id	::=			
v	::=			Values
	|	**b**		Boolean
	|	**n**		Number
	|	**str**		String
	|	**undefined**		Undefined
	|	**null**		null
	|	$get(s, id)$	M	GetStore
s	::=			Store
	|	$put(s, id, v)$	M	PutStore
vd	::=			VariableDeclaration
	|	id		Declaration
	|	$id = e$		Definition
	|	vd, vd'		Multiple
e	::=			Expression
	|	v		Value
	|	id		Deref
	|	$id = e$		Ref
m	::=			Statement
	|	e		Expression
	|	ϵ		Skip
	|	$m; m'$		Seq
	|	**var** vd		VarDeclaration
T	::=			Value Type
	|	**number**		Number
	|	**boolean**		Boolean
	|	**string**		String
	|	**undefined**		undefined
	|	**null**		null
Γ	::=			Context
	|	$\varnothing$		EmptyContext
	|	$\{\Gamma\}$		SingletonContext
	|	$\Gamma \cup \Gamma'$		UnionContext
	|	$id : T$		ContextItem
R	::=			Relations
	|	$=$		Equals
	|	$!=$		NotEquals
	|	$\in$		Contains
	|	$\notin$		NotContains

Eq	::=		Equations
	|	$Eq\ R\ Eq'$	com Equality
	|	C	ConstraintFormula
	|	Γ	ContextFormula
	|	X	VariableFormula
	|	T	TypeFormula
	|	id	IDFormula
	|	$func$	FuncFormula
C	::=		Constraint
	|	$\varnothing$	EmptyConstraint
	|	$C \cup C'$	UnionConstraint
	|	$C \cap C'$	IntersectConstraint
	|	$\{Eq\}$	ConstraintEquation
	|	C	BracketedConstraint
X	::=		Variable
	|	$\varnothing$	EmptyVariable
	|	$\{T\}$	SingletonVariable
	|	$X \cup X'$	UnionVariable
	|	$X \cap X'$	IntersectVariable
	|	$FV(T)$	FreeVars
$func$	::=		Function
	|	$dom(\Gamma)$	
$terminals$	::=		
	|	$\rightarrow$	
	|	Γ	
	|	$\vdash$	
	|	;	
	|	**var**	
	|	$\varnothing$	
$formula$	::=		
	|	$judgement$	
Jop	::=		
	|	$\langle m, s\rangle \rightarrow \langle m', s'\rangle$	
	|	$\mathbf{g}\,(id) = \mathbf{t}$	
	|	$\Gamma(id) = T$	M
	|	Eq	M
	|	$\Gamma \vdash e : T \ \mid_X C, \Gamma'$	
	|	$\Gamma \vdash m \ \mid_X C, \Gamma'$	
$judgement$	::=		
	|	Jop	

$$
\begin{array}{lll}
\textit{user\_syntax} & ::= & \\
& | & \textit{id} \\
& | & \textit{v} \\
& | & \textit{s} \\
& | & \textit{vd} \\
& | & \textit{e} \\
& | & \textit{m} \\
& | & \textit{T} \\
& | & \Gamma \\
& | & \textit{R} \\
& | & \textit{Eq} \\
& | & \textit{C} \\
& | & \textit{X} \\
& | & \textit{func} \\
& | & \textit{terminals}
\end{array}
$$

$\boxed{\langle m, s\rangle \to \langle m', s'\rangle}$

$$\frac{}{\langle v; e, s\rangle \to \langle e, s\rangle}\ \text{SEQ1}$$

$$\frac{\langle e_1, s\rangle \to \langle e_1', s'\rangle}{\langle e_1; e_2, s\rangle \to \langle e_1'; e_2, s'\rangle}\ \text{SEQ2}$$

$$\frac{\langle e, s\rangle \to \langle e', s'\rangle}{\langle id = e, s\rangle \to \langle id = e', s'\rangle}\ \text{ASSIGN1}$$

$$\frac{}{\langle id = v, s\rangle \to \langle v, put(s, id, v)\rangle}\ \text{ASSIGN2}$$

$$\frac{}{\langle id, s\rangle \to \langle get(s, id), s\rangle}\ \text{DEREF}$$

$$\frac{}{\langle \textbf{var}\ id = e, s\rangle \to \langle id = e, s\rangle}\ \text{VAR1}$$

$$\frac{}{\langle \textbf{var}\ id, s\rangle \to \langle \textbf{undefined}, s\rangle}\ \text{VAR2}$$

$$\frac{}{\langle \textbf{var}\ vd, vd', s\rangle \to \langle \textbf{var}\ vd; \textbf{var}\ vd', s\rangle}\ \text{VAR3}$$

