succ

∀u, v, w: ((¬ check_cpq(triple(u, v, w)) or ¬ ok(triple(u, v, w))) ⇒ ∀x, y, z: (succ_cpq(triple(u, v, w), triple(x, y, z)) ⇒ (¬ ok(triple(x, y, z)) or ¬ check_cpq(triple(x, y, z))))) fof(l20_co, conjecture)

SWV385+1.p Priority queue checker: lemma_not_min_elem_not_check_induction02
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (¬ ok(triple(u, v, w)) ⇒ ¬ ok(im_succ_cpq(triple(u, v, w)))) fof(l21_li_{1316}, lemma)
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ (¬ check_cpq(im_succ_cpq(triple(u, v, w))) or ¬ ok(im_succ_cpq(triple(u, v, w)))))
∀u, v, w: ((¬ check_cpq(triple(u, v, w)) or ¬ ok(triple(u, v, w))) ⇒ (¬ check_cpq(im_succ_cpq(triple(u, v, w))) or ¬ ok(im_succ_

SWV386+1.p Priority queue checker: lemma_not_min_elem_not_check_ind_steps 1
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ ∀x: ¬ check_cpq(insert_cpq(triple(u, v, w), x))) fof(l22_l_{26}, lemma)
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ ∀x: (¬ check_cpq(insert_cpq(triple(u, v, w), x)) or ¬ ok(insert_cpq(triple(u, v, w), x)))

SWV387+1.p Priority queue checker: lemma_not_min_elem_not_check_ind_steps 2
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w, x: ((check_cpq(remove_cpq(triple(u, v, w), x)) and ok(remove_cpq(triple(u, v, w), x))) ⇒ check_cpq(triple(u, v, w)))
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ ∀x: (¬ check_cpq(remove_cpq(triple(u, v, w), x)) or ¬ ok(remove_cpq(triple(u, v, w),

SWV388+1.p Priority queue checker: lemma_not_min_elem_not_check_ind_steps 3
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ ¬ check_cpq(findmin_cpq_eff(triple(u, v, w)))) fof(l24_l_{34}, lemma)
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ (¬ check_cpq(findmin_cpq_eff(triple(u, v, w))) or ¬ ok(findmin_cpq_eff(triple(u, v, w)

SWV389+1.p Priority queue checker: lemma_not_min_elem_not_check_ind_steps 4
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: ((check_cpq(removemin_cpq_eff(triple(u, v, w))) and ok(removemin_cpq_eff(triple(u, v, w)))) ⇒ check_cpq(triple(u,
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ (¬ check_cpq(removemin_cpq_eff(triple(u, v, w))) or ¬ ok(removemin_cpq_eff(triple(

SWV390+1.p Priority queue checker: tmp_not_check_01
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (check_cpq(triple(u, v, w)) ⟺ ∀x, y: (pair_in_list(v, x, y) ⇒ y < x)) fof(l26_li_{4142}, lemma)
∀u, v, w: (¬ check_cpq(triple(u, v, w)) ⇒ ∀x: ¬ check_cpq(insert_cpq(triple(u, v, w), x))) fof(l26_co, conjecture)

SWV391+1.p Priority queue checker: tmp_not_check_02
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
∀u, v, w: (check_cpq(triple(u, v, w)) ⟺ ∀x, y: (pair_in_list(v, x, y) ⇒ y < x)) fof(l27_li_{4142}, lemma)
∀u, v, w: (pair_in_list(u, v, w) ⇒ ∀x: (contains_slb(u, x) ⇒ (pair_in_list(remove_slb(u, x), v, w) or v = x))) fof(l27_li_{2829}, l
∀u, v, w, x: ((check_cpq(remove_cpq(triple(u, v, w), x)) and ok(remove_cpq(triple(u, v, w), x))) ⇒ ∀y: (pair_in_list(v, x, y) ⇒ y < x)) fof(l27_l_{30}, lemma)
∀u, v, w, x: (ok(remove_cpq(triple(u, v, w), x)) ⇒ contains_slb(v, x)) fof(l27_l_{33}, lemma)
∀u, v, w, x: ((check_cpq(remove_cpq(triple(u, v, w), x)) and ok(remove_cpq(triple(u, v, w), x))) ⇒ check_cpq(triple(u, v, w)))

SWV392+1.p Priority queue checker: tmp_not_check_02_1 base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
∀u, v: (pair_in_list(create_slb, u, v) ⇒ ∀w: (contains_slb(create_slb, w) ⇒ (pair_in_list(remove_slb(create_slb, w), u, v) or u = w))) fof(l28_co, conjecture)

SWV393+1.p Priority queue checker: tmp_not_check_02_1 step
include('Axioms/SWV007+0.ax')

include('Axioms/SWV007+2.ax')
$\forall u$: ($\forall v, w$: (pair_in_list(u, v, w) $\Rightarrow$ $\forall x$: (contains_slb(u, x) $\Rightarrow$ (pair_in_list(remove_slb(u, x), v, w) or $v = x$))) $\Rightarrow$ $\forall y, z, x_1, x_2$: (pair_in_list(insert_slb(u, pair(x_1, x_2)), y, z) $\Rightarrow$ $\forall x_1$: (contains_slb(insert_slb(u, pair(x_1, x_2)), x_1) $\Rightarrow$ (pair_in_list(remove_slb(insert_slb(u, pair(x_1, x_2)), x_1), y, z) or $y = x_1$)))) fof(l29_co, conjecture)

SWV394+1.p Priority queue checker: tmp_not_check_02_2
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: (check_cpq(triple(u, v, w)) $\iff$ $\forall x, y$: (pair_in_list(v, x, y) $\Rightarrow$ $y < x$)) fof(l30_li$_{4142}$, lemma)
$\forall u, v, w, x, y$: ((pair_in_list(v, x, y) and strictly_less_than(x, y) and ok(remove_cpq(triple(u, v, w), x))) $\Rightarrow$ pair_in_list(remove_s
$\forall u, v, w, x$: ((check_cpq(remove_cpq(triple(u, v, w), x)) and ok(remove_cpq(triple(u, v, w), x))) $\Rightarrow$ $\forall y$: (pair_in_list(v, x, y) $\Rightarrow$
$y < x$)) fof(l30_co, conjecture)

SWV395+1.p Priority queue checker: tmp_not_check_02_2_1 base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: ((pair_in_list(create_slb, w, x) and strictly_less_than(w, x) and ok(remove_cpq(triple(u, create_slb, v), w))) $\Rightarrow$ pair_in_list(remove_slb(create_slb, w), w, x)) fof(l31_co, conjecture)

SWV396+1.p Priority queue checker: tmp_not_check_02_2_1 step
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u$: ($\forall v, w, x, y$: ((pair_in_list(u, x, y) and strictly_less_than(x, y) and ok(remove_cpq(triple(v, u, w), x))) $\Rightarrow$ pair_in_list(remov
$\forall z, x_1, x_2, x_3, x_4, x_5$: ((pair_in_list(insert_slb(u, pair(x_4, x_5)), x_2, x_3) and strictly_less_than(x_2, x_3) and ok(remove_cpq(triple(z,
pair_in_list(remove_slb(insert_slb(u, pair(x_4, x_5)), x_2), x_2, x_3))) fof(l32_co, conjecture)

SWV397+1.p Priority queue checker: tmp_not_check_02_3
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: (ok(remove_cpq(triple(u, v, w), x)) $\Rightarrow$ contains_slb(v, x)) fof(l33_co, conjecture)

SWV398+1.p Priority queue checker: tmp_not_check_03
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: (check_cpq(triple(u, v, w)) $\iff$ $\forall x, y$: (pair_in_list(v, x, y) $\Rightarrow$ $y < x$)) fof(l26_li$_{4142}$, lemma)
$\forall u$: ($\exists v, w$: (pair_in_list(u, v, w) and strictly_less_than(v, w)) $\Rightarrow$ $\forall x$: $\exists y, z$: (pair_in_list(update_slb(u, x), y, z) and strictly_less_
$\forall u, v, w$: ($\neg$ check_cpq(triple(u, v, w)) $\Rightarrow$ $\neg$ check_cpq(findmin_cpq_eff(triple(u, v, w)))) fof(l24_co, conjecture)

SWV399+1.p Priority queue checker: tmp_not_check_03_1
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and $x < w$) $\Rightarrow$ pair_in_list(update_slb(u, x), v, w)) fof(l35_li$_{3637}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x)) fof(l35_li$_{3839}$, lemma)
$\forall u$: ($\exists v, w$: (pair_in_list(u, v, w) and strictly_less_than(v, w)) $\Rightarrow$ $\forall x$: $\exists y, z$: (pair_in_list(update_slb(u, x), y, z) and strictly_less_

SWV400+1.p Priority queue checker: tmp_not_check_03_2 base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v, w, x$: ((pair_in_list(create_slb, v, w) and $x < w$) $\Rightarrow$ pair_in_list(update_slb(create_slb, x), v, w)) fof(l36_co, conjecture

SWV401+1.p Priority queue checker: tmp_not_check_03_2 step
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u$: ($\forall v, w, x$: ((pair_in_list(u, v, w) and $x < w$) $\Rightarrow$ pair_in_list(update_slb(u, x), v, w)) $\Rightarrow$ $\forall y, z, x_1, x_2, x_3$: ((pair_in_list(insert
z) $\Rightarrow$ pair_in_list(update_slb(insert_slb(u, pair(x_2, x_3)), x_1), y, z))) fof(l37_co, conjecture)

SWV402+1.p Priority queue checker: tmp_not_check_03_3 base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v, w, x$: ((pair_in_list(create_slb, v, w) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(create_slb, x), v, x)) fof(l3

SWV403+1.p Priority queue checker: tmp_not_check_03_3 step
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u$: ($\forall v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x)) $\Rightarrow$ $\forall y, z, x_1, x_2, x_3$: ((p
pair_in_list(update_slb(insert_slb(u, pair(x_2, x_3)), x_1), y, x_1))) fof(l39_co, conjecture)

SWV404+1.p Priority queue checker: tmp_not_check_04
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w, x$: ((check_cpq(remove_cpq(triple(u, v, w), x)) and ok(remove_cpq(triple(u, v, w), x))) $\Rightarrow$ check_cpq(triple(u, v, w)))
$\forall u, v, w$: ($\neg$ check_cpq(triple(u, v, w)) $\Rightarrow$ $\neg$ check_cpq(findmin_cpq_eff(triple(u, v, w)))) fof(l40_l$_{34}$, lemma)
$\forall u, v, w$: ((check_cpq(removemin_cpq_eff(triple(u, v, w))) and ok(removemin_cpq_eff(triple(u, v, w)))) $\Rightarrow$ check_cpq(triple(u, v

SWV405+1.p Priority queue checker: lemma_check_characterization base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v$: (check_cpq(triple(u, create_slb, v)) $\iff$ $\forall w, x$: (pair_in_list(create_slb, w, x) $\Rightarrow$ $x < w$)) fof(l41_co, conjecture)

SWV406+1.p Priority queue checker: lemma_check_characterization step
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u$: ($\forall v, w$: (check_cpq(triple(v, u, w)) $\iff$ $\forall x, y$: (pair_in_list(u, x, y) $\Rightarrow$ $y < x$)) $\Rightarrow$ $\forall z, x_1, x_2, x_3$: (check_cpq(triple(z, insert
$\forall x_4, x_5$: (pair_in_list(insert_slb(u, pair(x_2, x_3)), x_4, x_5) $\Rightarrow$ $x_5 < x_4$))) fof(l42_co, conjecture)

SWV407+1.p Priority queue checker: lemma_not_min_elem_not_check
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: (check_cpq(triple(u, v, w)) $\iff$ $\forall x, y$: (pair_in_list(v, x, y) $\Rightarrow$ $y < x$)) fof(l43_li$_{4142}$, lemma)
$\forall u, v, w, x$: ((contains_slb(v, x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ (pair_in_list(update_slb(v, findm
y))) fof(l43_l$_{44}$, lemma)
$\forall u, v, w$: ($\exists x$: (contains_cpq(triple(u, v, w), x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ $\neg$ check_cpq(findn

SWV408+1.p Priority queue checker: lemma_not_min_elem_pair
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v, w$: ((contains_slb(u, v) and strictly_less_than(v, w)) $\Rightarrow$ (pair_in_list(update_slb(u, w), v, w) or $\exists x$: (pair_in_list(update_sl
x))) fof(l44_l$_{45}$, lemma)
$\forall u, v, w, x$: ((contains_slb(v, x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ (pair_in_list(update_slb(v, findm
y))) fof(l44_co, conjecture)

SWV408+2.p Priority queue checker: lemma_not_min_elem_pair
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
$\forall u, v$: (contains_slb(u, v) $\Rightarrow$ $\exists w$: pair_in_list(u, v, w)) fof(l45_li$_{4647}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x)) fof(l48_li$_{3839}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and $x < w$) $\Rightarrow$ pair_in_list(update_slb(u, x), v, w)) fof(l49_li$_{3637}$, lemma)
$\forall u, v, w, x$: ((contains_slb(v, x) and strictly_less_than(x, findmin_cpq_res(triple(u, v, w)))) $\Rightarrow$ (pair_in_list(update_slb(v, findm
y))) fof(l44_co, conjecture)

SWV409+1.p Priority queue checker: lemma_contains_update
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v$: (contains_slb(u, v) $\Rightarrow$ $\exists w$: pair_in_list(u, v, w)) fof(l45_li$_{4647}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and $x < w$) $\Rightarrow$ $\exists y$: (pair_in_list(update_slb(u, x), v, y) and $x <$
y)) fof(l45_l$_{49}$, lemma)

$\forall u, v, w$: ((contains_slb(u, v) and strictly_less_than(v, w)) $\Rightarrow$ (pair_in_list(update_slb(u, w), v, w) or $\exists x$: (pair_in_list(update_sl
x))) fof(l45_co, conjecture)

SWV410+1.p Priority queue checker: lemma_contains_pair base
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u$: (contains_slb(create_slb, u) $\Rightarrow$ $\exists v$: pair_in_list(create_slb, u, v)) fof(l46_co, conjecture)

SWV411+1.p Priority queue checker: lemma_contains_pair step
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u$: ($\forall v$: (contains_slb(u, v) $\Rightarrow$ $\exists w$: pair_in_list(u, v, w)) $\Rightarrow$ $\forall x, y, z$: (contains_slb(insert_slb(u, pair(y, z)), x) $\Rightarrow$ $\exists x_1$: pair_in_list(insert_slb(u, pair(y, z)), x, x_1))) fof(l47_co, conjecture)

SWV412+1.p Priority queue checker: lemma_contains_update_01
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x)) fof(l48_li$_{3839}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and strictly_less_than(w, x)) $\Rightarrow$ pair_in_list(update_slb(u, x), v, x

SWV413+1.p Priority queue checker: lemma_contains_update_02
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+2.ax')
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and $x < w$) $\Rightarrow$ pair_in_list(update_slb(u, x), v, w)) fof(l49_li$_{3637}$, lemma)
$\forall u, v, w, x$: ((pair_in_list(u, v, w) and strictly_less_than(v, x) and $x < w$) $\Rightarrow$ $\exists y$: (pair_in_list(update_slb(u, x), v, y) and $x <$ y)) fof(l49_co, conjecture)

SWV414+1.p Priority queue checker: Formula (12)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u$: i(triple(create_pqp, create_slb, u)) = create_pq fof(co$_1$, conjecture)

SWV415+1.p Priority queue checker: Formula (7)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x, y$: i(triple(u, w, x)) = i(triple(v, w, y)) fof(main2_l$_{12}$, lemma)
$\forall u, v, w, x$: i(insert_cpq(triple(u, v, w), x)) = insert_pq(i(triple(u, v, w)), x) fof(co$_2$, conjecture)

SWV415+2.p Priority queue checker: Formula (7)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
($\forall u, v, w, x$: i(triple(u, create_slb, w)) = i(triple(v, create_slb, x)) and $\forall y$: ($\forall z, x_1, x_2, x_3$: i(triple(z, y, x_2)) = i(triple(x_1, y, x_3))
$\forall x_4, x_5, x_6, x_7, x_8, x_9$: i(triple(x_4, insert_slb(y, pair(x_8, x_9)), x_6)) = i(triple(x_5, insert_slb(y, pair(x_8, x_9)), x_7)))) $\Rightarrow$ $\forall x_{10}, x_{11}, x_{12}, x_{13}, x_{14}$: i(triple(x_{10}, x_{12}, x_{13})) = i(triple(x_{11}, x_{12}, x_{14})) fof(big2_induction, axiom)
$\forall u, v, w, x$: i(insert_cpq(triple(u, v, w), x)) = insert_pq(i(triple(u, v, w)), x) fof(co$_2$, conjecture)

SWV416+1.p Priority queue checker: Formula (8)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w, x, y$: i(triple(u, w, x)) = i(triple(v, w, y)) fof(main3_li$_{12}$, lemma)
$\forall u, v, w, x$: (contains_pq(i(triple(u, v, w)), x) $\Rightarrow$ i(remove_cpq(triple(u, v, w), x)) = remove_pq(i(triple(u, v, w)), x)) fof(ma

$\forall u, v, w, x$: (pi_remove(triple(u, v, w), x) $\Rightarrow$ (phi(remove_cpq(triple(u, v, w), x)) $\Rightarrow$ (pi_sharp_remove(i(triple(u, v, w)), x) and
remove_pq(i(triple(u, v, w)), x)))) fof(co_3, conjecture)

SWV416+2.p Priority queue checker: Formula (8)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
($\forall u, v, w, x$: i(triple(u, create_slb, w)) = i(triple(v, create_slb, x)) and $\forall y$: ($\forall z, x_1, x_2, x_3$: i(triple(z, y, x_2)) = i(triple(x_1, y, x_3))
$\forall x_4, x_5, x_6, x_7, x_8, x_9$: i(triple(x_4, insert_slb(y, pair(x_8, x_9)), x_6)) = i(triple(x_5, insert_slb(y, pair(x_8, x_9)), x_7)))) $\Rightarrow$
$\forall x_{10}, x_{11}, x_{12}, x_{13}, x_{14}$: i(triple(x_{10}, x_{12}, x_{13})) = i(triple(x_{11}, x_{12}, x_{14})) fof(big3_induction$_1$, axiom)
($\forall u, v, w$: (contains_pq(i(triple(u, create_slb, v)), w) $\Rightarrow$ i(remove_cpq(triple(u, create_slb, v), w)) = remove_pq(i(triple(u, creat
i(remove_cpq(triple(y, x, z), x_1)) = remove_pq(i(triple(y, x, z)), x_1)) $\Rightarrow$ $\forall x_2, x_3, x_4, x_5, x_6$: (contains_pq($i$(triple($x_2$, insert_slb(
i(remove_cpq(triple(x_2, insert_slb(x, pair(x_5, x_6)), x_3), x_4)) = remove_pq(i(triple(x_2, insert_slb(x, pair(x_5, x_6)), x_3)), x_4)))) $\Rightarrow$
$\forall x_7, x_8, x_9, x_{10}$: (contains_pq($i$(triple($x_7, x_8, x_9$)), x_{10}) $\Rightarrow$ i(remove_cpq(triple(x_7, x_8, x_9), x_{10})) = remove_pq(i(triple(x_7, x_8, x
($\forall u, v, w$: (contains_cpq(triple(u, create_slb, v), w) $\iff$ contains_pq(i(triple(u, create_slb, v)), w)) and $\forall x$: ($\forall y, z, x_1$: (contains
contains_pq(i(triple(y, x, z)), x_1)) $\Rightarrow$ $\forall x_2, x_3, x_4, x_5, x_6$: (contains_cpq(triple($x_2$, insert_slb($x$, pair($x_4, x_5$)), x_3), x_6) $\iff$
contains_pq(i(triple(x_2, insert_slb(x, pair(x_4, x_5)), x_3)), x_6)))) $\Rightarrow$ $\forall x_7, x_8, x_9, x_{10}$: (contains_cpq(triple($x_7, x_8, x_9$), x_{10}) $\iff$
contains_pq(i(triple(x_7, x_8, x_9)), x_{10})) fof(big3_induction$_3$, axiom)
$\forall u, v, w, x$: (pi_remove(triple(u, v, w), x) $\Rightarrow$ (phi(remove_cpq(triple(u, v, w), x)) $\Rightarrow$ (pi_sharp_remove(i(triple(u, v, w)), x) and
remove_pq(i(triple(u, v, w)), x)))) fof(co_3, conjecture)

SWV417+1.p Priority queue checker: Formula (9)
include('Axioms/SWV007+0.ax')
include('Axioms/SWV007+1.ax')
include('Axioms/SWV007+2.ax')
include('Axioms/SWV007+3.ax')
include('Axioms/SWV007+4.ax')
$\forall u, v, w$: (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ pi_sharp_find_min(i(triple(u, v, w)), findmin_cpq_res(triple(u, v, w)))) fof
$\forall u, v, w$: (pi_find_min(triple(u, v, w)) $\Rightarrow$ (phi(findmin_cpq_eff(triple(u, v, w))) $\Rightarrow$ $\exists x$: (pi_sharp_find_min(i(triple(u, v, w)), x)
findmin_pq_res(i(triple(u, v, w)), x)))) fof(co_4, conjecture)

SWV425^1.p ICL logic mapping to modal logic implies 'unit'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
s: \$i $\to$ \$o thf(s, type)
a: \$i $\to$ \$o thf(a, type)
iclval@(icl_impl@(icl_atom@s)@(icl_says@(icl_princ@a)@(icl_atom@s))) thf(unit, conjecture)

SWV425^2.p ICL logic mapping to modal logic implies 'unit'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
s: \$i $\to$ \$o thf(s, type)
a: \$i $\to$ \$o thf(a, type)
iclval@(icl_impl@(icl_atom@s)@(icl_says@(icl_princ@a)@(icl_atom@s))) thf(unit, conjecture)

SWV426^1.p ICL logic mapping to modal logic implies 'cuc'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
s: \$i $\to$ \$o thf(s, type)
t: \$i $\to$ \$o thf(t, type)
a: \$i $\to$ \$o thf(a, type)
iclval@(icl_impl@(icl_says@(icl_princ@a)@(icl_impl@(icl_atom@s)@(icl_atom@t)))@(icl_impl@(icl_says@(icl_princ@a)@(icl_ato

SWV426^2.p ICL logic mapping to modal logic implies 'cuc'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
s: \$i $\to$ \$o thf(s, type)
t: \$i $\to$ \$o thf(t, type)
a: \$i $\to$ \$o thf(a, type)

iclval@(icl_impl@(icl_says@(icl_princ@a)@(icl_impl@(icl_atom@s)@(icl_atom@t)))@(icl_impl@(icl_says@(icl_princ@a)@(icl_ato

SWV426∧3.p ICL∧B logic mapping to modal logic implies 'cuc'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
s: $i → $o   thf($s$, type)
a: $i → $o   thf($a$, type)
b: $i → $o   thf($b$, type)
iclval@(icl_impl@(icl_says@(icl_impl@(icl_princ@a)@(icl_princ@b))@(icl_atom@s))@(icl_impl@(icl_says@(icl_princ@a)@(icl_ato

SWV426∧4.p ICL∧B logic mapping to modal logic implies 'cuc'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
include('Axioms/SWV008ˆ1.ax')
s: $i → $o   thf($s$, type)
a: $i → $o   thf($a$, type)
b: $i → $o   thf($b$, type)
iclval@(icl_impl@(icl_says@(icl_impl@(icl_princ@a)@(icl_princ@b))@(icl_atom@s))@(icl_impl@(icl_says@(icl_princ@a)@(icl_ato

SWV427∧1.p ICL logic mapping to modal logic implies 'idem'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
s: $i → $o   thf($s$, type)
a: $i → $o   thf($a$, type)
iclval@(icl_impl@(icl_says@(icl_princ@a)@(icl_says@(icl_princ@a)@(icl_atom@s)))@(icl_says@(icl_princ@a)@(icl_atom@s)))

SWV427∧2.p ICL logic mapping to modal logic implies 'idem'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
include('Axioms/SWV008ˆ1.ax')
s: $i → $o   thf($s$, type)
a: $i → $o   thf($a$, type)
iclval@(icl_impl@(icl_says@(icl_princ@a)@(icl_says@(icl_princ@a)@(icl_atom@s)))@(icl_says@(icl_princ@a)@(icl_atom@s)))

SWV428∧1.p ICL logic mapping to modal logic K implies that Example 1 holds
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
admin: $i → $o   thf(admin, type)
bob: $i → $o   thf(bob, type)
deletefile$_1$: $i → $o   thf(deletfile$_1$, type)
iclval@(icl_impl@(icl_says@(icl_princ@admin)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$))   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_impl@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$)))
iclval@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))   thf(ax$_3$, axiom)
iclval@(icl_atom@deletefile$_1$)   thf(ex$_1$, conjecture)

SWV428∧2.p ICL logic mapping to modal logic S4 implies 'Ex1'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
include('Axioms/SWV008ˆ1.ax')
admin: $i → $o   thf(admin, type)
bob: $i → $o   thf(bob, type)
deletefile$_1$: $i → $o   thf(deletfile$_1$, type)
iclval@(icl_impl@(icl_says@(icl_princ@admin)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$))   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_impl@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$)))
iclval@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))   thf(ax$_3$, axiom)
iclval@(icl_atom@deletefile$_1$)   thf(ex$_1$, conjecture)

SWV429∧1.p ICL∧=> logic mapping to modal logic implies 'refl'
include('Axioms/LCL008ˆ0.ax')
include('Axioms/SWV008ˆ0.ax')
include('Axioms/SWV008ˆ2.ax')
a: $i → $o   thf($a$, type)
iclval@(icl_impl_princ@(icl_princ@a)@(icl_princ@a))   thf(conj, conjecture)

SWV429^2.p ICL∧=> logic mapping to modal logic implies 'refl'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
iclval@(icl_impl_princ@(icl_princ@a)@(icl_princ@a)) thf(conj, conjecture)

SWV430^1.p ICL∧=> logic mapping to modal logic implies 'trans'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
c: \$i → \$o thf(c, type)
iclval@(icl_impl@(icl_impl_princ@(icl_princ@a)@(icl_princ@b))@(icl_impl@(icl_impl_princ@(icl_princ@b)@(icl_princ@c))@(icl_i

SWV430^2.p ICL∧=> logic mapping to modal logic implies 'trans'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
c: \$i → \$o thf(c, type)
iclval@(icl_impl@(icl_impl_princ@(icl_princ@a)@(icl_princ@b))@(icl_impl@(icl_impl_princ@(icl_princ@b)@(icl_princ@c))@(icl_i

SWV431^1.p ICL∧=> logic mapping to modal logic implies 'speaking_for'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
s: \$i → \$o thf(s, type)
iclval@(icl_impl@(icl_impl_princ@(icl_princ@a)@(icl_princ@b))@(icl_impl@(icl_says@(icl_princ@a)@(icl_atom@s))@(icl_says@(

SWV431^2.p ICL∧=> logic mapping to modal logic implies 'speaking_for'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
s: \$i → \$o thf(s, type)
iclval@(icl_impl@(icl_impl_princ@(icl_princ@a)@(icl_princ@b))@(icl_impl@(icl_says@(icl_princ@a)@(icl_atom@s))@(icl_says@(

SWV432^1.p ICL∧=> logic mapping to modal logic implies 'handoff'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
iclval@(icl_impl@(icl_says@(icl_princ@b)@(icl_impl_princ@(icl_princ@a)@(icl_princ@b)))@(icl_impl_princ@(icl_princ@a)@(icl_p

SWV432^2.p ICL∧=> logic mapping to modal logic implies 'handoff'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
include('Axioms/SWV008^2.ax')
a: \$i → \$o thf(a, type)
b: \$i → \$o thf(b, type)
iclval@(icl_impl@(icl_says@(icl_princ@b)@(icl_impl_princ@(icl_princ@a)@(icl_princ@b)))@(icl_impl_princ@(icl_princ@a)@(icl_p

SWV433^1.p ICL^=> logic mapping to modal logic implies that Example 2 holds
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^2.ax')
admin: $i → $o   thf(admin, type)
bob: $i → $o   thf(bob, type)
alice: $i → $o   thf(alice, type)
deletefile$_1$: $i → $o   thf(deletfile$_1$, type)
iclval@(icl_impl@(icl_says@(icl_princ@admin)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$))   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_impl@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$)))
iclval@(icl_says@(icl_princ@bob)@(icl_impl_princ@(icl_princ@alice)@(icl_princ@bob)))   thf(ax$_3$, axiom)
iclval@(icl_says@(icl_princ@alice)@(icl_atom@deletefile$_1$))   thf(ax$_4$, axiom)
iclval@(icl_atom@deletefile$_1$)   thf(conj, conjecture)

SWV433^2.p ICL^=> logic mapping to modal logic implies that Example 2 holds
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
include('Axioms/SWV008^2.ax')
admin: $i → $o   thf(admin, type)
bob: $i → $o   thf(bob, type)
alice: $i → $o   thf(alice, type)
deletefile$_1$: $i → $o   thf(deletfile$_1$, type)
iclval@(icl_impl@(icl_says@(icl_princ@admin)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$))   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_impl@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$))@(icl_atom@deletefile$_1$)))
iclval@(icl_says@(icl_princ@bob)@(icl_impl_princ@(icl_princ@alice)@(icl_princ@bob)))   thf(ax$_3$, axiom)
iclval@(icl_says@(icl_princ@alice)@(icl_atom@deletefile$_1$))   thf(ax$_4$, axiom)
iclval@(icl_atom@deletefile$_1$)   thf(conj, conjecture)

SWV434^3.p ICL^B logic mapping to modal logic implies 'trust'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
s: $i → $o   thf($s$, type)
iclval@(icl_impl@(icl_says@icl_false@(icl_atom@s))@(icl_atom@s))   thf(trust, conjecture)

SWV434^4.p ICL^B logic mapping to modal logic implies 'trust'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
s: $i → $o   thf($s$, type)
iclval@(icl_impl@(icl_says@icl_false@(icl_atom@s))@(icl_atom@s))   thf(trust, conjecture)

SWV435^3.p ICL^B logic mapping to modal logic implies 'untrust'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
a: $i → $o   thf($a$, type)
(icl_princ@a) = icl_true   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@a)@icl_false)   thf(untrust, conjecture)

SWV435^4.p ICL^B logic mapping to modal logic implies 'untrust'
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
a: $i → $o   thf($a$, type)
(icl_princ@a) = icl_true   thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@a)@icl_false)   thf(untrust, conjecture)

SWV436^3.p ICL^B logic mapping to modal logic implies that Example 3 holds
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
admin: $i → $o   thf(admin, type)
bob: $i → $o   thf(bob, type)
deletefile$_1$: $i → $o   thf(deletfile$_1$, type)

iclval@(icl_says@(icl_impl@(icl_princ@admin)@icl_false)@(icl_atom@deletefile$_1$)) thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_says@(icl_impl@(icl_princ@bob)@(icl_princ@admin))@(icl_atom@deletefile$_1$))) th
iclval@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$)) thf(ax$_3$, axiom)
iclval@(icl_atom@deletefile$_1$) thf(ex$_3$, conjecture)

SWV436^4.p ICL^B logic mapping to modal logic implies that Example 3 holds
include('Axioms/LCL008^0.ax')
include('Axioms/SWV008^0.ax')
include('Axioms/SWV008^1.ax')
admin: $i → $o thf(admin, type)
bob: $i → $o thf(bob, type)
deletefile$_1$: $i → $o thf(deletfile$_1$, type)
iclval@(icl_says@(icl_impl@(icl_princ@admin)@icl_false)@(icl_atom@deletefile$_1$)) thf(ax$_1$, axiom)
iclval@(icl_says@(icl_princ@admin)@(icl_says@(icl_impl@(icl_princ@bob)@(icl_princ@admin))@(icl_atom@deletefile$_1$))) th
iclval@(icl_says@(icl_princ@bob)@(icl_atom@deletefile$_1$)) thf(ax$_3$, axiom)
iclval@(icl_atom@deletefile$_1$) thf(ex$_3$, conjecture)

SWV441^1.p (K says (A => B)) => (K says A) => (K says B) in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*k*: individuals, *a*: $i → $o, *b*: $i → $o: (bl_valid@(bl_impl@(bl_says@*k*@(bl_impl@*a*@*b*))@(bl_impl@(bl_says@*k*@*a*)@(bl_says@

SWV442^1.p A => A in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*a*: $i → $o: (bl_valid@(bl_impl@(bl_atom@*a*)@(bl_atom@*a*))) thf(bl_id, conjecture)

SWV443^1.p (K says A) => (K says A) in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*k*: individuals, *a*: $i → $o: (bl_valid@(bl_impl@(bl_says@*k*@(bl_atom@*a*))@(bl_says@*k*@(bl_atom@*a*)))) thf(bl_id$_2$, conject

SWV444^1.p (loca says A) => (K says A) in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*k*: individuals, *a*: $i → $o: (bl_valid@(bl_impl@(bl_says@loca@(bl_atom@*a*))@(bl_says@*k*@(bl_atom@*a*)))) thf(bl_strength

SWV445^1.p (K says K says A) => (K says A) in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*k*: individuals, *a*: $i → $o: (bl_valid@(bl_impl@(bl_says@*k*@(bl_says@*k*@(bl_atom@*a*)))@(bl_says@*k*@(bl_atom@*a*)))) thf(

