Reinterpreate Types

1 INTRO

Here is a formalization of our type system.

2 CORE LANGUAGE

First, we'll define a small core language with basic integers, booleans, and functions.

$$
\begin{array}{rcll}
e & ::= & \mathbb{Z} \mid \mathbb{B} \mid x \mid \texttt{fun}\ x\ \texttt{->}\ e \mid e\ e & \textit{expressions} \\
x & ::= & \textit{(identifiers)} & \textit{variables} \\
v & ::= & \mathbb{Z} \mid \mathbb{B} \mid \texttt{fun}\ x\ \texttt{->}\ e \mid x & \textit{values} \\
\tau & ::= & \texttt{int} \mid \texttt{bool} \mid \tau\texttt{->}\tau & \textit{types}
\end{array}
$$

Fig. 1. Core language grammar

The typing rules of the system is defined as following:

Definition 2.1 (Typing rules).

(1) $\models e : \texttt{int}$ iff $e \Longrightarrow v, v \in \mathbb{Z}$.
(2) $\models e : \texttt{bool}$ iff $e \Longrightarrow v, v \in \mathbb{B}$.
(3) $\models e : \tau_1\texttt{->}\tau_2$ iff $\forall v$ such that $\models v : \tau_1$, $\models e\ v : \tau_2$.