

# LAMBDA

MODULE LAMBDA

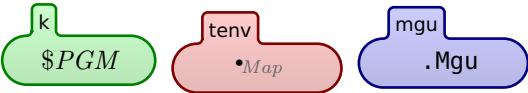
SYNTAX  $Exp ::= Int$   
|  $Bool$   
|  $Id$   
|  $(Exp)$  [bracket]  
|  $Exp\ Exp$  [strict]  
|  $Exp * Exp$  [strict]  
|  $Exp / Exp$  [strict]  
|  $Exp + Exp$  [strict]  
|  $Exp <= Exp$  [strict]  
|  $\text{lambda } Id . Exp$  [binder]  
|  $\text{if } Exp \text{ then } Exp \text{ else } Exp$  [strict]  
|  $\text{let } Id = Exp \text{ in } Exp$   
|  $\text{letrec } Id\ Id = Exp \text{ in } Exp$   
|  $\text{mu } Id . Exp$  [binder]

SYNTAX  $Type ::= \text{int}$   
|  $\text{bool}$   
|  $Type \rightarrow Type$   
|  $(Type)$  [bracket]

SYNTAX  $Exp ::= Type$

SYNTAX  $KResult ::= Type$

CONFIGURATION:



RULE  $\frac{I}{\text{int}}$

RULE  $\frac{B}{\text{bool}}$

RULE  $\frac{\frac{X}{T}}{X \mapsto T}$

RULE  $\frac{T1 * T2}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE  $\frac{T1 / T2}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE  $\frac{T1 + T2}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE  $\frac{T1 <= T2}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{bool}}$

SYNTAX  $Exp ::= Exp \rightarrow Exp$  [strict]

RULE  $\frac{\frac{\text{lambda } X . E}{T \rightarrow E \curvearrowright \text{tenv}(TEnv)}}{\frac{TEnv}{TEnv[T / X]}}$  requires  $\text{fresh}(T)$

RULE  $\frac{T1\ T2}{T1 = (T2 \rightarrow T) \curvearrowright T}$  requires  $\text{fresh}(T)$

RULE  $\frac{\text{if } T \text{ then } T1 \text{ else } T2}{T = \text{bool} \curvearrowright T1 = T2 \curvearrowright T1}$

RULE  $\frac{\text{let } X = E \text{ in } E'}{E'[E / X]}$  [macro]

RULE  $\frac{\text{letrec } F\ X = E \text{ in } E'}{\text{let } F = \text{mu } F . \text{lambda } X . E \text{ in } E'}$  [macro]

RULE  $\frac{\frac{\text{mu } X . E}{(T \rightarrow T)\ E \curvearrowright \text{tenv}(TEnv)}}{\frac{TEnv}{TEnv[T / X]}}$  requires  $\text{fresh}(T)$

SYNTAX  $K ::= Type = Type$

RULE  $\frac{\frac{T = T'}{\bullet_K}}{\frac{\theta}{\text{updateMgu}(\theta, T, T')}} \text{mgu}$

RULE  $\frac{T}{\theta(T)} \text{mgu}$

SYNTAX  $K ::= \text{tenv}(Map)$

RULE  $\frac{T \curvearrowright \text{tenv}(TEnv)}{\bullet_K} \text{tenv}$

END MODULE