SWV446^1.p K says ((K says A) => A) in BL
include('Axioms/LCL008^0.ax')
include('Axioms/LCL009^0.ax')
include('Axioms/SWV010^0.ax')
∀*k*: individuals, *a*: $i → $o: (bl_valid@(bl_says@*k*@(bl_impl@(bl_says@*k*@(bl_atom@*a*))@(bl_atom@*a*)))) thf(bl_conceit, co

SWV447^1.p Nipkow's simple map-cons problem
nil: $i thf(nil_type, type)
cons: $i → $i → $i thf(cons_type, type)
map: ($i → $i) → $i → $i thf(map_type, type)
∀*f*: $i → $i: (map@*f*@nil) = nil thf(ax$_1$, axiom)
∀*f*: $i → $i, *x*: $i, *y*: $i: (map@*f*@(cons@*x*@*y*)) = (cons@(*f*@*x*)@(map@*f*@*y*)) thf(ax$_2$, axiom)
∀*a*: $i: (map@λ*x*: $i: *x*@(cons@*a*@nil)) = (cons@*a*@nil) thf(test, conjecture)

SWV449+1.p Establishing that there cannot be two leaders, part i26_p30
include('Axioms/SWV011+0.ax')
∀*v*, *w*, *x*, *y*: ((∀*z*, pid$_0$: (setIn(pid$_0$, alive) ⇒ ¬ elem(m_Down(pid$_0$), queue(host(*z*)))) and ∀*z*, pid$_0$: (elem(m_Down(pid$_0$), queue
¬ setIn(pid$_0$, alive)) and ∀*z*, pid$_0$: (elem(m_Down(pid$_0$), queue(host(*z*))) ⇒ host(pid$_0$) ≠ host(*z*)) and ∀*z*, pid$_0$: (elem(m_Halt

$\neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pid}_{20}, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Ack}(\mathrm{pid}_0, z), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}))) \Rightarrow \neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pic}$
z and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow \neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $((\mathrm{pid}_0 \neq z$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow$
$(\neg\,\mathrm{setIn}(z, \mathrm{alive})$ or $\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive})))$ and $\forall z, \mathrm{pid}_{30}, \mathrm{pid}_{20}, \mathrm{pid}_0$: $((\mathrm{host}(\mathrm{pid}_{20}) \neq \mathrm{host}(z)$ and $\mathrm{setIn}(z, \mathrm{alive})$ and $\mathrm{setIn}(\mathrm{pid}_{20}$
$\mathrm{host}(z)$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(\mathrm{pid}_{20})) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z)))$ and $\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_{30}), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}$
$\mathrm{cons}(\mathrm{m\_Ack}(w, y), v)) \Rightarrow (\mathrm{setIn}(x, \mathrm{alive}) \Rightarrow ((\mathrm{index}(\mathrm{elid}, \mathrm{host}(x)) = w$ and $\mathrm{index}(\mathrm{status}, \mathrm{host}(x)) = \mathrm{elec}_2$ and $\mathrm{host}(y) =$
$\mathrm{index}(\mathrm{pendack}, \mathrm{host}(x))) \Rightarrow (\mathrm{nbr\_proc} \leq \mathrm{index}(\mathrm{pendack}, \mathrm{host}(x)) \Rightarrow \forall z$: $((\mathrm{setIn}(\mathrm{host}(z), \mathrm{index}(\mathrm{acks}, \mathrm{host}(x)))$ or $\mathrm{host}(z) =$
$\mathrm{host}(y)) \Rightarrow \forall v_0$: $(\mathrm{host}(z) = \mathrm{host}(v_0) \Rightarrow (\mathrm{host}(x) = \mathrm{host}(v_0) \Rightarrow \forall w_0, x_0$: $(\mathrm{host}(z) \neq \mathrm{host}(x_0) \Rightarrow (\mathrm{host}(x) \neq$
$\mathrm{host}(x_0) \Rightarrow \forall y_0$: $((\mathrm{host}(x_0) \neq \mathrm{host}(v_0)$ and $\mathrm{setIn}(v_0, \mathrm{alive})$ and $\mathrm{setIn}(x_0, \mathrm{alive})$ and $\mathrm{host}(w_0) = \mathrm{host}(v_0)$ and $\mathrm{host}(y_0) =$
$\mathrm{host}(x_0)) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(w_0), \mathrm{queue}(\mathrm{host}(x_0)))$ and $\mathrm{elem}(\mathrm{m\_Down}(y_0), \mathrm{snoc}(v, \mathrm{m\_Ldr}(x))))))))))))$ fof(conj, conjectu

SWV450+1.p Establishing that there cannot be two leaders, part i26_p36
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: $((\forall z, \mathrm{pid}_0$: $(\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}$
$\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))) \Rightarrow \mathrm{host}(\mathrm{pid}_0) \neq \mathrm{host}(z))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Halt}$
$\neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pid}_{20}, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Ack}(\mathrm{pid}_0, z), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}))) \Rightarrow \neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pic}$
z and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow \neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $((\mathrm{pid}_0 \neq z$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow$
$(\neg\,\mathrm{setIn}(z, \mathrm{alive})$ or $\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive})))$ and $\forall z, \mathrm{pid}_{30}, \mathrm{pid}_{20}, \mathrm{pid}_0$: $((\mathrm{host}(\mathrm{pid}_{20}) \neq \mathrm{host}(z)$ and $\mathrm{setIn}(z, \mathrm{alive})$ and $\mathrm{setIn}(\mathrm{pid}_{20}$
$\mathrm{host}(z)$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(\mathrm{pid}_{20})) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z)))$ and $\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_{30}), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}$
$\mathrm{cons}(\mathrm{m\_Ack}(w, y), v)) \Rightarrow (\mathrm{setIn}(x, \mathrm{alive}) \Rightarrow ((\mathrm{index}(\mathrm{elid}, \mathrm{host}(x)) = w$ and $\mathrm{index}(\mathrm{status}, \mathrm{host}(x)) = \mathrm{elec}_2$ and $\mathrm{host}(y) =$
$\mathrm{index}(\mathrm{pendack}, \mathrm{host}(x))) \Rightarrow (\mathrm{nbr\_proc} \leq \mathrm{index}(\mathrm{pendack}, \mathrm{host}(x)) \Rightarrow \forall z$: $((\mathrm{setIn}(\mathrm{host}(z), \mathrm{index}(\mathrm{acks}, \mathrm{host}(x)))$ or $\mathrm{host}(z) =$
$\mathrm{host}(y)) \Rightarrow \forall v_0$: $(\mathrm{host}(z) \neq \mathrm{host}(v_0) \Rightarrow (\mathrm{host}(x) = \mathrm{host}(v_0) \Rightarrow \forall w_0, x_0$: $(\mathrm{host}(z) = \mathrm{host}(x_0) \Rightarrow (\mathrm{host}(x) \neq$
$\mathrm{host}(x_0) \Rightarrow \forall y_0$: $((\mathrm{host}(x_0) \neq \mathrm{host}(v_0)$ and $\mathrm{setIn}(v_0, \mathrm{alive})$ and $\mathrm{setIn}(x_0, \mathrm{alive})$ and $\mathrm{host}(w_0) = \mathrm{host}(v_0)$ and $\mathrm{host}(y_0) =$
$\mathrm{host}(x_0)) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(y_0), v)$ and $\mathrm{elem}(\mathrm{m\_Down}(w_0), \mathrm{snoc}(\mathrm{queue}(\mathrm{host}(x_0)), \mathrm{m\_Ldr}(x))))))))))))$ fof(conj, conjectu

SWV451+1.p Establishing that there cannot be two leaders, part i26_p121
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: $((\forall z, \mathrm{pid}_0$: $(\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}$
$\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))) \Rightarrow \mathrm{host}(\mathrm{pid}_0) \neq \mathrm{host}(z))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Halt}$
$\neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pid}_{20}, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Ack}(\mathrm{pid}_0, z), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}))) \Rightarrow \neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pic}$
z and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow \neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $((\mathrm{pid}_0 \neq z$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow$
$(\neg\,\mathrm{setIn}(z, \mathrm{alive})$ or $\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive})))$ and $\forall z, \mathrm{pid}_{30}, \mathrm{pid}_{20}, \mathrm{pid}_0$: $((\mathrm{host}(\mathrm{pid}_{20}) \neq \mathrm{host}(z)$ and $\mathrm{setIn}(z, \mathrm{alive})$ and $\mathrm{setIn}(\mathrm{pid}_{20}$
$\mathrm{host}(z)$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(\mathrm{pid}_{20})) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z)))$ and $\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_{30}), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}$
$\mathrm{cons}(\mathrm{m\_NotNorm}(x), v)) \Rightarrow (\mathrm{setIn}(y, \mathrm{alive}) \Rightarrow ((\mathrm{index}(\mathrm{ldr}, \mathrm{host}(y)) = \mathrm{host}(y)$ and $\mathrm{index}(\mathrm{status}, \mathrm{host}(y)) =$
norm and $\mathrm{index}(\mathrm{elid}, \mathrm{host}(y)) = x) \Rightarrow ((\forall z$: $(\mathrm{host}(y) = \mathrm{host}(z) \Rightarrow z \leq w)$ and $\neg\,\mathrm{setIn}(w, \mathrm{pids})$ and $\mathrm{host}(y) =$
$\mathrm{host}(w)) \Rightarrow (\mathrm{host}(w) = s(0) \Rightarrow (\neg\,\mathrm{nbr\_proc} \leq \mathrm{host}(w) \Rightarrow \forall z$: $(s(\mathrm{host}(w)) = \mathrm{host}(z) \Rightarrow (\mathrm{host}(y) \neq \mathrm{host}(z) \Rightarrow$
$\forall x_0, y_0$: $(s(\mathrm{host}(w)) \neq \mathrm{host}(y_0) \Rightarrow (\mathrm{host}(y) = \mathrm{host}(y_0) \Rightarrow \forall z_0$: $((((z \neq y$ and $\mathrm{setIn}(z, \mathrm{alive}))$ or $z = w)$ and $((y_0 \neq$
y and $\mathrm{setIn}(y_0, \mathrm{alive}))$ or $y_0 = w)$ and $\mathrm{host}(y_0) \neq \mathrm{host}(z)$ and $\mathrm{host}(x_0) = \mathrm{host}(z)$ and $\mathrm{host}(z_0) = \mathrm{host}(y_0)) \Rightarrow$
$\neg\,\mathrm{elem}(\mathrm{m\_Down}(x_0), v)$ and $\mathrm{elem}(\mathrm{m\_Down}(z_0), \mathrm{snoc}(\mathrm{queue}(\mathrm{host}(z)), \mathrm{m\_Halt}(w)))))))))))))$ fof(conj, conjecture)

SWV452+1.p Establishing that there cannot be two leaders, part i26_p216
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: $((\forall z, \mathrm{pid}_0$: $(\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}$
$\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))) \Rightarrow \mathrm{host}(\mathrm{pid}_0) \neq \mathrm{host}(z))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Halt}$
$\neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pid}_{20}, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Ack}(\mathrm{pid}_0, z), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}))) \Rightarrow \neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pic}$
z and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow \neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $((\mathrm{pid}_0 \neq z$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow$
$(\neg\,\mathrm{setIn}(z, \mathrm{alive})$ or $\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive})))$ and $\forall z, \mathrm{pid}_{30}, \mathrm{pid}_{20}, \mathrm{pid}_0$: $((\mathrm{host}(\mathrm{pid}_{20}) \neq \mathrm{host}(z)$ and $\mathrm{setIn}(z, \mathrm{alive})$ and $\mathrm{setIn}(\mathrm{pid}_{20}$
$\mathrm{host}(z)$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(\mathrm{pid}_{20})) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z)))$ and $\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_{30}), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}$
$\mathrm{cons}(\mathrm{m\_Down}(y), v)) \Rightarrow (\mathrm{setIn}(x, \mathrm{alive}) \Rightarrow (\neg\,\mathrm{host}(x) \leq \mathrm{host}(y) \Rightarrow (((\mathrm{index}(\mathrm{ldr}, \mathrm{host}(x)) = \mathrm{host}(y)$ and $\mathrm{index}(\mathrm{status}, \mathrm{host}($
$\mathrm{norm})$ or $(\mathrm{index}(\mathrm{status}, \mathrm{host}(x)) = \mathrm{wait}$ and $\mathrm{host}(y) = \mathrm{host}(\mathrm{index}(\mathrm{elid}, \mathrm{host}(x))))) \Rightarrow ((\forall z$: $(\mathrm{host}(x) = \mathrm{host}(z) \Rightarrow$
$z \leq w)$ and $\neg\,\mathrm{setIn}(w, \mathrm{pids})$ and $\mathrm{host}(x) = \mathrm{host}(w)) \Rightarrow (\mathrm{host}(w) \neq s(0) \Rightarrow \forall z$: $(\mathrm{host}(x) = \mathrm{host}(z) \Rightarrow$
$\forall x_0, y_0$: $(\mathrm{host}(x) \neq \mathrm{host}(y_0) \Rightarrow \forall z_0$: $((((z \neq x$ and $\mathrm{setIn}(z, \mathrm{alive}))$ or $z = w)$ and $((y_0 \neq x$ and $\mathrm{setIn}(y_0, \mathrm{alive}))$ or $y_0 =$
$w)$ and $\mathrm{host}(y_0) \neq \mathrm{host}(z)$ and $\mathrm{host}(x_0) = \mathrm{host}(z)$ and $\mathrm{host}(z_0) = \mathrm{host}(y_0)) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(z_0), v)$ and $\mathrm{elem}(\mathrm{m\_Down}(x$

SWV453+1.p Establishing that there cannot be two leaders, part i26_p217
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: $((\forall z, \mathrm{pid}_0$: $(\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}$
$\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z))) \Rightarrow \mathrm{host}(\mathrm{pid}_0) \neq \mathrm{host}(z))$ and $\forall z, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Halt}$
$\neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pid}_{20}, \mathrm{pid}_0$: $(\mathrm{elem}(\mathrm{m\_Ack}(\mathrm{pid}_0, z), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}))) \Rightarrow \neg\,\mathrm{host}(z) \leq \mathrm{host}(\mathrm{pid}_0))$ and $\forall z, \mathrm{pic}$
z and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow \neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive}))$ and $\forall z, \mathrm{pid}_0$: $((\mathrm{pid}_0 \neq z$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(z)) \Rightarrow$
$(\neg\,\mathrm{setIn}(z, \mathrm{alive})$ or $\neg\,\mathrm{setIn}(\mathrm{pid}_0, \mathrm{alive})))$ and $\forall z, \mathrm{pid}_{30}, \mathrm{pid}_{20}, \mathrm{pid}_0$: $((\mathrm{host}(\mathrm{pid}_{20}) \neq \mathrm{host}(z)$ and $\mathrm{setIn}(z, \mathrm{alive})$ and $\mathrm{setIn}(\mathrm{pid}_{20}$
$\mathrm{host}(z)$ and $\mathrm{host}(\mathrm{pid}_0) = \mathrm{host}(\mathrm{pid}_{20})) \Rightarrow \neg\,\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_0), \mathrm{queue}(\mathrm{host}(z)))$ and $\mathrm{elem}(\mathrm{m\_Down}(\mathrm{pid}_{30}), \mathrm{queue}(\mathrm{host}(\mathrm{pid}_{20}$

cons(m_Down(y), v)) $\Rightarrow$ (setIn(x, alive) $\Rightarrow$ ($\neg$ host(x) $\leq$ host(y) $\Rightarrow$ (((index(ldr, host(x)) = host(y) and index(status, host(
norm) or (index(status, host(x)) = wait and host(y) = host(index(elid, host(x))))) $\Rightarrow$ (($\forall z$: (host(x) = host(z) $\Rightarrow$
$z \leq w$) and $\neg$ setIn(w, pids) and host(x) = host(w)) $\Rightarrow$ (host(w) $\neq$ $s(0)$ $\Rightarrow$ $\forall z$: (host(x) $\neq$ host(z) $\Rightarrow$
$\forall x_0, y_0$: (host(x) = host(y_0) $\Rightarrow$ $\forall z_0$: (((($z \neq x$ and setIn(z, alive)) or $z = w$) and (($y_0 \neq x$ and setIn(y_0, alive)) or $y_0 =$
w) and host(y_0) $\neq$ host(z) and host(x_0) = host(z) and host(z_0) = host(y_0)) $\Rightarrow$ $\neg$ elem(m_Down(x_0), v) and elem(m_Down(z

SWV454+1.p Establishing that there cannot be two leaders, part i26_p250
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: (($\forall z, \text{pid}_0$: (setIn(pid$_0$, alive) $\Rightarrow$ $\neg$ elem(m_Down(pid$_0$), queue(host(z)))) and $\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue
$\neg$ setIn(pid$_0$, alive)) and $\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue(host(z))) $\Rightarrow$ host(pid$_0$) $\neq$ host(z)) and $\forall z, \text{pid}_0$: (elem(m_Halt
$\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z, \text{pid}_{20}, \text{pid}_0$: (elem(m_Ack(pid$_0$, z), queue(host(pid$_{20}$))) $\Rightarrow$ $\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z$, pic
z and host(pid$_0$) = host(z)) $\Rightarrow$ $\neg$ setIn(pid$_0$, alive)) and $\forall z, \text{pid}_0$: ((pid$_0$ $\neq$ z and host(pid$_0$) = host(z)) $\Rightarrow$
($\neg$ setIn(z, alive) or $\neg$ setIn(pid$_0$, alive))) and $\forall z, \text{pid}_{30}, \text{pid}_{20}, \text{pid}_0$: ((host(pid$_{20}$) $\neq$ host(z) and setIn(z, alive) and setIn(pid$_{20}$
host(z) and host(pid$_0$) = host(pid$_{20}$)) $\Rightarrow$ $\neg$ elem(m_Down(pid$_0$), queue(host(z))) and elem(m_Down(pid$_{30}$), queue(host(pid$_{20}$
cons(m_Down(y), v)) $\Rightarrow$ (setIn(x, alive) $\Rightarrow$ ($\neg$ host(x) $\leq$ host(y) $\Rightarrow$ ($\neg$ (index(ldr, host(x)) = host(y) and index(status, host
norm) or (index(status, host(x)) = wait and host(y) = host(index(elid, host(x))))) $\Rightarrow$ (($\forall z$: (($\neg$ host(x) $\leq z$ and $s(0) \leq$
z) $\Rightarrow$ (setIn(z, index(down, host(x))) or z = host(y))) and index(status, host(x)) = elec$_1$) $\Rightarrow$ ($\neg$ nbr_proc $\leq$
host(x) $\Rightarrow$ $\forall z$: (s(host(x)) $\neq$ host(z) $\Rightarrow$ (host(x) = host(z) $\Rightarrow$ $\forall w_0, x_0$: (s(host(x)) $\neq$ host(x_0) $\Rightarrow$ (host(x) $\neq$
host(x_0) $\Rightarrow$ $\forall y_0$: ((host(x_0) $\neq$ host(z) and setIn(z, alive) and setIn(x_0, alive) and host(w_0) = host(z) and host(y_0) =
host(x_0)) $\Rightarrow$ $\neg$ elem(m_Down(y_0), v) and elem(m_Down(w_0), queue(host(x_0)))))))))))))) fof(conj, conjecture)

SWV455+1.p Establishing that there cannot be two leaders, part i26_p257
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: (($\forall z, \text{pid}_0$: (setIn(pid$_0$, alive) $\Rightarrow$ $\neg$ elem(m_Down(pid$_0$), queue(host(z)))) and $\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue
$\neg$ setIn(pid$_0$, alive)) and $\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue(host(z))) $\Rightarrow$ host(pid$_0$) $\neq$ host(z)) and $\forall z, \text{pid}_0$: (elem(m_Halt
$\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z, \text{pid}_{20}, \text{pid}_0$: (elem(m_Ack(pid$_0$, z), queue(host(pid$_{20}$))) $\Rightarrow$ $\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z$, pic
z and host(pid$_0$) = host(z)) $\Rightarrow$ $\neg$ setIn(pid$_0$, alive)) and $\forall z, \text{pid}_0$: ((pid$_0$ $\neq$ z and host(pid$_0$) = host(z)) $\Rightarrow$
($\neg$ setIn(z, alive) or $\neg$ setIn(pid$_0$, alive))) and $\forall z, \text{pid}_{30}, \text{pid}_{20}, \text{pid}_0$: ((host(pid$_{20}$) $\neq$ host(z) and setIn(z, alive) and setIn(pid$_{20}$
host(z) and host(pid$_0$) = host(pid$_{20}$)) $\Rightarrow$ $\neg$ elem(m_Down(pid$_0$), queue(host(z))) and elem(m_Down(pid$_{30}$), queue(host(pid$_{20}$
cons(m_Down(y), v)) $\Rightarrow$ (setIn(x, alive) $\Rightarrow$ ($\neg$ host(x) $\leq$ host(y) $\Rightarrow$ ($\neg$ (index(ldr, host(x)) = host(y) and index(status, host
norm) or (index(status, host(x)) = wait and host(y) = host(index(elid, host(x))))) $\Rightarrow$ ($\neg \forall z$: (($\neg$ host(x) $\leq z$ and $s(0) \leq$
z) $\Rightarrow$ (setIn(z, index(down, host(x))) or z = host(y))) and index(status, host(x)) = elec$_1$ $\Rightarrow$ $\forall z$: (host(x) $\neq$
host(z) $\Rightarrow$ $\forall w_0, x_0$: (host(x) = host(x_0) $\Rightarrow$ $\forall y_0$: ((host(x_0) $\neq$ host(z) and setIn(z, alive) and setIn(x_0, alive) and host(w_0) =
host(z) and host(y_0) = host(x_0)) $\Rightarrow$ $\neg$ elem(m_Down(w_0), v) and elem(m_Down(y_0), queue(host(z)))))))))))) fof(conj, con

SWV456+1.p Establishing that there cannot be two leaders, part i27_p134
include('Axioms/SWV011+0.ax')
$\forall v, w, x, y$: (($\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue(host(z))) $\Rightarrow$ $\neg$ setIn(pid$_0$, alive)) and $\forall z, \text{pid}_0$: (elem(m_Down(pid$_0$), queue
host(pid$_0$) $\neq$ host(z)) and $\forall z, \text{pid}_0$: (elem(m_Halt(pid$_0$), queue(host(z))) $\Rightarrow$ $\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z, \text{pid}_{20}, \text{pid}_0$: (elen
$\neg$ host(z) $\leq$ host(pid$_0$)) and $\forall z, \text{pid}_0$: (($\neg$ setIn(z, alive) and pid$_0$ $\leq z$ and host(pid$_0$) = host(z)) $\Rightarrow$ $\neg$ setIn(pid$_0$, alive)) and $\forall$
z and host(pid$_0$) = host(z)) $\Rightarrow$ ($\neg$ setIn(z, alive) or $\neg$ setIn(pid$_0$, alive))) and $\forall z, \text{pid}_{30}, \text{pid}_{20}, \text{pid}_0$: ((host(pid$_{20}$) $\neq$
host(z) and setIn(z, alive) and setIn(pid$_{20}$, alive) and host(pid$_{30}$) = host(z) and host(pid$_0$) = host(pid$_{20}$)) $\Rightarrow$ $\neg$ elem(m_Dow
host(z) and setIn(z, alive) and setIn(pid$_{20}$, alive) and host(pid$_{30}$) = host(z) and host(pid$_0$) = host(pid$_{20}$)) $\Rightarrow$ $\neg$ elem(m_Dow
cons(m_Down(y), v)) $\Rightarrow$ (setIn(x, alive) $\Rightarrow$ ($\neg$ host(x) $\leq$ host(y) $\Rightarrow$ (((index(ldr, host(x)) = host(y) and index(status, host(
norm) or (index(status, host(x)) = wait and host(y) = host(index(elid, host(x))))) $\Rightarrow$ (($\forall z$: (host(x) = host(z) $\Rightarrow$
$z \leq w$) and $\neg$ setIn(w, pids) and host(x) = host(w)) $\Rightarrow$ (host(w) $\neq$ $s(0)$ $\Rightarrow$ $\forall z$: (host(x) = host(z) $\Rightarrow$
$\forall x_0, y_0$: (host(w) $\neq$ host(y_0) $\Rightarrow$ (host(x) $\neq$ host(y_0) $\Rightarrow$ $\forall z_0$: (((($z \neq x$ and setIn(z, alive)) or $z = w$) and (($y_0 \neq$
x and setIn(y_0, alive)) or $y_0 = w$) and host(y_0) $\neq$ host(z) and host(x_0) = host(z) and host(z_0) = host(y_0)) $\Rightarrow$
$\neg$ elem(m_Down(z_0), v) and setIn(host(x_0), index(down, host(y_0)))))))))))) fof(conj, conjecture)

SWV486+1.p Matrix is lower-triangular
$\forall i, j$: (int_leq(i, j) $\iff$ (int_less(i, j) or $i = j$)) fof(int_leq, axiom)
$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)
$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)
$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)
int_less(int_zero, int_one) fof(int_zero_one, axiom)
$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)
$\forall i$: i + int_zero = i fof(plus_zero, axiom)
$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)
$\forall i, j$: (int_less(i, j) $\iff$ $\exists k$: ($i + k = j$ and int_less(int_zero, k))) fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i)) fof(one_successor_of_zero, axiom)

$\mathrm{real\_zero} \neq \mathrm{real\_one}$ fof(real_constants, axiom)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_leq}(i, n) \text{ and } \mathrm{int\_leq}(\mathrm{int\_one}, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow (\forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } i = j + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) \Rightarrow a(k + c, k) = \mathrm{qr}(k + c, k))) \text{ and } \forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } j = i + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, i)) \Rightarrow a(k, k + c) = \mathrm{real\_zero}))))$ fof(qih, hypothesis)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow a(i, j) = \mathrm{real\_zero})$ fof(lt, conjecture)

SWV486+2.p Matrix is lower-triangular

$\forall i, j\colon (\mathrm{int\_leq}(i, j) \iff (\mathrm{int\_less}(i, j) \text{ or } i = j))$ fof(int_leq, axiom)

$\forall i, j, k\colon ((\mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_less}(j, k)) \Rightarrow \mathrm{int\_less}(i, k))$ fof(int_less_transitive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \Rightarrow i \neq j)$ fof(int_less_irreflexive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \text{ or } \mathrm{int\_leq}(j, i))$ fof(int_less_total, axiom)

$\mathrm{int\_less}(\mathrm{int\_zero}, \mathrm{int\_one})$ fof(int_zero_one, axiom)

$\forall i, j\colon i + j = j + i$ fof(plus_commutative, axiom)

$\forall i\colon i + \mathrm{int\_zero} = i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2\colon ((\mathrm{int\_less}(i_1, j_1) \text{ and } \mathrm{int\_leq}(i_2, j_2)) \Rightarrow \mathrm{int\_leq}(i_1 + i_2, j_1 + j_2))$ fof(plus_and_order$_1$, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \iff \exists k\colon (i + k = j \text{ and } \mathrm{int\_less}(\mathrm{int\_zero}, k)))$ fof(plus_and_inverse, axiom)

$\forall i\colon (\mathrm{int\_less}(\mathrm{int\_zero}, i) \iff \mathrm{int\_leq}(\mathrm{int\_one}, i))$ fof(one_successor_of_zero, axiom)

$\mathrm{real\_zero} \neq \mathrm{real\_one}$ fof(real_constants, axiom)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_leq}(i, n) \text{ and } \mathrm{int\_leq}(\mathrm{int\_one}, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow (\forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } i = j + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) \Rightarrow a(k + c, k) = \mathrm{lu}(k + c, k))) \text{ and } \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) a(k, k) = \mathrm{real\_one}) \text{ and } \forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } j = i + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, i)) \Rightarrow a(k, k + c) = \mathrm{real\_zero}))))$ fof(qil, hypothesis)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow a(i, j) = \mathrm{real\_zero})$ fof(lt, conjecture)

SWV486+3.p Matrix is lower-triangular

$\forall i, j\colon (\mathrm{int\_leq}(i, j) \iff (\mathrm{int\_less}(i, j) \text{ or } i = j))$ fof(int_leq, axiom)

$\forall i, j, k\colon ((\mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_less}(j, k)) \Rightarrow \mathrm{int\_less}(i, k))$ fof(int_less_transitive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \Rightarrow i \neq j)$ fof(int_less_irreflexive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \text{ or } \mathrm{int\_leq}(j, i))$ fof(int_less_total, axiom)

$\mathrm{int\_less}(\mathrm{int\_zero}, \mathrm{int\_one})$ fof(int_zero_one, axiom)

$\forall i, j\colon i + j = j + i$ fof(plus_commutative, axiom)

$\forall i\colon i + \mathrm{int\_zero} = i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2\colon ((\mathrm{int\_less}(i_1, j_1) \text{ and } \mathrm{int\_leq}(i_2, j_2)) \Rightarrow \mathrm{int\_leq}(i_1 + i_2, j_1 + j_2))$ fof(plus_and_order$_1$, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \iff \exists k\colon (i + k = j \text{ and } \mathrm{int\_less}(\mathrm{int\_zero}, k)))$ fof(plus_and_inverse, axiom)

$\forall i\colon (\mathrm{int\_less}(\mathrm{int\_zero}, i) \iff \mathrm{int\_leq}(\mathrm{int\_one}, i))$ fof(one_successor_of_zero, axiom)

$\mathrm{real\_zero} \neq \mathrm{real\_one}$ fof(real_constants, axiom)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_leq}(i, n) \text{ and } \mathrm{int\_leq}(\mathrm{int\_one}, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow (\forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } i = j + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) \Rightarrow a(k + c, k) = \mathrm{real\_zero})) \text{ and } \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) a(k, k) = \mathrm{real\_one}) \text{ and } \forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } j = i + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, i)) \Rightarrow a(k, k + c) = \mathrm{real\_zero}))))$ fof(qii, hypothesis)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow a(i, j) = \mathrm{real\_zero})$ fof(lt, conjecture)

SWV487+1.p Matrix is upper triangular

$\forall i, j\colon (\mathrm{int\_leq}(i, j) \iff (\mathrm{int\_less}(i, j) \text{ or } i = j))$ fof(int_leq, axiom)

$\forall i, j, k\colon ((\mathrm{int\_less}(i, j) \text{ and } \mathrm{int\_less}(j, k)) \Rightarrow \mathrm{int\_less}(i, k))$ fof(int_less_transitive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \Rightarrow i \neq j)$ fof(int_less_irreflexive, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \text{ or } \mathrm{int\_leq}(j, i))$ fof(int_less_total, axiom)

$\mathrm{int\_less}(\mathrm{int\_zero}, \mathrm{int\_one})$ fof(int_zero_one, axiom)

$\forall i, j\colon i + j = j + i$ fof(plus_commutative, axiom)

$\forall i\colon i + \mathrm{int\_zero} = i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2\colon ((\mathrm{int\_less}(i_1, j_1) \text{ and } \mathrm{int\_leq}(i_2, j_2)) \Rightarrow \mathrm{int\_leq}(i_1 + i_2, j_1 + j_2))$ fof(plus_and_order$_1$, axiom)

$\forall i, j\colon (\mathrm{int\_less}(i, j) \iff \exists k\colon (i + k = j \text{ and } \mathrm{int\_less}(\mathrm{int\_zero}, k)))$ fof(plus_and_inverse, axiom)

$\forall i\colon (\mathrm{int\_less}(\mathrm{int\_zero}, i) \iff \mathrm{int\_leq}(\mathrm{int\_one}, i))$ fof(one_successor_of_zero, axiom)

$\mathrm{real\_zero} \neq \mathrm{real\_one}$ fof(real_constants, axiom)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, i) \text{ and } \mathrm{int\_leq}(i, n) \text{ and } \mathrm{int\_leq}(\mathrm{int\_one}, j) \text{ and } \mathrm{int\_leq}(j, n)) \Rightarrow (\forall c\colon ((\mathrm{int\_less}(\mathrm{int\_zero}, c) \text{ and } i = j + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, j)) \Rightarrow a(k + c, k) = \mathrm{real\_zero})) \text{ and } \forall c\colon ((\mathrm{int\_leq}(\mathrm{int\_zero}, c) \text{ and } j = i + c) \Rightarrow \forall k\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, k) \text{ and } \mathrm{int\_leq}(k, i)) \Rightarrow a(k, k + c) = \mathrm{lu}(k, k + c)))))$ fof(qiu, hypothesis)

$\forall i, j\colon ((\mathrm{int\_leq}(\mathrm{int\_one}, j) \text{ and } \mathrm{int\_less}(j, i) \text{ and } \mathrm{int\_leq}(i, n)) \Rightarrow a(i, j) = \mathrm{real\_zero})$ fof(ut, conjecture)

SWV487+3.p Matrix is upper triangular

$\forall i, j\colon (\mathrm{int\_leq}(i, j) \iff (\mathrm{int\_less}(i, j) \text{ or } i = j))$ fof(int_leq, axiom)

$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)

$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)

$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)

int_less(int_zero, int_one) fof(int_zero_one, axiom)

$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)

$\forall i$: $i +$ int_zero $= i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)

