Typing Instructions

$$\boxed{C \vdash e^* : \mathit{tf}}$$

$$\overline{C \vdash t.\textbf{const}\ c : \epsilon \to t} \qquad \overline{C \vdash t.\textit{unop} : t \to t} \qquad \overline{C \vdash t.\textit{binop} : t\,t \to t} \qquad \overline{C \vdash t.\textit{testop} : t \to \textsf{i32}} \qquad \overline{C \vdash t.\textit{relop} : t\,t \to \textsf{i32}}$$

$$\frac{t_1 \neq t_2 \qquad sx^? = \epsilon \Leftrightarrow (t_1 = \textbf{in} \wedge t_2 = \textbf{in}' \wedge |t_1| < |t_2|) \vee (t_1 = \textbf{fn} \wedge t_2 = \textbf{fn}')}{C \vdash t_1.\textbf{convert}\ t_2\_sx^? : t_2 \to t_1} \qquad \frac{t_1 \neq t_2 \qquad |t_1| = |t_2|}{C \vdash t_1.\textbf{reinterpret}\ t_2 : t_2 \to t_1}$$

$$\overline{C \vdash \textbf{unreachable} : t_1^* \to t_2^*} \qquad \overline{C \vdash \textbf{nop} : \epsilon \to \epsilon} \qquad \overline{C \vdash \textbf{drop} : t \to \epsilon} \qquad \overline{C \vdash \textbf{select} : t\,t\,\textsf{i32} \to t}$$

$$\frac{\mathit{tf} = t_1^n \to t_2^m \qquad C, \text{label}\,(t_2^m) \vdash e^* : \mathit{tf}}{C \vdash \textbf{block}\ \mathit{tf}\ e^*\ \textbf{end} : \mathit{tf}} \qquad \frac{\mathit{tf} = t_1^n \to t_2^m \qquad C, \text{label}\,(t_1^n) \vdash e^* : \mathit{tf}}{C \vdash \textbf{loop}\ \mathit{tf}\ e^*\ \textbf{end} : \mathit{tf}}$$

$$\frac{\mathit{tf} = t_1^n \to t_2^m \qquad C, \text{label}\,(t_2^m) \vdash e_1^* : \mathit{tf} \qquad C, \text{label}\,(t_2^m) \vdash e_2^* : \mathit{tf}}{C \vdash \textbf{if}\ \mathit{tf}\ e_1^*\ \textbf{else}\ e_2^*\ \textbf{end} : t_1^n\,\textsf{i32} \to t_2^m}$$

$$\frac{C_{\text{label}}(i) = t^*}{C \vdash \textbf{br}\ i : t_1^*\,t^* \to t_2^*} \qquad \frac{C_{\text{label}}(i) = t^*}{C \vdash \textbf{br\_if}\ i : t^*\,\textsf{i32} \to t^*} \qquad \frac{(C_{\text{label}}(i) = t^*)^+}{C \vdash \textbf{br\_table}\ i^+ : t_1^*\,t^*\,\textsf{i32} \to t_2^*}$$

$$\frac{C_{\text{return}} = t^*}{C \vdash \textbf{return} : t_1^*\,t^* \to t_2^*} \qquad \frac{C_{\text{func}}(i) = \mathit{tf}}{C \vdash \textbf{call}\ i : \mathit{tf}} \qquad \frac{\mathit{tf} = t_1^* \to t_2^* \qquad C_{\text{table}} = n}{C \vdash \textbf{call\_indirect}\ \mathit{tf} : t_1^*\,\textsf{i32} \to t_2^*}$$

$$\frac{C_{\text{local}}(i) = t}{C \vdash \textbf{get\_local}\ i : \epsilon \to t} \quad \frac{C_{\text{local}}(i) = t}{C \vdash \textbf{set\_local}\ i : t \to \epsilon} \quad \frac{C_{\text{local}}(i) = t}{C \vdash \textbf{tee\_local}\ i : t \to t} \quad \frac{C_{\text{global}}(i) = \text{mut}^?\,t}{C \vdash \textbf{get\_global}\ i : \epsilon \to t} \quad \frac{C_{\text{global}}(i) = \text{mut}\,t}{C \vdash \textbf{set\_global}\ i : t \to \epsilon}$$

