Grammar - Types

(Base types) $\quad A, B ::= \texttt{unit} \mid A_1 \oplus ... \oplus A_n \mid A_1 \otimes ... \otimes A_n \mid \mu X.A \mid X$

(Isos) $\quad\quad\quad T ::= A \leftrightarrow B \mid T_1 \rightarrow T_2$

Grammar - Terms

(Values) $\quad\quad\quad v ::= () \mid x \mid c\, v \mid (v_1, ..., v_n)$

(Patterns) $\quad\quad\quad p ::= x \mid (p_1, ..., p_n)$

(Expressions) $\quad\quad e ::= v \mid \texttt{let } p_1 = \omega\, p_2 \texttt{ in } e$

(Isos) $\quad\quad\quad\quad \omega ::= \{v_1 \leftrightarrow e_1 \mid ... \mid v_n \leftrightarrow e_n\} \mid \lambda\phi.\omega \mid \phi \mid \omega_1\, \omega_2$

(Terms) $\quad\quad\quad\quad t ::= () \mid x \mid (t_1, ..., t_n) \mid \omega\, t \mid \texttt{let } p = t_1 \texttt{ in } t_2$

Typing Rules - Terms

$$\frac{}{\Psi; \emptyset \vdash () : \texttt{unit}} \qquad \frac{}{\Psi; x : A \vdash x : A} \qquad \frac{\Psi; \Delta_1 \vdash t_1 : A_1 \quad ... \quad \Psi; \Delta_n \vdash t_n : A_n}{\Psi; \Delta \vdash (t_1, ..., t_n) : A_1 \otimes ... \otimes A_n}$$

$$\frac{\Psi \vdash_\omega \omega : A \leftrightarrow B \quad \Psi; \Delta \vdash t : A}{\Psi; \Delta \vdash \omega\, t : B}$$

$$\frac{\Psi; \Delta_1 \vdash t_1 : A_1 \otimes ... \otimes A_n \quad \Psi; \Delta_2 \vdash x_1 : A_1, ..., x_n : A_n \vdash t_2 : B}{\Psi; \Delta_1, \Delta_2 \vdash \texttt{let } (x_1, .., x_n) = t_1 \texttt{ in } t_2 : B}$$

Typing Rules - Isos

$$\frac{}{\Psi; \phi : T \vdash_\omega \phi : T} \qquad \frac{\Psi \vdash_\omega \omega_1 : T_1 \quad \Psi \vdash_\omega \omega_2 : T_1 \rightarrow T_2}{\Psi \vdash_\omega \omega_2\, \omega_1 : T_2} \qquad \frac{\Psi, \phi : T_1 \vdash_\omega \omega : T_2}{\Psi \vdash_\omega \lambda\phi.\omega : T_1 \rightarrow T_2}$$

$$\frac{\Psi; \Delta_1 \vdash v_1 : A \quad ... \quad \Psi; \Delta_n \vdash v_n : A \quad \forall i \neq j, v_i \perp v_j \quad \Psi; \Delta_1 \vdash e_1 : B \quad ... \quad \Psi; \Delta_n \vdash e_n : B \quad \forall i \neq j, e_i \perp e_j}{\Psi \vdash_\omega \{v_1 \leftrightarrow e_1 \mid ... \mid v_n \leftrightarrow e_n\} : A \leftrightarrow B}$$