$\forall i, j$: (int_less(i, j) $\iff$ $\exists k$: ($i + k = j$ and int_less(int_zero, k))) fof(plus_and_inverse, axiom)

$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i)) fof(one_successor_of_zero, axiom)

real_zero $\neq$ real_one fof(real_constants, axiom)

$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, n) and int_leq(int_one, j) and int_leq(j, n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i =$ $j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $\Rightarrow$ $a(k+c, k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $a(k, k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i + c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, i)) $\Rightarrow$ $a(k, k + c) =$ real_zero)))) fof(qii, hypothesis)

$\forall i, j$: ((int_leq(int_one, j) and int_less(j, i) and int_leq(i, n)) $\Rightarrow$ $a(i, j) =$ real_zero) fof(ut, conjecture)

SWV488+2.p Matrix has no zero on the diagonal

$\forall i, j$: (int_leq(i, j) $\iff$ (int_less(i, j) or $i = j$)) fof(int_leq, axiom)

$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)

$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)

$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)

int_less(int_zero, int_one) fof(int_zero_one, axiom)

$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)

$\forall i$: $i +$ int_zero $= i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)

$\forall i, j$: (int_less(i, j) $\iff$ $\exists k$: ($i + k = j$ and int_less(int_zero, k))) fof(plus_and_inverse, axiom)

$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i)) fof(one_successor_of_zero, axiom)

real_zero $\neq$ real_one fof(real_constants, axiom)

$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, n) and int_leq(int_one, j) and int_leq(j, n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i =$ $j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $\Rightarrow$ $a(k+c, k) =$ lu($k+c, k$))) and $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $a(k, k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i + c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, i)) $\Rightarrow$ $a(k, k + c) =$ real_zero)))) fof(qil, hypothesis)

$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, j) and int_leq(j, n)) $\Rightarrow$ ($i = j$ $\Rightarrow$ $a(i, j) \neq$ real_zero)) fof(lti, conjecture)

SWV488+3.p Matrix has no zero on the diagonal

$\forall i, j$: (int_leq(i, j) $\iff$ (int_less(i, j) or $i = j$)) fof(int_leq, axiom)

$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)

$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)

$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)

int_less(int_zero, int_one) fof(int_zero_one, axiom)

$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)

$\forall i$: $i +$ int_zero $= i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)

$\forall i, j$: (int_less(i, j) $\iff$ $\exists k$: ($i + k = j$ and int_less(int_zero, k))) fof(plus_and_inverse, axiom)

$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i)) fof(one_successor_of_zero, axiom)

real_zero $\neq$ real_one fof(real_constants, axiom)

$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, n) and int_leq(int_one, j) and int_leq(j, n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i =$ $j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $\Rightarrow$ $a(k+c, k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $a(k, k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i + c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, i)) $\Rightarrow$ $a(k, k + c) =$ real_zero)))) fof(qii, hypothesis)

$\forall i, j$: ((int_leq(int_one, j) and int_leq(j, i) and int_leq(i, n)) $\Rightarrow$ ($i = j$ $\Rightarrow$ $a(i, j) \neq$ real_zero)) fof(uti, conjecture)

SWV489+3.p Matrix is diagonal

$\forall i, j$: (int_leq(i, j) $\iff$ (int_less(i, j) or $i = j$)) fof(int_leq, axiom)

$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)

$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)

$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)

int_less(int_zero, int_one) fof(int_zero_one, axiom)

$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)

$\forall i$: $i +$ int_zero $= i$ fof(plus_zero, axiom)

$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)

$\forall i,j$: (int_less(i,j) $\iff$ $\exists k$: ($i+k=j$ and int_less(int_zero, k)))   fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i))   fof(one_successor_of_zero, axiom)
real_zero $\neq$ real_one   fof(real_constants, axiom)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i = j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $\Rightarrow$ $a(k+c,k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $a(k,k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,i)) $\Rightarrow$ $a(k,k+c) =$ real_zero))))   fof(qii, hypothesis)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n) and $i \neq j$) $\Rightarrow$ $a(i,j) =$ real_zero)   fof(d,

SWV490+3.p Matrix is diagonal invertible
$\forall i,j$: (int_leq(i,j) $\iff$ (int_less(i,j) or $i=j$))   fof(int_leq, axiom)
$\forall i,j,k$: ((int_less(i,j) and int_less(j,k)) $\Rightarrow$ int_less(i,k))   fof(int_less_transitive, axiom)
$\forall i,j$: (int_less(i,j) $\Rightarrow$ $i \neq j$)   fof(int_less_irreflexive, axiom)
$\forall i,j$: (int_less(i,j) or int_leq(j,i))   fof(int_less_total, axiom)
int_less(int_zero, int_one)   fof(int_zero_one, axiom)
$\forall i,j$: $i+j=j+i$ fof(plus_commutative, axiom)
$\forall i$: $i+\text{int\_zero}=i$ fof(plus_zero, axiom)
$\forall i_1,j_1,i_2,j_2$: ((int_less(i_1,j_1) and int_leq(i_2,j_2)) $\Rightarrow$ int_leq(i_1+i_2,j_1+j_2))   fof(plus_and_order$_1$, axiom)
$\forall i,j$: (int_less(i,j) $\iff$ $\exists k$: ($i+k=j$ and int_less(int_zero, k)))   fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i))   fof(one_successor_of_zero, axiom)
real_zero $\neq$ real_one   fof(real_constants, axiom)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i = j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $\Rightarrow$ $a(k+c,k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $a(k,k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,i)) $\Rightarrow$ $a(k,k+c) =$ real_zero))))   fof(qii, hypothesis)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ (($i \neq j$ $\Rightarrow$ $a(i,j) =$ real_zero) and ($i = j$ $\Rightarrow$ $a(i,j) \neq$ real_zero)))   fof(di, conjecture)

SWV491+3.p Matrix is identity
$\forall i,j$: (int_leq(i,j) $\iff$ (int_less(i,j) or $i=j$))   fof(int_leq, axiom)
$\forall i,j,k$: ((int_less(i,j) and int_less(j,k)) $\Rightarrow$ int_less(i,k))   fof(int_less_transitive, axiom)
$\forall i,j$: (int_less(i,j) $\Rightarrow$ $i \neq j$)   fof(int_less_irreflexive, axiom)
$\forall i,j$: (int_less(i,j) or int_leq(j,i))   fof(int_less_total, axiom)
int_less(int_zero, int_one)   fof(int_zero_one, axiom)
$\forall i,j$: $i+j=j+i$ fof(plus_commutative, axiom)
$\forall i$: $i+\text{int\_zero}=i$ fof(plus_zero, axiom)
$\forall i_1,j_1,i_2,j_2$: ((int_less(i_1,j_1) and int_leq(i_2,j_2)) $\Rightarrow$ int_leq(i_1+i_2,j_1+j_2))   fof(plus_and_order$_1$, axiom)
$\forall i,j$: (int_less(i,j) $\iff$ $\exists k$: ($i+k=j$ and int_less(int_zero, k)))   fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i))   fof(one_successor_of_zero, axiom)
real_zero $\neq$ real_one   fof(real_constants, axiom)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i = j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $\Rightarrow$ $a(k+c,k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $a(k,k) =$ real_one) and $\forall c$: ((int_less(int_zero, c) and $j = i+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,i)) $\Rightarrow$ $a(k,k+c) =$ real_zero))))   fof(qih, hypothesis)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ ((int_less(i,j) $\Rightarrow$ $a(i,j) =$ real_zero) and (int_less(j,i) $\Rightarrow$ $a(i,j) =$ real_zero) and ($i = j$ $\Rightarrow$ $a(i,j) =$ real_one)))   fof(diag, conjecture)

SWV491+4.p Matrix is identity
$\forall i,j$: (int_leq(i,j) $\iff$ (int_less(i,j) or $i=j$))   fof(int_leq, axiom)
$\forall i,j,k$: ((int_less(i,j) and int_less(j,k)) $\Rightarrow$ int_less(i,k))   fof(int_less_transitive, axiom)
$\forall i,j$: (int_less(i,j) $\Rightarrow$ $i \neq j$)   fof(int_less_irreflexive, axiom)
$\forall i,j$: (int_less(i,j) or int_leq(j,i))   fof(int_less_total, axiom)
int_less(int_zero, int_one)   fof(int_zero_one, axiom)
$\forall i,j$: $i+j=j+i$ fof(plus_commutative, axiom)
$\forall i$: $i+\text{int\_zero}=i$ fof(plus_zero, axiom)
$\forall i_1,j_1,i_2,j_2$: ((int_less(i_1,j_1) and int_leq(i_2,j_2)) $\Rightarrow$ int_leq(i_1+i_2,j_1+j_2))   fof(plus_and_order$_1$, axiom)
$\forall i,j$: (int_less(i,j) $\iff$ $\exists k$: ($i+k=j$ and int_less(int_zero, k)))   fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i))   fof(one_successor_of_zero, axiom)
real_zero $\neq$ real_one   fof(real_constants, axiom)
$\forall i,j$: ((int_leq(int_one, i) and int_leq(i,n) and int_leq(int_one, j) and int_leq(j,n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i = j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k,j)) $\Rightarrow$ $a(k+c,k) =$ real_zero)) and $\forall k$: ((int_leq(int_one, k) and int_leq(k,j))

$a(k,k) = \text{real\_one}$) and $\forall c$: ((int_less(int_zero, c) and $j = i + c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, i)) $\Rightarrow$ $a(k, k + c) = \text{real\_zero}$)))) fof(qii, hypothesis)
$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, n) and int_leq(int_one, j) and int_leq(j, n)) $\Rightarrow$ (($i \neq j$ $\Rightarrow$ $a(i, j) = \text{real\_zero}$) and ($i =$ j $\Rightarrow$ $a(i, j) = \text{real\_one}$))) fof(id, conjecture)

SWV492+1.p Matrix is lower-triangular and invertible
$\forall i, j$: (int_leq(i, j) $\iff$ (int_less(i, j) or $i = j$)) fof(int_leq, axiom)
$\forall i, j, k$: ((int_less(i, j) and int_less(j, k)) $\Rightarrow$ int_less(i, k)) fof(int_less_transitive, axiom)
$\forall i, j$: (int_less(i, j) $\Rightarrow$ $i \neq j$) fof(int_less_irreflexive, axiom)
$\forall i, j$: (int_less(i, j) or int_leq(j, i)) fof(int_less_total, axiom)
int_less(int_zero, int_one) fof(int_zero_one, axiom)
$\forall i, j$: $i + j = j + i$ fof(plus_commutative, axiom)
$\forall i$: $i + \text{int\_zero} = i$ fof(plus_zero, axiom)
$\forall i_1, j_1, i_2, j_2$: ((int_less($i_1, j_1$) and int_leq($i_2, j_2$)) $\Rightarrow$ int_leq($i_1 + i_2, j_1 + j_2$)) fof(plus_and_order$_1$, axiom)
$\forall i, j$: (int_less(i, j) $\iff$ $\exists k$: ($i + k = j$ and int_less(int_zero, k))) fof(plus_and_inverse, axiom)
$\forall i$: (int_less(int_zero, i) $\iff$ int_leq(int_one, i)) fof(one_successor_of_zero, axiom)
real_zero $\neq$ real_one fof(real_constants, axiom)
$\forall i, j$: ((int_leq(int_one, i) and int_leq(i, n) and int_leq(int_one, j) and int_leq(j, n)) $\Rightarrow$ ($\forall c$: ((int_less(int_zero, c) and $i =$ $j+c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)) $\Rightarrow$ $a(k+c, k) = \text{qr}(k+c, k)$))) and $\forall k$: ((int_leq(int_one, k) and int_leq(k, j)
$a(k,k) = \text{real\_one}$) and $\forall c$: ((int_less(int_zero, c) and $j = i + c$) $\Rightarrow$ $\forall k$: ((int_leq(int_one, k) and int_leq(k, i)) $\Rightarrow$ $a(k, k + c) = \text{real\_zero}$)))) fof(qih, hypothesis)
$\forall i, j$: ((int_leq(int_one, i) and int_less(i, j) and int_leq(j, n)) $\Rightarrow$ $a(i, j) = \text{real\_zero}$) and $\forall i, j$: ((int_leq(int_one, i) and int_leq(
j) $\Rightarrow$ $a(i, j) \neq \text{real\_zero}$) fof(lti, conjecture)

SWV495-1.030.p Store commutativity (t1_np_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
store(stor
store(stor

SWV495-1.040.p Store commutativity (t1_np_nf_ni_00040)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
store(stor
store(stor

SWV495-1.050.p Store commutativity (t1_np_nf_ni_00050)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
store(stor
store(stor

SWV496-1.030.p Store commutativity (t1_np_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
store(stor
store(stor

SWV496-1.040.p Store commutativity (t1_np_nf_ni_00040)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
store(stor
store(stor

SWV496-1.050.p Store commutativity (t1_np_nf_ni_00050)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
store(stor
store(stor

SWV503-1.030.p Store commutativity (t1_pp_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
select(store(sto
select(store(sto

SWV504-1.030.p Store commutativity (t1_pp_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
select(store(sto
select(store(sto

SWV511-1.030.p Store commutativity (t2_np_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
store(a, i, select(a, i)) = a cnf(a_3, axiom)
store(store(a, i, e), i, f) = store(a, i, f)   cnf(a_4, axiom)
$i = j$ or store(store(a, i, e), j, f) = store(store(a, j, f), i, e)   cnf(a_5, axiom)
store(stor
store(stor

SWV511-1.040.p Store commutativity (t2_np_nf_ni_00040)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
store(a, i, select(a, i)) = a cnf(a_3, axiom)
store(store(a, i, e), i, f) = store(a, i, f)   cnf(a_4, axiom)
$i = j$ or store(store(a, i, e), j, f) = store(store(a, j, f), i, e)   cnf(a_5, axiom)
store(stor
store(stor

SWV511-1.050.p Store commutativity (t2_np_nf_ni_00050)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
store(a, i, select(a, i)) = a cnf(a_3, axiom)
store(store(a, i, e), i, f) = store(a, i, f)   cnf(a_4, axiom)
$i = j$ or store(store(a, i, e), j, f) = store(store(a, j, f), i, e)   cnf(a_5, axiom)
store(stor
store(stor

SWV517-1.030.p Store commutativity (t3_np_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
select(store(a, i, e), i) = e cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) = select(a, j)   cnf(a_2, axiom)
store(store(a, i, select(a, j)), j, select(a, i)) = store(store(a, j, select(a, i)), i, select(a, j))   cnf(a_3, axiom)

store(stor
store(stor

SWV517-1.040.p Store commutativity (t3_np_nf_ni_00040)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
store(stor
store(stor

SWV517-1.050.p Store commutativity (t3_np_nf_ni_00050)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
store(stor
store(stor

SWV518-1.030.p Store commutativity (t3_np_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
store(stor
store(stor

SWV518-1.040.p Store commutativity (t3_np_nf_ni_00040)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
store(stor
store(stor

SWV518-1.050.p Store commutativity (t3_np_nf_ni_00050)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
store(stor
store(stor

SWV525-1.030.p Store commutativity (t3_pp_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
select(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(sto
select(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(store(sto

SWV526-1.030.p Store commutativity (t3_pp_nf_ni_00030)
The result of storing a set of elements in different positions within an array is not acted by the relative order of the store operations.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, \mathrm{select}(a, j)), j, \mathrm{select}(a, i)) = \mathrm{store}(\mathrm{store}(a, j, \mathrm{select}(a, i)), i, \mathrm{select}(a, j)) \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$

select(store(sto
select(store(sto

SWV533-1.004.p Swap elements (t1_np_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j \text{ or } \text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$a_{417} = \text{store}(a_1, i_1, e_{416}) \qquad \text{cnf}(\text{hyp}_0, \text{hypothesis})$
$a_{418} = \text{store}(a_{417}, i_1, e_{416}) \qquad \text{cnf}(\text{hyp}_1, \text{hypothesis})$
$a_{420} = \text{store}(a_{418}, i_0, e_{419}) \qquad \text{cnf}(\text{hyp}_2, \text{hypothesis})$
$a_{422} = \text{store}(a_{420}, i_3, e_{421}) \qquad \text{cnf}(\text{hyp}_3, \text{hypothesis})$
$a_{424} = \text{store}(a_{422}, i_3, e_{423}) \qquad \text{cnf}(\text{hyp}_4, \text{hypothesis})$
$a_{426} = \text{store}(a_{424}, i_2, e_{425}) \qquad \text{cnf}(\text{hyp}_5, \text{hypothesis})$
$a_{428} = \text{store}(a_{426}, i_2, e_{427}) \qquad \text{cnf}(\text{hyp}_6, \text{hypothesis})$
$a_{430} = \text{store}(a_{428}, i_0, e_{429}) \qquad \text{cnf}(\text{hyp}_7, \text{hypothesis})$
$a_{431} = \text{store}(a_{418}, i_3, e_{421}) \qquad \text{cnf}(\text{hyp}_8, \text{hypothesis})$
$a_{432} = \text{store}(a_{431}, i_0, e_{419}) \qquad \text{cnf}(\text{hyp}_9, \text{hypothesis})$
$a_{434} = \text{store}(a_{432}, i_3, e_{433}) \qquad \text{cnf}(\text{hyp}_{10}, \text{hypothesis})$
$a_{436} = \text{store}(a_{434}, i_2, e_{435}) \qquad \text{cnf}(\text{hyp}_{11}, \text{hypothesis})$
$a_{438} = \text{store}(a_{436}, i_0, e_{437}) \qquad \text{cnf}(\text{hyp}_{12}, \text{hypothesis})$
$a_{440} = \text{store}(a_{438}, i_2, e_{439}) \qquad \text{cnf}(\text{hyp}_{13}, \text{hypothesis})$
$e_{416} = \text{select}(a_1, i_1) \qquad \text{cnf}(\text{hyp}_{14}, \text{hypothesis})$
$e_{419} = \text{select}(a_{418}, i_3) \qquad \text{cnf}(\text{hyp}_{15}, \text{hypothesis})$
$e_{421} = \text{select}(a_{418}, i_0) \qquad \text{cnf}(\text{hyp}_{16}, \text{hypothesis})$
$e_{423} = \text{select}(a_{422}, i_2) \qquad \text{cnf}(\text{hyp}_{17}, \text{hypothesis})$
$e_{425} = \text{select}(a_{422}, i_3) \qquad \text{cnf}(\text{hyp}_{18}, \text{hypothesis})$
$e_{427} = \text{select}(a_{426}, i_0) \qquad \text{cnf}(\text{hyp}_{19}, \text{hypothesis})$
$e_{429} = \text{select}(a_{426}, i_2) \qquad \text{cnf}(\text{hyp}_{20}, \text{hypothesis})$
$e_{433} = \text{select}(a_{432}, i_2) \qquad \text{cnf}(\text{hyp}_{21}, \text{hypothesis})$
$e_{435} = \text{select}(a_{432}, i_3) \qquad \text{cnf}(\text{hyp}_{22}, \text{hypothesis})$
$e_{437} = \text{select}(a_{436}, i_2) \qquad \text{cnf}(\text{hyp}_{23}, \text{hypothesis})$
$e_{439} = \text{select}(a_{436}, i_0) \qquad \text{cnf}(\text{hyp}_{24}, \text{hypothesis})$
$a_{430} \neq a_{440} \qquad \text{cnf}(\text{goal}, \text{negated\_conjecture})$

SWV533-1.007.p Swap elements (t1_np_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j \text{ or } \text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$a_{783} = \text{store}(a_1, i_4, e_{782}) \qquad \text{cnf}(\text{hyp}_0, \text{hypothesis})$
$a_{785} = \text{store}(a_{783}, i_3, e_{784}) \qquad \text{cnf}(\text{hyp}_1, \text{hypothesis})$
$a_{787} = \text{store}(a_{785}, i_2, e_{786}) \qquad \text{cnf}(\text{hyp}_2, \text{hypothesis})$
$a_{789} = \text{store}(a_{787}, i_1, e_{788}) \qquad \text{cnf}(\text{hyp}_3, \text{hypothesis})$
$a_{791} = \text{store}(a_{789}, i_0, e_{790}) \qquad \text{cnf}(\text{hyp}_4, \text{hypothesis})$
$a_{793} = \text{store}(a_{791}, i_5, e_{792}) \qquad \text{cnf}(\text{hyp}_5, \text{hypothesis})$
$a_{795} = \text{store}(a_{793}, i_2, e_{794}) \qquad \text{cnf}(\text{hyp}_6, \text{hypothesis})$
$a_{797} = \text{store}(a_{795}, i_5, e_{796}) \qquad \text{cnf}(\text{hyp}_7, \text{hypothesis})$
$a_{799} = \text{store}(a_{797}, i_1, e_{798}) \qquad \text{cnf}(\text{hyp}_8, \text{hypothesis})$
$a_{800} = \text{store}(a_{799}, i_1, e_{798}) \qquad \text{cnf}(\text{hyp}_9, \text{hypothesis})$
$a_{802} = \text{store}(a_{800}, i_5, e_{801}) \qquad \text{cnf}(\text{hyp}_{10}, \text{hypothesis})$
$a_{804} = \text{store}(a_{802}, i_2, e_{803}) \qquad \text{cnf}(\text{hyp}_{11}, \text{hypothesis})$
$a_{806} = \text{store}(a_{804}, i_5, e_{805}) \qquad \text{cnf}(\text{hyp}_{12}, \text{hypothesis})$
$a_{808} = \text{store}(a_{806}, i_2, e_{807}) \qquad \text{cnf}(\text{hyp}_{13}, \text{hypothesis})$
$a_{809} = \text{store}(a_{785}, i_1, e_{788}) \qquad \text{cnf}(\text{hyp}_{14}, \text{hypothesis})$
$a_{810} = \text{store}(a_{809}, i_2, e_{786}) \qquad \text{cnf}(\text{hyp}_{15}, \text{hypothesis})$
$a_{812} = \text{store}(a_{810}, i_5, e_{811}) \qquad \text{cnf}(\text{hyp}_{16}, \text{hypothesis})$
$a_{814} = \text{store}(a_{812}, i_0, e_{813}) \qquad \text{cnf}(\text{hyp}_{17}, \text{hypothesis})$
$a_{816} = \text{store}(a_{814}, i_5, e_{815}) \qquad \text{cnf}(\text{hyp}_{18}, \text{hypothesis})$
$a_{818} = \text{store}(a_{816}, i_2, e_{817}) \qquad \text{cnf}(\text{hyp}_{19}, \text{hypothesis})$

$a_{820} = \text{store}(a_{818}, i_1, e_{819})$ cnf(hyp$_{20}$, hypothesis)
$a_{821} = \text{store}(a_{820}, i_1, e_{819})$ cnf(hyp$_{21}$, hypothesis)
$a_{823} = \text{store}(a_{821}, i_5, e_{822})$ cnf(hyp$_{22}$, hypothesis)
$a_{825} = \text{store}(a_{823}, i_2, e_{824})$ cnf(hyp$_{23}$, hypothesis)
$a_{827} = \text{store}(a_{825}, i_5, e_{826})$ cnf(hyp$_{24}$, hypothesis)
$a_{829} = \text{store}(a_{827}, i_2, e_{828})$ cnf(hyp$_{25}$, hypothesis)
$e_{782} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{784} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{786} = \text{select}(a_{785}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{788} = \text{select}(a_{785}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{790} = \text{select}(a_{789}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{792} = \text{select}(a_{789}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{794} = \text{select}(a_{793}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{796} = \text{select}(a_{793}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{798} = \text{select}(a_{797}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{801} = \text{select}(a_{800}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{803} = \text{select}(a_{800}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{805} = \text{select}(a_{804}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{807} = \text{select}(a_{804}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{811} = \text{select}(a_{810}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{813} = \text{select}(a_{810}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{815} = \text{select}(a_{814}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{817} = \text{select}(a_{814}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{819} = \text{select}(a_{818}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{822} = \text{select}(a_{821}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{824} = \text{select}(a_{821}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{826} = \text{select}(a_{825}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{828} = \text{select}(a_{825}, i_5)$ cnf(hyp$_{47}$, hypothesis)
$a_{808} \neq a_{829}$ cnf(goal, negated_conjecture)

SWV534-1.004.p Swap elements (t1_np_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{418} = \text{store}(a_1, i_1, e_{417})$ cnf(hyp$_0$, hypothesis)
$a_{419} = \text{store}(a_{418}, i_1, e_{417})$ cnf(hyp$_1$, hypothesis)
$a_{421} = \text{store}(a_{419}, i_0, e_{420})$ cnf(hyp$_2$, hypothesis)
$a_{423} = \text{store}(a_{421}, i_3, e_{422})$ cnf(hyp$_3$, hypothesis)
$a_{425} = \text{store}(a_{423}, i_3, e_{424})$ cnf(hyp$_4$, hypothesis)
$a_{427} = \text{store}(a_{425}, i_2, e_{426})$ cnf(hyp$_5$, hypothesis)
$a_{429} = \text{store}(a_{427}, i_2, e_{428})$ cnf(hyp$_6$, hypothesis)
$a_{431} = \text{store}(a_{429}, i_0, e_{430})$ cnf(hyp$_7$, hypothesis)
$a_{432} = \text{store}(a_{419}, i_3, e_{422})$ cnf(hyp$_8$, hypothesis)
$a_{433} = \text{store}(a_{432}, i_0, e_{420})$ cnf(hyp$_9$, hypothesis)
$a_{435} = \text{store}(a_{433}, i_3, e_{434})$ cnf(hyp$_{10}$, hypothesis)
$a_{437} = \text{store}(a_{435}, i_2, e_{436})$ cnf(hyp$_{11}$, hypothesis)
$a_{439} = \text{store}(a_{437}, i_0, e_{438})$ cnf(hyp$_{12}$, hypothesis)
$a_{441} = \text{store}(a_{439}, i_3, e_{440})$ cnf(hyp$_{13}$, hypothesis)
$e_{417} = \text{select}(a_1, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{420} = \text{select}(a_{419}, i_3)$ cnf(hyp$_{15}$, hypothesis)
$e_{422} = \text{select}(a_{419}, i_0)$ cnf(hyp$_{16}$, hypothesis)
$e_{424} = \text{select}(a_{423}, i_2)$ cnf(hyp$_{17}$, hypothesis)
$e_{426} = \text{select}(a_{423}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{428} = \text{select}(a_{427}, i_0)$ cnf(hyp$_{19}$, hypothesis)
$e_{430} = \text{select}(a_{427}, i_2)$ cnf(hyp$_{20}$, hypothesis)
$e_{434} = \text{select}(a_{433}, i_2)$ cnf(hyp$_{21}$, hypothesis)
$e_{436} = \text{select}(a_{433}, i_3)$ cnf(hyp$_{22}$, hypothesis)
$e_{438} = \text{select}(a_{437}, i_3)$ cnf(hyp$_{23}$, hypothesis)
$e_{440} = \text{select}(a_{437}, i_0)$ cnf(hyp$_{24}$, hypothesis)

$a_{431} \neq a_{441}$ cnf(goal, negated_conjecture)

SWV534-1.007.p Swap elements (t1_np_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{785} = \text{store}(a_1, i_4, e_{784})$ cnf(hyp_0, hypothesis)
$a_{787} = \text{store}(a_{785}, i_3, e_{786})$ cnf(hyp_1, hypothesis)
$a_{789} = \text{store}(a_{787}, i_2, e_{788})$ cnf(hyp_2, hypothesis)
$a_{791} = \text{store}(a_{789}, i_1, e_{790})$ cnf(hyp_3, hypothesis)
$a_{793} = \text{store}(a_{791}, i_0, e_{792})$ cnf(hyp_4, hypothesis)
$a_{795} = \text{store}(a_{793}, i_5, e_{794})$ cnf(hyp_5, hypothesis)
$a_{797} = \text{store}(a_{795}, i_2, e_{796})$ cnf(hyp_6, hypothesis)
$a_{799} = \text{store}(a_{797}, i_5, e_{798})$ cnf(hyp_7, hypothesis)
$a_{801} = \text{store}(a_{799}, i_1, e_{800})$ cnf(hyp_8, hypothesis)
$a_{802} = \text{store}(a_{801}, i_1, e_{800})$ cnf(hyp_9, hypothesis)
$a_{804} = \text{store}(a_{802}, i_5, e_{803})$ cnf(hyp_{10}, hypothesis)
$a_{806} = \text{store}(a_{804}, i_2, e_{805})$ cnf(hyp_{11}, hypothesis)
$a_{808} = \text{store}(a_{806}, i_5, e_{807})$ cnf(hyp_{12}, hypothesis)
$a_{810} = \text{store}(a_{808}, i_2, e_{809})$ cnf(hyp_{13}, hypothesis)
$a_{811} = \text{store}(a_{787}, i_1, e_{790})$ cnf(hyp_{14}, hypothesis)
$a_{812} = \text{store}(a_{811}, i_2, e_{788})$ cnf(hyp_{15}, hypothesis)
$a_{814} = \text{store}(a_{812}, i_5, e_{813})$ cnf(hyp_{16}, hypothesis)
$a_{816} = \text{store}(a_{814}, i_0, e_{815})$ cnf(hyp_{17}, hypothesis)
$a_{818} = \text{store}(a_{816}, i_5, e_{817})$ cnf(hyp_{18}, hypothesis)
$a_{820} = \text{store}(a_{818}, i_2, e_{819})$ cnf(hyp_{19}, hypothesis)
$a_{822} = \text{store}(a_{820}, i_1, e_{821})$ cnf(hyp_{20}, hypothesis)
$a_{823} = \text{store}(a_{822}, i_1, e_{821})$ cnf(hyp_{21}, hypothesis)
$a_{825} = \text{store}(a_{823}, i_5, e_{824})$ cnf(hyp_{22}, hypothesis)
$a_{827} = \text{store}(a_{825}, i_2, e_{826})$ cnf(hyp_{23}, hypothesis)
$a_{829} = \text{store}(a_{827}, i_6, e_{828})$ cnf(hyp_{24}, hypothesis)
$a_{831} = \text{store}(a_{829}, i_2, e_{830})$ cnf(hyp_{25}, hypothesis)
$e_{784} = \text{select}(a_1, i_3)$ cnf(hyp_{26}, hypothesis)
$e_{786} = \text{select}(a_1, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{788} = \text{select}(a_{787}, i_1)$ cnf(hyp_{28}, hypothesis)
$e_{790} = \text{select}(a_{787}, i_2)$ cnf(hyp_{29}, hypothesis)
$e_{792} = \text{select}(a_{791}, i_5)$ cnf(hyp_{30}, hypothesis)
$e_{794} = \text{select}(a_{791}, i_0)$ cnf(hyp_{31}, hypothesis)
$e_{796} = \text{select}(a_{795}, i_5)$ cnf(hyp_{32}, hypothesis)
$e_{798} = \text{select}(a_{795}, i_2)$ cnf(hyp_{33}, hypothesis)
$e_{800} = \text{select}(a_{799}, i_1)$ cnf(hyp_{34}, hypothesis)
$e_{803} = \text{select}(a_{802}, i_2)$ cnf(hyp_{35}, hypothesis)
$e_{805} = \text{select}(a_{802}, i_5)$ cnf(hyp_{36}, hypothesis)
$e_{807} = \text{select}(a_{806}, i_2)$ cnf(hyp_{37}, hypothesis)
$e_{809} = \text{select}(a_{806}, i_5)$ cnf(hyp_{38}, hypothesis)
$e_{813} = \text{select}(a_{812}, i_0)$ cnf(hyp_{39}, hypothesis)
$e_{815} = \text{select}(a_{812}, i_5)$ cnf(hyp_{40}, hypothesis)
$e_{817} = \text{select}(a_{816}, i_2)$ cnf(hyp_{41}, hypothesis)
$e_{819} = \text{select}(a_{816}, i_5)$ cnf(hyp_{42}, hypothesis)
$e_{821} = \text{select}(a_{820}, i_1)$ cnf(hyp_{43}, hypothesis)
$e_{824} = \text{select}(a_{823}, i_2)$ cnf(hyp_{44}, hypothesis)
$e_{826} = \text{select}(a_{823}, i_5)$ cnf(hyp_{45}, hypothesis)
$e_{828} = \text{select}(a_{827}, i_2)$ cnf(hyp_{46}, hypothesis)
$e_{830} = \text{select}(a_{827}, i_6)$ cnf(hyp_{47}, hypothesis)
$a_{810} \neq a_{831}$ cnf(goal, negated_conjecture)

SWV537-1.004.p Swap elements (t1_pp_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.

