LAMBDA

MODULE LAMBDA

SYNTAX *Type* ::= `int`
| `bool`
| *Type* `->` *Type*
| (*Type*) [bracket]

SYNTAX *Exp* ::= *Id*
| `lambda` *Id* `:` *Type* `.` *Exp* [binder]
| *Exp* *Exp* [strict]
| (*Exp*) [bracket]

SYNTAX *Exp* ::= *Type*

SYNTAX *Variable* ::= *Id*

SYNTAX *KResult* ::= *Type*

SYNTAX *Exp* ::= *Exp* `->` *Exp* [strict]

RULE $\dfrac{\texttt{lambda}\ X\ \texttt{:}\ T\ \texttt{.}\ E{:}Exp}{T\ \texttt{->}\ \overset{\bullet}{E}[T\ \texttt{/}\ X]}$

RULE $\dfrac{(T1\ \texttt{->}\ T2)\ \ T1}{\overset{\bullet}{T2}}$

SYNTAX *Exp* ::= *Int*
| *Bool*
| *Exp* `*` *Exp* [strict]
| *Exp* `/` *Exp* [strict]
| *Exp* `+` *Exp* [strict]
| *Exp* `<=` *Exp* [strict]

RULE $\dfrac{\text{—}{:}\text{Int}}{\overset{\bullet}{\texttt{int}}}$

RULE $\dfrac{\text{—}{:}\text{Bool}}{\overset{\bullet}{\texttt{bool}}}$

RULE $\dfrac{\texttt{int}\ \texttt{*}\ \texttt{int}}{\overset{\bullet}{\texttt{int}}}$

RULE $\dfrac{\texttt{int}\ \texttt{/}\ \texttt{int}}{\overset{\bullet}{\texttt{int}}}$

RULE $\dfrac{\texttt{int}\ \texttt{+}\ \texttt{int}}{\overset{\bullet}{\texttt{int}}}$

RULE $\dfrac{\texttt{int}\ \texttt{<=}\ \texttt{int}}{\overset{\bullet}{\texttt{bool}}}$

SYNTAX *Exp* ::= `if` *Exp* `then` *Exp* `else` *Exp* [strict]

RULE $\dfrac{\texttt{if}\ \texttt{bool}\ \texttt{then}\ T{:}Type\ \texttt{else}\ T}{\overset{\bullet}{T}}$

SYNTAX *Exp* ::= `let` *Id* `:` *Type* `=` *Exp* `in` *Exp*

RULE $\dfrac{\texttt{let}\ X\ \texttt{:}\ T\ \texttt{=}\ E\ \texttt{in}\ E'}{(\ \texttt{lambda}\ X\ \texttt{:}\ T\ \texttt{.}\ E')\ \ E}$ [macro]

SYNTAX *Exp* ::= `letrec` *Id* `:` *Type* *Id* `:` *Type* `=` *Exp* `in` *Exp*
| `mu` *Id* `:` *Type* `.` *Exp* [binder]

RULE $\dfrac{\texttt{letrec}\ F\ \texttt{:}\ T1\ \ X\ \texttt{:}\ T2\ \texttt{=}\ E\ \texttt{in}\ E'}{\texttt{let}\ F\ \texttt{:}\ T1\ \texttt{=}\ \texttt{mu}\ F\ \texttt{:}\ T1\ \texttt{.}\ \texttt{lambda}\ X\ \texttt{:}\ T2\ \texttt{.}\ E\ \texttt{in}\ E'}$ [macro]

RULE $\dfrac{\texttt{mu}\ X\ \texttt{:}\ T\ \texttt{.}\ E}{(T\ \texttt{->}\ T)\ \ (E[T\ \texttt{/}\ X])}$

END MODULE