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
Tv	::=			Value Type
	|	**number**		Number
	|	**boolean**		Boolean
	|	**string**		String
	|	**undefined**		undefined
	|	**null**		null
T	::=			Expression Type
	|	Tv		ValueType
	|	$ref\langle Tv \rangle$		Location Type
Γ	::=			Context
	|	$\varnothing$		EmptyContext
	|	$\{\Gamma\}$		SingletonContext
	|	$\Gamma \cup \Gamma'$		UnionContext
	|	$id : T$		ContextItem
R	::=			Relations

	$=$	Equals
	$!=$	NotEquals
	$\in$	Contains
	$\notin$	NotContains

Eq	::=	Equations
	$Eq\ R\ Eq'$	
	C	
	Γ	
	X	
	T	
	id	
	$func$	

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
	$dom(\Gamma)$	
	$FV(T)$	

$terminals$	::=	
	$\rightarrow$	
	Γ	
	$\vdash$	
	;	
	var	
	$\varnothing$	

$formula$	::=	
	$judgement$	

Jop	::=	
	$< m, s > \rightarrow < m', s' >$	
	$\Gamma(id) = T$	M
	$\Gamma(id) = T$	M

	Eq
|	$\Gamma \vdash e : T \ \|_X \ C, \Gamma'$
|	$\Gamma \vdash m \ \|_X \ C, \Gamma'$

judgement	::=	
	|	Jop

user_syntax	::=	
	|	id
	|	v
	|	s
	|	vd
	|	e
	|	m
	|	Tv
	|	T
	|	Γ
	|	R
	|	Eq
	|	C
	|	X
	|	$func$
	|	$terminals$

$\boxed{< m, s > \rightarrow < m', s' >}$

$$\frac{}{< v; e, s > \rightarrow < e, s >} \ \text{SEQ1}$$

$$\frac{< e_1, s > \rightarrow < e_1', s' >}{< e_1; e_2, s > \rightarrow < e_1'; e_2, s' >} \ \text{SEQ2}$$

$$\frac{< e, s > \rightarrow < e', s' >}{< id = e, s > \rightarrow < id = e', s' >} \ \text{ASSIGN1}$$

$$\frac{}{< id = v, s > \rightarrow < v, put(s, id, v) >} \ \text{ASSIGN2}$$

$$\frac{}{< id, s > \rightarrow < get(s, id), s >} \ \text{DEREF}$$

$$\frac{}{< \textbf{var}\ id = e, s > \rightarrow < id = e, s >} \ \text{VAR1}$$

$$\frac{}{< \textbf{var}\ id, s > \rightarrow < \textbf{undefined}, s >} \ \text{VAR2}$$

$$\frac{}{< \textbf{var}\ vd, vd', s > \rightarrow < \textbf{var}\ vd; \textbf{var}\ vd', s >} \ \text{VAR3}$$

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

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

$\boxed{Eq}$

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

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

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

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

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

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

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

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

$$\frac{\begin{array}{c}\Gamma \vdash e : Tv_1 \ |_{X_1} \ C_1, \Gamma_1 \\ \Gamma_1 \vdash id : T_2 \ |_{X_2} \ C_2, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash id = e : T_2 \ |_{X_1 \cup X_2} \ C_1 \cup C_2 \cup \{T_2 = Tv_1\}, \Gamma_2} \ \textsc{AssignType}$$

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

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

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

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

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

$$\frac{\begin{array}{c}\Gamma \vdash \mathbf{var}\, id \ |_{X_1} \ C, \Gamma_1 \\ \Gamma_1 \vdash id = e : T \ |_{X_2} \ C, \Gamma_2 \\ X_1 \cap X_2 = \varnothing\end{array}}{\Gamma \vdash m_1; m_2 \ |_{X_1 \cup X_2} \ C_1 \cup C_2, \Gamma_2} \ \textsc{DefTypable}$$

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

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