select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
$a_{466} =$ store(a_1, i_1, e_{465}) cnf(hyp_0, hypothesis)
$a_{467} =$ store(a_{466}, i_1, e_{465}) cnf(hyp_1, hypothesis)
$a_{469} =$ store(a_{467}, i_0, e_{468}) cnf(hyp_2, hypothesis)
$a_{471} =$ store(a_{469}, i_3, e_{470}) cnf(hyp_3, hypothesis)
$a_{473} =$ store(a_{471}, i_3, e_{472}) cnf(hyp_4, hypothesis)
$a_{475} =$ store(a_{473}, i_2, e_{474}) cnf(hyp_5, hypothesis)
$a_{477} =$ store(a_{475}, i_2, e_{476}) cnf(hyp_6, hypothesis)
$a_{479} =$ store(a_{477}, i_0, e_{478}) cnf(hyp_7, hypothesis)
$a_{480} =$ store(a_{467}, i_3, e_{470}) cnf(hyp_8, hypothesis)
$a_{481} =$ store(a_{480}, i_0, e_{468}) cnf(hyp_9, hypothesis)
$a_{483} =$ store(a_{481}, i_3, e_{482}) cnf(hyp_{10}, hypothesis)
$a_{485} =$ store(a_{483}, i_2, e_{484}) cnf(hyp_{11}, hypothesis)
$a_{487} =$ store(a_{485}, i_0, e_{486}) cnf(hyp_{12}, hypothesis)
$a_{489} =$ store(a_{487}, i_2, e_{488}) cnf(hyp_{13}, hypothesis)
$e_{465} =$ select(a_1, i_1) cnf(hyp_{14}, hypothesis)
$e_{468} =$ select(a_{467}, i_3) cnf(hyp_{15}, hypothesis)
$e_{470} =$ select(a_{467}, i_0) cnf(hyp_{16}, hypothesis)
$e_{472} =$ select(a_{471}, i_2) cnf(hyp_{17}, hypothesis)
$e_{474} =$ select(a_{471}, i_3) cnf(hyp_{18}, hypothesis)
$e_{476} =$ select(a_{475}, i_0) cnf(hyp_{19}, hypothesis)
$e_{478} =$ select(a_{475}, i_2) cnf(hyp_{20}, hypothesis)
$e_{482} =$ select(a_{481}, i_2) cnf(hyp_{21}, hypothesis)
$e_{484} =$ select(a_{481}, i_3) cnf(hyp_{22}, hypothesis)
$e_{486} =$ select(a_{485}, i_2) cnf(hyp_{23}, hypothesis)
$e_{488} =$ select(a_{485}, i_0) cnf(hyp_{24}, hypothesis)
$e_{491} =$ select(a_{479}, i_{490}) cnf(hyp_{25}, hypothesis)
$e_{492} =$ select(a_{489}, i_{490}) cnf(hyp_{26}, hypothesis)
$i_{490} =$ sk(a_{479}, a_{489}) cnf(hyp_{27}, hypothesis)
$e_{491} \neq e_{492}$ cnf(goal, negated_conjecture)

SWV537-1.007.p Swap elements (t1_pp_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
select(store(a, i, e), i) $= e$ cnf(a_1, axiom)
$i = j$ or select(store(a, i, e), j) $=$ select(a, j) cnf(a_2, axiom)
$a_{834} =$ store(a_1, i_4, e_{833}) cnf(hyp_0, hypothesis)
$a_{836} =$ store(a_{834}, i_3, e_{835}) cnf(hyp_1, hypothesis)
$a_{838} =$ store(a_{836}, i_2, e_{837}) cnf(hyp_2, hypothesis)
$a_{840} =$ store(a_{838}, i_1, e_{839}) cnf(hyp_3, hypothesis)
$a_{842} =$ store(a_{840}, i_0, e_{841}) cnf(hyp_4, hypothesis)
$a_{844} =$ store(a_{842}, i_5, e_{843}) cnf(hyp_5, hypothesis)
$a_{846} =$ store(a_{844}, i_2, e_{845}) cnf(hyp_6, hypothesis)
$a_{848} =$ store(a_{846}, i_5, e_{847}) cnf(hyp_7, hypothesis)
$a_{850} =$ store(a_{848}, i_1, e_{849}) cnf(hyp_8, hypothesis)
$a_{851} =$ store(a_{850}, i_1, e_{849}) cnf(hyp_9, hypothesis)
$a_{853} =$ store(a_{851}, i_5, e_{852}) cnf(hyp_{10}, hypothesis)
$a_{855} =$ store(a_{853}, i_2, e_{854}) cnf(hyp_{11}, hypothesis)
$a_{857} =$ store(a_{855}, i_5, e_{856}) cnf(hyp_{12}, hypothesis)
$a_{859} =$ store(a_{857}, i_2, e_{858}) cnf(hyp_{13}, hypothesis)
$a_{860} =$ store(a_{836}, i_1, e_{839}) cnf(hyp_{14}, hypothesis)
$a_{861} =$ store(a_{860}, i_2, e_{837}) cnf(hyp_{15}, hypothesis)
$a_{863} =$ store(a_{861}, i_5, e_{862}) cnf(hyp_{16}, hypothesis)
$a_{865} =$ store(a_{863}, i_0, e_{864}) cnf(hyp_{17}, hypothesis)
$a_{867} =$ store(a_{865}, i_5, e_{866}) cnf(hyp_{18}, hypothesis)
$a_{869} =$ store(a_{867}, i_2, e_{868}) cnf(hyp_{19}, hypothesis)
$a_{871} =$ store(a_{869}, i_1, e_{870}) cnf(hyp_{20}, hypothesis)
$a_{872} =$ store(a_{871}, i_1, e_{870}) cnf(hyp_{21}, hypothesis)
$a_{874} =$ store(a_{872}, i_5, e_{873}) cnf(hyp_{22}, hypothesis)

$a_{876} = \text{store}(a_{874}, i_2, e_{875})$ cnf(hyp_{23}, hypothesis)
$a_{878} = \text{store}(a_{876}, i_5, e_{877})$ cnf(hyp_{24}, hypothesis)
$a_{880} = \text{store}(a_{878}, i_2, e_{879})$ cnf(hyp_{25}, hypothesis)
$e_{833} = \text{select}(a_1, i_3)$ cnf(hyp_{26}, hypothesis)
$e_{835} = \text{select}(a_1, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{837} = \text{select}(a_{836}, i_1)$ cnf(hyp_{28}, hypothesis)
$e_{839} = \text{select}(a_{836}, i_2)$ cnf(hyp_{29}, hypothesis)
$e_{841} = \text{select}(a_{840}, i_5)$ cnf(hyp_{30}, hypothesis)
$e_{843} = \text{select}(a_{840}, i_0)$ cnf(hyp_{31}, hypothesis)
$e_{845} = \text{select}(a_{844}, i_5)$ cnf(hyp_{32}, hypothesis)
$e_{847} = \text{select}(a_{844}, i_2)$ cnf(hyp_{33}, hypothesis)
$e_{849} = \text{select}(a_{848}, i_1)$ cnf(hyp_{34}, hypothesis)
$e_{852} = \text{select}(a_{851}, i_2)$ cnf(hyp_{35}, hypothesis)
$e_{854} = \text{select}(a_{851}, i_5)$ cnf(hyp_{36}, hypothesis)
$e_{856} = \text{select}(a_{855}, i_2)$ cnf(hyp_{37}, hypothesis)
$e_{858} = \text{select}(a_{855}, i_5)$ cnf(hyp_{38}, hypothesis)
$e_{862} = \text{select}(a_{861}, i_0)$ cnf(hyp_{39}, hypothesis)
$e_{864} = \text{select}(a_{861}, i_5)$ cnf(hyp_{40}, hypothesis)
$e_{866} = \text{select}(a_{865}, i_2)$ cnf(hyp_{41}, hypothesis)
$e_{868} = \text{select}(a_{865}, i_5)$ cnf(hyp_{42}, hypothesis)
$e_{870} = \text{select}(a_{869}, i_1)$ cnf(hyp_{43}, hypothesis)
$e_{873} = \text{select}(a_{872}, i_2)$ cnf(hyp_{44}, hypothesis)
$e_{875} = \text{select}(a_{872}, i_5)$ cnf(hyp_{45}, hypothesis)
$e_{877} = \text{select}(a_{876}, i_2)$ cnf(hyp_{46}, hypothesis)
$e_{879} = \text{select}(a_{876}, i_5)$ cnf(hyp_{47}, hypothesis)
$e_{882} = \text{select}(a_{859}, i_{881})$ cnf(hyp_{48}, hypothesis)
$e_{883} = \text{select}(a_{880}, i_{881})$ cnf(hyp_{49}, hypothesis)
$i_{881} = \text{sk}(a_{859}, a_{880})$ cnf(hyp_{50}, hypothesis)
$e_{882} \neq e_{883}$ cnf(goal, negated_conjecture)

SWV538-1.004.p Swap elements (t1_pp_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{469} = \text{store}(a_1, i_1, e_{468})$ cnf(hyp_0, hypothesis)
$a_{470} = \text{store}(a_{469}, i_1, e_{468})$ cnf(hyp_1, hypothesis)
$a_{472} = \text{store}(a_{470}, i_0, e_{471})$ cnf(hyp_2, hypothesis)
$a_{474} = \text{store}(a_{472}, i_3, e_{473})$ cnf(hyp_3, hypothesis)
$a_{476} = \text{store}(a_{474}, i_3, e_{475})$ cnf(hyp_4, hypothesis)
$a_{478} = \text{store}(a_{476}, i_2, e_{477})$ cnf(hyp_5, hypothesis)
$a_{480} = \text{store}(a_{478}, i_2, e_{479})$ cnf(hyp_6, hypothesis)
$a_{482} = \text{store}(a_{480}, i_0, e_{481})$ cnf(hyp_7, hypothesis)
$a_{483} = \text{store}(a_{470}, i_3, e_{473})$ cnf(hyp_8, hypothesis)
$a_{484} = \text{store}(a_{483}, i_0, e_{471})$ cnf(hyp_9, hypothesis)
$a_{486} = \text{store}(a_{484}, i_3, e_{485})$ cnf(hyp_{10}, hypothesis)
$a_{488} = \text{store}(a_{486}, i_2, e_{487})$ cnf(hyp_{11}, hypothesis)
$a_{490} = \text{store}(a_{488}, i_0, e_{489})$ cnf(hyp_{12}, hypothesis)
$a_{492} = \text{store}(a_{490}, i_3, e_{491})$ cnf(hyp_{13}, hypothesis)
$e_{468} = \text{select}(a_1, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{471} = \text{select}(a_{470}, i_3)$ cnf(hyp_{15}, hypothesis)
$e_{473} = \text{select}(a_{470}, i_0)$ cnf(hyp_{16}, hypothesis)
$e_{475} = \text{select}(a_{474}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{477} = \text{select}(a_{474}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{479} = \text{select}(a_{478}, i_0)$ cnf(hyp_{19}, hypothesis)
$e_{481} = \text{select}(a_{478}, i_2)$ cnf(hyp_{20}, hypothesis)
$e_{485} = \text{select}(a_{484}, i_2)$ cnf(hyp_{21}, hypothesis)
$e_{487} = \text{select}(a_{484}, i_3)$ cnf(hyp_{22}, hypothesis)
$e_{489} = \text{select}(a_{488}, i_3)$ cnf(hyp_{23}, hypothesis)
$e_{491} = \text{select}(a_{488}, i_0)$ cnf(hyp_{24}, hypothesis)

$e_{494} = \text{select}(a_{482}, i_{493})$ cnf(hyp$_{25}$, hypothesis)
$e_{495} = \text{select}(a_{492}, i_{493})$ cnf(hyp$_{26}$, hypothesis)
$i_{493} = \text{sk}(a_{482}, a_{492})$ cnf(hyp$_{27}$, hypothesis)
$e_{494} \neq e_{495}$ cnf(goal, negated_conjecture)

SWV538-1.007.p Swap elements (t1_pp_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{836} = \text{store}(a_1, i_4, e_{835})$ cnf(hyp$_0$, hypothesis)
$a_{838} = \text{store}(a_{836}, i_3, e_{837})$ cnf(hyp$_1$, hypothesis)
$a_{840} = \text{store}(a_{838}, i_2, e_{839})$ cnf(hyp$_2$, hypothesis)
$a_{842} = \text{store}(a_{840}, i_1, e_{841})$ cnf(hyp$_3$, hypothesis)
$a_{844} = \text{store}(a_{842}, i_0, e_{843})$ cnf(hyp$_4$, hypothesis)
$a_{846} = \text{store}(a_{844}, i_5, e_{845})$ cnf(hyp$_5$, hypothesis)
$a_{848} = \text{store}(a_{846}, i_2, e_{847})$ cnf(hyp$_6$, hypothesis)
$a_{850} = \text{store}(a_{848}, i_5, e_{849})$ cnf(hyp$_7$, hypothesis)
$a_{852} = \text{store}(a_{850}, i_1, e_{851})$ cnf(hyp$_8$, hypothesis)
$a_{853} = \text{store}(a_{852}, i_1, e_{851})$ cnf(hyp$_9$, hypothesis)
$a_{855} = \text{store}(a_{853}, i_5, e_{854})$ cnf(hyp$_{10}$, hypothesis)
$a_{857} = \text{store}(a_{855}, i_2, e_{856})$ cnf(hyp$_{11}$, hypothesis)
$a_{859} = \text{store}(a_{857}, i_5, e_{858})$ cnf(hyp$_{12}$, hypothesis)
$a_{861} = \text{store}(a_{859}, i_2, e_{860})$ cnf(hyp$_{13}$, hypothesis)
$a_{862} = \text{store}(a_{838}, i_1, e_{841})$ cnf(hyp$_{14}$, hypothesis)
$a_{863} = \text{store}(a_{862}, i_2, e_{839})$ cnf(hyp$_{15}$, hypothesis)
$a_{865} = \text{store}(a_{863}, i_5, e_{864})$ cnf(hyp$_{16}$, hypothesis)
$a_{867} = \text{store}(a_{865}, i_0, e_{866})$ cnf(hyp$_{17}$, hypothesis)
$a_{869} = \text{store}(a_{867}, i_5, e_{868})$ cnf(hyp$_{18}$, hypothesis)
$a_{871} = \text{store}(a_{869}, i_2, e_{870})$ cnf(hyp$_{19}$, hypothesis)
$a_{873} = \text{store}(a_{871}, i_1, e_{872})$ cnf(hyp$_{20}$, hypothesis)
$a_{874} = \text{store}(a_{873}, i_1, e_{872})$ cnf(hyp$_{21}$, hypothesis)
$a_{876} = \text{store}(a_{874}, i_5, e_{875})$ cnf(hyp$_{22}$, hypothesis)
$a_{878} = \text{store}(a_{876}, i_2, e_{877})$ cnf(hyp$_{23}$, hypothesis)
$a_{880} = \text{store}(a_{878}, i_6, e_{879})$ cnf(hyp$_{24}$, hypothesis)
$a_{882} = \text{store}(a_{880}, i_2, e_{881})$ cnf(hyp$_{25}$, hypothesis)
$e_{835} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{837} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{839} = \text{select}(a_{838}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{841} = \text{select}(a_{838}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{843} = \text{select}(a_{842}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{845} = \text{select}(a_{842}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{847} = \text{select}(a_{846}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{849} = \text{select}(a_{846}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{851} = \text{select}(a_{850}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{854} = \text{select}(a_{853}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{856} = \text{select}(a_{853}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{858} = \text{select}(a_{857}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{860} = \text{select}(a_{857}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{864} = \text{select}(a_{863}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{866} = \text{select}(a_{863}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{868} = \text{select}(a_{867}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{870} = \text{select}(a_{867}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{872} = \text{select}(a_{871}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{875} = \text{select}(a_{874}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{877} = \text{select}(a_{874}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{879} = \text{select}(a_{878}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{881} = \text{select}(a_{878}, i_6)$ cnf(hyp$_{47}$, hypothesis)
$e_{884} = \text{select}(a_{861}, i_{883})$ cnf(hyp$_{48}$, hypothesis)
$e_{885} = \text{select}(a_{882}, i_{883})$ cnf(hyp$_{49}$, hypothesis)

$i_{883} = \mathrm{sk}(a_{861}, a_{882})$ cnf(hyp_{50}, hypothesis)
$e_{884} \neq e_{885}$ cnf(goal, negated_conjecture)

SWV540-1.004.p Swap elements (t2_np_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j)$ cnf(a_2, axiom)
$\mathrm{store}(a, i, \mathrm{select}(a, i)) = a$ cnf(a_3, axiom)
$\mathrm{store}(\mathrm{store}(a, i, e), i, f) = \mathrm{store}(a, i, f)$ cnf(a_4, axiom)
$i = j$ or $\mathrm{store}(\mathrm{store}(a, i, e), j, f) = \mathrm{store}(\mathrm{store}(a, j, f), i, e)$ cnf(a_5, axiom)
$a_{417} = \mathrm{store}(a_1, i_1, e_{416})$ cnf(hyp_0, hypothesis)
$a_{418} = \mathrm{store}(a_{417}, i_1, e_{416})$ cnf(hyp_1, hypothesis)
$a_{420} = \mathrm{store}(a_{418}, i_0, e_{419})$ cnf(hyp_2, hypothesis)
$a_{422} = \mathrm{store}(a_{420}, i_3, e_{421})$ cnf(hyp_3, hypothesis)
$a_{424} = \mathrm{store}(a_{422}, i_3, e_{423})$ cnf(hyp_4, hypothesis)
$a_{426} = \mathrm{store}(a_{424}, i_2, e_{425})$ cnf(hyp_5, hypothesis)
$a_{428} = \mathrm{store}(a_{426}, i_2, e_{427})$ cnf(hyp_6, hypothesis)
$a_{430} = \mathrm{store}(a_{428}, i_0, e_{429})$ cnf(hyp_7, hypothesis)
$a_{431} = \mathrm{store}(a_{418}, i_3, e_{421})$ cnf(hyp_8, hypothesis)
$a_{432} = \mathrm{store}(a_{431}, i_0, e_{419})$ cnf(hyp_9, hypothesis)
$a_{434} = \mathrm{store}(a_{432}, i_3, e_{433})$ cnf(hyp_{10}, hypothesis)
$a_{436} = \mathrm{store}(a_{434}, i_2, e_{435})$ cnf(hyp_{11}, hypothesis)
$a_{438} = \mathrm{store}(a_{436}, i_0, e_{437})$ cnf(hyp_{12}, hypothesis)
$a_{440} = \mathrm{store}(a_{438}, i_2, e_{439})$ cnf(hyp_{13}, hypothesis)
$e_{416} = \mathrm{select}(a_1, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{419} = \mathrm{select}(a_{418}, i_3)$ cnf(hyp_{15}, hypothesis)
$e_{421} = \mathrm{select}(a_{418}, i_0)$ cnf(hyp_{16}, hypothesis)
$e_{423} = \mathrm{select}(a_{422}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{425} = \mathrm{select}(a_{422}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{427} = \mathrm{select}(a_{426}, i_0)$ cnf(hyp_{19}, hypothesis)
$e_{429} = \mathrm{select}(a_{426}, i_2)$ cnf(hyp_{20}, hypothesis)
$e_{433} = \mathrm{select}(a_{432}, i_2)$ cnf(hyp_{21}, hypothesis)
$e_{435} = \mathrm{select}(a_{432}, i_3)$ cnf(hyp_{22}, hypothesis)
$e_{437} = \mathrm{select}(a_{436}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{439} = \mathrm{select}(a_{436}, i_0)$ cnf(hyp_{24}, hypothesis)
$a_{430} \neq a_{440}$ cnf(goal, negated_conjecture)

SWV540-1.007.p Swap elements (t2_np_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j)$ cnf(a_2, axiom)
$\mathrm{store}(a, i, \mathrm{select}(a, i)) = a$ cnf(a_3, axiom)
$\mathrm{store}(\mathrm{store}(a, i, e), i, f) = \mathrm{store}(a, i, f)$ cnf(a_4, axiom)
$i = j$ or $\mathrm{store}(\mathrm{store}(a, i, e), j, f) = \mathrm{store}(\mathrm{store}(a, j, f), i, e)$ cnf(a_5, axiom)
$a_{783} = \mathrm{store}(a_1, i_4, e_{782})$ cnf(hyp_0, hypothesis)
$a_{785} = \mathrm{store}(a_{783}, i_3, e_{784})$ cnf(hyp_1, hypothesis)
$a_{787} = \mathrm{store}(a_{785}, i_2, e_{786})$ cnf(hyp_2, hypothesis)
$a_{789} = \mathrm{store}(a_{787}, i_1, e_{788})$ cnf(hyp_3, hypothesis)
$a_{791} = \mathrm{store}(a_{789}, i_0, e_{790})$ cnf(hyp_4, hypothesis)
$a_{793} = \mathrm{store}(a_{791}, i_5, e_{792})$ cnf(hyp_5, hypothesis)
$a_{795} = \mathrm{store}(a_{793}, i_2, e_{794})$ cnf(hyp_6, hypothesis)
$a_{797} = \mathrm{store}(a_{795}, i_5, e_{796})$ cnf(hyp_7, hypothesis)
$a_{799} = \mathrm{store}(a_{797}, i_1, e_{798})$ cnf(hyp_8, hypothesis)
$a_{800} = \mathrm{store}(a_{799}, i_1, e_{798})$ cnf(hyp_9, hypothesis)
$a_{802} = \mathrm{store}(a_{800}, i_5, e_{801})$ cnf(hyp_{10}, hypothesis)
$a_{804} = \mathrm{store}(a_{802}, i_2, e_{803})$ cnf(hyp_{11}, hypothesis)
$a_{806} = \mathrm{store}(a_{804}, i_5, e_{805})$ cnf(hyp_{12}, hypothesis)
$a_{808} = \mathrm{store}(a_{806}, i_2, e_{807})$ cnf(hyp_{13}, hypothesis)

$a_{809} = \text{store}(a_{785}, i_1, e_{788})$ cnf(hyp$_{14}$, hypothesis)
$a_{810} = \text{store}(a_{809}, i_2, e_{786})$ cnf(hyp$_{15}$, hypothesis)
$a_{812} = \text{store}(a_{810}, i_5, e_{811})$ cnf(hyp$_{16}$, hypothesis)
$a_{814} = \text{store}(a_{812}, i_0, e_{813})$ cnf(hyp$_{17}$, hypothesis)
$a_{816} = \text{store}(a_{814}, i_5, e_{815})$ cnf(hyp$_{18}$, hypothesis)
$a_{818} = \text{store}(a_{816}, i_2, e_{817})$ cnf(hyp$_{19}$, hypothesis)
$a_{820} = \text{store}(a_{818}, i_1, e_{819})$ cnf(hyp$_{20}$, hypothesis)
$a_{821} = \text{store}(a_{820}, i_1, e_{819})$ cnf(hyp$_{21}$, hypothesis)
$a_{823} = \text{store}(a_{821}, i_5, e_{822})$ cnf(hyp$_{22}$, hypothesis)
$a_{825} = \text{store}(a_{823}, i_2, e_{824})$ cnf(hyp$_{23}$, hypothesis)
$a_{827} = \text{store}(a_{825}, i_5, e_{826})$ cnf(hyp$_{24}$, hypothesis)
$a_{829} = \text{store}(a_{827}, i_2, e_{828})$ cnf(hyp$_{25}$, hypothesis)
$e_{782} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{784} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{786} = \text{select}(a_{785}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{788} = \text{select}(a_{785}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{790} = \text{select}(a_{789}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{792} = \text{select}(a_{789}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{794} = \text{select}(a_{793}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{796} = \text{select}(a_{793}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{798} = \text{select}(a_{797}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{801} = \text{select}(a_{800}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{803} = \text{select}(a_{800}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{805} = \text{select}(a_{804}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{807} = \text{select}(a_{804}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{811} = \text{select}(a_{810}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{813} = \text{select}(a_{810}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{815} = \text{select}(a_{814}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{817} = \text{select}(a_{814}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{819} = \text{select}(a_{818}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{822} = \text{select}(a_{821}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{824} = \text{select}(a_{821}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{826} = \text{select}(a_{825}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{828} = \text{select}(a_{825}, i_5)$ cnf(hyp$_{47}$, hypothesis)
$a_{808} \neq a_{829}$ cnf(goal, negated_conjecture)

SWV543-1.004.p Swap elements (t3_np_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{417} = \text{store}(a_1, i_1, e_{416})$ cnf(hyp$_0$, hypothesis)
$a_{418} = \text{store}(a_{417}, i_1, e_{416})$ cnf(hyp$_1$, hypothesis)
$a_{420} = \text{store}(a_{418}, i_0, e_{419})$ cnf(hyp$_2$, hypothesis)
$a_{422} = \text{store}(a_{420}, i_3, e_{421})$ cnf(hyp$_3$, hypothesis)
$a_{424} = \text{store}(a_{422}, i_3, e_{423})$ cnf(hyp$_4$, hypothesis)
$a_{426} = \text{store}(a_{424}, i_2, e_{425})$ cnf(hyp$_5$, hypothesis)
$a_{428} = \text{store}(a_{426}, i_2, e_{427})$ cnf(hyp$_6$, hypothesis)
$a_{430} = \text{store}(a_{428}, i_0, e_{429})$ cnf(hyp$_7$, hypothesis)
$a_{431} = \text{store}(a_{418}, i_3, e_{421})$ cnf(hyp$_8$, hypothesis)
$a_{432} = \text{store}(a_{431}, i_0, e_{419})$ cnf(hyp$_9$, hypothesis)
$a_{434} = \text{store}(a_{432}, i_3, e_{433})$ cnf(hyp$_{10}$, hypothesis)
$a_{436} = \text{store}(a_{434}, i_2, e_{435})$ cnf(hyp$_{11}$, hypothesis)
$a_{438} = \text{store}(a_{436}, i_0, e_{437})$ cnf(hyp$_{12}$, hypothesis)
$a_{440} = \text{store}(a_{438}, i_2, e_{439})$ cnf(hyp$_{13}$, hypothesis)
$e_{416} = \text{select}(a_1, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{419} = \text{select}(a_{418}, i_3)$ cnf(hyp$_{15}$, hypothesis)
$e_{421} = \text{select}(a_{418}, i_0)$ cnf(hyp$_{16}$, hypothesis)
$e_{423} = \text{select}(a_{422}, i_2)$ cnf(hyp$_{17}$, hypothesis)

$e_{425} = \text{select}(a_{422}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{427} = \text{select}(a_{426}, i_0)$ cnf(hyp$_{19}$, hypothesis)
$e_{429} = \text{select}(a_{426}, i_2)$ cnf(hyp$_{20}$, hypothesis)
$e_{433} = \text{select}(a_{432}, i_2)$ cnf(hyp$_{21}$, hypothesis)
$e_{435} = \text{select}(a_{432}, i_3)$ cnf(hyp$_{22}$, hypothesis)
$e_{437} = \text{select}(a_{436}, i_2)$ cnf(hyp$_{23}$, hypothesis)
$e_{439} = \text{select}(a_{436}, i_0)$ cnf(hyp$_{24}$, hypothesis)
$a_{430} \neq a_{440}$ cnf(goal, negated_conjecture)

SWV543-1.007.p Swap elements (t3_np_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{783} = \text{store}(a_1, i_4, e_{782})$ cnf(hyp$_0$, hypothesis)
$a_{785} = \text{store}(a_{783}, i_3, e_{784})$ cnf(hyp$_1$, hypothesis)
$a_{787} = \text{store}(a_{785}, i_2, e_{786})$ cnf(hyp$_2$, hypothesis)
$a_{789} = \text{store}(a_{787}, i_1, e_{788})$ cnf(hyp$_3$, hypothesis)
$a_{791} = \text{store}(a_{789}, i_0, e_{790})$ cnf(hyp$_4$, hypothesis)
$a_{793} = \text{store}(a_{791}, i_5, e_{792})$ cnf(hyp$_5$, hypothesis)
$a_{795} = \text{store}(a_{793}, i_2, e_{794})$ cnf(hyp$_6$, hypothesis)
$a_{797} = \text{store}(a_{795}, i_5, e_{796})$ cnf(hyp$_7$, hypothesis)
$a_{799} = \text{store}(a_{797}, i_1, e_{798})$ cnf(hyp$_8$, hypothesis)
$a_{800} = \text{store}(a_{799}, i_1, e_{798})$ cnf(hyp$_9$, hypothesis)
$a_{802} = \text{store}(a_{800}, i_5, e_{801})$ cnf(hyp$_{10}$, hypothesis)
$a_{804} = \text{store}(a_{802}, i_2, e_{803})$ cnf(hyp$_{11}$, hypothesis)
$a_{806} = \text{store}(a_{804}, i_5, e_{805})$ cnf(hyp$_{12}$, hypothesis)
$a_{808} = \text{store}(a_{806}, i_2, e_{807})$ cnf(hyp$_{13}$, hypothesis)
$a_{809} = \text{store}(a_{785}, i_1, e_{788})$ cnf(hyp$_{14}$, hypothesis)
$a_{810} = \text{store}(a_{809}, i_2, e_{786})$ cnf(hyp$_{15}$, hypothesis)
$a_{812} = \text{store}(a_{810}, i_5, e_{811})$ cnf(hyp$_{16}$, hypothesis)
$a_{814} = \text{store}(a_{812}, i_0, e_{813})$ cnf(hyp$_{17}$, hypothesis)
$a_{816} = \text{store}(a_{814}, i_5, e_{815})$ cnf(hyp$_{18}$, hypothesis)
$a_{818} = \text{store}(a_{816}, i_2, e_{817})$ cnf(hyp$_{19}$, hypothesis)
$a_{820} = \text{store}(a_{818}, i_1, e_{819})$ cnf(hyp$_{20}$, hypothesis)
$a_{821} = \text{store}(a_{820}, i_1, e_{819})$ cnf(hyp$_{21}$, hypothesis)
$a_{823} = \text{store}(a_{821}, i_5, e_{822})$ cnf(hyp$_{22}$, hypothesis)
$a_{825} = \text{store}(a_{823}, i_2, e_{824})$ cnf(hyp$_{23}$, hypothesis)
$a_{827} = \text{store}(a_{825}, i_5, e_{826})$ cnf(hyp$_{24}$, hypothesis)
$a_{829} = \text{store}(a_{827}, i_2, e_{828})$ cnf(hyp$_{25}$, hypothesis)
$e_{782} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{784} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{786} = \text{select}(a_{785}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{788} = \text{select}(a_{785}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{790} = \text{select}(a_{789}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{792} = \text{select}(a_{789}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{794} = \text{select}(a_{793}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{796} = \text{select}(a_{793}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{798} = \text{select}(a_{797}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{801} = \text{select}(a_{800}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{803} = \text{select}(a_{800}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{805} = \text{select}(a_{804}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{807} = \text{select}(a_{804}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{811} = \text{select}(a_{810}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{813} = \text{select}(a_{810}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{815} = \text{select}(a_{814}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{817} = \text{select}(a_{814}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{819} = \text{select}(a_{818}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{822} = \text{select}(a_{821}, i_2)$ cnf(hyp$_{44}$, hypothesis)

$e_{824} = \text{select}(a_{821}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{826} = \text{select}(a_{825}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{828} = \text{select}(a_{825}, i_5)$ cnf(hyp$_{47}$, hypothesis)
$a_{808} \neq a_{829}$ cnf(goal, negated_conjecture)

SWV544-1.004.p Swap elements (t3_np_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{418} = \text{store}(a_1, i_1, e_{417})$ cnf(hyp$_0$, hypothesis)
$a_{419} = \text{store}(a_{418}, i_1, e_{417})$ cnf(hyp$_1$, hypothesis)
$a_{421} = \text{store}(a_{419}, i_0, e_{420})$ cnf(hyp$_2$, hypothesis)
$a_{423} = \text{store}(a_{421}, i_3, e_{422})$ cnf(hyp$_3$, hypothesis)
$a_{425} = \text{store}(a_{423}, i_3, e_{424})$ cnf(hyp$_4$, hypothesis)
$a_{427} = \text{store}(a_{425}, i_2, e_{426})$ cnf(hyp$_5$, hypothesis)
$a_{429} = \text{store}(a_{427}, i_2, e_{428})$ cnf(hyp$_6$, hypothesis)
$a_{431} = \text{store}(a_{429}, i_0, e_{430})$ cnf(hyp$_7$, hypothesis)
$a_{432} = \text{store}(a_{419}, i_3, e_{422})$ cnf(hyp$_8$, hypothesis)
$a_{433} = \text{store}(a_{432}, i_0, e_{420})$ cnf(hyp$_9$, hypothesis)
$a_{435} = \text{store}(a_{433}, i_3, e_{434})$ cnf(hyp$_{10}$, hypothesis)
$a_{437} = \text{store}(a_{435}, i_2, e_{436})$ cnf(hyp$_{11}$, hypothesis)
$a_{439} = \text{store}(a_{437}, i_0, e_{438})$ cnf(hyp$_{12}$, hypothesis)
$a_{441} = \text{store}(a_{439}, i_3, e_{440})$ cnf(hyp$_{13}$, hypothesis)
$e_{417} = \text{select}(a_1, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{420} = \text{select}(a_{419}, i_3)$ cnf(hyp$_{15}$, hypothesis)
$e_{422} = \text{select}(a_{419}, i_0)$ cnf(hyp$_{16}$, hypothesis)
$e_{424} = \text{select}(a_{423}, i_2)$ cnf(hyp$_{17}$, hypothesis)
$e_{426} = \text{select}(a_{423}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{428} = \text{select}(a_{427}, i_0)$ cnf(hyp$_{19}$, hypothesis)
$e_{430} = \text{select}(a_{427}, i_2)$ cnf(hyp$_{20}$, hypothesis)
$e_{434} = \text{select}(a_{433}, i_2)$ cnf(hyp$_{21}$, hypothesis)
$e_{436} = \text{select}(a_{433}, i_3)$ cnf(hyp$_{22}$, hypothesis)
$e_{438} = \text{select}(a_{437}, i_3)$ cnf(hyp$_{23}$, hypothesis)
$e_{440} = \text{select}(a_{437}, i_0)$ cnf(hyp$_{24}$, hypothesis)
$a_{431} \neq a_{441}$ cnf(goal, negated_conjecture)

