

Lacs context-sensitive specification rules

Metavariable definitions

$$E \in \{\text{expresas, expra, expr, term, factor}\} \quad \tau \in \{\text{type}\}$$

Type derivation rules

<p>LITERAL</p> $\frac{}{\Gamma \vdash \mathbf{NUM} : \mathbf{Int}}$	<p>IDENTIFIER</p> $\frac{\Gamma(\mathbf{ID}) = \tau}{\Gamma \vdash \mathbf{ID} : \tau}$	<p>PARENTHESES</p> $\frac{\Gamma \vdash E : \tau}{\Gamma \vdash (E) : \tau}$
<p>ARITHMETIC</p> $\frac{\Gamma \vdash E_1 : \mathbf{Int} \quad \Gamma \vdash E_2 : \mathbf{Int}}{\Gamma \vdash E_1 + E_2 : \mathbf{Int} \quad \Gamma \vdash E_1 - E_2 : \mathbf{Int} \quad \Gamma \vdash E_1 * E_2 : \mathbf{Int} \quad \Gamma \vdash E_1 / E_2 : \mathbf{Int} \quad \Gamma \vdash E_1 \% E_2 : \mathbf{Int}}$		
<p>ASSIGNMENT</p> $\frac{\Gamma(\mathbf{ID}) = \tau \quad \Gamma \vdash E : \tau}{\Gamma \vdash \mathbf{ID} = E : \tau}$	<p>SEQUENCING</p> $\frac{\Gamma \vdash E_1 : \tau' \quad \Gamma \vdash E_2 : \tau}{\Gamma \vdash E_1; E_2 : \tau}$	
<p>IF STATEMENT</p> $\frac{\Gamma \vdash E_1 : \mathbf{Int} \quad \Gamma \vdash E_2 : \mathbf{Int} \quad \Gamma \vdash E_3 : \tau \quad \Gamma \vdash E_4 : \tau}{\Gamma \vdash \mathbf{if}(E_1 == E_2) E_3 \mathbf{else} E_4 : \tau \quad \Gamma \vdash \mathbf{if}(E_1 != E_2) E_3 \mathbf{else} E_4 : \tau \quad \Gamma \vdash \mathbf{if}(E_1 <= E_2) E_3 \mathbf{else} E_4 : \tau \quad \Gamma \vdash \mathbf{if}(E_1 >= E_2) E_3 \mathbf{else} E_4 : \tau \quad \Gamma \vdash \mathbf{if}(E_1 < E_2) E_3 \mathbf{else} E_4 : \tau \quad \Gamma \vdash \mathbf{if}(E_1 > E_2) E_3 \mathbf{else} E_4 : \tau}$		
<p>PROCEDURE CALL</p> $\frac{\Gamma \vdash E' : (\bar{\tau}) \Rightarrow \tau' \quad \forall i. \Gamma \vdash E_i : \tau_i}{\Gamma \vdash E'(E) : \tau'}$		

Well-formedness rules

<p>PROCEDURE DECLARATION</p> $\frac{\text{all names in } \overline{\text{vardef}}, \overline{\text{vardef}'}, \overline{\text{defdef}} \text{ distinct} \quad \Gamma, \overline{\text{vardef}}, \overline{\text{vardef}'}, \overline{\text{defdef}} \vdash \forall i. \text{defdef}_i \quad \Gamma, \overline{\text{vardef}}, \overline{\text{vardef}'}, \overline{\text{defdef}} \vdash E : \tau}{\Gamma \vdash \mathbf{def ID}(\overline{\text{vardef}}) : \tau = \{\overline{\text{vardef}'}, \overline{\text{defdef}} E\}}$	<p>PROGRAM</p> $\frac{\forall i. \overline{\text{defdef}} \vdash \text{defdef}_i}{\emptyset \vdash \overline{\text{defdef}}}$
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