Semantyka i weryfikacja - praca domowa nr 2

Mateusz Bieganski mb385162

1 Expressions

e

$$[\![e]\!]\ \varrho_V, s = q \in \mathbb{Q}$$

x

$$[\![x]\!]\ \varrho_V, s = s\ (\varrho_V\ x)$$

e + e

$$[\![e_1 + e_2]\!]\ \varrho_V, s = [\![e1]\!]\ \varrho_V, s + [\![e2]\!]\ \varrho_V, s$$

e * e, e - e - similarly

2 Bool Expressions

true

$$[\![true]\!]\ \varrho_V, s = tt$$

false

$$[\![false]\!]\ \varrho_V, s = ff$$

$\mathbf{e < e}$

$$[\![e_1 < e_2]\!]\ \varrho_V, s = ifte(\ [\![e_1]\!]\ \varrho_V, s < [\![e_2]\!]\ \varrho_V, s,\ tt, ff\ )$$

$\mathbf{e = e, b \wedge b, \neg b}$ - similarly

3 Declarations

var x = e

$$\begin{gathered}[\![var\ x = e]\!]\ \varrho_V, \varrho_P, s = \varrho_V[x \mapsto l], \varrho_P, s[l \mapsto n] \\ where\ l = newloc(s),\ n = [\![e]\!]\ \varrho_V, s\end{gathered}$$

ϵ

$$[\![\epsilon]\!]\ \ \varrho_V, \varrho_P, s =\ \ \varrho_V, \varrho_P, s$$

proc p(x) I

$$\begin{gathered}[\![proc\, p(x)\ I]\!]\ \varrho_V, \varrho_P, s = \varrho_V\ \ \varrho_P[p \mapsto P]\ s \\ where\ P = \lambda s \lambda xloc.s'[locx \mapsto s'\ l] \\ where\ s' = [\![I]\!]\ \varrho_V[x \mapsto l]\ \varrho_P[p \mapsto P]\ s[l \mapsto (s\ locx)], \\ l = newloc(s)\end{gathered}$$

$D_1; D_2$

$$[\![D_1; D_2]\!] = [\![D_2]\!] \circ [\![D_1]\!]$$

4 Instructions

skip

$$[\![skip]\!]\ \varrho_V, \varrho_P, s = s$$

x := e

$$[\![x := e]\!]\ \varrho_V, \varrho_P, s = s[(\varrho_V\ x) \mapsto [\![e]\!]\ \varrho_V, s]$$

$I_1; I_2$

$$[\![I_1; I_2]\!] = [\![I_2]\!] \circ [\![I_1]\!]$$

if b then I_1 else I_2

$$[\![if\ b\ then\ I_1\ else\ I_2]\!]\ \varrho_V, \varrho_P, s = ifte([\![b]\!]\ \varrho_V, \varrho_P, s,\ [\![I_1]\!]\ \varrho_V, \varrho_P, s, [\![I_2]\!]\ \varrho_V, \varrho_P, s)$$

todo punkt staly

while b do I

$$[\![while\ b\ do\ I]\!]\ \varrho_V, \varrho_P, s = Fix(\Phi)$$
$$where\ \Phi(F) = ifte([\![b]\!]\ \varrho_V, \varrho_P, s, [\![while\ b\ do\ I]\!]([\![I]\!]\ \varrho_V, \varrho_P, s),\ \varrho_V, \varrho_P, s)$$

begin D; I end

$$[\![begin\ D;\ I\ end]\!] = [\![I]\!]\ [\![D]\!]$$

call p(x)

$$[\![call\ p(x)]\!]\ \varrho_V, \varrho_P, s = (\varrho_P\ p)\ s\ (\varrho_V\ x)$$

test

$$\Phi$$