LAMBDA

MODULE LAMBDA

SYNTAX $\mathit{Val} ::= \mathit{Id}$
$\quad\mid\ \lambda \mathit{Id}.\mathit{Exp}$ [binder]

SYNTAX $\mathit{Exp} ::= \mathit{Val}$
$\quad\mid\ \mathit{Exp}\ \ \mathit{Exp}$ [strict]
$\quad\mid\ (\mathit{Exp})$ [bracket]

SYNTAX $\mathit{KResult} ::= \mathit{Val}$

RULE $$\frac{(\lambda X{:}\mathit{Id}.E{:}\mathit{Exp})\ \ V{:}\mathit{Val}}{E[V\ /\ X]}$$

SYNTAX $\mathit{Val} ::= \mathit{Int}$
$\quad\mid\ \mathit{Bool}$

SYNTAX $\mathit{Exp} ::= \mathit{Exp} * \mathit{Exp}$ [strict]
$\quad\mid\ \mathit{Exp}\ /\ \mathit{Exp}$ [strict]
$\quad\mid\ \mathit{Exp} + \mathit{Exp}$ [strict]
$\quad\mid\ \mathit{Exp} <= \mathit{Exp}$ [strict]

RULE $$\frac{I1{:}\mathit{Int} * I2{:}\mathit{Int}}{I1 *_{\mathit{Int}} I2}$$

RULE $$\frac{I1{:}\mathit{Int}\ /\ I2{:}\mathit{Int}}{I1 \div_{\mathit{Int}} I2}$$

RULE $$\frac{I1{:}\mathit{Int} + I2{:}\mathit{Int}}{I1 +_{\mathit{Int}} I2}$$

RULE $$\frac{I1{:}\mathit{Int} <= I2{:}\mathit{Int}}{I1 \leq_{\mathit{Int}} I2}$$

SYNTAX $\mathit{Exp} ::=$ if Exp then Exp else Exp [strict(1)]

RULE $$\frac{\texttt{if true then } E \texttt{ else } —}{E}$$

RULE $$\frac{\texttt{if false then } — \texttt{ else } E}{E}$$

SYNTAX $\mathit{Exp} ::=$ let Id = Exp in Exp

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

SYNTAX $\mathit{Exp} ::=$ letrec $\mathit{Id}\ \ \mathit{Id}$ = Exp in Exp
$\quad\mid\ \mu \mathit{Id}.\mathit{Exp}$ [binder]

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

RULE $$\frac{\mu X.E}{E[(\mu X.E)\ /\ X]}$$

END MODULE