Semantyka i weryfikacja - praca domowa nr 2

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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

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

e < e

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

e = e, b ∧ b, ¬b - similarly

3 Declarations

var x = e

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

ϵ

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

proc p(x) I

$$[\![proc\ p(x)\ I]\!]\ \varrho_V, \varrho_P, s = \varrho_V\ \varrho_P[p \mapsto P]\ s$$
$$where\ P = \lambda.s : State.[\![I]\!]\ \varrho_V[x \mapsto l]\ \varrho_P[p \mapsto P]\ s[l \mapsto [\![s\ (\varrho_V\ x)]\!]\ \varrho_V, s],$$
$$l = newloc(s)$$

$D_1; D_2$

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

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

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

begin D; I end

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

call p(x)

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