COMP3610/6361

(recording of 02/08/23)

06/08/2023

- EdStem

- Quiz (Voluntary)
- Assessment 1
- Course Representative

successor / next step in a computation:

$$\langle E, s \rangle \rightarrow \langle E', s' \rangle$$

- chaining is possible

$$\langle E, s \rangle \rightarrow \langle E', s' \rangle \rightarrow \langle E'', s'' \rangle \ldots$$

Derivation tree of one single computation step

provides a proof that the successor is reachable.

$\langle 42, !\ell, \phi \rangle$ does not have a successor,
we say $\langle 42 + !\ell, \phi \rangle$ is stuck.

$$\frac{\langle !\ell, \phi \rangle \not\rightarrow \quad \text{we can't find a successor}}{\langle 42 + !\ell, \phi \rangle \longrightarrow \not{z}} \; op^2$$

ϕ : the empty function / empty storage/store
no location has been assigned a value.

Slide 43

$$s + \{l_2 \mapsto 0\} = s$$

$$\frac{\dfrac{}{\langle l_2 := 0, s\rangle \longrightarrow \langle \mathrm{skip}, s + \{l_2 \mapsto 0\}\rangle}\ \text{assign}1}{\langle E, s\rangle \longrightarrow \langle \mathrm{skip}; \text{while } !l_1 \geq 1 \text{ do} \ldots, s + \{l_2 \mapsto 0\}\rangle}\ \text{seq}2$$

$E = l_2 := 0;\ \text{while } !l_1 \geq 1 \text{ do } (l_2 := !l_2 + !l_1 ;\ l_1 := !l_1 + -1)$

$s = \{l_1 \mapsto 3,\ l_2 \mapsto 0\}$

$\langle skip; \text{while } !l_1 \geq 1 \text{ do } (\dots), s \rangle$

$\rightarrow \langle \text{while } !l_1 \geq 1 \text{ do } \dots, s \rangle$

$\rightarrow \langle \text{if } !l_1 \geq 1 \text{ then "body"; while}(!l_1 \geq 1) \dots \text{ else skip}, s \rangle$

$\rightarrow \langle \text{if } 3 \geq 1 \text{ then "body"; while} \dots \text{ else skip}, s \rangle$

$\rightarrow \dots$

$E = l_2 := 0; \text{while } !l_1 \geq 1 \text{ do } \underbrace{(l_2 := !l_2 + !l_1 ; l_1 := !l_1 + -1)}_{\text{"body"}}$

$s = \{l_1 \mapsto 3, l_2 \mapsto 0\}$

$\langle (l := 1; 0) + (l := 2; 0), \{l \mapsto 0\} \rangle$

$\rightarrow \langle skip; 0 + (l := 2; 0), \{l \mapsto 1\} \rangle$

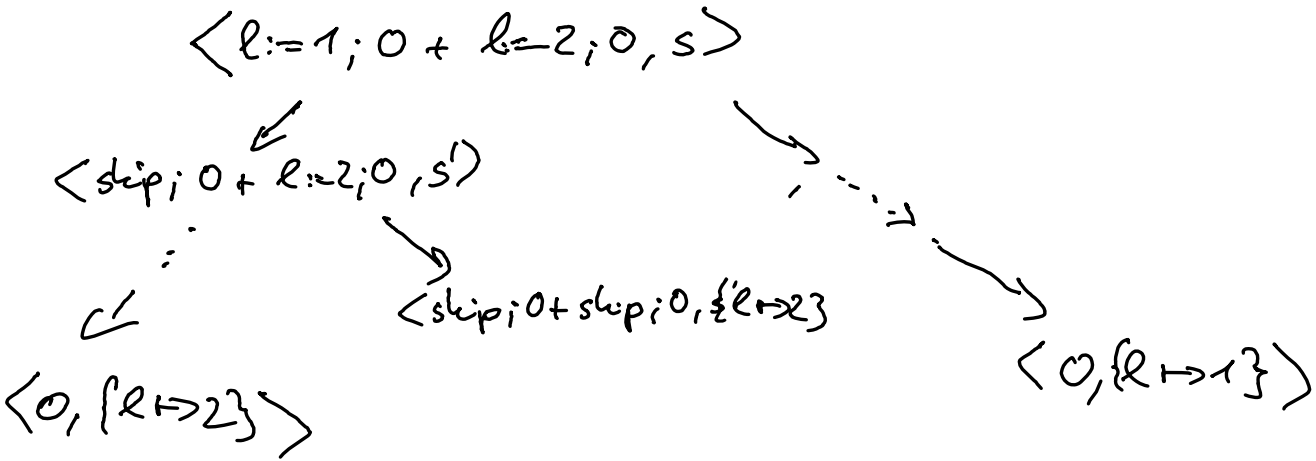
$\rightarrow \langle 0 + (l := 2; 0), \{l \mapsto 1\} \rangle$

