

# LAMBDA

MODULE LAMBDA

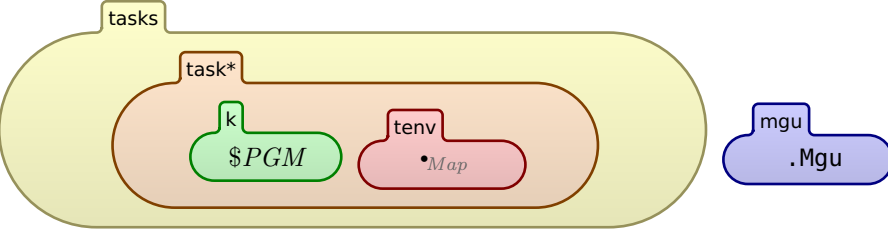
SYNTAX  $Exp ::= Int$   
|  $Bool$   
|  $Id$   
|  $(Exp)$  [bracket]  
|  $Exp\ Exp$   
|  $Exp * Exp$   
|  $Exp / Exp$   
|  $Exp + Exp$   
|  $Exp \leq Exp$   
|  $lambda\ Id.\ Exp$   
|  $if\ Exp\ then\ Exp\ else\ Exp$   
|  $let\ Id = Exp\ in\ Exp$   
|  $letrec\ Id\ Id = Exp\ in\ Exp$   
|  $mu\ Id.\ Exp$

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

SYNTAX  $Exp ::= Type$

SYNTAX  $KResult ::= Type$

CONFIGURATION:



RULE  $\frac{I}{int}$

RULE  $\frac{B}{bool}$

RULE  $\frac{\frac{k}{X}}{T} \quad \frac{tenv}{X \mapsto T}$

RULE  $\frac{\frac{k}{E1 * E2}}{int} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = int} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = int} \quad \frac{tenv}{\rho} \end{array} \right)$

RULE  $\frac{\frac{k}{E1 / E2}}{int} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = int} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = int} \quad \frac{tenv}{\rho} \end{array} \right)$

RULE  $\frac{\frac{k}{E1 + E2}}{int} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = int} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = int} \quad \frac{tenv}{\rho} \end{array} \right)$

RULE  $\frac{\frac{k}{E1 \leq E2}}{bool} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = int} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = int} \quad \frac{tenv}{\rho} \end{array} \right)$

RULE  $\frac{\frac{k}{lambda\ X.\ E}}{Tx \rightarrow Te} \quad \frac{tenv}{TEnv}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E = Te} \quad \frac{tenv}{TEnv[Tx / X]} \end{array} \right)$  requires  $fresh(Tx) \wedge_{Bool} fresh(Te)$

RULE  $\frac{\frac{k}{E1\ E2}}{T} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = T2 \rightarrow T} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = T2} \quad \frac{tenv}{\rho} \end{array} \right)$  requires  $fresh(T2) \wedge_{Bool} fresh(T)$

RULE  $\frac{\frac{k}{if\ E\ then\ E1\ else\ E2}}{T} \quad \frac{tenv}{\rho}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E = bool} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E1 = T} \quad \frac{tenv}{\rho} \end{array} \right)$   
 $\left( \begin{array}{c} \text{task} \\ \frac{k}{E2 = T} \quad \frac{tenv}{\rho} \end{array} \right)$  requires  $fresh(T)$

RULE  $\frac{let\ X = E\ in\ E'}{(lambda\ X.\ E')\ E}$  [macro]

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

RULE  $\frac{\frac{k}{mu\ X.\ E}}{T} \quad \frac{tenv}{TEnv}$   $\xrightarrow{*Bag}$   $\left( \begin{array}{c} \text{task} \\ \frac{k}{E = T} \quad \frac{tenv}{TEnv[T / X]} \end{array} \right)$  requires  $fresh(T)$

SYNTAX  $K ::= Exp = Exp$  [strict]

RULE  $\frac{\frac{k}{T = T'}}{*K} \quad \frac{mgu}{\theta} \quad \frac{}{updateMgu(\theta, T, T')}$

RULE  $\left( \begin{array}{c} \text{tasks} \\ \left( \begin{array}{c} \text{task} \\ \frac{k}{T} \quad \frac{}{\theta(T)} \end{array} \right) \end{array} \right) \quad \frac{mgu}{\theta} \quad \frac{}{*K}$

RULE  $\frac{\left( \begin{array}{c} \text{task} \\ \frac{k}{*K} \end{array} \right)}{*Bag}$

END MODULE