

Semantyka i weryfikacja

Praca domowa nr 2

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Domains

Only Procedure domain might differ from standard TINY domains are listed (variable passing by reference)

$$Proc = Store \rightarrow Loc \rightarrow Store$$

Semantic function types

$$\begin{aligned} \llbracket \mathbf{Num} \rrbracket &: Int \\ \llbracket \mathbf{Expr} \rrbracket &: (VEnv \rightarrow Store) \rightarrow \mathbb{Q} \\ \llbracket \mathbf{BExpr} \rrbracket &: (VEnv \rightarrow Store) \rightarrow Bool \\ \llbracket \mathbf{Decl} \rrbracket &: (VEnv \rightarrow PEnv \rightarrow Store) \rightarrow (VEnv \rightarrow PEnv \rightarrow Store) \\ \llbracket \mathbf{Instr} \rrbracket &: (VEnv \rightarrow PEnv \rightarrow Store) \rightarrow Store \end{aligned}$$

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

$$\begin{aligned} \llbracket var\ x = e \rrbracket\ \varrho_V, \varrho_P, s &= \varrho_V[x \mapsto l], \varrho_P, s[l \mapsto n] \\ \text{where } l &= newloc(s),\ n = \llbracket e \rrbracket\ \varrho_V, s \end{aligned}$$

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$$\llbracket \epsilon \rrbracket\ \varrho_V, \varrho_P, s = \varrho_V, \varrho_P, s$$

proc p(x) **I**

$$\begin{aligned} \llbracket \text{proc } p(x) \text{ } I \rrbracket \varrho_V, \varrho_P, s &= \varrho_V \varrho_P[p \mapsto P] s \\ \text{where } P &= \lambda s \lambda locx. s'[locx \mapsto s' l] \\ \text{where } s' &= \llbracket I \rrbracket \varrho_V[x \mapsto l] \varrho_P[p \mapsto P] s[l \mapsto (s \text{ } locx)], \\ l &= \text{newloc}(s) \end{aligned}$$

$D_1; D_2$

$$\llbracket D_1; D_2 \rrbracket = \llbracket D_2 \rrbracket \circ \llbracket D_1 \rrbracket$$

Instructions

begin D; **I end**

$$\llbracket \text{begin } D; \text{ } I \text{ end} \rrbracket = \llbracket I \rrbracket \circ \llbracket D \rrbracket$$

call p(x)

$$\llbracket \text{call } p(x) \rrbracket \varrho_V, \varrho_P, s = (\varrho_P p) s (\varrho_V x)$$