SWV544-1.007.p Swap elements (t3_np_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{785} = \text{store}(a_1, i_4, e_{784})$ cnf(hyp$_0$, hypothesis)
$a_{787} = \text{store}(a_{785}, i_3, e_{786})$ cnf(hyp$_1$, hypothesis)
$a_{789} = \text{store}(a_{787}, i_2, e_{788})$ cnf(hyp$_2$, hypothesis)
$a_{791} = \text{store}(a_{789}, i_1, e_{790})$ cnf(hyp$_3$, hypothesis)
$a_{793} = \text{store}(a_{791}, i_0, e_{792})$ cnf(hyp$_4$, hypothesis)
$a_{795} = \text{store}(a_{793}, i_5, e_{794})$ cnf(hyp$_5$, hypothesis)
$a_{797} = \text{store}(a_{795}, i_2, e_{796})$ cnf(hyp$_6$, hypothesis)
$a_{799} = \text{store}(a_{797}, i_5, e_{798})$ cnf(hyp$_7$, hypothesis)
$a_{801} = \text{store}(a_{799}, i_1, e_{800})$ cnf(hyp$_8$, hypothesis)
$a_{802} = \text{store}(a_{801}, i_1, e_{800})$ cnf(hyp$_9$, hypothesis)
$a_{804} = \text{store}(a_{802}, i_5, e_{803})$ cnf(hyp$_{10}$, hypothesis)
$a_{806} = \text{store}(a_{804}, i_2, e_{805})$ cnf(hyp$_{11}$, hypothesis)
$a_{808} = \text{store}(a_{806}, i_5, e_{807})$ cnf(hyp$_{12}$, hypothesis)
$a_{810} = \text{store}(a_{808}, i_2, e_{809})$ cnf(hyp$_{13}$, hypothesis)
$a_{811} = \text{store}(a_{787}, i_1, e_{790})$ cnf(hyp$_{14}$, hypothesis)
$a_{812} = \text{store}(a_{811}, i_2, e_{788})$ cnf(hyp$_{15}$, hypothesis)

$a_{814} = \text{store}(a_{812}, i_5, e_{813})$ cnf(hyp$_{16}$, hypothesis)
$a_{816} = \text{store}(a_{814}, i_0, e_{815})$ cnf(hyp$_{17}$, hypothesis)
$a_{818} = \text{store}(a_{816}, i_5, e_{817})$ cnf(hyp$_{18}$, hypothesis)
$a_{820} = \text{store}(a_{818}, i_2, e_{819})$ cnf(hyp$_{19}$, hypothesis)
$a_{822} = \text{store}(a_{820}, i_1, e_{821})$ cnf(hyp$_{20}$, hypothesis)
$a_{823} = \text{store}(a_{822}, i_1, e_{821})$ cnf(hyp$_{21}$, hypothesis)
$a_{825} = \text{store}(a_{823}, i_5, e_{824})$ cnf(hyp$_{22}$, hypothesis)
$a_{827} = \text{store}(a_{825}, i_2, e_{826})$ cnf(hyp$_{23}$, hypothesis)
$a_{829} = \text{store}(a_{827}, i_6, e_{828})$ cnf(hyp$_{24}$, hypothesis)
$a_{831} = \text{store}(a_{829}, i_2, e_{830})$ cnf(hyp$_{25}$, hypothesis)
$e_{784} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{786} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{788} = \text{select}(a_{787}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{790} = \text{select}(a_{787}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{792} = \text{select}(a_{791}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{794} = \text{select}(a_{791}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{796} = \text{select}(a_{795}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{798} = \text{select}(a_{795}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{800} = \text{select}(a_{799}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{803} = \text{select}(a_{802}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{805} = \text{select}(a_{802}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{807} = \text{select}(a_{806}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{809} = \text{select}(a_{806}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{813} = \text{select}(a_{812}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{815} = \text{select}(a_{812}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{817} = \text{select}(a_{816}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{819} = \text{select}(a_{816}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{821} = \text{select}(a_{820}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{824} = \text{select}(a_{823}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{826} = \text{select}(a_{823}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{828} = \text{select}(a_{827}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{830} = \text{select}(a_{827}, i_6)$ cnf(hyp$_{47}$, hypothesis)
$a_{810} \neq a_{831}$ cnf(goal, negated_conjecture)

SWV547-1.004.p Swap elements (t3_pp_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{466} = \text{store}(a_1, i_1, e_{465})$ cnf(hyp$_0$, hypothesis)
$a_{467} = \text{store}(a_{466}, i_1, e_{465})$ cnf(hyp$_1$, hypothesis)
$a_{469} = \text{store}(a_{467}, i_0, e_{468})$ cnf(hyp$_2$, hypothesis)
$a_{471} = \text{store}(a_{469}, i_3, e_{470})$ cnf(hyp$_3$, hypothesis)
$a_{473} = \text{store}(a_{471}, i_3, e_{472})$ cnf(hyp$_4$, hypothesis)
$a_{475} = \text{store}(a_{473}, i_2, e_{474})$ cnf(hyp$_5$, hypothesis)
$a_{477} = \text{store}(a_{475}, i_2, e_{476})$ cnf(hyp$_6$, hypothesis)
$a_{479} = \text{store}(a_{477}, i_0, e_{478})$ cnf(hyp$_7$, hypothesis)
$a_{480} = \text{store}(a_{467}, i_3, e_{470})$ cnf(hyp$_8$, hypothesis)
$a_{481} = \text{store}(a_{480}, i_0, e_{468})$ cnf(hyp$_9$, hypothesis)
$a_{483} = \text{store}(a_{481}, i_3, e_{482})$ cnf(hyp$_{10}$, hypothesis)
$a_{485} = \text{store}(a_{483}, i_2, e_{484})$ cnf(hyp$_{11}$, hypothesis)
$a_{487} = \text{store}(a_{485}, i_0, e_{486})$ cnf(hyp$_{12}$, hypothesis)
$a_{489} = \text{store}(a_{487}, i_2, e_{488})$ cnf(hyp$_{13}$, hypothesis)
$e_{465} = \text{select}(a_1, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{468} = \text{select}(a_{467}, i_3)$ cnf(hyp$_{15}$, hypothesis)
$e_{470} = \text{select}(a_{467}, i_0)$ cnf(hyp$_{16}$, hypothesis)
$e_{472} = \text{select}(a_{471}, i_2)$ cnf(hyp$_{17}$, hypothesis)
$e_{474} = \text{select}(a_{471}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{476} = \text{select}(a_{475}, i_0)$ cnf(hyp$_{19}$, hypothesis)

$e_{478} = \text{select}(a_{475}, i_2)$ cnf(hyp$_{20}$, hypothesis)
$e_{482} = \text{select}(a_{481}, i_2)$ cnf(hyp$_{21}$, hypothesis)
$e_{484} = \text{select}(a_{481}, i_3)$ cnf(hyp$_{22}$, hypothesis)
$e_{486} = \text{select}(a_{485}, i_2)$ cnf(hyp$_{23}$, hypothesis)
$e_{488} = \text{select}(a_{485}, i_0)$ cnf(hyp$_{24}$, hypothesis)
$e_{491} = \text{select}(a_{479}, i_{490})$ cnf(hyp$_{25}$, hypothesis)
$e_{492} = \text{select}(a_{489}, i_{490})$ cnf(hyp$_{26}$, hypothesis)
$i_{490} = \text{sk}(a_{479}, a_{489})$ cnf(hyp$_{27}$, hypothesis)
$e_{491} \neq e_{492}$ cnf(goal, negated_conjecture)

SWV547-1.007.p Swap elements (t3_pp_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{834} = \text{store}(a_1, i_4, e_{833})$ cnf(hyp$_0$, hypothesis)
$a_{836} = \text{store}(a_{834}, i_3, e_{835})$ cnf(hyp$_1$, hypothesis)
$a_{838} = \text{store}(a_{836}, i_2, e_{837})$ cnf(hyp$_2$, hypothesis)
$a_{840} = \text{store}(a_{838}, i_1, e_{839})$ cnf(hyp$_3$, hypothesis)
$a_{842} = \text{store}(a_{840}, i_0, e_{841})$ cnf(hyp$_4$, hypothesis)
$a_{844} = \text{store}(a_{842}, i_5, e_{843})$ cnf(hyp$_5$, hypothesis)
$a_{846} = \text{store}(a_{844}, i_2, e_{845})$ cnf(hyp$_6$, hypothesis)
$a_{848} = \text{store}(a_{846}, i_5, e_{847})$ cnf(hyp$_7$, hypothesis)
$a_{850} = \text{store}(a_{848}, i_1, e_{849})$ cnf(hyp$_8$, hypothesis)
$a_{851} = \text{store}(a_{850}, i_1, e_{849})$ cnf(hyp$_9$, hypothesis)
$a_{853} = \text{store}(a_{851}, i_5, e_{852})$ cnf(hyp$_{10}$, hypothesis)
$a_{855} = \text{store}(a_{853}, i_2, e_{854})$ cnf(hyp$_{11}$, hypothesis)
$a_{857} = \text{store}(a_{855}, i_5, e_{856})$ cnf(hyp$_{12}$, hypothesis)
$a_{859} = \text{store}(a_{857}, i_2, e_{858})$ cnf(hyp$_{13}$, hypothesis)
$a_{860} = \text{store}(a_{836}, i_1, e_{839})$ cnf(hyp$_{14}$, hypothesis)
$a_{861} = \text{store}(a_{860}, i_2, e_{837})$ cnf(hyp$_{15}$, hypothesis)
$a_{863} = \text{store}(a_{861}, i_5, e_{862})$ cnf(hyp$_{16}$, hypothesis)
$a_{865} = \text{store}(a_{863}, i_0, e_{864})$ cnf(hyp$_{17}$, hypothesis)
$a_{867} = \text{store}(a_{865}, i_5, e_{866})$ cnf(hyp$_{18}$, hypothesis)
$a_{869} = \text{store}(a_{867}, i_2, e_{868})$ cnf(hyp$_{19}$, hypothesis)
$a_{871} = \text{store}(a_{869}, i_1, e_{870})$ cnf(hyp$_{20}$, hypothesis)
$a_{872} = \text{store}(a_{871}, i_1, e_{870})$ cnf(hyp$_{21}$, hypothesis)
$a_{874} = \text{store}(a_{872}, i_5, e_{873})$ cnf(hyp$_{22}$, hypothesis)
$a_{876} = \text{store}(a_{874}, i_2, e_{875})$ cnf(hyp$_{23}$, hypothesis)
$a_{878} = \text{store}(a_{876}, i_5, e_{877})$ cnf(hyp$_{24}$, hypothesis)
$a_{880} = \text{store}(a_{878}, i_2, e_{879})$ cnf(hyp$_{25}$, hypothesis)
$e_{833} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{835} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{837} = \text{select}(a_{836}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{839} = \text{select}(a_{836}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{841} = \text{select}(a_{840}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{843} = \text{select}(a_{840}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{845} = \text{select}(a_{844}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{847} = \text{select}(a_{844}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{849} = \text{select}(a_{848}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{852} = \text{select}(a_{851}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{854} = \text{select}(a_{851}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{856} = \text{select}(a_{855}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{858} = \text{select}(a_{855}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{862} = \text{select}(a_{861}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{864} = \text{select}(a_{861}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{866} = \text{select}(a_{865}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{868} = \text{select}(a_{865}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{870} = \text{select}(a_{869}, i_1)$ cnf(hyp$_{43}$, hypothesis)

$e_{873} = \text{select}(a_{872}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{875} = \text{select}(a_{872}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{877} = \text{select}(a_{876}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{879} = \text{select}(a_{876}, i_5)$ cnf(hyp$_{47}$, hypothesis)
$e_{882} = \text{select}(a_{859}, i_{881})$ cnf(hyp$_{48}$, hypothesis)
$e_{883} = \text{select}(a_{880}, i_{881})$ cnf(hyp$_{49}$, hypothesis)
$i_{881} = \text{sk}(a_{859}, a_{880})$ cnf(hyp$_{50}$, hypothesis)
$e_{882} \neq e_{883}$ cnf(goal, negated_conjecture)

SWV548-1.004.p Swap elements (t3_pp_sf_ai_00004)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{469} = \text{store}(a_1, i_1, e_{468})$ cnf(hyp$_0$, hypothesis)
$a_{470} = \text{store}(a_{469}, i_1, e_{468})$ cnf(hyp$_1$, hypothesis)
$a_{472} = \text{store}(a_{470}, i_0, e_{471})$ cnf(hyp$_2$, hypothesis)
$a_{474} = \text{store}(a_{472}, i_3, e_{473})$ cnf(hyp$_3$, hypothesis)
$a_{476} = \text{store}(a_{474}, i_3, e_{475})$ cnf(hyp$_4$, hypothesis)
$a_{478} = \text{store}(a_{476}, i_2, e_{477})$ cnf(hyp$_5$, hypothesis)
$a_{480} = \text{store}(a_{478}, i_2, e_{479})$ cnf(hyp$_6$, hypothesis)
$a_{482} = \text{store}(a_{480}, i_0, e_{481})$ cnf(hyp$_7$, hypothesis)
$a_{483} = \text{store}(a_{470}, i_3, e_{473})$ cnf(hyp$_8$, hypothesis)
$a_{484} = \text{store}(a_{483}, i_0, e_{471})$ cnf(hyp$_9$, hypothesis)
$a_{486} = \text{store}(a_{484}, i_3, e_{485})$ cnf(hyp$_{10}$, hypothesis)
$a_{488} = \text{store}(a_{486}, i_2, e_{487})$ cnf(hyp$_{11}$, hypothesis)
$a_{490} = \text{store}(a_{488}, i_0, e_{489})$ cnf(hyp$_{12}$, hypothesis)
$a_{492} = \text{store}(a_{490}, i_3, e_{491})$ cnf(hyp$_{13}$, hypothesis)
$e_{468} = \text{select}(a_1, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{471} = \text{select}(a_{470}, i_3)$ cnf(hyp$_{15}$, hypothesis)
$e_{473} = \text{select}(a_{470}, i_0)$ cnf(hyp$_{16}$, hypothesis)
$e_{475} = \text{select}(a_{474}, i_2)$ cnf(hyp$_{17}$, hypothesis)
$e_{477} = \text{select}(a_{474}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{479} = \text{select}(a_{478}, i_0)$ cnf(hyp$_{19}$, hypothesis)
$e_{481} = \text{select}(a_{478}, i_2)$ cnf(hyp$_{20}$, hypothesis)
$e_{485} = \text{select}(a_{484}, i_2)$ cnf(hyp$_{21}$, hypothesis)
$e_{487} = \text{select}(a_{484}, i_3)$ cnf(hyp$_{22}$, hypothesis)
$e_{489} = \text{select}(a_{488}, i_3)$ cnf(hyp$_{23}$, hypothesis)
$e_{491} = \text{select}(a_{488}, i_0)$ cnf(hyp$_{24}$, hypothesis)
$e_{494} = \text{select}(a_{482}, i_{493})$ cnf(hyp$_{25}$, hypothesis)
$e_{495} = \text{select}(a_{492}, i_{493})$ cnf(hyp$_{26}$, hypothesis)
$i_{493} = \text{sk}(a_{482}, a_{492})$ cnf(hyp$_{27}$, hypothesis)
$e_{494} \neq e_{495}$ cnf(goal, negated_conjecture)

SWV548-1.007.p Swap elements (t3_pp_sf_ai_00007)
Swapping an element at position i1 with an element at position i2 is equivalent to swapping the element at position i2 with the element at position i1.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{836} = \text{store}(a_1, i_4, e_{835})$ cnf(hyp$_0$, hypothesis)
$a_{838} = \text{store}(a_{836}, i_3, e_{837})$ cnf(hyp$_1$, hypothesis)
$a_{840} = \text{store}(a_{838}, i_2, e_{839})$ cnf(hyp$_2$, hypothesis)
$a_{842} = \text{store}(a_{840}, i_1, e_{841})$ cnf(hyp$_3$, hypothesis)
$a_{844} = \text{store}(a_{842}, i_0, e_{843})$ cnf(hyp$_4$, hypothesis)
$a_{846} = \text{store}(a_{844}, i_5, e_{845})$ cnf(hyp$_5$, hypothesis)
$a_{848} = \text{store}(a_{846}, i_2, e_{847})$ cnf(hyp$_6$, hypothesis)
$a_{850} = \text{store}(a_{848}, i_5, e_{849})$ cnf(hyp$_7$, hypothesis)
$a_{852} = \text{store}(a_{850}, i_1, e_{851})$ cnf(hyp$_8$, hypothesis)

$a_{853} = \text{store}(a_{852}, i_1, e_{851})$ cnf(hyp$_9$, hypothesis)
$a_{855} = \text{store}(a_{853}, i_5, e_{854})$ cnf(hyp$_{10}$, hypothesis)
$a_{857} = \text{store}(a_{855}, i_2, e_{856})$ cnf(hyp$_{11}$, hypothesis)
$a_{859} = \text{store}(a_{857}, i_5, e_{858})$ cnf(hyp$_{12}$, hypothesis)
$a_{861} = \text{store}(a_{859}, i_2, e_{860})$ cnf(hyp$_{13}$, hypothesis)
$a_{862} = \text{store}(a_{838}, i_1, e_{841})$ cnf(hyp$_{14}$, hypothesis)
$a_{863} = \text{store}(a_{862}, i_2, e_{839})$ cnf(hyp$_{15}$, hypothesis)
$a_{865} = \text{store}(a_{863}, i_5, e_{864})$ cnf(hyp$_{16}$, hypothesis)
$a_{867} = \text{store}(a_{865}, i_0, e_{866})$ cnf(hyp$_{17}$, hypothesis)
$a_{869} = \text{store}(a_{867}, i_5, e_{868})$ cnf(hyp$_{18}$, hypothesis)
$a_{871} = \text{store}(a_{869}, i_2, e_{870})$ cnf(hyp$_{19}$, hypothesis)
$a_{873} = \text{store}(a_{871}, i_1, e_{872})$ cnf(hyp$_{20}$, hypothesis)
$a_{874} = \text{store}(a_{873}, i_1, e_{872})$ cnf(hyp$_{21}$, hypothesis)
$a_{876} = \text{store}(a_{874}, i_5, e_{875})$ cnf(hyp$_{22}$, hypothesis)
$a_{878} = \text{store}(a_{876}, i_2, e_{877})$ cnf(hyp$_{23}$, hypothesis)
$a_{880} = \text{store}(a_{878}, i_6, e_{879})$ cnf(hyp$_{24}$, hypothesis)
$a_{882} = \text{store}(a_{880}, i_2, e_{881})$ cnf(hyp$_{25}$, hypothesis)
$e_{835} = \text{select}(a_1, i_3)$ cnf(hyp$_{26}$, hypothesis)
$e_{837} = \text{select}(a_1, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{839} = \text{select}(a_{838}, i_1)$ cnf(hyp$_{28}$, hypothesis)
$e_{841} = \text{select}(a_{838}, i_2)$ cnf(hyp$_{29}$, hypothesis)
$e_{843} = \text{select}(a_{842}, i_5)$ cnf(hyp$_{30}$, hypothesis)
$e_{845} = \text{select}(a_{842}, i_0)$ cnf(hyp$_{31}$, hypothesis)
$e_{847} = \text{select}(a_{846}, i_5)$ cnf(hyp$_{32}$, hypothesis)
$e_{849} = \text{select}(a_{846}, i_2)$ cnf(hyp$_{33}$, hypothesis)
$e_{851} = \text{select}(a_{850}, i_1)$ cnf(hyp$_{34}$, hypothesis)
$e_{854} = \text{select}(a_{853}, i_2)$ cnf(hyp$_{35}$, hypothesis)
$e_{856} = \text{select}(a_{853}, i_5)$ cnf(hyp$_{36}$, hypothesis)
$e_{858} = \text{select}(a_{857}, i_2)$ cnf(hyp$_{37}$, hypothesis)
$e_{860} = \text{select}(a_{857}, i_5)$ cnf(hyp$_{38}$, hypothesis)
$e_{864} = \text{select}(a_{863}, i_0)$ cnf(hyp$_{39}$, hypothesis)
$e_{866} = \text{select}(a_{863}, i_5)$ cnf(hyp$_{40}$, hypothesis)
$e_{868} = \text{select}(a_{867}, i_2)$ cnf(hyp$_{41}$, hypothesis)
$e_{870} = \text{select}(a_{867}, i_5)$ cnf(hyp$_{42}$, hypothesis)
$e_{872} = \text{select}(a_{871}, i_1)$ cnf(hyp$_{43}$, hypothesis)
$e_{875} = \text{select}(a_{874}, i_2)$ cnf(hyp$_{44}$, hypothesis)
$e_{877} = \text{select}(a_{874}, i_5)$ cnf(hyp$_{45}$, hypothesis)
$e_{879} = \text{select}(a_{878}, i_2)$ cnf(hyp$_{46}$, hypothesis)
$e_{881} = \text{select}(a_{878}, i_6)$ cnf(hyp$_{47}$, hypothesis)
$e_{884} = \text{select}(a_{861}, i_{883})$ cnf(hyp$_{48}$, hypothesis)
$e_{885} = \text{select}(a_{882}, i_{883})$ cnf(hyp$_{49}$, hypothesis)
$i_{883} = \text{sk}(a_{861}, a_{882})$ cnf(hyp$_{50}$, hypothesis)
$e_{884} \neq e_{885}$ cnf(goal, negated_conjecture)

SWV549-1.004.p Store inverse (t1_np_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2, \text{select}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2, \text{select}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)),$
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV550-1.004.p Store inverse (t1_np_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2, \text{select}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2, \text{select}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)),$

$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV551-1.004.p Store inverse (t1_np_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{17} = \text{store}(a_1, i_1, e_{16})$ cnf(hyp_0, hypothesis)
$a_{19} = \text{store}(a_2, i_1, e_{18})$ cnf(hyp_1, hypothesis)
$a_{21} = \text{store}(a_{17}, i_2, e_{20})$ cnf(hyp_2, hypothesis)
$a_{23} = \text{store}(a_{19}, i_2, e_{22})$ cnf(hyp_3, hypothesis)
$a_{25} = \text{store}(a_{21}, i_3, e_{24})$ cnf(hyp_4, hypothesis)
$a_{27} = \text{store}(a_{23}, i_3, e_{26})$ cnf(hyp_5, hypothesis)
$a_{29} = \text{store}(a_{25}, i_4, e_{28})$ cnf(hyp_6, hypothesis)
$a_{31} = \text{store}(a_{27}, i_4, e_{30})$ cnf(hyp_7, hypothesis)
$e_{16} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{18} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{20} = \text{select}(a_{19}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{22} = \text{select}(a_{17}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{24} = \text{select}(a_{23}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{26} = \text{select}(a_{21}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_{27}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_{25}, i_4)$ cnf(hyp_{15}, hypothesis)
$a_{29} = a_{31}$ cnf(hyp_{16}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV551-1.007.p Store inverse (t1_np_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{29} = \text{store}(a_1, i_1, e_{28})$ cnf(hyp_0, hypothesis)
$a_{31} = \text{store}(a_2, i_1, e_{30})$ cnf(hyp_1, hypothesis)
$a_{33} = \text{store}(a_{29}, i_2, e_{32})$ cnf(hyp_2, hypothesis)
$a_{35} = \text{store}(a_{31}, i_2, e_{34})$ cnf(hyp_3, hypothesis)
$a_{37} = \text{store}(a_{33}, i_3, e_{36})$ cnf(hyp_4, hypothesis)
$a_{39} = \text{store}(a_{35}, i_3, e_{38})$ cnf(hyp_5, hypothesis)
$a_{41} = \text{store}(a_{37}, i_4, e_{40})$ cnf(hyp_6, hypothesis)
$a_{43} = \text{store}(a_{39}, i_4, e_{42})$ cnf(hyp_7, hypothesis)
$a_{45} = \text{store}(a_{41}, i_5, e_{44})$ cnf(hyp_8, hypothesis)
$a_{47} = \text{store}(a_{43}, i_5, e_{46})$ cnf(hyp_9, hypothesis)
$a_{49} = \text{store}(a_{45}, i_6, e_{48})$ cnf(hyp_{10}, hypothesis)
$a_{51} = \text{store}(a_{47}, i_6, e_{50})$ cnf(hyp_{11}, hypothesis)
$a_{53} = \text{store}(a_{49}, i_7, e_{52})$ cnf(hyp_{12}, hypothesis)
$a_{55} = \text{store}(a_{51}, i_7, e_{54})$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{32} = \text{select}(a_{31}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{34} = \text{select}(a_{29}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{36} = \text{select}(a_{35}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{38} = \text{select}(a_{33}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_{39}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_{37}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \text{select}(a_{43}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \text{select}(a_{41}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \text{select}(a_{47}, i_6)$ cnf(hyp_{24}, hypothesis)
$e_{50} = \text{select}(a_{45}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \text{select}(a_{51}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \text{select}(a_{49}, i_7)$ cnf(hyp_{27}, hypothesis)
$a_{53} = a_{55}$ cnf(hyp_{28}, hypothesis)

$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV551-1.010.p Store inverse (t1_np_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{41} = \text{store}(a_1, i_1, e_{40})$ cnf(hyp_0, hypothesis)
$a_{43} = \text{store}(a_2, i_1, e_{42})$ cnf(hyp_1, hypothesis)
$a_{45} = \text{store}(a_{41}, i_2, e_{44})$ cnf(hyp_2, hypothesis)
$a_{47} = \text{store}(a_{43}, i_2, e_{46})$ cnf(hyp_3, hypothesis)
$a_{49} = \text{store}(a_{45}, i_3, e_{48})$ cnf(hyp_4, hypothesis)
$a_{51} = \text{store}(a_{47}, i_3, e_{50})$ cnf(hyp_5, hypothesis)
$a_{53} = \text{store}(a_{49}, i_4, e_{52})$ cnf(hyp_6, hypothesis)
$a_{55} = \text{store}(a_{51}, i_4, e_{54})$ cnf(hyp_7, hypothesis)
$a_{57} = \text{store}(a_{53}, i_5, e_{56})$ cnf(hyp_8, hypothesis)
$a_{59} = \text{store}(a_{55}, i_5, e_{58})$ cnf(hyp_9, hypothesis)
$a_{61} = \text{store}(a_{57}, i_6, e_{60})$ cnf(hyp_{10}, hypothesis)
$a_{63} = \text{store}(a_{59}, i_6, e_{62})$ cnf(hyp_{11}, hypothesis)
$a_{65} = \text{store}(a_{61}, i_7, e_{64})$ cnf(hyp_{12}, hypothesis)
$a_{67} = \text{store}(a_{63}, i_7, e_{66})$ cnf(hyp_{13}, hypothesis)
$a_{69} = \text{store}(a_{65}, i_8, e_{68})$ cnf(hyp_{14}, hypothesis)
$a_{71} = \text{store}(a_{67}, i_8, e_{70})$ cnf(hyp_{15}, hypothesis)
$a_{73} = \text{store}(a_{69}, i_9, e_{72})$ cnf(hyp_{16}, hypothesis)
$a_{75} = \text{store}(a_{71}, i_9, e_{74})$ cnf(hyp_{17}, hypothesis)
$a_{77} = \text{store}(a_{73}, i_{10}, e_{76})$ cnf(hyp_{18}, hypothesis)
$a_{79} = \text{store}(a_{75}, i_{10}, e_{78})$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \text{select}(a_{43}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \text{select}(a_{41}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \text{select}(a_{47}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{50} = \text{select}(a_{45}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \text{select}(a_{51}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \text{select}(a_{49}, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{56} = \text{select}(a_{55}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{58} = \text{select}(a_{53}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{60} = \text{select}(a_{59}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{62} = \text{select}(a_{57}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{64} = \text{select}(a_{63}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{66} = \text{select}(a_{61}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{68} = \text{select}(a_{67}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{70} = \text{select}(a_{65}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{72} = \text{select}(a_{71}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{74} = \text{select}(a_{69}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{76} = \text{select}(a_{75}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{78} = \text{select}(a_{73}, i_{10})$ cnf(hyp_{39}, hypothesis)
$a_{77} = a_{79}$ cnf(hyp_{40}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV552-1.004.p Store inverse (t1_np_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{17} = \text{store}(a_1, i_1, e_{16})$ cnf(hyp_0, hypothesis)
$a_{19} = \text{store}(a_2, i_1, e_{18})$ cnf(hyp_1, hypothesis)
$a_{21} = \text{store}(a_{17}, i_2, e_{20})$ cnf(hyp_2, hypothesis)
$a_{23} = \text{store}(a_{19}, i_2, e_{22})$ cnf(hyp_3, hypothesis)
$a_{25} = \text{store}(a_{21}, i_3, e_{24})$ cnf(hyp_4, hypothesis)

$a_{27} = \text{store}(a_{23}, i_3, e_{26})$ cnf(hyp_5, hypothesis)
$a_{29} = \text{store}(a_{25}, i_1, e_{28})$ cnf(hyp_6, hypothesis)
$a_{31} = \text{store}(a_{27}, i_4, e_{30})$ cnf(hyp_7, hypothesis)
$e_{16} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{18} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{20} = \text{select}(a_{19}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{22} = \text{select}(a_{17}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{24} = \text{select}(a_{23}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{26} = \text{select}(a_{21}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_{27}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_{25}, i_4)$ cnf(hyp_{15}, hypothesis)
$a_{29} = a_{31}$ cnf(hyp_{16}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV552-1.007.p Store inverse (t1_np_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{29} = \text{store}(a_1, i_1, e_{28})$ cnf(hyp_0, hypothesis)
$a_{31} = \text{store}(a_2, i_1, e_{30})$ cnf(hyp_1, hypothesis)
$a_{33} = \text{store}(a_{29}, i_2, e_{32})$ cnf(hyp_2, hypothesis)
$a_{35} = \text{store}(a_{31}, i_2, e_{34})$ cnf(hyp_3, hypothesis)
$a_{37} = \text{store}(a_{33}, i_3, e_{36})$ cnf(hyp_4, hypothesis)
$a_{39} = \text{store}(a_{35}, i_3, e_{38})$ cnf(hyp_5, hypothesis)
$a_{41} = \text{store}(a_{37}, i_4, e_{40})$ cnf(hyp_6, hypothesis)
$a_{43} = \text{store}(a_{39}, i_4, e_{42})$ cnf(hyp_7, hypothesis)
$a_{45} = \text{store}(a_{41}, i_5, e_{44})$ cnf(hyp_8, hypothesis)
$a_{47} = \text{store}(a_{43}, i_5, e_{46})$ cnf(hyp_9, hypothesis)
$a_{49} = \text{store}(a_{45}, i_6, e_{48})$ cnf(hyp_{10}, hypothesis)
$a_{51} = \text{store}(a_{47}, i_6, e_{50})$ cnf(hyp_{11}, hypothesis)
$a_{53} = \text{store}(a_{49}, i_1, e_{52})$ cnf(hyp_{12}, hypothesis)
$a_{55} = \text{store}(a_{51}, i_7, e_{54})$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{32} = \text{select}(a_{31}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{34} = \text{select}(a_{29}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{36} = \text{select}(a_{35}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{38} = \text{select}(a_{33}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_{39}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_{37}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \text{select}(a_{43}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \text{select}(a_{41}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \text{select}(a_{47}, i_6)$ cnf(hyp_{24}, hypothesis)
$e_{50} = \text{select}(a_{45}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \text{select}(a_{51}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \text{select}(a_{49}, i_7)$ cnf(hyp_{27}, hypothesis)
$a_{53} = a_{55}$ cnf(hyp_{28}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV552-1.010.p Store inverse (t1_np_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{41} = \text{store}(a_1, i_1, e_{40})$ cnf(hyp_0, hypothesis)
$a_{43} = \text{store}(a_2, i_1, e_{42})$ cnf(hyp_1, hypothesis)
$a_{45} = \text{store}(a_{41}, i_2, e_{44})$ cnf(hyp_2, hypothesis)
$a_{47} = \text{store}(a_{43}, i_2, e_{46})$ cnf(hyp_3, hypothesis)
$a_{49} = \text{store}(a_{45}, i_3, e_{48})$ cnf(hyp_4, hypothesis)

