TADs Básicos

tad Bool **where**

true : Bool
false : Bool
$\neg$: Bool $\to$ Bool
and : Bool $\to$ Bool $\to$ Bool
or : Bool $\to$ Bool $\to$ Bool
$(\Rightarrow)$: Bool $\to$ Bool $\to$ Bool
if _ then _ else _ : Bool $\to$ E $\to$ E $\to$ E

$$
\begin{aligned}
\neg \text{ true} &= \text{false} \\
\neg \text{ false} &= \text{true} \\
\text{and true } x &= b \\
\text{and false } x &= \text{false} \\
\text{or true } x &= \text{true} \\
\text{or false } x &= x \\
\text{true} \Rightarrow x &= x \\
\text{false} \Rightarrow x &= \text{true} \\
\text{if true then } x \text{ else } y &= x \\
\text{if true then } x \text{ else } y &= y
\end{aligned}
$$

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tad Nat **where**

import Bool

0 : Nat
succ : Nat $\to$ Nat
$(>)$: Nat $\to$ Nat $\to$ Bool
$(\equiv)$: Nat $\to$ Nat $\to$ Bool
$(+)$: Nat $\to$ Nat $\to$ Nat
$(-)$: Nat $\to$ Nat $\to$ Nat

$$
\begin{aligned}
x + 0 &= x \\
x + (\text{succ } y) &= \text{succ } (x + y) \\
0 - x &= 0 \\
x - 0 &= x \\
(\text{succ } x) - (\text{succ } y) &= x - y \\
0 \equiv 0 &= \text{true} \\
(\text{succ } x) \equiv 0 &= \text{false} \\
0 \equiv (\text{succ } y) &= \text{false} \\
0 > x &= \text{false} \\
(\text{succ } x) > 0 &= \text{true} \\
(\text{succ } x) > (\text{succ } y) &= x > y
\end{aligned}
$$

tad Int **where**
import Bool

0 : Int
succ : Int → Int
pred : Int → Int
neg : Int → Int
abs : Int → Int
$(+)$: Int → Int → Int
$(-)$: Int → Int → Int
$(*)$: Int → Int → Int
div : Int → Int → Int
mod : Int → Int → Int
min : Int → Int → Int
max : Int → Int → Int
$(>)$: Int → Int → Bool
$(\equiv)$: Int → Int → Bool

{– se considera la especificación usual para este tipo -}

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tad Tupla$_n$ $(A_1, \ldots, A_n : \text{Set})$ **where**
$p_1 : (A_1, \ldots, A_n) \to A_1$
...
$p_n : (A_1, \ldots, A_n) \to A_n$

$$\begin{aligned} p_1\ (x_1, \ldots, x_n) &= x_1 \\ &\ldots \\ p_n\ (x_1, \ldots, x_n) &= x_n \end{aligned}$$

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tad Maybe $(A : \text{Set})$ **where**
import Bool

Nothing : Maybe A
just : A → Maybe A
isNothing : Maybe A → Bool
fromJust : Maybe A → A

$$\begin{aligned} \text{isNothing}\ (\text{Nothing}) &= \text{true} \\ \text{isNothing}\ (\text{Just}\ x) &= \text{false} \\ \text{fromJust}\ (\text{Just}\ x) &= x \end{aligned}$$