

Typing rules for SmallC

1 Declarations

$$\text{VARDECL}(\text{Var}) \frac{\mathbf{T} \in \{\mathbf{int}, \mathbf{char}\}}{\text{add } \langle \text{Var} : \mathbf{T} \rangle \text{ to } \Gamma}$$

$$\text{PROCEDURE}(\text{f}) \frac{}{\text{add } \langle f : \overline{U} \rightarrow \mathbf{T} \rangle \text{ to } \Gamma}$$

2 Expressions

$$\text{INTLITERAL}(\text{i}) \frac{}{\Gamma \vdash i : \mathbf{int}}$$

$$\text{STRLITERAL}(\text{s}) \frac{}{\Gamma \vdash s : \mathbf{string}}$$

$$\text{CHRLITERAL}(\text{c}) \frac{}{\Gamma \vdash c : \mathbf{char}}$$

$$\text{VAR} \frac{\vdash \langle \text{Var} : \mathbf{T} \rangle \in \Gamma}{\Gamma \vdash \text{Var} : \mathbf{T}}$$

$$\text{FUNCCALLEXP}(\text{f}) \frac{\mathbf{T} \in \{\mathbf{int}, \mathbf{char}\} \quad \vdash \langle f : \overline{U} \rightarrow \mathbf{T} \rangle \in \Gamma \quad \Gamma \vdash \overline{\text{Var}} : \overline{U}}{\Gamma \vdash f(\overline{\text{Var}}) : \mathbf{T}}$$

$$\text{BINOP}(\text{OP}=\text{ADD}, \text{SUB}, \text{MUL}, \text{DIV}, \text{MOD}) \frac{\Gamma \vdash \text{Expr}_1 : \mathbf{int} \quad \vdash \text{Expr}_2 : \mathbf{int}}{\Gamma \vdash \text{Expr}_1 \text{ Op } \text{Expr}_2 : \mathbf{int}}$$

$$\text{BINOP}(\text{OP}=\text{GT}, \text{LT}, \text{GE}, \text{LE}, \text{NE}, \text{EQ}) \frac{\Gamma \vdash \text{Expr}_1 : \mathbf{T} \quad \vdash \text{Expr}_2 : \mathbf{T}}{\Gamma \vdash \text{Expr}_1 \text{ Op } \text{Expr}_2 : \mathbf{int}}$$

3 Statements

$$\text{FUNCCALLSTMT}(\text{f}) \frac{\vdash \langle f : \overline{U} \rightarrow \mathbf{T} \rangle \in \Gamma \quad \Gamma \vdash \overline{\text{Var}} : \overline{U}}{\Gamma \vdash f(\overline{\text{Var}})}$$

$$\text{WHILE} \frac{\Gamma \vdash \text{Expr} : \mathbf{int}}{\Gamma \vdash \text{while}(\text{Expr}) \text{ Stmt}}$$

$$\text{IF}(\text{NO ELSE}) \frac{\Gamma \vdash \text{Expr} : \mathbf{int}}{\Gamma \vdash \text{if}(\text{Expr}) \text{ Stmt}}$$

$$\text{IF}(\text{WITH ELSE}) \frac{\Gamma \vdash \text{Expr} : \mathbf{int}}{\Gamma \vdash \text{if}(\text{Expr}) \text{ Stmt}_1 \text{ else } \text{Stmt}_2}$$

$$\text{ASSIGN} \frac{\Gamma \vdash \text{Var} : \mathbf{T} \quad \Gamma \vdash \text{Expr} : \mathbf{T}}{\Gamma \vdash \text{Var} = \text{Expr}}$$

$$\text{RETURN(FROM FUNCTION f)} \frac{\Gamma \vdash f : \overline{U} \rightarrow \mathbf{T} \quad \Gamma \vdash \text{Expr} : \mathbf{T}}{\Gamma \vdash \text{return Expr}}$$