$a_{51} = \mathrm{store}(a_{47}, i_3, e_{50})$ cnf(hyp_5, hypothesis)
$a_{53} = \mathrm{store}(a_{49}, i_4, e_{52})$ cnf(hyp_6, hypothesis)
$a_{55} = \mathrm{store}(a_{51}, i_4, e_{54})$ cnf(hyp_7, hypothesis)
$a_{57} = \mathrm{store}(a_{53}, i_5, e_{56})$ cnf(hyp_8, hypothesis)
$a_{59} = \mathrm{store}(a_{55}, i_5, e_{58})$ cnf(hyp_9, hypothesis)
$a_{61} = \mathrm{store}(a_{57}, i_6, e_{60})$ cnf(hyp_{10}, hypothesis)
$a_{63} = \mathrm{store}(a_{59}, i_6, e_{62})$ cnf(hyp_{11}, hypothesis)
$a_{65} = \mathrm{store}(a_{61}, i_7, e_{64})$ cnf(hyp_{12}, hypothesis)
$a_{67} = \mathrm{store}(a_{63}, i_7, e_{66})$ cnf(hyp_{13}, hypothesis)
$a_{69} = \mathrm{store}(a_{65}, i_8, e_{68})$ cnf(hyp_{14}, hypothesis)
$a_{71} = \mathrm{store}(a_{67}, i_8, e_{70})$ cnf(hyp_{15}, hypothesis)
$a_{73} = \mathrm{store}(a_{69}, i_9, e_{72})$ cnf(hyp_{16}, hypothesis)
$a_{75} = \mathrm{store}(a_{71}, i_9, e_{74})$ cnf(hyp_{17}, hypothesis)
$a_{77} = \mathrm{store}(a_{73}, i_1, e_{76})$ cnf(hyp_{18}, hypothesis)
$a_{79} = \mathrm{store}(a_{75}, i_{10}, e_{78})$ cnf(hyp_{19}, hypothesis)
$e_{40} = \mathrm{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \mathrm{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \mathrm{select}(a_{43}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \mathrm{select}(a_{41}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \mathrm{select}(a_{47}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{50} = \mathrm{select}(a_{45}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \mathrm{select}(a_{51}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \mathrm{select}(a_{49}, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{56} = \mathrm{select}(a_{55}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{58} = \mathrm{select}(a_{53}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{60} = \mathrm{select}(a_{59}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{62} = \mathrm{select}(a_{57}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{64} = \mathrm{select}(a_{63}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{66} = \mathrm{select}(a_{61}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{68} = \mathrm{select}(a_{67}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{70} = \mathrm{select}(a_{65}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{72} = \mathrm{select}(a_{71}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{74} = \mathrm{select}(a_{69}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{76} = \mathrm{select}(a_{75}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{78} = \mathrm{select}(a_{73}, i_{10})$ cnf(hyp_{39}, hypothesis)
$a_{77} = a_{79}$ cnf(hyp_{40}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV553-1.004.p Store inverse (t1_pp_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j)$ cnf(a_2, axiom)
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)),$
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)),$
$\mathrm{select}(a_1, \mathrm{sk}(a_1, a_2)) \neq \mathrm{select}(a_2, \mathrm{sk}(a_1, a_2))$ cnf(goal, negated_conjecture)

SWV554-1.004.p Store inverse (t1_pp_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j)$ cnf(a_2, axiom)
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)),$
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)),$
$\mathrm{select}(a_1, \mathrm{sk}(a_1, a_2)) \neq \mathrm{select}(a_2, \mathrm{sk}(a_1, a_2))$ cnf(goal, negated_conjecture)

SWV555-1.004.p Store inverse (t1_pp_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j)$ cnf(a_2, axiom)

$a_{20} = \text{store}(a_1, i_1, e_{19})$ cnf(hyp_0, hypothesis)
$a_{22} = \text{store}(a_2, i_1, e_{21})$ cnf(hyp_1, hypothesis)
$a_{24} = \text{store}(a_{20}, i_2, e_{23})$ cnf(hyp_2, hypothesis)
$a_{26} = \text{store}(a_{22}, i_2, e_{25})$ cnf(hyp_3, hypothesis)
$a_{28} = \text{store}(a_{24}, i_3, e_{27})$ cnf(hyp_4, hypothesis)
$a_{30} = \text{store}(a_{26}, i_3, e_{29})$ cnf(hyp_5, hypothesis)
$a_{32} = \text{store}(a_{28}, i_4, e_{31})$ cnf(hyp_6, hypothesis)
$a_{34} = \text{store}(a_{30}, i_4, e_{33})$ cnf(hyp_7, hypothesis)
$e_{19} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{21} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{23} = \text{select}(a_{22}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{25} = \text{select}(a_{20}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{27} = \text{select}(a_{26}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{29} = \text{select}(a_{24}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{31} = \text{select}(a_{30}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{33} = \text{select}(a_{28}, i_4)$ cnf(hyp_{15}, hypothesis)
$e_{36} = \text{select}(a_1, i_{35})$ cnf(hyp_{16}, hypothesis)
$e_{37} = \text{select}(a_2, i_{35})$ cnf(hyp_{17}, hypothesis)
$i_{35} = \text{sk}(a_1, a_2)$ cnf(hyp_{18}, hypothesis)
$a_{32} = a_{34}$ cnf(hyp_{19}, hypothesis)
$e_{36} \neq e_{37}$ cnf(goal, negated_conjecture)

SWV555-1.007.p Store inverse (t1_pp_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{32} = \text{store}(a_1, i_1, e_{31})$ cnf(hyp_0, hypothesis)
$a_{34} = \text{store}(a_2, i_1, e_{33})$ cnf(hyp_1, hypothesis)
$a_{36} = \text{store}(a_{32}, i_2, e_{35})$ cnf(hyp_2, hypothesis)
$a_{38} = \text{store}(a_{34}, i_2, e_{37})$ cnf(hyp_3, hypothesis)
$a_{40} = \text{store}(a_{36}, i_3, e_{39})$ cnf(hyp_4, hypothesis)
$a_{42} = \text{store}(a_{38}, i_3, e_{41})$ cnf(hyp_5, hypothesis)
$a_{44} = \text{store}(a_{40}, i_4, e_{43})$ cnf(hyp_6, hypothesis)
$a_{46} = \text{store}(a_{42}, i_4, e_{45})$ cnf(hyp_7, hypothesis)
$a_{48} = \text{store}(a_{44}, i_5, e_{47})$ cnf(hyp_8, hypothesis)
$a_{50} = \text{store}(a_{46}, i_5, e_{49})$ cnf(hyp_9, hypothesis)
$a_{52} = \text{store}(a_{48}, i_6, e_{51})$ cnf(hyp_{10}, hypothesis)
$a_{54} = \text{store}(a_{50}, i_6, e_{53})$ cnf(hyp_{11}, hypothesis)
$a_{56} = \text{store}(a_{52}, i_7, e_{55})$ cnf(hyp_{12}, hypothesis)
$a_{58} = \text{store}(a_{54}, i_7, e_{57})$ cnf(hyp_{13}, hypothesis)
$e_{31} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{33} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{35} = \text{select}(a_{34}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{37} = \text{select}(a_{32}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{39} = \text{select}(a_{38}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{41} = \text{select}(a_{36}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_{42}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_{40}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_6)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_7)$ cnf(hyp_{27}, hypothesis)
$e_{60} = \text{select}(a_1, i_{59})$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_2, i_{59})$ cnf(hyp_{29}, hypothesis)
$i_{59} = \text{sk}(a_1, a_2)$ cnf(hyp_{30}, hypothesis)
$a_{56} = a_{58}$ cnf(hyp_{31}, hypothesis)
$e_{60} \neq e_{61}$ cnf(goal, negated_conjecture)

SWV555-1.010.p Store inverse (t1_pp_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{44} = \text{store}(a_1, i_1, e_{43})$ cnf(hyp_0, hypothesis)
$a_{46} = \text{store}(a_2, i_1, e_{45})$ cnf(hyp_1, hypothesis)
$a_{48} = \text{store}(a_{44}, i_2, e_{47})$ cnf(hyp_2, hypothesis)
$a_{50} = \text{store}(a_{46}, i_2, e_{49})$ cnf(hyp_3, hypothesis)
$a_{52} = \text{store}(a_{48}, i_3, e_{51})$ cnf(hyp_4, hypothesis)
$a_{54} = \text{store}(a_{50}, i_3, e_{53})$ cnf(hyp_5, hypothesis)
$a_{56} = \text{store}(a_{52}, i_4, e_{55})$ cnf(hyp_6, hypothesis)
$a_{58} = \text{store}(a_{54}, i_4, e_{57})$ cnf(hyp_7, hypothesis)
$a_{60} = \text{store}(a_{56}, i_5, e_{59})$ cnf(hyp_8, hypothesis)
$a_{62} = \text{store}(a_{58}, i_5, e_{61})$ cnf(hyp_9, hypothesis)
$a_{64} = \text{store}(a_{60}, i_6, e_{63})$ cnf(hyp_{10}, hypothesis)
$a_{66} = \text{store}(a_{62}, i_6, e_{65})$ cnf(hyp_{11}, hypothesis)
$a_{68} = \text{store}(a_{64}, i_7, e_{67})$ cnf(hyp_{12}, hypothesis)
$a_{70} = \text{store}(a_{66}, i_7, e_{69})$ cnf(hyp_{13}, hypothesis)
$a_{72} = \text{store}(a_{68}, i_8, e_{71})$ cnf(hyp_{14}, hypothesis)
$a_{74} = \text{store}(a_{70}, i_8, e_{73})$ cnf(hyp_{15}, hypothesis)
$a_{76} = \text{store}(a_{72}, i_9, e_{75})$ cnf(hyp_{16}, hypothesis)
$a_{78} = \text{store}(a_{74}, i_9, e_{77})$ cnf(hyp_{17}, hypothesis)
$a_{80} = \text{store}(a_{76}, i_{10}, e_{79})$ cnf(hyp_{18}, hypothesis)
$a_{82} = \text{store}(a_{78}, i_{10}, e_{81})$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{59} = \text{select}(a_{58}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_{56}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{63} = \text{select}(a_{62}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{65} = \text{select}(a_{60}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{67} = \text{select}(a_{66}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{69} = \text{select}(a_{64}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{71} = \text{select}(a_{70}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{73} = \text{select}(a_{68}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{75} = \text{select}(a_{74}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{77} = \text{select}(a_{72}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{79} = \text{select}(a_{78}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{81} = \text{select}(a_{76}, i_{10})$ cnf(hyp_{39}, hypothesis)
$e_{84} = \text{select}(a_1, i_{83})$ cnf(hyp_{40}, hypothesis)
$e_{85} = \text{select}(a_2, i_{83})$ cnf(hyp_{41}, hypothesis)
$i_{83} = \text{sk}(a_1, a_2)$ cnf(hyp_{42}, hypothesis)
$a_{80} = a_{82}$ cnf(hyp_{43}, hypothesis)
$e_{84} \neq e_{85}$ cnf(goal, negated_conjecture)

SWV556-1.004.p Store inverse (t1_pp_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$a_{20} = \text{store}(a_1, i_1, e_{19})$ cnf(hyp_0, hypothesis)
$a_{22} = \text{store}(a_2, i_1, e_{21})$ cnf(hyp_1, hypothesis)
$a_{24} = \text{store}(a_{20}, i_2, e_{23})$ cnf(hyp_2, hypothesis)
$a_{26} = \text{store}(a_{22}, i_2, e_{25})$ cnf(hyp_3, hypothesis)

$a_{28} = \mathrm{store}(a_{24}, i_3, e_{27}) \qquad \mathrm{cnf}(\mathrm{hyp}_4, \mathrm{hypothesis})$
$a_{30} = \mathrm{store}(a_{26}, i_3, e_{29}) \qquad \mathrm{cnf}(\mathrm{hyp}_5, \mathrm{hypothesis})$
$a_{32} = \mathrm{store}(a_{28}, i_1, e_{31}) \qquad \mathrm{cnf}(\mathrm{hyp}_6, \mathrm{hypothesis})$
$a_{34} = \mathrm{store}(a_{30}, i_4, e_{33}) \qquad \mathrm{cnf}(\mathrm{hyp}_7, \mathrm{hypothesis})$
$e_{19} = \mathrm{select}(a_2, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_8, \mathrm{hypothesis})$
$e_{21} = \mathrm{select}(a_1, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_9, \mathrm{hypothesis})$
$e_{23} = \mathrm{select}(a_{22}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{10}, \mathrm{hypothesis})$
$e_{25} = \mathrm{select}(a_{20}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{11}, \mathrm{hypothesis})$
$e_{27} = \mathrm{select}(a_{26}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{12}, \mathrm{hypothesis})$
$e_{29} = \mathrm{select}(a_{24}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{13}, \mathrm{hypothesis})$
$e_{31} = \mathrm{select}(a_{30}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{14}, \mathrm{hypothesis})$
$e_{33} = \mathrm{select}(a_{28}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{15}, \mathrm{hypothesis})$
$e_{36} = \mathrm{select}(a_1, i_{35}) \qquad \mathrm{cnf}(\mathrm{hyp}_{16}, \mathrm{hypothesis})$
$e_{37} = \mathrm{select}(a_2, i_{35}) \qquad \mathrm{cnf}(\mathrm{hyp}_{17}, \mathrm{hypothesis})$
$i_{35} = \mathrm{sk}(a_1, a_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{18}, \mathrm{hypothesis})$
$a_{32} = a_{34} \qquad \mathrm{cnf}(\mathrm{hyp}_{19}, \mathrm{hypothesis})$
$e_{36} \neq e_{37} \qquad \mathrm{cnf}(\mathrm{goal}, \mathrm{negated\_conjecture})$

SWV556-1.007.p Store inverse (t1_pp_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j$ or $\mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$a_{32} = \mathrm{store}(a_1, i_1, e_{31}) \qquad \mathrm{cnf}(\mathrm{hyp}_0, \mathrm{hypothesis})$
$a_{34} = \mathrm{store}(a_2, i_1, e_{33}) \qquad \mathrm{cnf}(\mathrm{hyp}_1, \mathrm{hypothesis})$
$a_{36} = \mathrm{store}(a_{32}, i_2, e_{35}) \qquad \mathrm{cnf}(\mathrm{hyp}_2, \mathrm{hypothesis})$
$a_{38} = \mathrm{store}(a_{34}, i_2, e_{37}) \qquad \mathrm{cnf}(\mathrm{hyp}_3, \mathrm{hypothesis})$
$a_{40} = \mathrm{store}(a_{36}, i_3, e_{39}) \qquad \mathrm{cnf}(\mathrm{hyp}_4, \mathrm{hypothesis})$
$a_{42} = \mathrm{store}(a_{38}, i_3, e_{41}) \qquad \mathrm{cnf}(\mathrm{hyp}_5, \mathrm{hypothesis})$
$a_{44} = \mathrm{store}(a_{40}, i_4, e_{43}) \qquad \mathrm{cnf}(\mathrm{hyp}_6, \mathrm{hypothesis})$
$a_{46} = \mathrm{store}(a_{42}, i_4, e_{45}) \qquad \mathrm{cnf}(\mathrm{hyp}_7, \mathrm{hypothesis})$
$a_{48} = \mathrm{store}(a_{44}, i_5, e_{47}) \qquad \mathrm{cnf}(\mathrm{hyp}_8, \mathrm{hypothesis})$
$a_{50} = \mathrm{store}(a_{46}, i_5, e_{49}) \qquad \mathrm{cnf}(\mathrm{hyp}_9, \mathrm{hypothesis})$
$a_{52} = \mathrm{store}(a_{48}, i_6, e_{51}) \qquad \mathrm{cnf}(\mathrm{hyp}_{10}, \mathrm{hypothesis})$
$a_{54} = \mathrm{store}(a_{50}, i_6, e_{53}) \qquad \mathrm{cnf}(\mathrm{hyp}_{11}, \mathrm{hypothesis})$
$a_{56} = \mathrm{store}(a_{52}, i_1, e_{55}) \qquad \mathrm{cnf}(\mathrm{hyp}_{12}, \mathrm{hypothesis})$
$a_{58} = \mathrm{store}(a_{54}, i_7, e_{57}) \qquad \mathrm{cnf}(\mathrm{hyp}_{13}, \mathrm{hypothesis})$
$e_{31} = \mathrm{select}(a_2, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_{14}, \mathrm{hypothesis})$
$e_{33} = \mathrm{select}(a_1, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_{15}, \mathrm{hypothesis})$
$e_{35} = \mathrm{select}(a_{34}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{16}, \mathrm{hypothesis})$
$e_{37} = \mathrm{select}(a_{32}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{17}, \mathrm{hypothesis})$
$e_{39} = \mathrm{select}(a_{38}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{18}, \mathrm{hypothesis})$
$e_{41} = \mathrm{select}(a_{36}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{19}, \mathrm{hypothesis})$
$e_{43} = \mathrm{select}(a_{42}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{20}, \mathrm{hypothesis})$
$e_{45} = \mathrm{select}(a_{40}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{21}, \mathrm{hypothesis})$
$e_{47} = \mathrm{select}(a_{46}, i_5) \qquad \mathrm{cnf}(\mathrm{hyp}_{22}, \mathrm{hypothesis})$
$e_{49} = \mathrm{select}(a_{44}, i_5) \qquad \mathrm{cnf}(\mathrm{hyp}_{23}, \mathrm{hypothesis})$
$e_{51} = \mathrm{select}(a_{50}, i_6) \qquad \mathrm{cnf}(\mathrm{hyp}_{24}, \mathrm{hypothesis})$
$e_{53} = \mathrm{select}(a_{48}, i_6) \qquad \mathrm{cnf}(\mathrm{hyp}_{25}, \mathrm{hypothesis})$
$e_{55} = \mathrm{select}(a_{54}, i_7) \qquad \mathrm{cnf}(\mathrm{hyp}_{26}, \mathrm{hypothesis})$
$e_{57} = \mathrm{select}(a_{52}, i_7) \qquad \mathrm{cnf}(\mathrm{hyp}_{27}, \mathrm{hypothesis})$
$e_{60} = \mathrm{select}(a_1, i_{59}) \qquad \mathrm{cnf}(\mathrm{hyp}_{28}, \mathrm{hypothesis})$
$e_{61} = \mathrm{select}(a_2, i_{59}) \qquad \mathrm{cnf}(\mathrm{hyp}_{29}, \mathrm{hypothesis})$
$i_{59} = \mathrm{sk}(a_1, a_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{30}, \mathrm{hypothesis})$
$a_{56} = a_{58} \qquad \mathrm{cnf}(\mathrm{hyp}_{31}, \mathrm{hypothesis})$
$e_{60} \neq e_{61} \qquad \mathrm{cnf}(\mathrm{goal}, \mathrm{negated\_conjecture})$

SWV556-1.010.p Store inverse (t1_pp_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.

$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$a_{44} = \mathrm{store}(a_1, i_1, e_{43}) \qquad \mathrm{cnf}(\mathrm{hyp}_0, \mathrm{hypothesis})$
$a_{46} = \mathrm{store}(a_2, i_1, e_{45}) \qquad \mathrm{cnf}(\mathrm{hyp}_1, \mathrm{hypothesis})$
$a_{48} = \mathrm{store}(a_{44}, i_2, e_{47}) \qquad \mathrm{cnf}(\mathrm{hyp}_2, \mathrm{hypothesis})$
$a_{50} = \mathrm{store}(a_{46}, i_2, e_{49}) \qquad \mathrm{cnf}(\mathrm{hyp}_3, \mathrm{hypothesis})$
$a_{52} = \mathrm{store}(a_{48}, i_3, e_{51}) \qquad \mathrm{cnf}(\mathrm{hyp}_4, \mathrm{hypothesis})$
$a_{54} = \mathrm{store}(a_{50}, i_3, e_{53}) \qquad \mathrm{cnf}(\mathrm{hyp}_5, \mathrm{hypothesis})$
$a_{56} = \mathrm{store}(a_{52}, i_4, e_{55}) \qquad \mathrm{cnf}(\mathrm{hyp}_6, \mathrm{hypothesis})$
$a_{58} = \mathrm{store}(a_{54}, i_4, e_{57}) \qquad \mathrm{cnf}(\mathrm{hyp}_7, \mathrm{hypothesis})$
$a_{60} = \mathrm{store}(a_{56}, i_5, e_{59}) \qquad \mathrm{cnf}(\mathrm{hyp}_8, \mathrm{hypothesis})$
$a_{62} = \mathrm{store}(a_{58}, i_5, e_{61}) \qquad \mathrm{cnf}(\mathrm{hyp}_9, \mathrm{hypothesis})$
$a_{64} = \mathrm{store}(a_{60}, i_6, e_{63}) \qquad \mathrm{cnf}(\mathrm{hyp}_{10}, \mathrm{hypothesis})$
$a_{66} = \mathrm{store}(a_{62}, i_6, e_{65}) \qquad \mathrm{cnf}(\mathrm{hyp}_{11}, \mathrm{hypothesis})$
$a_{68} = \mathrm{store}(a_{64}, i_7, e_{67}) \qquad \mathrm{cnf}(\mathrm{hyp}_{12}, \mathrm{hypothesis})$
$a_{70} = \mathrm{store}(a_{66}, i_7, e_{69}) \qquad \mathrm{cnf}(\mathrm{hyp}_{13}, \mathrm{hypothesis})$
$a_{72} = \mathrm{store}(a_{68}, i_8, e_{71}) \qquad \mathrm{cnf}(\mathrm{hyp}_{14}, \mathrm{hypothesis})$
$a_{74} = \mathrm{store}(a_{70}, i_8, e_{73}) \qquad \mathrm{cnf}(\mathrm{hyp}_{15}, \mathrm{hypothesis})$
$a_{76} = \mathrm{store}(a_{72}, i_9, e_{75}) \qquad \mathrm{cnf}(\mathrm{hyp}_{16}, \mathrm{hypothesis})$
$a_{78} = \mathrm{store}(a_{74}, i_9, e_{77}) \qquad \mathrm{cnf}(\mathrm{hyp}_{17}, \mathrm{hypothesis})$
$a_{80} = \mathrm{store}(a_{76}, i_1, e_{79}) \qquad \mathrm{cnf}(\mathrm{hyp}_{18}, \mathrm{hypothesis})$
$a_{82} = \mathrm{store}(a_{78}, i_{10}, e_{81}) \qquad \mathrm{cnf}(\mathrm{hyp}_{19}, \mathrm{hypothesis})$
$e_{43} = \mathrm{select}(a_2, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_{20}, \mathrm{hypothesis})$
$e_{45} = \mathrm{select}(a_1, i_1) \qquad \mathrm{cnf}(\mathrm{hyp}_{21}, \mathrm{hypothesis})$
$e_{47} = \mathrm{select}(a_{46}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{22}, \mathrm{hypothesis})$
$e_{49} = \mathrm{select}(a_{44}, i_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{23}, \mathrm{hypothesis})$
$e_{51} = \mathrm{select}(a_{50}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{24}, \mathrm{hypothesis})$
$e_{53} = \mathrm{select}(a_{48}, i_3) \qquad \mathrm{cnf}(\mathrm{hyp}_{25}, \mathrm{hypothesis})$
$e_{55} = \mathrm{select}(a_{54}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{26}, \mathrm{hypothesis})$
$e_{57} = \mathrm{select}(a_{52}, i_4) \qquad \mathrm{cnf}(\mathrm{hyp}_{27}, \mathrm{hypothesis})$
$e_{59} = \mathrm{select}(a_{58}, i_5) \qquad \mathrm{cnf}(\mathrm{hyp}_{28}, \mathrm{hypothesis})$
$e_{61} = \mathrm{select}(a_{56}, i_5) \qquad \mathrm{cnf}(\mathrm{hyp}_{29}, \mathrm{hypothesis})$
$e_{63} = \mathrm{select}(a_{62}, i_6) \qquad \mathrm{cnf}(\mathrm{hyp}_{30}, \mathrm{hypothesis})$
$e_{65} = \mathrm{select}(a_{60}, i_6) \qquad \mathrm{cnf}(\mathrm{hyp}_{31}, \mathrm{hypothesis})$
$e_{67} = \mathrm{select}(a_{66}, i_7) \qquad \mathrm{cnf}(\mathrm{hyp}_{32}, \mathrm{hypothesis})$
$e_{69} = \mathrm{select}(a_{64}, i_7) \qquad \mathrm{cnf}(\mathrm{hyp}_{33}, \mathrm{hypothesis})$
$e_{71} = \mathrm{select}(a_{70}, i_8) \qquad \mathrm{cnf}(\mathrm{hyp}_{34}, \mathrm{hypothesis})$
$e_{73} = \mathrm{select}(a_{68}, i_8) \qquad \mathrm{cnf}(\mathrm{hyp}_{35}, \mathrm{hypothesis})$
$e_{75} = \mathrm{select}(a_{74}, i_9) \qquad \mathrm{cnf}(\mathrm{hyp}_{36}, \mathrm{hypothesis})$
$e_{77} = \mathrm{select}(a_{72}, i_9) \qquad \mathrm{cnf}(\mathrm{hyp}_{37}, \mathrm{hypothesis})$
$e_{79} = \mathrm{select}(a_{78}, i_{10}) \qquad \mathrm{cnf}(\mathrm{hyp}_{38}, \mathrm{hypothesis})$
$e_{81} = \mathrm{select}(a_{76}, i_{10}) \qquad \mathrm{cnf}(\mathrm{hyp}_{39}, \mathrm{hypothesis})$
$e_{84} = \mathrm{select}(a_1, i_{83}) \qquad \mathrm{cnf}(\mathrm{hyp}_{40}, \mathrm{hypothesis})$
$e_{85} = \mathrm{select}(a_2, i_{83}) \qquad \mathrm{cnf}(\mathrm{hyp}_{41}, \mathrm{hypothesis})$
$i_{83} = \mathrm{sk}(a_1, a_2) \qquad \mathrm{cnf}(\mathrm{hyp}_{42}, \mathrm{hypothesis})$
$a_{80} = a_{82} \qquad \mathrm{cnf}(\mathrm{hyp}_{43}, \mathrm{hypothesis})$
$e_{84} \neq e_{85} \qquad \mathrm{cnf}(\mathrm{goal}, \mathrm{negated\_conjecture})$

SWV557-1.004.p Store inverse (t2_np_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\mathrm{select}(\mathrm{store}(a, i, e), i) = e \qquad \mathrm{cnf}(a_1, \mathrm{axiom})$
$i = j \text{ or } \mathrm{select}(\mathrm{store}(a, i, e), j) = \mathrm{select}(a, j) \qquad \mathrm{cnf}(a_2, \mathrm{axiom})$
$\mathrm{store}(a, i, \mathrm{select}(a, i)) = a \qquad \mathrm{cnf}(a_3, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(a, i, e), i, f) = \mathrm{store}(a, i, f) \qquad \mathrm{cnf}(a_4, \mathrm{axiom})$
$i = j \text{ or } \mathrm{store}(\mathrm{store}(a, i, e), j, f) = \mathrm{store}(\mathrm{store}(a, j, f), i, e) \qquad \mathrm{cnf}(a_5, \mathrm{axiom})$
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)),$
$\mathrm{store}(\mathrm{store}(\mathrm{store}(\mathrm{store}(a_2, i_1, \mathrm{select}(a_1, i_1)), i_2, \mathrm{select}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)), i_2)), i_3, \mathrm{select}(\mathrm{store}(\mathrm{store}(a_1, i_1, \mathrm{select}(a_2, i_1)),$
$a_1 \neq a_2 \qquad \mathrm{cnf}(\mathrm{goal}, \mathrm{negated\_conjecture})$

SWV558-1.004.p Store inverse (t2_np_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(a, i, \text{select}(a, i)) = a$ cnf(a_3, axiom)
$\text{store}(\text{store}(a, i, e), i, f) = \text{store}(a, i, f)$ cnf(a_4, axiom)
$i = j$ or $\text{store}(\text{store}(a, i, e), j, f) = \text{store}(\text{store}(a, j, f), i, e)$ cnf(a_5, axiom)
$a_{17} = \text{store}(a_1, i_1, e_{16})$ cnf(hyp_0, hypothesis)
$a_{19} = \text{store}(a_2, i_1, e_{18})$ cnf(hyp_1, hypothesis)
$a_{21} = \text{store}(a_{17}, i_2, e_{20})$ cnf(hyp_2, hypothesis)
$a_{23} = \text{store}(a_{19}, i_2, e_{22})$ cnf(hyp_3, hypothesis)
$a_{25} = \text{store}(a_{21}, i_3, e_{24})$ cnf(hyp_4, hypothesis)
$a_{27} = \text{store}(a_{23}, i_3, e_{26})$ cnf(hyp_5, hypothesis)
$a_{29} = \text{store}(a_{25}, i_4, e_{28})$ cnf(hyp_6, hypothesis)
$a_{31} = \text{store}(a_{27}, i_4, e_{30})$ cnf(hyp_7, hypothesis)
$e_{16} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{18} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{20} = \text{select}(a_{19}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{22} = \text{select}(a_{17}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{24} = \text{select}(a_{23}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{26} = \text{select}(a_{21}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_{27}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_{25}, i_4)$ cnf(hyp_{15}, hypothesis)
$a_{29} = a_{31}$ cnf(hyp_{16}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV558-1.007.p Store inverse (t2_np_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(a, i, \text{select}(a, i)) = a$ cnf(a_3, axiom)
$\text{store}(\text{store}(a, i, e), i, f) = \text{store}(a, i, f)$ cnf(a_4, axiom)
$i = j$ or $\text{store}(\text{store}(a, i, e), j, f) = \text{store}(\text{store}(a, j, f), i, e)$ cnf(a_5, axiom)
$a_{29} = \text{store}(a_1, i_1, e_{28})$ cnf(hyp_0, hypothesis)
$a_{31} = \text{store}(a_2, i_1, e_{30})$ cnf(hyp_1, hypothesis)
$a_{33} = \text{store}(a_{29}, i_2, e_{32})$ cnf(hyp_2, hypothesis)
$a_{35} = \text{store}(a_{31}, i_2, e_{34})$ cnf(hyp_3, hypothesis)
$a_{37} = \text{store}(a_{33}, i_3, e_{36})$ cnf(hyp_4, hypothesis)
$a_{39} = \text{store}(a_{35}, i_3, e_{38})$ cnf(hyp_5, hypothesis)
$a_{41} = \text{store}(a_{37}, i_4, e_{40})$ cnf(hyp_6, hypothesis)
$a_{43} = \text{store}(a_{39}, i_4, e_{42})$ cnf(hyp_7, hypothesis)
$a_{45} = \text{store}(a_{41}, i_5, e_{44})$ cnf(hyp_8, hypothesis)
$a_{47} = \text{store}(a_{43}, i_5, e_{46})$ cnf(hyp_9, hypothesis)
$a_{49} = \text{store}(a_{45}, i_6, e_{48})$ cnf(hyp_{10}, hypothesis)
$a_{51} = \text{store}(a_{47}, i_6, e_{50})$ cnf(hyp_{11}, hypothesis)
$a_{53} = \text{store}(a_{49}, i_7, e_{52})$ cnf(hyp_{12}, hypothesis)
$a_{55} = \text{store}(a_{51}, i_7, e_{54})$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{32} = \text{select}(a_{31}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{34} = \text{select}(a_{29}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{36} = \text{select}(a_{35}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{38} = \text{select}(a_{33}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_{39}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_{37}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \text{select}(a_{43}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \text{select}(a_{41}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \text{select}(a_{47}, i_6)$ cnf(hyp_{24}, hypothesis)

$e_{50} = \text{select}(a_{45}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \text{select}(a_{51}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \text{select}(a_{49}, i_7)$ cnf(hyp_{27}, hypothesis)
$a_{53} = a_{55}$ cnf(hyp_{28}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV558-1.010.p Store inverse (t2_np_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(a, i, \text{select}(a, i)) = a$ cnf(a_3, axiom)
$\text{store}(\text{store}(a, i, e), i, f) = \text{store}(a, i, f)$ cnf(a_4, axiom)
$i = j$ or $\text{store}(\text{store}(a, i, e), j, f) = \text{store}(\text{store}(a, j, f), i, e)$ cnf(a_5, axiom)
$a_{41} = \text{store}(a_1, i_1, e_{40})$ cnf(hyp_0, hypothesis)
$a_{43} = \text{store}(a_2, i_1, e_{42})$ cnf(hyp_1, hypothesis)
$a_{45} = \text{store}(a_{41}, i_2, e_{44})$ cnf(hyp_2, hypothesis)
$a_{47} = \text{store}(a_{43}, i_2, e_{46})$ cnf(hyp_3, hypothesis)
$a_{49} = \text{store}(a_{45}, i_3, e_{48})$ cnf(hyp_4, hypothesis)
$a_{51} = \text{store}(a_{47}, i_3, e_{50})$ cnf(hyp_5, hypothesis)
$a_{53} = \text{store}(a_{49}, i_4, e_{52})$ cnf(hyp_6, hypothesis)
$a_{55} = \text{store}(a_{51}, i_4, e_{54})$ cnf(hyp_7, hypothesis)
$a_{57} = \text{store}(a_{53}, i_5, e_{56})$ cnf(hyp_8, hypothesis)
$a_{59} = \text{store}(a_{55}, i_5, e_{58})$ cnf(hyp_9, hypothesis)
$a_{61} = \text{store}(a_{57}, i_6, e_{60})$ cnf(hyp_{10}, hypothesis)
$a_{63} = \text{store}(a_{59}, i_6, e_{62})$ cnf(hyp_{11}, hypothesis)
$a_{65} = \text{store}(a_{61}, i_7, e_{64})$ cnf(hyp_{12}, hypothesis)
$a_{67} = \text{store}(a_{63}, i_7, e_{66})$ cnf(hyp_{13}, hypothesis)
$a_{69} = \text{store}(a_{65}, i_8, e_{68})$ cnf(hyp_{14}, hypothesis)
$a_{71} = \text{store}(a_{67}, i_8, e_{70})$ cnf(hyp_{15}, hypothesis)
$a_{73} = \text{store}(a_{69}, i_9, e_{72})$ cnf(hyp_{16}, hypothesis)
$a_{75} = \text{store}(a_{71}, i_9, e_{74})$ cnf(hyp_{17}, hypothesis)
$a_{77} = \text{store}(a_{73}, i_{10}, e_{76})$ cnf(hyp_{18}, hypothesis)
$a_{79} = \text{store}(a_{75}, i_{10}, e_{78})$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{44} = \text{select}(a_{43}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{46} = \text{select}(a_{41}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{48} = \text{select}(a_{47}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{50} = \text{select}(a_{45}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{52} = \text{select}(a_{51}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{54} = \text{select}(a_{49}, i_4)$ cnf(hyp_{27}, hypothesis)
$e_{56} = \text{select}(a_{55}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{58} = \text{select}(a_{53}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{60} = \text{select}(a_{59}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{62} = \text{select}(a_{57}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{64} = \text{select}(a_{63}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{66} = \text{select}(a_{61}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{68} = \text{select}(a_{67}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{70} = \text{select}(a_{65}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{72} = \text{select}(a_{71}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{74} = \text{select}(a_{69}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{76} = \text{select}(a_{75}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{78} = \text{select}(a_{73}, i_{10})$ cnf(hyp_{39}, hypothesis)
$a_{77} = a_{79}$ cnf(hyp_{40}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV559-1.004.p Store inverse (t3_np_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.

