SimFL

January 29, 2024

Syntax

$$\alpha \in \textsc{TypeVar} \qquad T \in \textsc{TypeCon} \qquad C \in \textsc{DataCon}$$

$$\begin{aligned} \mathit{datadef} \in \textsc{DataDef} &::= \mathsf{data}\ T\ \overline{\alpha} = \delta\ \overline{\langle \mid\ \delta \rangle} \\ \delta \in \textsc{ConDef} &::= C\ \overline{\tau} \end{aligned}$$

$$\begin{aligned} e \in \textsc{Expr} ::= {} & x \\ \mid {} & n \\ \mid {} & C \\ \mid {} & \text{`}\ c\ \text{`} \\ \mid {} & \text{"}\ \overline{c}\ \text{"} \\ \mid {} & [\,] \\ \mid {} & [\,e\ \overline{\langle , e \rangle}\,] \\ \mid {} & e \bullet e \\ \mid {} & (\bullet) \\ \mid {} & \mathsf{fun}\ x\ \mathsf{->}\ e \\ \mid {} & e\ e \\ \mid {} & \mathsf{let}\ d\ \overline{\langle \mathsf{and}\ d \rangle}\ \mathsf{in} \\ \mid {} & \mathsf{case}\ e\ \mathsf{of}\ \{\ p\ \mathsf{->}\ e\ \overline{\langle \mathsf{;}\ p\ \mathsf{->}\ e \rangle}\ \} \\ \mid {} & \mathsf{if}\ e\ \mathsf{then}\ e\ \mathsf{else}\ e \\ d \in \textsc{Decl} ::= {} & f = e \\ \mid {} & \mathsf{rec}\ f\ x = e \\ \mid {} & \mathsf{data}\ T = C\ \overline{\tau}\ \overline{\langle \mid\ C\ \overline{\tau} \rangle} \\ \mid {} & \mathsf{rec}\ f\ x : \tau = e \\ \mid {} & \mathsf{rec}\ f\ x\ \overline{x} = e \\ \mid {} & \mathsf{data}\ T\ \overline{\alpha} = \delta\ \overline{\langle \mid\ \delta \rangle} \\ \bullet \in \textsc{BinOp} ::= {} & s\overline{s} \end{aligned}$$

$$\begin{aligned} v \in \textsc{Value} ::= {} & (\mathbf{val}\ C\ \overline{v}, \tau) \\ \mid {} & (\mathbf{closure}\ x \to e, \rho) \end{aligned}$$

$$\frac{}{\rho \vdash n \Rightarrow (\mathbf{val}\ n\ , \mathsf{Int})}$$

$$\frac{\rho[C \mapsto (\mathbf{val}\ C\ \varnothing, \overline{\tau} \to T)] \vdash e \Rightarrow v}{\rho \vdash \mathsf{let\ data}\ T = C\ \overline{\tau}\ \mathsf{in}\ e \Rightarrow v}$$

$$\frac{\rho \vdash C \Rightarrow (\mathbf{val}\ C\ s, \tau_1 \to \tau_2) \quad \rho \vdash e \Rightarrow v}{\rho \vdash C\,e \Rightarrow (\mathbf{val}\ C\ s\,v, \tau_2)}$$