$$\frac{C_{\text{memory}} = n \qquad 2^a \leq (|tp| <)^?|t| \qquad (tp\_sz)^? = \epsilon \vee t = \textbf{im}}{C \vdash t.\textbf{load}\ (tp\_sz)^?\ a\ o : \textsf{i32} \to t} \qquad \frac{C_{\text{memory}} = n \qquad 2^a \leq (|tp| <)^?|t| \qquad tp^? = \epsilon \vee t = \textbf{im}}{C \vdash t.\textbf{store}\ tp^?\ a\ o : \textsf{i32}\,t \to \epsilon}$$

$$\frac{C_{\text{memory}} = n}{C \vdash \textbf{current\_memory} : \epsilon \to \textsf{i32}} \qquad \frac{C_{\text{memory}} = n}{C \vdash \textbf{grow\_memory} : \textsf{i32} \to \textsf{i32}}$$

$$\overline{C \vdash \epsilon : \epsilon \to \epsilon} \qquad \frac{C \vdash e_1^* : t_1^* \to t_2^* \qquad C \vdash e_2 : t_2^* \to t_3^*}{C \vdash e_1^*\,e_2 : t_1^* \to t_3^*} \qquad \frac{C \vdash e^* : t_1^* \to t_2^*}{C \vdash e^* : t^*\,t_1^* \to t^*\,t_2^*}$$

Typing Modules

$$\frac{\mathit{tf} = t_1^* \to t_2^* \qquad C, \text{local}\ t_1^*\,t^*, \text{label}\,(t_2^*), \text{return}\,(t_2^*) \vdash e^* : \epsilon \to t_2^*}{C \vdash ex^*\ \textbf{func}\ \mathit{tf}\ \textbf{local}\ t^*\ e^* : ex^*\ \mathit{tf}} \qquad \frac{\mathit{tg} = \text{mut}^?\,t \qquad C \vdash e^* : \epsilon \to t \qquad ex^* = \epsilon \vee \mathit{tg} = t}{C \vdash ex^*\ \textbf{global}\ \mathit{tg}\ e^* : ex^*\ \mathit{tg}}$$

$$\frac{(C_{\text{func}}(i) = \mathit{tf})^n}{C \vdash ex^*\ \textbf{table}\ n\ i^n : ex^*\ n} \qquad \overline{C \vdash ex^*\ \textbf{memory}\ n : ex^*\ n}$$

$$\overline{C \vdash ex^*\ \textbf{func}\ \mathit{tf}\ im : ex^*\ \mathit{tf}} \qquad \frac{\mathit{tg} = t}{C \vdash ex^*\ \textbf{global}\ \mathit{tg}\ im : ex^*\ \mathit{tg}} \qquad \overline{C \vdash ex^*\ \textbf{table}\ n\ im : ex^*\ n} \qquad \overline{C \vdash ex^*\ \textbf{memory}\ n\ im : ex^*\ n}$$

$$\frac{(C \vdash f : ex_f^*\ \mathit{tf})^* \qquad (C_i \vdash glob_i : ex_g^*\ \mathit{tg}_i)_i^* \qquad (C \vdash tab : ex_t^*\ n)^? \qquad (C \vdash mem : ex_m^*\ n)^?}{(C_i = \{\text{global}\ \mathit{tg}^{i-1}\})_i^* \qquad C = \{\text{func}\ \mathit{tf}^*, \text{global}\ \mathit{tg}^*, \text{table}\ n^?, \text{memory}\ n^?\} \qquad ex_f^{**}\ ex_g^{**}\ ex_t^{*?}\ ex_m^{*?}\ \text{distinct}}{\vdash \textbf{module}\ f^*\ glob^*\ tab^?\ mem^?}$$

The desktop is still moving to the web