COMP3610/6361

31/08/2023

Small-step v big-step

equivalence

$\langle c, s \rangle \Rightarrow s'$

to show

$\langle c, s \rangle \to^* \langle \text{Skip}, s' \rangle$

s this enough.

What about

$E :=$ $l_1 := 0;$
while true do
$l_1 := !l_1 + 1$

$\langle E, s \rangle \not\Rightarrow$?

- no final state in big-step semantics
- no final state in small-step either;
  but infinite sequence

$\langle c, s \rangle \to^*_{\text{SOS}} \langle \text{skip}, s' \rangle$

$\Leftrightarrow$

$\langle c, s \rangle \to^*_{\text{NSA}} \langle \text{skip}, s' \rangle$

com, ig

$\langle !\ell := 3+4, s \rangle \to_{\text{SOS}} \langle !\ell := 7, s \rangle \to \langle \text{skip}, s' \rangle$

$\downarrow$

$\langle !\ell := 7+4, s \rangle \to_{\text{NSA}} \langle \text{skip}, s' \rangle$

$\langle \ell := 1, s \rangle \to \langle \text{skip}, s(\ell \mapsto 1) \rangle$ ✓ trm

$\langle \ell := 1, s \rangle \to \langle \ell := 2, s \rangle$ ✗ fals

$f: int * int \Rightarrow int$

$f:(x,y) = x+y$

$f(3,4) = 7$

$f\ 3$

$f: int \Rightarrow (int \Rightarrow int)$

$f: x\ y = x+y$

$f\ 3\ 4 = 7$

$f\ 3 = 3+y$