

- Value terms
  - Var  $x$
  - lambda  $\lambda x : A.C$
  - const  $\mathbb{C}^A$
  - unit  $()$
  - true **true**
  - false **false**
- Computation terms
  - If  $\text{if}_{\epsilon,A} v \text{ then } C_1 \text{ else } C_2$
  - Application  $V_1 V_2$
  - Do  $\text{do } x \leftarrow C_1 \text{ in } C_2$
  - return **return**  $V$
- Type System
  - (Unit)  $\frac{}{\Gamma \vdash () : \mathbf{Unit}}$
  - (True)  $\frac{}{\Gamma \vdash \mathbf{true} : \mathbf{Bool}}$
  - (False)  $\frac{}{\Gamma \vdash \mathbf{false} : \mathbf{Bool}}$
  - (Var)  $\frac{}{\Gamma, x : A \vdash X : A}$
  - (Weaken)  $\frac{\Gamma \vdash x : A}{\Gamma, y : B \vdash X : A} \text{ (if } x \neq y \text{)}$
  - (Fn)  $\frac{\Gamma, x : A \vdash C : \mathbf{M}_\epsilon B}{\Gamma \vdash \lambda x : A. C : A \rightarrow \mathbf{M}_\epsilon B}$
  - (Sub)  $\frac{\Gamma \vdash v : AA \leq B}{\Gamma \vdash v : B}$
  - (Return)  $\frac{\Gamma \vdash v : A}{\Gamma \vdash \mathbf{return } v : \mathbf{M}_1 A}$
  - (Apply)  $\frac{\Gamma \vdash v_1 : A \rightarrow \mathbf{M}_\epsilon B \quad \Gamma \vdash v_2 : A}{\Gamma \vdash v_1 v_2 : \mathbf{M}_\epsilon B}$
  - (if)  $\frac{\Gamma \vdash v : \mathbf{Bool} \quad \Gamma \vdash C_1 : \mathbf{M}_\epsilon A \quad \Gamma \vdash C_2 : \mathbf{M}_\epsilon A}{\Gamma \vdash \text{if}_{\epsilon,A} v \text{ then } C_1 \text{ else } C_2 : \mathbf{M}_\epsilon A}$
  - (Do)  $\frac{\Gamma \vdash C_1 : \mathbf{M}_{\epsilon_1} A \quad \Gamma, x : A \vdash C_2 : \mathbf{M}_{\epsilon_2} B}{\Gamma \vdash \text{do } x \leftarrow C_1 \text{ in } C_2 : \mathbf{M}_{\epsilon_1, \epsilon_2} B}$
  - (Subeffect)  $\frac{\Gamma \vdash C : \mathbf{M}_{\epsilon_1} AA \leq B \quad \epsilon_1 \leq \epsilon_2}{\Gamma \vdash C : \mathbf{M}_{\epsilon_2} B}$