LAMBDA

MODULE LAMBDA

SYNTAX $Val ::= Id$
$\mid \lambda Id.Exp$ [binder]

SYNTAX $Exp ::= Val$
$\mid Exp\ \ Exp$ [strict]
$\mid (Exp)$ [bracket]

SYNTAX $Variable ::= Id$

SYNTAX $KResult ::= Val$

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

SYNTAX $Val ::= Int$
$\mid Bool$

SYNTAX $Exp ::= Exp * Exp$ [strict]
$\mid Exp\ /\ Exp$ [strict]
$\mid Exp + Exp$ [strict]
$\mid Exp <= Exp$ [strict]

RULE $\dfrac{I1{:}Int * I2{:}Int}{I1 *_{Int} I2}$

RULE $\dfrac{I1{:}Int\ /\ I2{:}Int}{I1 \div_{Int} I2}$

RULE $\dfrac{I1{:}Int + I2{:}Int}{I1 +_{Int} I2}$

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

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

RULE $\dfrac{\texttt{if true then}\ E\ \texttt{else}\ \_}{E}$

RULE $\dfrac{\texttt{if false then}\ \_\ \texttt{else}\ E}{E}$

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

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

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

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

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

END MODULE