Your Paper

You

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1 primitive operations

1.1 int operations

$$\frac{}{n_1 + n_2 \rightsquigarrow \textbf{return} n_1 + n_2}$$

$$\frac{}{n_1 - n_2 \rightsquigarrow \textbf{return} n_1 - n_2}$$

$$\frac{}{n_1 * n_2 \rightsquigarrow \textbf{return} n_1 \cdot n_2}$$

$$\frac{}{n_1 / n_2 \rightsquigarrow \textbf{return} n_1 / n_2}$$

$$\frac{}{n_1 \% n_2 \rightsquigarrow \textbf{return} n_1 \% n_2}$$

$$\frac{}{-n \rightsquigarrow \textbf{return} - n}$$

1.2 float operations

$$\frac{}{n_1 + .n_2 \rightsquigarrow \textbf{return} n_1 + n_2}$$

$$\frac{}{n_1 - .n_2 \rightsquigarrow \textbf{return} n_1 - n_2}$$

$$\frac{}{n_1 * .n_2 \rightsquigarrow \textbf{return} n_1 \cdot n_2}$$

$$\frac{}{n_1 /. n_2 \rightsquigarrow \textbf{return} \frac{n_1}{n_2}}$$

$$\frac{}{n_1 \%. n_2 \rightsquigarrow \textbf{return} n_1 \% n_2}$$

$$\frac{}{-.n \rightsquigarrow \textbf{return} - n}$$

$$\frac{}{n_1 ** n_2 \rightsquigarrow \textbf{return} n_1^{n_2}}$$

1.3 bool operations

$$\frac{n_1 < n_2}{n_1 < n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 \not< n_2}{n_1 < n_2 \rightsquigarrow \mathbf{false}}$$

$$\frac{n_1 > n_2}{n_1 > n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 \not> n_2}{n_1 > n_2 \rightsquigarrow \mathbf{false}}$$

$$\frac{n_1 \leq n_2}{n_1 <= n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 \not\leq n_2}{n_1 <= n_2 \rightsquigarrow \mathbf{false}}$$

$$\frac{n_1 \geq n_2}{n_1 >= n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 \not\geq n_2}{n_1 >= n_2 \rightsquigarrow \mathbf{false}}$$

$$\frac{n_1 = n_2}{n_1 = n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 \neq n_2}{n_1 = n_2 \rightsquigarrow \mathbf{false}}$$

$$\frac{n_1 \neq n_2}{n_1 <> n_2 \rightsquigarrow \mathbf{true}}$$

$$\frac{n_1 = n_2}{n_1 <> n_2 \rightsquigarrow \mathbf{false}}$$

2 Functions and computations

$$\frac{}{(\mathbf{fun}\, x \to T)V \rightsquigarrow T[V/x]}$$

$$\frac{}{(\mathbf{fun}\, f\, x = T)V \rightsquigarrow T[V/x]}$$

$$\frac{}{(\mathbf{rec}\,\mathbf{fun}\, f\, x = T)V \rightsquigarrow T[V/x, (\mathbf{rec}\,\mathbf{fun}\, f\, x = T)/f]}$$

$$\frac{}{\mathbf{fst}(V_1, V_2) \rightsquigarrow \mathbf{return} V_1}$$

$$\frac{}{\mathbf{snd}(V_1, V_2) \rightsquigarrow \mathbf{return} V_2}$$

$$\frac{}{xs\,@\,ys \rightsquigarrow (@)\ xs\ ys}$$

the append operation for lists is in the Millet standard library and is denoted with (@) as is standard for ML style languages.

$$\frac{T_1 \rightsquigarrow T_1'}{\mathbf{let} x = T_1 \mathbf{in} T_2 \rightsquigarrow \mathbf{let} x = T_1' \mathbf{in} T_2}$$

$$\frac{}{\mathbf{let} x = V \mathbf{in} T \rightsquigarrow T[V/x]}$$

$$\frac{}{\mathbf{match} [\,] \mathbf{with} [\,] \rightarrow T_1 | x :: xs \rightarrow T_2 \rightsquigarrow T_1}$$

$$\frac{}{\mathbf{match} V_1 :: V_2 \mathbf{with} [\,] \rightarrow T_1 | x :: xs \rightarrow T_2 \rightsquigarrow T_2[V_1/x, V_2/xs]}$$

$$\frac{}{\mathbf{match}\, \mathbf{inl} V \mathbf{with}\ \mathbf{inl} x_1 \rightarrow T_1 | \mathbf{inr} x_2 \rightarrow T_2 \rightsquigarrow T_1[V/x_1]}$$

$$\frac{}{\mathbf{match}\, \mathbf{inr} V \mathbf{with}\ \mathbf{inl} x_1 \rightarrow T_1 | \mathbf{inr} x_2 \rightarrow T_2 \rightsquigarrow T_2[V/x_2]}$$

$$\frac{}{\mathbf{if}\, \mathbf{true}\, \mathbf{then} T_1 \mathbf{else} T_2 \rightsquigarrow T_1}$$

$$\frac{}{\mathbf{if}\, \mathbf{true}\, \mathbf{then} T_1 \mathbf{else} T_2 \rightsquigarrow T_2}$$