Isolation

Assume: Show:

1) $H, TS \rightsquigarrow H', TS'$ isolated(H', TS')

2) isolated(H, TS)

3) $\vdash H : *$

4) $H \vdash TS$?

Proof by case distinction on used reduction rule "$\rightsquigarrow$":

└ E-FINISH2:

T_1 T_2

(4) $H, \{(f, \langle \text{FINISH } f' \rangle \circ FS)\} \uplus TS \rightsquigarrow H, \{(f, FS)\} \uplus TS$

isolated$(H, T_1 \uplus TS)$ by assump.

- $\forall (g, GS) \in TS.$ isolated$(H, \langle \text{FINISH } f' \rangle \circ FS, GS)$ $\vee$ awaitsT$(TS, (g, GS), T_1)$ $\vee$ awaitsT$(TS, T_1, (g, GS))$
- isolated$(H, \langle \text{FINISH } f' \rangle \circ FS, GS)$ $\Rightarrow$ isolated(H, FS, GS) by isolated-def
- awaitsT$(TS, (g, GS), T_1)$ $\Rightarrow$ awaitsT$(TS, (g, GS), (f, FS))$ by awaitsT$(TS, T_1, (f, FS)) =$ awaitsT$(TS, T_1, (f, GS))$
- $\neg$ awaitsT$(TS, T_1, (g, GS))$ by (4), awaitsT blocks reduction
- $\forall (g, GS) \in TS.$ isolated(H, FS, GS) $\vee$ awaitsT$(TS, (g, GS), T_2)$

E- FINISH1:

T_1 F_1 F_2 F_3 T_3

(4) $H, \{(f, \langle L, \text{let } x = \text{finish } \{t\} \text{ in } s, P \rangle^l \circ FS)\} \uplus TS$
$\rightsquigarrow H, \{(f, \langle \text{FINISH } f' \rangle^x \circ \langle L, s, P \rangle^l \circ FS), T_2\} \uplus TS$

other dir impossible as $F_1 \neq$ FINISH

$\forall (g, GS) \in TS.$ isolated$(H, F_1 \circ FS, GS)$ $\vee$ awaitsT$(TS \uplus \{T_1\}, (g, GS), (f, F_1 \circ FS))$

isolated$(H, TS \uplus \{T_3\})$ $\wedge$ isolated$(H, TS \uplus \{T_2\})$ $\wedge$ awaitsT(TS, T_3, T_2)

Short analysis of remaining rules:
E-NULL: Trivial
E-VAR: L isolated -> L(y) isolated -> L[x -> L(y)] isolated
E-SELECT: L isolated -> y isolated -> y.f isolated
E-ASSIGN: L isolated -> x,y,z isolated
E-NEW: <C, f->null> is isolated
E-INVOKE: L isolated -> x,y,z isolated -> new Frames also isolated
E-RETURN1, 2: Trivial

E-OPEN, E-BOX: Trivial, only shuffling things around on stack
E-CAPTURE: p' available -> updated field of o also okay
E-SWAP: The objects remain the same, all objects permissions are available too