$\boxed{\mathbf{g}\,(id) = \mathbf{t}}$

$\boxed{\Gamma(id) = T}$

$\boxed{Eq}$

$\boxed{\Gamma \vdash e : T \ |_X \ C, \Gamma'}$

$$\frac{}{\Gamma \vdash \mathbf{n} : \textbf{number} \ |_\varnothing \ \varnothing, \Gamma}\ \text{V\_NUM}$$

$$\frac{}{\Gamma \vdash \mathbf{b} : \textbf{boolean} \ |_\varnothing \ \varnothing, \Gamma}\ \text{V\_BOOL}$$

$$\frac{}{\Gamma \vdash \mathbf{str} : \textbf{string} \ |_\varnothing \ \varnothing, \Gamma}\ \text{V\_STRING}$$

$$\frac{}{\Gamma \vdash \textbf{undefined} : \textbf{undefined} \ |_\varnothing \ \varnothing, \Gamma}\ \text{V\_UNDEFINED}$$

$$\frac{}{\Gamma \vdash \textbf{null} : \textbf{null} \ |_\varnothing \ \varnothing, \Gamma}\ \text{V\_NULL}$$

$$\frac{\Gamma(id) = T}{\Gamma \vdash id : T \ |_{\varnothing} \varnothing, \Gamma} \quad \textsc{IdType}$$

$$\frac{id \notin dom(\Gamma)}{\Gamma \vdash id : T \ |_{\{T\}} \varnothing, \Gamma \cup \{id : T\}} \quad \textsc{IdTypeUndef}$$

$$\frac{\begin{array}{l}\Gamma \vdash e : T_1 \ |_{X_1} \ C_1, \Gamma_1 \\ \Gamma_1 \vdash id : T_2 \ |_{X_2} \ C_2, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash id = e : T_2 \ |_{X_1 \cup X_2} \ C_1 \cup C_2 \cup \{T_2 = T_1\}, \Gamma_2} \quad \textsc{AssignType}$$

$\boxed{\Gamma \vdash m \ |_X \ C, \Gamma'}$

$$\frac{}{\Gamma \vdash \epsilon \ |_{\varnothing} \varnothing, \Gamma} \quad \textsc{SkipTypable}$$

$$\frac{}{\Gamma \vdash \textbf{var}\, id \ |_{\{T\}} \varnothing, \Gamma \cup \{id : T\}} \quad \textsc{DecTypable}$$

$$\frac{\Gamma \vdash e : T \ |_X \ C, \Gamma'}{\Gamma \vdash e \ |_X \ C, \Gamma'} \quad \textsc{ExpTypable}$$

$$\frac{\begin{array}{l}\Gamma \vdash m_1 \ |_{X_1} \ C_1, \Gamma_1 \\ \Gamma_1 \vdash m_2 \ |_{X_2} \ C_2, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash m_1; m_2 \ |_{X_1 \cup X_2} \ C_1 \cup C_2, \Gamma_2} \quad \textsc{SeqTypable}$$

$$\frac{\begin{array}{l}\Gamma \vdash \textbf{var}\, id \ |_{X_1} \ C, \Gamma_1 \\ \Gamma_1 \vdash id = e : T \ |_{X_2} \ C, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash \textbf{var}\, id = e \ |_{X_1 \cup X_2} \ C_1 \cup C_2, \Gamma_2} \quad \textsc{DefTypable}$$

$$\frac{\begin{array}{l}\Gamma \vdash \textbf{var}\, vd \ |_{X_1} \ C_1, \Gamma_1 \\ \Gamma_1 \vdash \textbf{var}\, vd' \ |_{X_1} \ C_2, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash \textbf{var}\, vd, vd' \ |_{X_1 \cup X_2} \ C_1 \cup C_2, \Gamma_2} \quad \textsc{MultiDecTypable}$$

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Definition rules:         22 good    0 bad
Definition rule clauses: 39 good    0 bad
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