MiniScala v2

Grammar

Exp	::=	IntLit
	|	Exp BinOp Exp
	|	UnOp Exp
	|	`(` Exp `)`
	|	Var
	|	`{` Decl `;` Exp `}`
IntLit	::=	`0` | `1` | `2` | ...
BinOp	::=	`+` | `-` | `*` | `/` | `%` | `max`
UnOp	::=	`-`
Var	::=	`x` | `y` | `z` | ...
Decl	::=	`val` Var `=` Exp

$\mathsf{VarEnv} \vdash \mathsf{Exp} \Rightarrow \mathbb{Z}$
$\mathsf{VarEnv} \vdash \mathsf{Decl} \Rightarrow \mathsf{VarEnv}$

Operational Semantics

IntLit
$$\frac{i \in \mathsf{IntLit} \text{ is the repr. of } v \in \mathbb{Z}}{\rho \vdash i \Rightarrow v}$$

Lookup
$$\frac{\rho(x) = v}{\rho \vdash x \Rightarrow v}$$

IntPlus
$$\frac{\rho \vdash e_1 \Rightarrow v_1 \qquad \rho \vdash e_2 \Rightarrow v_2 \qquad v_1, v_2 \in \mathbb{Z} \qquad v = v_1 + v_2}{\rho \vdash e_1 \texttt{ + } e_2 \Rightarrow v}$$

IntNeg
$$\frac{\rho \vdash e \Rightarrow v' \qquad v' \in \mathbb{Z} \qquad v = -v'}{\rho \vdash \texttt{-}e \Rightarrow v}$$

Block
$$\frac{\rho \vdash d \Rightarrow \rho' \qquad \rho' \vdash e \Rightarrow v}{\rho \vdash \texttt{\{ } d \texttt{ ; } e \texttt{ \}} \Rightarrow v}$$

ValDecl
$$\frac{\rho \vdash e \Rightarrow v \qquad \rho' = \rho[x \mapsto v]}{\rho \vdash \texttt{val } x \texttt{ = } e \Rightarrow \rho'}$$

Rules for `-`, `*`, `/`, `%`, and `max` are omitted.