$\rightarrow \langle 0 + (skip; 0), \{l \mapsto 2\} \rangle$

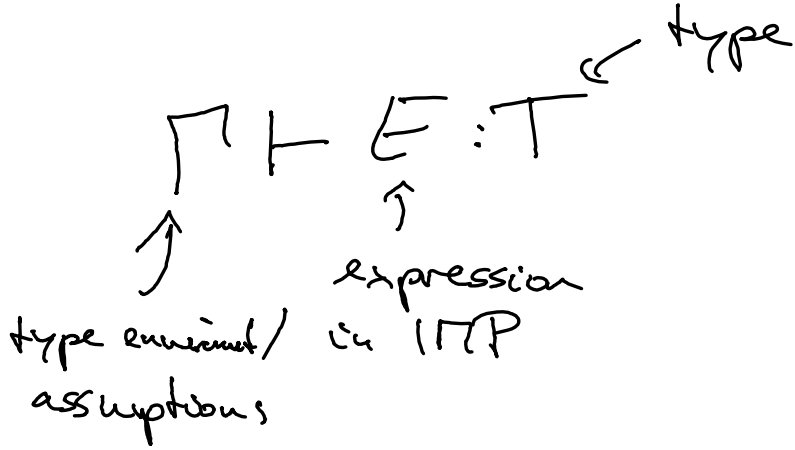
$\rightarrow \langle 0 + 0, \{l \mapsto 2\} \rangle$

$\rightarrow \langle 0, \{l \mapsto 2\} \rangle$

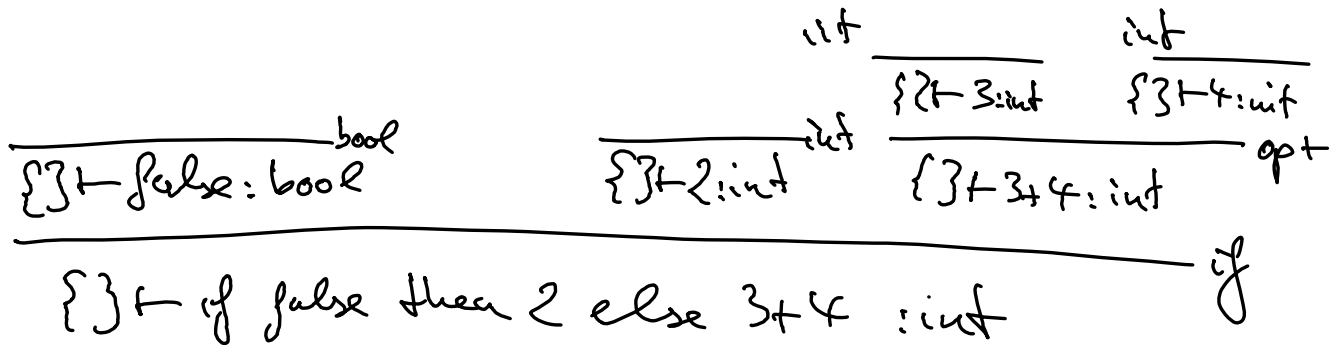
IMP (incl op1 and op2) + op1' + op2'



non-deterministic language



E is of type T if the assumptions in Γ are satisfied.


int
int
{2⊢3:int
{3⊢4:int
bool
int
op+
{}⊢false:bool
{}⊢2:int
{}⊢3+4:int
{}⊢ if false then 2 else 3+4 :int
if