$\text{select}(\text{store}(a,i,e),i)=e \qquad \text{cnf}(a_1,\text{axiom})$
$i=j$ or $\text{select}(\text{store}(a,i,e),j)=\text{select}(a,j) \qquad \text{cnf}(a_2,\text{axiom})$
$\text{store}(\text{store}(a,i,\text{select}(a,j)),j,\text{select}(a,i))=\text{store}(\text{store}(a,j,\text{select}(a,i)),i,\text{select}(a,j)) \qquad \text{cnf}(a_3,\text{axiom})$
$\text{store}(\text{store}(\text{store}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),i_2,\text{select}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),i_2)),i_3,\text{select}(\text{store}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),i_2,\text{select}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),i_2)),i_3,\text{select}(\text{store}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),$
$a_1\neq a_2 \qquad \text{cnf}(\text{goal},\text{negated\_conjecture})$

SWV560-1.004.p Store inverse (t3_np_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a,i,e),i)=e \qquad \text{cnf}(a_1,\text{axiom})$
$i=j$ or $\text{select}(\text{store}(a,i,e),j)=\text{select}(a,j) \qquad \text{cnf}(a_2,\text{axiom})$
$\text{store}(\text{store}(a,i,\text{select}(a,j)),j,\text{select}(a,i))=\text{store}(\text{store}(a,j,\text{select}(a,i)),i,\text{select}(a,j)) \qquad \text{cnf}(a_3,\text{axiom})$
$\text{store}(\text{store}(\text{store}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),i_2,\text{select}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),i_2)),i_3,\text{select}(\text{store}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2,i_1,\text{select}(a_1,i_1)),i_2,\text{select}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),i_2)),i_3,\text{select}(\text{store}(\text{store}(a_1,i_1,\text{select}(a_2,i_1)),$
$a_1\neq a_2 \qquad \text{cnf}(\text{goal},\text{negated\_conjecture})$

SWV561-1.004.p Store inverse (t3_np_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a,i,e),i)=e \qquad \text{cnf}(a_1,\text{axiom})$
$i=j$ or $\text{select}(\text{store}(a,i,e),j)=\text{select}(a,j) \qquad \text{cnf}(a_2,\text{axiom})$
$\text{store}(\text{store}(a,i,\text{select}(a,j)),j,\text{select}(a,i))=\text{store}(\text{store}(a,j,\text{select}(a,i)),i,\text{select}(a,j)) \qquad \text{cnf}(a_3,\text{axiom})$
$a_{17}=\text{store}(a_1,i_1,e_{16}) \qquad \text{cnf}(\text{hyp}_0,\text{hypothesis})$
$a_{19}=\text{store}(a_2,i_1,e_{18}) \qquad \text{cnf}(\text{hyp}_1,\text{hypothesis})$
$a_{21}=\text{store}(a_{17},i_2,e_{20}) \qquad \text{cnf}(\text{hyp}_2,\text{hypothesis})$
$a_{23}=\text{store}(a_{19},i_2,e_{22}) \qquad \text{cnf}(\text{hyp}_3,\text{hypothesis})$
$a_{25}=\text{store}(a_{21},i_3,e_{24}) \qquad \text{cnf}(\text{hyp}_4,\text{hypothesis})$
$a_{27}=\text{store}(a_{23},i_3,e_{26}) \qquad \text{cnf}(\text{hyp}_5,\text{hypothesis})$
$a_{29}=\text{store}(a_{25},i_4,e_{28}) \qquad \text{cnf}(\text{hyp}_6,\text{hypothesis})$
$a_{31}=\text{store}(a_{27},i_4,e_{30}) \qquad \text{cnf}(\text{hyp}_7,\text{hypothesis})$
$e_{16}=\text{select}(a_2,i_1) \qquad \text{cnf}(\text{hyp}_8,\text{hypothesis})$
$e_{18}=\text{select}(a_1,i_1) \qquad \text{cnf}(\text{hyp}_9,\text{hypothesis})$
$e_{20}=\text{select}(a_{19},i_2) \qquad \text{cnf}(\text{hyp}_{10},\text{hypothesis})$
$e_{22}=\text{select}(a_{17},i_2) \qquad \text{cnf}(\text{hyp}_{11},\text{hypothesis})$
$e_{24}=\text{select}(a_{23},i_3) \qquad \text{cnf}(\text{hyp}_{12},\text{hypothesis})$
$e_{26}=\text{select}(a_{21},i_3) \qquad \text{cnf}(\text{hyp}_{13},\text{hypothesis})$
$e_{28}=\text{select}(a_{27},i_4) \qquad \text{cnf}(\text{hyp}_{14},\text{hypothesis})$
$e_{30}=\text{select}(a_{25},i_4) \qquad \text{cnf}(\text{hyp}_{15},\text{hypothesis})$
$a_{29}=a_{31} \qquad \text{cnf}(\text{hyp}_{16},\text{hypothesis})$
$a_1\neq a_2 \qquad \text{cnf}(\text{goal},\text{negated\_conjecture})$

SWV561-1.007.p Store inverse (t3_np_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a,i,e),i)=e \qquad \text{cnf}(a_1,\text{axiom})$
$i=j$ or $\text{select}(\text{store}(a,i,e),j)=\text{select}(a,j) \qquad \text{cnf}(a_2,\text{axiom})$
$\text{store}(\text{store}(a,i,\text{select}(a,j)),j,\text{select}(a,i))=\text{store}(\text{store}(a,j,\text{select}(a,i)),i,\text{select}(a,j)) \qquad \text{cnf}(a_3,\text{axiom})$
$a_{29}=\text{store}(a_1,i_1,e_{28}) \qquad \text{cnf}(\text{hyp}_0,\text{hypothesis})$
$a_{31}=\text{store}(a_2,i_1,e_{30}) \qquad \text{cnf}(\text{hyp}_1,\text{hypothesis})$
$a_{33}=\text{store}(a_{29},i_2,e_{32}) \qquad \text{cnf}(\text{hyp}_2,\text{hypothesis})$
$a_{35}=\text{store}(a_{31},i_2,e_{34}) \qquad \text{cnf}(\text{hyp}_3,\text{hypothesis})$
$a_{37}=\text{store}(a_{33},i_3,e_{36}) \qquad \text{cnf}(\text{hyp}_4,\text{hypothesis})$
$a_{39}=\text{store}(a_{35},i_3,e_{38}) \qquad \text{cnf}(\text{hyp}_5,\text{hypothesis})$
$a_{41}=\text{store}(a_{37},i_4,e_{40}) \qquad \text{cnf}(\text{hyp}_6,\text{hypothesis})$
$a_{43}=\text{store}(a_{39},i_4,e_{42}) \qquad \text{cnf}(\text{hyp}_7,\text{hypothesis})$
$a_{45}=\text{store}(a_{41},i_5,e_{44}) \qquad \text{cnf}(\text{hyp}_8,\text{hypothesis})$
$a_{47}=\text{store}(a_{43},i_5,e_{46}) \qquad \text{cnf}(\text{hyp}_9,\text{hypothesis})$
$a_{49}=\text{store}(a_{45},i_6,e_{48}) \qquad \text{cnf}(\text{hyp}_{10},\text{hypothesis})$
$a_{51}=\text{store}(a_{47},i_6,e_{50}) \qquad \text{cnf}(\text{hyp}_{11},\text{hypothesis})$
$a_{53}=\text{store}(a_{49},i_7,e_{52}) \qquad \text{cnf}(\text{hyp}_{12},\text{hypothesis})$

$a_{55} = \text{store}(a_{51}, i_7, e_{54})$ cnf(hyp$_{13}$, hypothesis)
$e_{28} = \text{select}(a_2, i_1)$ cnf(hyp$_{14}$, hypothesis)
$e_{30} = \text{select}(a_1, i_1)$ cnf(hyp$_{15}$, hypothesis)
$e_{32} = \text{select}(a_{31}, i_2)$ cnf(hyp$_{16}$, hypothesis)
$e_{34} = \text{select}(a_{29}, i_2)$ cnf(hyp$_{17}$, hypothesis)
$e_{36} = \text{select}(a_{35}, i_3)$ cnf(hyp$_{18}$, hypothesis)
$e_{38} = \text{select}(a_{33}, i_3)$ cnf(hyp$_{19}$, hypothesis)
$e_{40} = \text{select}(a_{39}, i_4)$ cnf(hyp$_{20}$, hypothesis)
$e_{42} = \text{select}(a_{37}, i_4)$ cnf(hyp$_{21}$, hypothesis)
$e_{44} = \text{select}(a_{43}, i_5)$ cnf(hyp$_{22}$, hypothesis)
$e_{46} = \text{select}(a_{41}, i_5)$ cnf(hyp$_{23}$, hypothesis)
$e_{48} = \text{select}(a_{47}, i_6)$ cnf(hyp$_{24}$, hypothesis)
$e_{50} = \text{select}(a_{45}, i_6)$ cnf(hyp$_{25}$, hypothesis)
$e_{52} = \text{select}(a_{51}, i_7)$ cnf(hyp$_{26}$, hypothesis)
$e_{54} = \text{select}(a_{49}, i_7)$ cnf(hyp$_{27}$, hypothesis)
$a_{53} = a_{55}$ cnf(hyp$_{28}$, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV561-1.010.p Store inverse (t3_np_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{41} = \text{store}(a_1, i_1, e_{40})$ cnf(hyp$_0$, hypothesis)
$a_{43} = \text{store}(a_2, i_1, e_{42})$ cnf(hyp$_1$, hypothesis)
$a_{45} = \text{store}(a_{41}, i_2, e_{44})$ cnf(hyp$_2$, hypothesis)
$a_{47} = \text{store}(a_{43}, i_2, e_{46})$ cnf(hyp$_3$, hypothesis)
$a_{49} = \text{store}(a_{45}, i_3, e_{48})$ cnf(hyp$_4$, hypothesis)
$a_{51} = \text{store}(a_{47}, i_3, e_{50})$ cnf(hyp$_5$, hypothesis)
$a_{53} = \text{store}(a_{49}, i_4, e_{52})$ cnf(hyp$_6$, hypothesis)
$a_{55} = \text{store}(a_{51}, i_4, e_{54})$ cnf(hyp$_7$, hypothesis)
$a_{57} = \text{store}(a_{53}, i_5, e_{56})$ cnf(hyp$_8$, hypothesis)
$a_{59} = \text{store}(a_{55}, i_5, e_{58})$ cnf(hyp$_9$, hypothesis)
$a_{61} = \text{store}(a_{57}, i_6, e_{60})$ cnf(hyp$_{10}$, hypothesis)
$a_{63} = \text{store}(a_{59}, i_6, e_{62})$ cnf(hyp$_{11}$, hypothesis)
$a_{65} = \text{store}(a_{61}, i_7, e_{64})$ cnf(hyp$_{12}$, hypothesis)
$a_{67} = \text{store}(a_{63}, i_7, e_{66})$ cnf(hyp$_{13}$, hypothesis)
$a_{69} = \text{store}(a_{65}, i_8, e_{68})$ cnf(hyp$_{14}$, hypothesis)
$a_{71} = \text{store}(a_{67}, i_8, e_{70})$ cnf(hyp$_{15}$, hypothesis)
$a_{73} = \text{store}(a_{69}, i_9, e_{72})$ cnf(hyp$_{16}$, hypothesis)
$a_{75} = \text{store}(a_{71}, i_9, e_{74})$ cnf(hyp$_{17}$, hypothesis)
$a_{77} = \text{store}(a_{73}, i_{10}, e_{76})$ cnf(hyp$_{18}$, hypothesis)
$a_{79} = \text{store}(a_{75}, i_{10}, e_{78})$ cnf(hyp$_{19}$, hypothesis)
$e_{40} = \text{select}(a_2, i_1)$ cnf(hyp$_{20}$, hypothesis)
$e_{42} = \text{select}(a_1, i_1)$ cnf(hyp$_{21}$, hypothesis)
$e_{44} = \text{select}(a_{43}, i_2)$ cnf(hyp$_{22}$, hypothesis)
$e_{46} = \text{select}(a_{41}, i_2)$ cnf(hyp$_{23}$, hypothesis)
$e_{48} = \text{select}(a_{47}, i_3)$ cnf(hyp$_{24}$, hypothesis)
$e_{50} = \text{select}(a_{45}, i_3)$ cnf(hyp$_{25}$, hypothesis)
$e_{52} = \text{select}(a_{51}, i_4)$ cnf(hyp$_{26}$, hypothesis)
$e_{54} = \text{select}(a_{49}, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{56} = \text{select}(a_{55}, i_5)$ cnf(hyp$_{28}$, hypothesis)
$e_{58} = \text{select}(a_{53}, i_5)$ cnf(hyp$_{29}$, hypothesis)
$e_{60} = \text{select}(a_{59}, i_6)$ cnf(hyp$_{30}$, hypothesis)
$e_{62} = \text{select}(a_{57}, i_6)$ cnf(hyp$_{31}$, hypothesis)
$e_{64} = \text{select}(a_{63}, i_7)$ cnf(hyp$_{32}$, hypothesis)
$e_{66} = \text{select}(a_{61}, i_7)$ cnf(hyp$_{33}$, hypothesis)
$e_{68} = \text{select}(a_{67}, i_8)$ cnf(hyp$_{34}$, hypothesis)
$e_{70} = \text{select}(a_{65}, i_8)$ cnf(hyp$_{35}$, hypothesis)

$e_{72} = \text{select}(a_{71}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{74} = \text{select}(a_{69}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{76} = \text{select}(a_{75}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{78} = \text{select}(a_{73}, i_{10})$ cnf(hyp_{39}, hypothesis)
$a_{77} = a_{79}$ cnf(hyp_{40}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV562-1.004.p Store inverse (t3_np_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{17} = \text{store}(a_1, i_1, e_{16})$ cnf(hyp_0, hypothesis)
$a_{19} = \text{store}(a_2, i_1, e_{18})$ cnf(hyp_1, hypothesis)
$a_{21} = \text{store}(a_{17}, i_2, e_{20})$ cnf(hyp_2, hypothesis)
$a_{23} = \text{store}(a_{19}, i_2, e_{22})$ cnf(hyp_3, hypothesis)
$a_{25} = \text{store}(a_{21}, i_3, e_{24})$ cnf(hyp_4, hypothesis)
$a_{27} = \text{store}(a_{23}, i_3, e_{26})$ cnf(hyp_5, hypothesis)
$a_{29} = \text{store}(a_{25}, i_1, e_{28})$ cnf(hyp_6, hypothesis)
$a_{31} = \text{store}(a_{27}, i_4, e_{30})$ cnf(hyp_7, hypothesis)
$e_{16} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{18} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{20} = \text{select}(a_{19}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{22} = \text{select}(a_{17}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{24} = \text{select}(a_{23}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{26} = \text{select}(a_{21}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_{27}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_{25}, i_4)$ cnf(hyp_{15}, hypothesis)
$a_{29} = a_{31}$ cnf(hyp_{16}, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV562-1.007.p Store inverse (t3_np_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{29} = \text{store}(a_1, i_1, e_{28})$ cnf(hyp_0, hypothesis)
$a_{31} = \text{store}(a_2, i_1, e_{30})$ cnf(hyp_1, hypothesis)
$a_{33} = \text{store}(a_{29}, i_2, e_{32})$ cnf(hyp_2, hypothesis)
$a_{35} = \text{store}(a_{31}, i_2, e_{34})$ cnf(hyp_3, hypothesis)
$a_{37} = \text{store}(a_{33}, i_3, e_{36})$ cnf(hyp_4, hypothesis)
$a_{39} = \text{store}(a_{35}, i_3, e_{38})$ cnf(hyp_5, hypothesis)
$a_{41} = \text{store}(a_{37}, i_4, e_{40})$ cnf(hyp_6, hypothesis)
$a_{43} = \text{store}(a_{39}, i_4, e_{42})$ cnf(hyp_7, hypothesis)
$a_{45} = \text{store}(a_{41}, i_5, e_{44})$ cnf(hyp_8, hypothesis)
$a_{47} = \text{store}(a_{43}, i_5, e_{46})$ cnf(hyp_9, hypothesis)
$a_{49} = \text{store}(a_{45}, i_6, e_{48})$ cnf(hyp_{10}, hypothesis)
$a_{51} = \text{store}(a_{47}, i_6, e_{50})$ cnf(hyp_{11}, hypothesis)
$a_{53} = \text{store}(a_{49}, i_1, e_{52})$ cnf(hyp_{12}, hypothesis)
$a_{55} = \text{store}(a_{51}, i_7, e_{54})$ cnf(hyp_{13}, hypothesis)
$e_{28} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{30} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{32} = \text{select}(a_{31}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{34} = \text{select}(a_{29}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{36} = \text{select}(a_{35}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{38} = \text{select}(a_{33}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{40} = \text{select}(a_{39}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{42} = \text{select}(a_{37}, i_4)$ cnf(hyp_{21}, hypothesis)

$e_{44} = \text{select}(a_{43}, i_5)$ cnf(hyp$_{22}$, hypothesis)
$e_{46} = \text{select}(a_{41}, i_5)$ cnf(hyp$_{23}$, hypothesis)
$e_{48} = \text{select}(a_{47}, i_6)$ cnf(hyp$_{24}$, hypothesis)
$e_{50} = \text{select}(a_{45}, i_6)$ cnf(hyp$_{25}$, hypothesis)
$e_{52} = \text{select}(a_{51}, i_7)$ cnf(hyp$_{26}$, hypothesis)
$e_{54} = \text{select}(a_{49}, i_7)$ cnf(hyp$_{27}$, hypothesis)
$a_{53} = a_{55}$ cnf(hyp$_{28}$, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV562-1.010.p Store inverse (t3_np_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{41} = \text{store}(a_1, i_1, e_{40})$ cnf(hyp$_0$, hypothesis)
$a_{43} = \text{store}(a_2, i_1, e_{42})$ cnf(hyp$_1$, hypothesis)
$a_{45} = \text{store}(a_{41}, i_2, e_{44})$ cnf(hyp$_2$, hypothesis)
$a_{47} = \text{store}(a_{43}, i_2, e_{46})$ cnf(hyp$_3$, hypothesis)
$a_{49} = \text{store}(a_{45}, i_3, e_{48})$ cnf(hyp$_4$, hypothesis)
$a_{51} = \text{store}(a_{47}, i_3, e_{50})$ cnf(hyp$_5$, hypothesis)
$a_{53} = \text{store}(a_{49}, i_4, e_{52})$ cnf(hyp$_6$, hypothesis)
$a_{55} = \text{store}(a_{51}, i_4, e_{54})$ cnf(hyp$_7$, hypothesis)
$a_{57} = \text{store}(a_{53}, i_5, e_{56})$ cnf(hyp$_8$, hypothesis)
$a_{59} = \text{store}(a_{55}, i_5, e_{58})$ cnf(hyp$_9$, hypothesis)
$a_{61} = \text{store}(a_{57}, i_6, e_{60})$ cnf(hyp$_{10}$, hypothesis)
$a_{63} = \text{store}(a_{59}, i_6, e_{62})$ cnf(hyp$_{11}$, hypothesis)
$a_{65} = \text{store}(a_{61}, i_7, e_{64})$ cnf(hyp$_{12}$, hypothesis)
$a_{67} = \text{store}(a_{63}, i_7, e_{66})$ cnf(hyp$_{13}$, hypothesis)
$a_{69} = \text{store}(a_{65}, i_8, e_{68})$ cnf(hyp$_{14}$, hypothesis)
$a_{71} = \text{store}(a_{67}, i_8, e_{70})$ cnf(hyp$_{15}$, hypothesis)
$a_{73} = \text{store}(a_{69}, i_9, e_{72})$ cnf(hyp$_{16}$, hypothesis)
$a_{75} = \text{store}(a_{71}, i_9, e_{74})$ cnf(hyp$_{17}$, hypothesis)
$a_{77} = \text{store}(a_{73}, i_1, e_{76})$ cnf(hyp$_{18}$, hypothesis)
$a_{79} = \text{store}(a_{75}, i_{10}, e_{78})$ cnf(hyp$_{19}$, hypothesis)
$e_{40} = \text{select}(a_2, i_1)$ cnf(hyp$_{20}$, hypothesis)
$e_{42} = \text{select}(a_1, i_1)$ cnf(hyp$_{21}$, hypothesis)
$e_{44} = \text{select}(a_{43}, i_2)$ cnf(hyp$_{22}$, hypothesis)
$e_{46} = \text{select}(a_{41}, i_2)$ cnf(hyp$_{23}$, hypothesis)
$e_{48} = \text{select}(a_{47}, i_3)$ cnf(hyp$_{24}$, hypothesis)
$e_{50} = \text{select}(a_{45}, i_3)$ cnf(hyp$_{25}$, hypothesis)
$e_{52} = \text{select}(a_{51}, i_4)$ cnf(hyp$_{26}$, hypothesis)
$e_{54} = \text{select}(a_{49}, i_4)$ cnf(hyp$_{27}$, hypothesis)
$e_{56} = \text{select}(a_{55}, i_5)$ cnf(hyp$_{28}$, hypothesis)
$e_{58} = \text{select}(a_{53}, i_5)$ cnf(hyp$_{29}$, hypothesis)
$e_{60} = \text{select}(a_{59}, i_6)$ cnf(hyp$_{30}$, hypothesis)
$e_{62} = \text{select}(a_{57}, i_6)$ cnf(hyp$_{31}$, hypothesis)
$e_{64} = \text{select}(a_{63}, i_7)$ cnf(hyp$_{32}$, hypothesis)
$e_{66} = \text{select}(a_{61}, i_7)$ cnf(hyp$_{33}$, hypothesis)
$e_{68} = \text{select}(a_{67}, i_8)$ cnf(hyp$_{34}$, hypothesis)
$e_{70} = \text{select}(a_{65}, i_8)$ cnf(hyp$_{35}$, hypothesis)
$e_{72} = \text{select}(a_{71}, i_9)$ cnf(hyp$_{36}$, hypothesis)
$e_{74} = \text{select}(a_{69}, i_9)$ cnf(hyp$_{37}$, hypothesis)
$e_{76} = \text{select}(a_{75}, i_{10})$ cnf(hyp$_{38}$, hypothesis)
$e_{78} = \text{select}(a_{73}, i_{10})$ cnf(hyp$_{39}$, hypothesis)
$a_{77} = a_{79}$ cnf(hyp$_{40}$, hypothesis)
$a_1 \neq a_2$ cnf(goal, negated_conjecture)

SWV563-1.004.p Store inverse (t3_pp_nf_ai_00004)

If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j)) \qquad \text{cnf}(a_3, \text{axiom})$
$\text{store}(\text{store}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2, \text{select}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2, \text{select}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)),$
$\text{select}(a_1, \text{sk}(a_1, a_2)) \neq \text{select}(a_2, \text{sk}(a_1, a_2)) \qquad \text{cnf}(\text{goal}, \text{negated\_conjecture})$

SWV564-1.004.p Store inverse (t3_pp_nf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j)) \qquad \text{cnf}(a_3, \text{axiom})$
$\text{store}(\text{store}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2, \text{select}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)),$
$\text{store}(\text{store}(\text{store}(\text{store}(a_2, i_1, \text{select}(a_1, i_1)), i_2, \text{select}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)), i_2)), i_3, \text{select}(\text{store}(\text{store}(a_1, i_1, \text{select}(a_2, i_1)),$
$\text{select}(a_1, \text{sk}(a_1, a_2)) \neq \text{select}(a_2, \text{sk}(a_1, a_2)) \qquad \text{cnf}(\text{goal}, \text{negated\_conjecture})$

SWV565-1.004.p Store inverse (t3_pp_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j)) \qquad \text{cnf}(a_3, \text{axiom})$
$a_{20} = \text{store}(a_1, i_1, e_{19}) \qquad \text{cnf}(\text{hyp}_0, \text{hypothesis})$
$a_{22} = \text{store}(a_2, i_1, e_{21}) \qquad \text{cnf}(\text{hyp}_1, \text{hypothesis})$
$a_{24} = \text{store}(a_{20}, i_2, e_{23}) \qquad \text{cnf}(\text{hyp}_2, \text{hypothesis})$
$a_{26} = \text{store}(a_{22}, i_2, e_{25}) \qquad \text{cnf}(\text{hyp}_3, \text{hypothesis})$
$a_{28} = \text{store}(a_{24}, i_3, e_{27}) \qquad \text{cnf}(\text{hyp}_4, \text{hypothesis})$
$a_{30} = \text{store}(a_{26}, i_3, e_{29}) \qquad \text{cnf}(\text{hyp}_5, \text{hypothesis})$
$a_{32} = \text{store}(a_{28}, i_4, e_{31}) \qquad \text{cnf}(\text{hyp}_6, \text{hypothesis})$
$a_{34} = \text{store}(a_{30}, i_4, e_{33}) \qquad \text{cnf}(\text{hyp}_7, \text{hypothesis})$
$e_{19} = \text{select}(a_2, i_1) \qquad \text{cnf}(\text{hyp}_8, \text{hypothesis})$
$e_{21} = \text{select}(a_1, i_1) \qquad \text{cnf}(\text{hyp}_9, \text{hypothesis})$
$e_{23} = \text{select}(a_{22}, i_2) \qquad \text{cnf}(\text{hyp}_{10}, \text{hypothesis})$
$e_{25} = \text{select}(a_{20}, i_2) \qquad \text{cnf}(\text{hyp}_{11}, \text{hypothesis})$
$e_{27} = \text{select}(a_{26}, i_3) \qquad \text{cnf}(\text{hyp}_{12}, \text{hypothesis})$
$e_{29} = \text{select}(a_{24}, i_3) \qquad \text{cnf}(\text{hyp}_{13}, \text{hypothesis})$
$e_{31} = \text{select}(a_{30}, i_4) \qquad \text{cnf}(\text{hyp}_{14}, \text{hypothesis})$
$e_{33} = \text{select}(a_{28}, i_4) \qquad \text{cnf}(\text{hyp}_{15}, \text{hypothesis})$
$e_{36} = \text{select}(a_1, i_{35}) \qquad \text{cnf}(\text{hyp}_{16}, \text{hypothesis})$
$e_{37} = \text{select}(a_2, i_{35}) \qquad \text{cnf}(\text{hyp}_{17}, \text{hypothesis})$
$i_{35} = \text{sk}(a_1, a_2) \qquad \text{cnf}(\text{hyp}_{18}, \text{hypothesis})$
$a_{32} = a_{34} \qquad \text{cnf}(\text{hyp}_{19}, \text{hypothesis})$
$e_{36} \neq e_{37} \qquad \text{cnf}(\text{goal}, \text{negated\_conjecture})$

SWV565-1.007.p Store inverse (t3_pp_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e \qquad \text{cnf}(a_1, \text{axiom})$
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j) \qquad \text{cnf}(a_2, \text{axiom})$
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j)) \qquad \text{cnf}(a_3, \text{axiom})$
$a_{32} = \text{store}(a_1, i_1, e_{31}) \qquad \text{cnf}(\text{hyp}_0, \text{hypothesis})$
$a_{34} = \text{store}(a_2, i_1, e_{33}) \qquad \text{cnf}(\text{hyp}_1, \text{hypothesis})$
$a_{36} = \text{store}(a_{32}, i_2, e_{35}) \qquad \text{cnf}(\text{hyp}_2, \text{hypothesis})$
$a_{38} = \text{store}(a_{34}, i_2, e_{37}) \qquad \text{cnf}(\text{hyp}_3, \text{hypothesis})$
$a_{40} = \text{store}(a_{36}, i_3, e_{39}) \qquad \text{cnf}(\text{hyp}_4, \text{hypothesis})$
$a_{42} = \text{store}(a_{38}, i_3, e_{41}) \qquad \text{cnf}(\text{hyp}_5, \text{hypothesis})$
$a_{44} = \text{store}(a_{40}, i_4, e_{43}) \qquad \text{cnf}(\text{hyp}_6, \text{hypothesis})$
$a_{46} = \text{store}(a_{42}, i_4, e_{45}) \qquad \text{cnf}(\text{hyp}_7, \text{hypothesis})$

$a_{48} = \text{store}(a_{44}, i_5, e_{47})$ cnf(hyp_8, hypothesis)
$a_{50} = \text{store}(a_{46}, i_5, e_{49})$ cnf(hyp_9, hypothesis)
$a_{52} = \text{store}(a_{48}, i_6, e_{51})$ cnf(hyp_{10}, hypothesis)
$a_{54} = \text{store}(a_{50}, i_6, e_{53})$ cnf(hyp_{11}, hypothesis)
$a_{56} = \text{store}(a_{52}, i_7, e_{55})$ cnf(hyp_{12}, hypothesis)
$a_{58} = \text{store}(a_{54}, i_7, e_{57})$ cnf(hyp_{13}, hypothesis)
$e_{31} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{33} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{35} = \text{select}(a_{34}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{37} = \text{select}(a_{32}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{39} = \text{select}(a_{38}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{41} = \text{select}(a_{36}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_{42}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_{40}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_6)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_7)$ cnf(hyp_{27}, hypothesis)
$e_{60} = \text{select}(a_1, i_{59})$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_2, i_{59})$ cnf(hyp_{29}, hypothesis)
$i_{59} = \text{sk}(a_1, a_2)$ cnf(hyp_{30}, hypothesis)
$a_{56} = a_{58}$ cnf(hyp_{31}, hypothesis)
$e_{60} \neq e_{61}$ cnf(goal, negated_conjecture)

SWV565-1.010.p Store inverse (t3_pp_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{44} = \text{store}(a_1, i_1, e_{43})$ cnf(hyp_0, hypothesis)
$a_{46} = \text{store}(a_2, i_1, e_{45})$ cnf(hyp_1, hypothesis)
$a_{48} = \text{store}(a_{44}, i_2, e_{47})$ cnf(hyp_2, hypothesis)
$a_{50} = \text{store}(a_{46}, i_2, e_{49})$ cnf(hyp_3, hypothesis)
$a_{52} = \text{store}(a_{48}, i_3, e_{51})$ cnf(hyp_4, hypothesis)
$a_{54} = \text{store}(a_{50}, i_3, e_{53})$ cnf(hyp_5, hypothesis)
$a_{56} = \text{store}(a_{52}, i_4, e_{55})$ cnf(hyp_6, hypothesis)
$a_{58} = \text{store}(a_{54}, i_4, e_{57})$ cnf(hyp_7, hypothesis)
$a_{60} = \text{store}(a_{56}, i_5, e_{59})$ cnf(hyp_8, hypothesis)
$a_{62} = \text{store}(a_{58}, i_5, e_{61})$ cnf(hyp_9, hypothesis)
$a_{64} = \text{store}(a_{60}, i_6, e_{63})$ cnf(hyp_{10}, hypothesis)
$a_{66} = \text{store}(a_{62}, i_6, e_{65})$ cnf(hyp_{11}, hypothesis)
$a_{68} = \text{store}(a_{64}, i_7, e_{67})$ cnf(hyp_{12}, hypothesis)
$a_{70} = \text{store}(a_{66}, i_7, e_{69})$ cnf(hyp_{13}, hypothesis)
$a_{72} = \text{store}(a_{68}, i_8, e_{71})$ cnf(hyp_{14}, hypothesis)
$a_{74} = \text{store}(a_{70}, i_8, e_{73})$ cnf(hyp_{15}, hypothesis)
$a_{76} = \text{store}(a_{72}, i_9, e_{75})$ cnf(hyp_{16}, hypothesis)
$a_{78} = \text{store}(a_{74}, i_9, e_{77})$ cnf(hyp_{17}, hypothesis)
$a_{80} = \text{store}(a_{76}, i_{10}, e_{79})$ cnf(hyp_{18}, hypothesis)
$a_{82} = \text{store}(a_{78}, i_{10}, e_{81})$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_4)$ cnf(hyp_{27}, hypothesis)

