Term variables, x, y, z	variables
Type variables, a, b	type variables
Integer, i	

Monotypes, τ	$::=$			Monotypes
	$\mid$	$\mathtt{Int}$		
	$\mid$	a		
	$\mid$	$\tau_1 \rightarrow \tau_2$		
Rho-types, ρ	$::=$			Rho-types
	$\mid$	τ		
	$\mid$	(ρ)	S	
Polytypes, σ	$::=$			
	$\mid$	ρ		
	$\mid$	$\forall a.\sigma$	bind a in σ	
	$\mid$	$[a \mapsto \tau]\, \sigma$	M	
Terms, t, u	$::=$			
	$\mid$	i		Literal
	$\mid$	x		Variable
	$\mid$	$\lambda x.t$	bind x in t	Abstraction
	$\mid$	$t\ u$		Application
	$\mid$	$\lambda(x :: \sigma).t$	bind x in t	Typed abstraction
	$\mid$	$\mathtt{let}\ x = u\ \mathtt{in}\ t$	bind x in t	Local binding
	$\mid$	$t :: \sigma$		Type annotation
	$\mid$	(t)	S	
	$\mid$	$t\,[x \rightsquigarrow t']$	M	
value, v	$::=$			
	$\mid$	i		
	$\mid$	$\lambda x.t$	bind x in t	
	$\mid$	$\lambda(x :: \sigma).t$	bind x in t	
Typing contexts, Γ	$::=$			
	$\mid$	ϵ		empty context
	$\mid$	$\Gamma, x : \sigma$		assumption
fv	$::=$			
	$\mid$	$\mathit{fv}(t)$	M	
ftvany	$::=$			
	$\mid$	$\mathrm{ftv}(\tau)$	M	
	$\mid$	$\mathrm{ftv}(\rho)$	M	
	$\mid$	$\mathrm{ftv}(\sigma)$	M	
	$\mid$	$\mathrm{ftv}(\Gamma)$	M	
terminals	$::=$			
	$\mid$	$\longrightarrow$		
	$\mid$	$\rightarrow$		
	$\mid$	$::$		
	$\mid$	fv		
	$\mid$	ftv		

	$\|$	$\in$
	$\|$	$\notin$
	$\|$	$\vdash$
formula	$::=$	
	$\|$	*judgement*
	$\|$	$\mathsf{value}\, v$
	$\|$	$\mathsf{uniq}\, \Gamma$
	$\|$	$\mathsf{closed}\, \sigma$
	$\|$	$a \notin \mathit{ftvany}$
	$\|$	$x : \sigma \ \in \ \Gamma$
JTyping	$::=$	
	$\|$	$\Gamma \vdash t : \sigma$
JStep	$::=$	
	$\|$	$t \longrightarrow u$
judgement	$::=$	
	$\|$	*JTyping*
	$\|$	*JStep*
user_syntax	$::=$	
	$\|$	Term variables
	$\|$	Type variables
	$\|$	Integer
	$\|$	Monotypes
	$\|$	Rho-types
	$\|$	Polytypes
	$\|$	Terms
	$\|$	*value*
	$\|$	Typing contexts
	$\|$	*fv*
	$\|$	*ftvany*
	$\|$	*terminals*
	$\|$	*formula*

$\boxed{\Gamma \vdash t : \sigma}$

$$\frac{}{\Gamma \vdash i : \mathtt{Int}} \quad \text{TYP\_INT}$$

$$\frac{\begin{array}{c}\mathsf{uniq}\, \Gamma \\ x : \sigma \ \in \ \Gamma\end{array}}{\Gamma \vdash i : \sigma} \quad \text{TYP\_VAR}$$

$$\frac{\Gamma, x : \tau_1 \vdash t : \tau_2}{\Gamma \vdash (\lambda x.t) : (\tau_1 \to \tau_2)} \quad \text{TYP\_ABS}$$

$$\frac{\begin{array}{c}\Gamma \vdash t : \tau_1 \to \tau_2 \\ \Gamma \vdash u : \tau_1\end{array}}{\Gamma \vdash t\ u : \tau_2} \quad \text{TYP\_APP}$$

$$\frac{\Gamma \vdash u : \sigma \qquad \Gamma, x : \sigma \vdash t : \rho}{\Gamma \vdash \texttt{let}\ x = u\ \texttt{in}\ t : \rho} \quad \text{TYP\_LET}$$

$$\frac{\mathsf{closed}\ \sigma \qquad \Gamma \vdash t : \sigma}{\Gamma \vdash (t :: \sigma) : \sigma} \quad \text{TYP\_ANNOT}$$

$$\frac{\Gamma \vdash t : \rho}{\Gamma \vdash t : \forall a.\rho} \quad \text{TYP\_GEN}$$

$$\frac{\Gamma \vdash t : \forall a.\rho}{\Gamma \vdash t : [a \mapsto \tau]\,\rho} \quad \text{TYP\_INST}$$

$\boxed{t \longrightarrow u}$

$$\frac{u \longrightarrow u'}{\texttt{let}\ x = u\ \texttt{in}\ t \longrightarrow \texttt{let}\ x = u'\ \texttt{in}\ t} \quad \text{STEP\_LET1}$$

$$\frac{}{\texttt{let}\ x = v\ \texttt{in}\ t \longrightarrow t\,[x \rightsquigarrow v]} \quad \text{STEP\_LET}$$

$$\frac{t \longrightarrow t'}{t\ u \longrightarrow t'\ u} \quad \text{STEP\_APP1}$$

$$\frac{u \longrightarrow u'}{(\lambda x.t)\ u \longrightarrow (\lambda x.t)\ u'} \quad \text{STEP\_APP2}$$

$$\frac{}{(\lambda x.t)\ v \longrightarrow t\,[x \rightsquigarrow v]} \quad \text{STEP\_APP}$$

$$\frac{u \longrightarrow u'}{(\lambda(x :: \sigma).t)\ u \longrightarrow (\lambda(x :: \sigma).t)\ u'} \quad \text{STEP\_ANNOT\_APP2}$$

$$\frac{}{(\lambda(x :: \sigma).t)\ v \longrightarrow t\,[x \rightsquigarrow v]} \quad \text{STEP\_ANNOT\_APP}$$

$$\frac{}{t :: \sigma \longrightarrow t} \quad \text{STEP\_ERASE}$$

```
Definition rules:        16 good    0 bad
Definition rule clauses: 31 good    0 bad
```