Semantyka i weryfikacja
Praca domowa nr 2

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Domains

Only Procedure domain might differ from standard TINY domain (variable passing a la 'by reference')

$$Proc = Store \to Loc \rightharpoonup Store$$

Semantic function types

$[\![\textbf{Num}]\!] : Int$
$[\![\textbf{Expr}]\!] : (VEnv \to Store) \rightharpoonup \mathbb{Q}$
$[\![\textbf{BExpr}]\!] : (VEnv \to Store) \rightharpoonup Bool$
$[\![\textbf{Decl}]\!] : (VEnv \to PEnv \to Store) \rightharpoonup (VEnv \to PEnv \to Store)$
$[\![\textbf{Instr}]\!] : (VEnv \to PEnv \to Store) \rightharpoonup Store$

Declarations

Standard ones, I put them because on the Lecture they were separated to Procedure declaration and Variable declaration, and I got them mixed.

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

$Fix : (PEnv \to PEnv) \to PEnv$

$$[\![proc\ p(x)\ I]\!]\ \varrho_V, \varrho_P, s = \varrho_V, Fix(\Phi),\ s$$
$$where\ \Phi(\varrho_x) = \varrho_P[p \mapsto P]$$
$$where\ P = \lambda s \lambda locx.s'[locx \mapsto s'\ l]$$
$$where\ s' = [\![I]\!]\ \varrho_x[x \mapsto l]\ \varrho_P[p \mapsto P]\ s[l \mapsto (s\ locx)],$$
$$l = newloc(s)$$

$D_1; D_2$

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

Instructions

begin D; I end

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

call p(x)

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