$e_{59} = \text{select}(a_{58}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_{56}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{63} = \text{select}(a_{62}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{65} = \text{select}(a_{60}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{67} = \text{select}(a_{66}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{69} = \text{select}(a_{64}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{71} = \text{select}(a_{70}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{73} = \text{select}(a_{68}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{75} = \text{select}(a_{74}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{77} = \text{select}(a_{72}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{79} = \text{select}(a_{78}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{81} = \text{select}(a_{76}, i_{10})$ cnf(hyp_{39}, hypothesis)
$e_{84} = \text{select}(a_1, i_{83})$ cnf(hyp_{40}, hypothesis)
$e_{85} = \text{select}(a_2, i_{83})$ cnf(hyp_{41}, hypothesis)
$i_{83} = \text{sk}(a_1, a_2)$ cnf(hyp_{42}, hypothesis)
$a_{80} = a_{82}$ cnf(hyp_{43}, hypothesis)
$e_{84} \neq e_{85}$ cnf(goal, negated_conjecture)

SWV566-1.004.p Store inverse (t3_pp_sf_ai_00004)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{20} = \text{store}(a_1, i_1, e_{19})$ cnf(hyp_0, hypothesis)
$a_{22} = \text{store}(a_2, i_1, e_{21})$ cnf(hyp_1, hypothesis)
$a_{24} = \text{store}(a_{20}, i_2, e_{23})$ cnf(hyp_2, hypothesis)
$a_{26} = \text{store}(a_{22}, i_2, e_{25})$ cnf(hyp_3, hypothesis)
$a_{28} = \text{store}(a_{24}, i_3, e_{27})$ cnf(hyp_4, hypothesis)
$a_{30} = \text{store}(a_{26}, i_3, e_{29})$ cnf(hyp_5, hypothesis)
$a_{32} = \text{store}(a_{28}, i_1, e_{31})$ cnf(hyp_6, hypothesis)
$a_{34} = \text{store}(a_{30}, i_4, e_{33})$ cnf(hyp_7, hypothesis)
$e_{19} = \text{select}(a_2, i_1)$ cnf(hyp_8, hypothesis)
$e_{21} = \text{select}(a_1, i_1)$ cnf(hyp_9, hypothesis)
$e_{23} = \text{select}(a_{22}, i_2)$ cnf(hyp_{10}, hypothesis)
$e_{25} = \text{select}(a_{20}, i_2)$ cnf(hyp_{11}, hypothesis)
$e_{27} = \text{select}(a_{26}, i_3)$ cnf(hyp_{12}, hypothesis)
$e_{29} = \text{select}(a_{24}, i_3)$ cnf(hyp_{13}, hypothesis)
$e_{31} = \text{select}(a_{30}, i_4)$ cnf(hyp_{14}, hypothesis)
$e_{33} = \text{select}(a_{28}, i_4)$ cnf(hyp_{15}, hypothesis)
$e_{36} = \text{select}(a_1, i_{35})$ cnf(hyp_{16}, hypothesis)
$e_{37} = \text{select}(a_2, i_{35})$ cnf(hyp_{17}, hypothesis)
$i_{35} = \text{sk}(a_1, a_2)$ cnf(hyp_{18}, hypothesis)
$a_{32} = a_{34}$ cnf(hyp_{19}, hypothesis)
$e_{36} \neq e_{37}$ cnf(goal, negated_conjecture)

SWV566-1.007.p Store inverse (t3_pp_sf_ai_00007)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{32} = \text{store}(a_1, i_1, e_{31})$ cnf(hyp_0, hypothesis)
$a_{34} = \text{store}(a_2, i_1, e_{33})$ cnf(hyp_1, hypothesis)
$a_{36} = \text{store}(a_{32}, i_2, e_{35})$ cnf(hyp_2, hypothesis)
$a_{38} = \text{store}(a_{34}, i_2, e_{37})$ cnf(hyp_3, hypothesis)
$a_{40} = \text{store}(a_{36}, i_3, e_{39})$ cnf(hyp_4, hypothesis)
$a_{42} = \text{store}(a_{38}, i_3, e_{41})$ cnf(hyp_5, hypothesis)
$a_{44} = \text{store}(a_{40}, i_4, e_{43})$ cnf(hyp_6, hypothesis)
$a_{46} = \text{store}(a_{42}, i_4, e_{45})$ cnf(hyp_7, hypothesis)

$a_{48} = \text{store}(a_{44}, i_5, e_{47})$ cnf(hyp_8, hypothesis)
$a_{50} = \text{store}(a_{46}, i_5, e_{49})$ cnf(hyp_9, hypothesis)
$a_{52} = \text{store}(a_{48}, i_6, e_{51})$ cnf(hyp_{10}, hypothesis)
$a_{54} = \text{store}(a_{50}, i_6, e_{53})$ cnf(hyp_{11}, hypothesis)
$a_{56} = \text{store}(a_{52}, i_1, e_{55})$ cnf(hyp_{12}, hypothesis)
$a_{58} = \text{store}(a_{54}, i_7, e_{57})$ cnf(hyp_{13}, hypothesis)
$e_{31} = \text{select}(a_2, i_1)$ cnf(hyp_{14}, hypothesis)
$e_{33} = \text{select}(a_1, i_1)$ cnf(hyp_{15}, hypothesis)
$e_{35} = \text{select}(a_{34}, i_2)$ cnf(hyp_{16}, hypothesis)
$e_{37} = \text{select}(a_{32}, i_2)$ cnf(hyp_{17}, hypothesis)
$e_{39} = \text{select}(a_{38}, i_3)$ cnf(hyp_{18}, hypothesis)
$e_{41} = \text{select}(a_{36}, i_3)$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_{42}, i_4)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_{40}, i_4)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_5)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_5)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_6)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_6)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_7)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_7)$ cnf(hyp_{27}, hypothesis)
$e_{60} = \text{select}(a_1, i_{59})$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_2, i_{59})$ cnf(hyp_{29}, hypothesis)
$i_{59} = \text{sk}(a_1, a_2)$ cnf(hyp_{30}, hypothesis)
$a_{56} = a_{58}$ cnf(hyp_{31}, hypothesis)
$e_{60} \neq e_{61}$ cnf(goal, negated_conjecture)

SWV566-1.010.p Store inverse (t3_pp_sf_ai_00010)
If the arrays resulting from swapping elements of array a with the elements of array b occurring in the same positions are equal, then a and b must have been equal to begin with.
$\text{select}(\text{store}(a, i, e), i) = e$ cnf(a_1, axiom)
$i = j$ or $\text{select}(\text{store}(a, i, e), j) = \text{select}(a, j)$ cnf(a_2, axiom)
$\text{store}(\text{store}(a, i, \text{select}(a, j)), j, \text{select}(a, i)) = \text{store}(\text{store}(a, j, \text{select}(a, i)), i, \text{select}(a, j))$ cnf(a_3, axiom)
$a_{44} = \text{store}(a_1, i_1, e_{43})$ cnf(hyp_0, hypothesis)
$a_{46} = \text{store}(a_2, i_1, e_{45})$ cnf(hyp_1, hypothesis)
$a_{48} = \text{store}(a_{44}, i_2, e_{47})$ cnf(hyp_2, hypothesis)
$a_{50} = \text{store}(a_{46}, i_2, e_{49})$ cnf(hyp_3, hypothesis)
$a_{52} = \text{store}(a_{48}, i_3, e_{51})$ cnf(hyp_4, hypothesis)
$a_{54} = \text{store}(a_{50}, i_3, e_{53})$ cnf(hyp_5, hypothesis)
$a_{56} = \text{store}(a_{52}, i_4, e_{55})$ cnf(hyp_6, hypothesis)
$a_{58} = \text{store}(a_{54}, i_4, e_{57})$ cnf(hyp_7, hypothesis)
$a_{60} = \text{store}(a_{56}, i_5, e_{59})$ cnf(hyp_8, hypothesis)
$a_{62} = \text{store}(a_{58}, i_5, e_{61})$ cnf(hyp_9, hypothesis)
$a_{64} = \text{store}(a_{60}, i_6, e_{63})$ cnf(hyp_{10}, hypothesis)
$a_{66} = \text{store}(a_{62}, i_6, e_{65})$ cnf(hyp_{11}, hypothesis)
$a_{68} = \text{store}(a_{64}, i_7, e_{67})$ cnf(hyp_{12}, hypothesis)
$a_{70} = \text{store}(a_{66}, i_7, e_{69})$ cnf(hyp_{13}, hypothesis)
$a_{72} = \text{store}(a_{68}, i_8, e_{71})$ cnf(hyp_{14}, hypothesis)
$a_{74} = \text{store}(a_{70}, i_8, e_{73})$ cnf(hyp_{15}, hypothesis)
$a_{76} = \text{store}(a_{72}, i_9, e_{75})$ cnf(hyp_{16}, hypothesis)
$a_{78} = \text{store}(a_{74}, i_9, e_{77})$ cnf(hyp_{17}, hypothesis)
$a_{80} = \text{store}(a_{76}, i_1, e_{79})$ cnf(hyp_{18}, hypothesis)
$a_{82} = \text{store}(a_{78}, i_{10}, e_{81})$ cnf(hyp_{19}, hypothesis)
$e_{43} = \text{select}(a_2, i_1)$ cnf(hyp_{20}, hypothesis)
$e_{45} = \text{select}(a_1, i_1)$ cnf(hyp_{21}, hypothesis)
$e_{47} = \text{select}(a_{46}, i_2)$ cnf(hyp_{22}, hypothesis)
$e_{49} = \text{select}(a_{44}, i_2)$ cnf(hyp_{23}, hypothesis)
$e_{51} = \text{select}(a_{50}, i_3)$ cnf(hyp_{24}, hypothesis)
$e_{53} = \text{select}(a_{48}, i_3)$ cnf(hyp_{25}, hypothesis)
$e_{55} = \text{select}(a_{54}, i_4)$ cnf(hyp_{26}, hypothesis)
$e_{57} = \text{select}(a_{52}, i_4)$ cnf(hyp_{27}, hypothesis)

$e_{59} = \text{select}(a_{58}, i_5)$ cnf(hyp_{28}, hypothesis)
$e_{61} = \text{select}(a_{56}, i_5)$ cnf(hyp_{29}, hypothesis)
$e_{63} = \text{select}(a_{62}, i_6)$ cnf(hyp_{30}, hypothesis)
$e_{65} = \text{select}(a_{60}, i_6)$ cnf(hyp_{31}, hypothesis)
$e_{67} = \text{select}(a_{66}, i_7)$ cnf(hyp_{32}, hypothesis)
$e_{69} = \text{select}(a_{64}, i_7)$ cnf(hyp_{33}, hypothesis)
$e_{71} = \text{select}(a_{70}, i_8)$ cnf(hyp_{34}, hypothesis)
$e_{73} = \text{select}(a_{68}, i_8)$ cnf(hyp_{35}, hypothesis)
$e_{75} = \text{select}(a_{74}, i_9)$ cnf(hyp_{36}, hypothesis)
$e_{77} = \text{select}(a_{72}, i_9)$ cnf(hyp_{37}, hypothesis)
$e_{79} = \text{select}(a_{78}, i_{10})$ cnf(hyp_{38}, hypothesis)
$e_{81} = \text{select}(a_{76}, i_{10})$ cnf(hyp_{39}, hypothesis)
$e_{84} = \text{select}(a_1, i_{83})$ cnf(hyp_{40}, hypothesis)
$e_{85} = \text{select}(a_2, i_{83})$ cnf(hyp_{41}, hypothesis)
$i_{83} = \text{sk}(a_1, a_2)$ cnf(hyp_{42}, hypothesis)
$a_{80} = a_{82}$ cnf(hyp_{43}, hypothesis)
$e_{84} \neq e_{85}$ cnf(goal, negated_conjecture)

SWV817-1.p Hoare logic with procedures 112_1
Completeness is taken relative to completeness of the underlying logic. Two versions of completeness proof: nested single recursion and simultaneous recursion in call rule.
c_Fun_Oid(v_x, t_a) = v_x cnf(cls_id__apply$_0$, axiom)
c_Fun_Oid(v_x, t_a) = v_x cnf(cls_id__def$_0$, axiom)
v_sko__Hoare__Mirabelle__Xstate__not__singleton__def__raw$_{\text{-}1}$ = v_sko__Hoare__Mirabelle__Xstate__not__singleton__def__raw$_{\text{-}2}$ =
¬ c_Hoare__Mirabelle_Ostate__not__singleton cnf(cls_state__not__singleton__def__raw$_0$, axiom)
c_Hoare__Mirabelle_Ostate__not__singleton or v_x = v_xa cnf(cls_state__not__singleton__def$_1$, axiom)
v_sko__Hoare__Mirabelle__Xstate__not__singleton__def$_{\text{-}1}$ = v_sko__Hoare__Mirabelle__Xstate__not__singleton__def$_{\text{-}2}$ ⇒
¬ c_Hoare__Mirabelle_Ostate__not__singleton cnf(cls_state__not__singleton__def$_0$, axiom)
c_Hoare__Mirabelle_Ostate__not__singleton cnf(cls_conjecture$_0$, negated_conjecture)
v_s = v_x cnf(cls_conjecture$_1$, negated_conjecture)

SWV818-1.p Hoare logic with procedures 114_1
Completeness is taken relative to completeness of the underlying logic. Two versions of completeness proof: nested single recursion and simultaneous recursion in call rule.
c_Code__Evaluation_Otracing(v_s, v_x, t_a) = v_x cnf(cls_tracing__def$_0$, axiom)
c_Code__Evaluation_Otracing(v_s, v_x, t_a) = v_x cnf(cls_tracing__def__raw$_0$, axiom)
v_s ≠ v_t cnf(cls_conjecture$_0$, negated_conjecture)
v_s = v_ta cnf(cls_conjecture$_1$, negated_conjecture)

SWV819-1.p Hoare logic with procedures 116_1
Completeness is taken relative to completeness of the underlying logic. Two versions of completeness proof: nested single recursion and simultaneous recursion in call rule.
c_Code__Evaluation_Otracing(v_s, v_x, t_a) = v_x cnf(cls_tracing__def$_0$, axiom)
c_Code__Evaluation_Otracing(v_s, v_x, t_a) = v_x cnf(cls_tracing__def__raw$_0$, axiom)
v_s ≠ v_t cnf(cls_conjecture$_0$, negated_conjecture)
v_s = v_ta cnf(cls_conjecture$_1$, negated_conjecture)
v_ta ≠ v_t cnf(cls_conjecture$_2$, negated_conjecture)

SWV904-1.p Hoare logic with procedures 450_1
Completeness is taken relative to completeness of the underlying logic. Two versions of completeness proof: nested single recursion and simultaneous recursion in call rule.
c_Option_Ooption_ONone(t_a) ≠ c_Option_Ooption_OSome(v_a_H, t_a) cnf(cls_option_Osimps_I2_J$_0$, axiom)
c_Option_Ooption_ONone(t_a) ≠ c_Option_Ooption_OSome(v_y, t_a) cnf(cls_not__Some__eq$_1$, axiom)
c_Option_Ooption_OSome(v_a_H, t_a) ≠ c_Option_Ooption_ONone(t_a) cnf(cls_option_Osimps_I3_J$_0$, axiom)
c_Option_Ooption_OSome(v_xa, t_a) ≠ c_Option_Ooption_ONone(t_a) cnf(cls_not__None__eq$_1$, axiom)
c_Com_OWT(c_Com_Ocom_OBODY(v_pn)) or c_Com_Obody(v_pn) = c_Option_Ooption_ONone(tc_Com_Ocom) cnf(cls_
c_Com_Ocom_OBODY(v_pname_H) ≠ c_Com_Ocom_OSKIP cnf(cls_com_Osimps_I19_J$_0$, axiom)
c_Com_Ocom_OBODY(v_pname_H) ≠ c_Com_Ocom_OSemi(v_com$_1$, v_com$_2$) cnf(cls_com_Osimps_I49_J$_0$, axiom)
c_Com_Ocom_OSemi(v_com$_1$, v_com$_2$) ≠ c_Com_Ocom_OBODY(v_pname_H) cnf(cls_com_Osimps_I48_J$_0$, axiom)
c_Com_Ocom_OBODY(v_pname) = c_Com_Ocom_OBODY(v_pname_H) ⇒ v_pname = v_pname_H cnf(cls_com_Osimps_
c_Com_Ocom_OSKIP ≠ c_Com_Ocom_OBODY(v_pname_H) cnf(cls_com_Osimps_I18_J$_0$, axiom)

c_Com_OWT(c_Com_Ocom_OBODY(v_P)) ⇒ c_Com_Obody(v_P) = c_Option_Ooption_OSome(c_Com_Osko__Com__XWTs_
c_Com_Ocom_OSemi(v_com$_1$, v_com$_2$) = c_Com_Ocom_OSemi(v_com1_H, v_com2_H) ⇒ v_com$_2$ = v_com2_H   cnf(cls_com
c_Com_Ocom_OSemi(v_com$_1$, v_com$_2$) = c_Com_Ocom_OSemi(v_com1_H, v_com2_H) ⇒ v_com$_1$ = v_com1_H   cnf(cls_com
c_Option_Ooption_OSome(v_a, t_a) = c_Option_Ooption_OSome(v_a_H, t_a) ⇒ v_a = v_a_H   cnf(cls_option_Oinject$_0$, axion
c_Com_Ocom_OSemi(v_com1_H, v_com2_H) ≠ c_Com_Ocom_OSKIP   cnf(cls_com_Osimps_I13_J$_0$, axiom)
c_Com_Ocom_OSKIP ≠ c_Com_Ocom_OSemi(v_com1_H, v_com2_H)   cnf(cls_com_Osimps_I12_J$_0$, axiom)
(c_Com_Obody(v_pn) = c_Option_Ooption_OSome(v_b, tc_Com_Ocom) and c_Com_OWT__bodies) ⇒ c_Com_OWT(v_b)
(c_Com_OWT(v_c$_1$) and c_Com_OWT(v_c$_0$)) ⇒ c_Com_OWT(c_Com_Ocom_OSemi(v_c$_0$, v_c$_1$))   cnf(cls_WT_OSemi$_0$, axi
c_Com_OWT(c_Com_Ocom_OSemi(v_c$_1$, v_c$_2$)) ⇒ c_Com_OWT(v_c$_1$)   cnf(cls_WTs__elim__cases_I4_J$_0$, axiom)
c_Com_OWT(c_Com_Ocom_OSemi(v_c$_1$, v_c$_2$)) ⇒ c_Com_OWT(v_c$_2$)   cnf(cls_WTs__elim__cases_I4_J$_1$, axiom)
v_sko__Hoare__Mirabelle__Xstate__not__singleton__def__raw$_{-1}$ = v_sko__Hoare__Mirabelle__Xstate__not__singleton__def__raw$_{-2}$ =
¬ c_Hoare__Mirabelle_Ostate__not__singleton   cnf(cls_state__not__singleton__def__raw$_0$, axiom)
c_Hoare__Mirabelle_Ostate__not__singleton or v_x = v_xa   cnf(cls_state__not__singleton__def$_1$, axiom)
v_sko__Hoare__Mirabelle__Xsingle__stateE$_{-1}$(v_t) = v_t ⇒ ¬ c_Hoare__Mirabelle_Ostate__not__singleton   cnf(cls_single__stat
c_Com_OWT(c_Com_Ocom_OSKIP)   cnf(cls_WT_OSkip$_0$, axiom)
v_sko__Hoare__Mirabelle__Xstate__not__singleton__def$_{-1}$ = v_sko__Hoare__Mirabelle__Xstate__not__singleton__def$_{-2}$ ⇒
¬ c_Hoare__Mirabelle_Ostate__not__singleton   cnf(cls_state__not__singleton__def$_0$, axiom)
c_Hoare__Mirabelle_Ostate__not__singleton   cnf(cls_conjecture$_0$, negated_conjecture)
c_Com_OWT__bodies   cnf(cls_conjecture$_1$, negated_conjecture)
c_Com_OWT(v_c)   cnf(cls_conjecture$_2$, negated_conjecture)
¬ c_Hoare__Mirabelle_Ostate__not__singleton   cnf(cls_conjecture$_3$, negated_conjecture)

SWV917-1.p Java type soundness 027_36
v_v = c_Option_Ooption_OSome(c_ATP__Linkup_Osko__Option__Xoption__Xnchotomy__1$_{-1}$(v_v, t_a), t_a) or v_v = c_Option_C
v_x = c_Option_Ooption_OSome(c_ATP__Linkup_Osko__Option__Xnot__None__eq__1$_{-1}$(v_x, t_a), t_a) or v_x = c_Option_Ooptic
c_Option_Ooption_OSome(v_a, t_a) = c_Option_Ooption_OSome(v_a_H, t_a) ⇒ v_a = v_a_H   cnf(cls_option_Oinject$_0$, axion
¬ c_Option_Ois__none(c_Option_Ooption_OSome(v_x, t_a), t_a)   cnf(cls_is__none__code_I2_J$_0$, axiom)
v_x = c_Option_Ooption_ONone(t_a) or v_x = c_Option_Ooption_OSome(c_ATP__Linkup_Osko__Option__Xnot__Some__eq__1_
v_y = c_Option_Ooption_OSome(c_ATP__Linkup_Osko__Option__Xoption__Xexhaust__1$_{-1}$(v_y, t_a), t_a) or v_y = c_Option_Oo
c_Option_Ois__none(c_Option_Ooption_ONone(t_a), t_a)   cnf(cls_is__none__def$_1$, axiom)
c_Option_Ooption_OSome(v_xa, t_a) ≠ c_Option_Ooption_ONone(t_a)   cnf(cls_not__None__eq$_1$, axiom)
c_Option_Ooption_OSome(v_a_H, t_a) ≠ c_Option_Ooption_ONone(t_a)   cnf(cls_option_Osimps_I3_J$_0$, axiom)
c_Option_Ooption_ONone(t_a) ≠ c_Option_Ooption_OSome(v_y, t_a)   cnf(cls_not__Some__eq$_1$, axiom)
c_Option_Ooption_ONone(t_a) ≠ c_Option_Ooption_OSome(v_a_H, t_a)   cnf(cls_option_Osimps_I2_J$_0$, axiom)
c_Option_Ois__none(v_x, t_a) ⇒ v_x = c_Option_Ooption_ONone(t_a)   cnf(cls_is__none__def$_0$, axiom)
c_Objects_Onew__Addr(v_ha____) = c_Option_Ooption_OSome(v_a____, tc_nat)   cnf(cls_CHAINED$_0$, axiom)
hAPP(v_ha____, v_a____) ≠ c_Option_Ooption_ONone(tc_prod(tc_List_Olist(tc_String_Ochar), tc_fun(tc_prod(tc_List_Olist(tc_S

SWV918-1.p Java type soundness 030_39
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def$_0$, axiom)
c_Conform_Ohconf(v_P, v_h, t_a) ⇒ c_Exceptions_Opreallocated(v_h)   cnf(cls_hconf__def$_1$, axiom)
c_Conform_Ohconf(v_P, v_ha____, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(tc_List_Olist(tc_String_C
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def__raw$_0$, axiom)
v_h_Ha____ = c_Fun_Ofun__upd(v_ha____, v_a____, c_Option_Ooption_OSome(c_Pair(v_C____, c_Objects_Oinit__fields(v_FDTs____)
c_Conform_Ooconf(v_P, v_ha____, c_Pair(v_C____, c_Objects_Oinit__fields(v_FDTs____), tc_List_Olist(tc_String_Ochar), tc_fun(tc_
hAPP(v_ha____, v_a____) = c_Option_Ooption_ONone(tc_prod(tc_List_Olist(tc_String_Ochar), tc_fun(tc_prod(tc_List_Olist(tc_S
¬ c_Conform_Ohconf(v_P, v_h_Ha____, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(tc_List_Olist(tc_Stri
c_fequal(v_x, v_x, t_a)   cnf(cls_ATP__Linkup_Oequal__imp__fequal$_0$, axiom)
c_fequal(v_X, v_Y, t_a) ⇒ v_X = v_Y   cnf(cls_ATP__Linkup_Ofequal__imp__equal$_0$, axiom)

SWV920-1.p Java type soundness 058_5
c_Objects_Ohext(v_h, v_h)   cnf(cls_hext__refl$_0$, axiom)
(c_Objects_Ohext(v_h_H, v_h_H_H) and c_Objects_Ohext(v_h, v_h_H)) ⇒ c_Objects_Ohext(v_h, v_h_H_H)   cnf(cls_hext__tr
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def$_0$, axiom)
c_Conform_Olconf(v_P, v_ha______, v_la______, v_E____, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(tc_Li
(c_Objects_Ohext(v_h, v_h_H) and c_Conform_Olconf(v_P, v_h, v_l, v_E, t_a)) ⇒ c_Conform_Olconf(v_P, v_h_H, v_l, v_E, t_a)
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def__raw$_0$, axiom)
c_Conform_Olconf(v_P, v_ha______, v_la______, v_E____, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(tc_Li
c_WellTypeRT_OWTrt(v_P, v_ha______, v_E____, c_Expr_Oexp_Onew(v_C______, tc_List_Olist(tc_String_Ochar)), v_T____)   cnf(
v_h_Ha______ = c_Fun_Ofun__upd(v_ha______, v_a______, c_Option_Ooption_OSome(c_Pair(v_C______, c_Objects_Oinit__fields(v_FD
c_TypeRel_OFields(v_P, v_C______, v_FDTs______, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(tc_List_C

c_Objects_Onew__Addr(v_ha______) = c_Option_Ooption_OSome(v_a______, tc_nat)   cnf(cls_CHAINED_0$_{04}$, axiom)
¬ c_Conform_Olconf(v_P, v_h_Ha______, v_la______, v_E____, tc_prod(tc_List_Olist(tc_List_Olist(tc_String_Ochar)), tc_Expr_Oexp(t
c_fequal(v_x, v_x, t_a)   cnf(cls_ATP__Linkup_Oequal__imp__fequal$_0$, axiom)
c_fequal(v_X, v_Y, t_a) ⇒ v_X = v_Y   cnf(cls_ATP__Linkup_Ofequal__imp__equal$_0$, axiom)

SWV973-1.p Java type soundness 464_31
c_Value_Oval_OUnit ≠ c_Value_Oval_OAddr(v_nat_H)   cnf(cls_val_Osimps_I10_J$_0$, axiom)
c_Value_Oval_OIntg(v_int) ≠ c_Value_Oval_OAddr(v_nat_H)   cnf(cls_val_Osimps_I22_J$_0$, axiom)
c_Value_Oval_OAddr(v_nat_H) ≠ c_Value_Oval_OIntg(v_int)   cnf(cls_val_Osimps_I23_J$_0$, axiom)
c_Value_Oval_OAddr(v_nat_H) ≠ c_Value_Oval_OUnit   cnf(cls_val_Osimps_I11_J$_0$, axiom)
c_Value_Oval_OUnit ≠ c_Value_Oval_OIntg(v_int_H)   cnf(cls_val_Osimps_I8_J$_0$, axiom)
c_Value_Oval_OAddr(v_nat) = c_Value_Oval_OAddr(v_nat_H) ⇒ v_nat = v_nat_H   cnf(cls_val_Osimps_I3_J$_0$, axiom)
c_Value_Oval_OIntg(v_int_H) ≠ c_Value_Oval_OUnit   cnf(cls_val_Osimps_I9_J$_0$, axiom)
c_Value_Oval_OIntg(v_int) = c_Value_Oval_OIntg(v_int_H) ⇒ v_int = v_int_H   cnf(cls_val_Osimps_I2_J$_0$, axiom)
c_Value_Oval_ONull ≠ c_Value_Oval_OUnit   cnf(cls_val_Osimps_I5_J$_0$, axiom)
c_Value_Oval_OIntg(v_int_H) ≠ c_Value_Oval_ONull   cnf(cls_val_Osimps_I15_J$_0$, axiom)
c_Value_Oval_OUnit ≠ c_Value_Oval_ONull   cnf(cls_val_Osimps_I4_J$_0$, axiom)
c_Value_Oval_ONull ≠ c_Value_Oval_OIntg(v_int_H)   cnf(cls_val_Osimps_I14_J$_0$, axiom)
c_Value_Oval_OAddr(v_nat_H) ≠ c_Value_Oval_ONull   cnf(cls_val_Osimps_I17_J$_0$, axiom)
c_Value_Oval_ONull ≠ c_Value_Oval_OAddr(v_nat_H)   cnf(cls_val_Osimps_I16_J$_0$, axiom)
c_WellTypeRT_OWTrt(v_P, v_ha____, v_E____, c_Expr_Oexp_OVal(v_v____, tc_List_Olist(tc_String_Ochar)), c_Type_Oty_ONT)
v_v____ ≠ c_Value_Oval_ONull   cnf(cls_conjecture$_0$, negated_conjecture)

SWV985-1.p Java type soundness 555_24
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def$_0$, axiom)
c_TypeSafe__Mirabelle_Osconf(v_P, v_E, v_s_H)   cnf(cls_refl_I2_J$_0$, axiom)
c_WellTypeRT_OWTrt(v_P, c_State_Ohp(v_s_H), v_E, v_e_H, v_T____)   cnf(cls_refl_I1_J$_0$, axiom)
c_COMBI(v_P, t_a) = v_P   cnf(cls_COMBI__def__raw$_0$, axiom)
¬ c_TypeSafe__Mirabelle_Osconf(v_P, v_E, v_s_H)   cnf(cls_conjecture$_0$, negated_conjecture)
c_fequal(v_x, v_x, t_a)   cnf(cls_ATP__Linkup_Oequal__imp__fequal$_0$, axiom)
c_fequal(v_X, v_Y, t_a) ⇒ v_X = v_Y   cnf(cls_ATP__Linkup_Ofequal__imp__equal$_0$, axiom)

SWV996=1.p Backward simplification: node deletion 2
A problem extracted from model checking a safety problem (no violation of mutual exclusion) for a parameterized system (a variant of the protocol due to Szymanski).
z_1: $int   tff(z1_type, type)
z_2: $int   tff(z2_type, type)
z_3: $int   tff(z3_type, type)
a: $int → $int   tff(a_type, type)
b: $int → $int   tff(b_type, type)
($\forall z_1$: $int: ($lesseq(1, $a(z_1)$) and $lesseq($a(z_1)$, 12)) and $\forall z_1$: $int: ($lesseq(1, $b(z_1)$) and $lesseq($b(z_1)$, 5)) and $true and $z_1 \neq$ z_2 and $z_1 \neq z_3$ and $z_2 \neq z_3$ and $\forall z_1$: $int, z_2: $int: $\neg z_1 \neq z_2$ and $a(z_1) = 10$ and $a(z_2) = 10$) ⇒ $\neg a(z_1) =$ 9 and $a(z_2) = 10$ and $less($b(z_2)$, 3) and $less($z_2, z_1$)   tff(0, conjecture)

SWV997=1.p Fix-point check 20
A problem extracted from model checking a safety problem (no violation of mutual exclusion) for a parameterized system (a variant of the protocol due to Szymanski).
z_1: $int   tff(z1_type, type)
z_2: $int   tff(z2_type, type)
z_3: $int   tff(z3_type, type)
z_4: $int   tff(z4_type, type)
a: $int → $int   tff(a_type, type)
b: $int → $int   tff(b_type, type)
($\forall z_1$: $int: ($lesseq(1, $a(z_1)$) and $lesseq($a(z_1)$, 12)) and $\forall z_1$: $int: ($lesseq(1, $b(z_1)$) and $lesseq($b(z_1)$, 5)) and $true and $z_1 \neq$ z_2 and $z_1 \neq z_3$ and $z_1 \neq z_4$ and $z_2 \neq z_3$ and $z_2 \neq z_4$ and $z_3 \neq z_4$ and $\forall z_1$: $int, z_2: $int: $\neg z_1 \neq z_2$ and $a(z_1) =$ 10 and $a(z_2) = 10$ and $\forall z_1$: $int, z_2: $int: $\neg z_1 \neq z_2$ and $a(z_1) = 9$ and $a(z_2) = 10$ and $less($b(z_2)$, 3) and $less($z_2, z_1$) and $\forall z_1$
z_2 and $a(z_1) = 8$ and $a(z_2) = 10$ and $less($b(z_2)$, 3) and $less($z_2, z_1$) and $\forall z_1$: $int, z_2: $int, z_3: $int: $\neg z_1 \neq z_2$ and $z_1 \neq$ z_3 and $z_2 \neq z_3$ and $a(z_1) = 7$ and $a(z_2) = 10$ and $less($b(z_2)$, 3) and $b(z_3) = 5$ and $less($z_2, z_1$) and $\forall z_1$: $int, z_2: $int, z_3: $int
z_2 and $z_1 \neq z_3$ and $z_2 \neq z_3$ and $a(z_1) = 6$ and $a(z_2) = 10$ and $less($b(z_2)$, 3) and $b(z_3) = 5$ and $less($z_2, z_1$) and $\forall z_1$: $int, z_2:
z_2 and $z_1 \neq z_3$ and $z_2 \neq z_3$ and $a(z_1) = 7$ and $a(z_2) = 10$ and $a(z_3) = 8$ and $less($b(z_2)$, 3) and $less($z_2, z_1$)) ⇒ $\neg a(z_1) = 6$ and $a(z_2) = 10$ and $a(z_3) = 1$ and $less($b(z_2)$, 3) and $b(z_3) = 5$ and $less($z_2, z_1$)   tff(0, conjecture)