$termvar,\ x,\ y,\ z,\ f$
$typevar,\ X,\ Y,\ Z$
$index,\ i,\ j,\ k$

$t,\ c,\ v,\ s,\ n$	$::=$		
	$\mid$	x	
	$\mid$	triv	
	$\mid$	box	
	$\mid$	unbox	
	$\mid$	$\Lambda(X <: A).t$	
	$\mid$	$[A]t$	
	$\mid$	$\lambda(x : A).t$	
	$\mid$	$t_1\ t_2$	
	$\mid$	(t_1, t_2)	
	$\mid$	$\mathsf{fst}\ t$	
	$\mid$	$\mathsf{snd}\ t$	
	$\mid$	$\mathsf{succ}\ t$	
	$\mid$	0	
	$\mid$	$\mathsf{case}\ t\ \mathsf{of}\ t_3 \to t_1, t_4 \to t_2$	
	$\mid$	$[]$	
	$\mid$	$t :: t'$	
	$\mid$	(t)	S
K	$::=$		
	$\mid$	$\star$	
$A,\ B,\ C,\ D,\ E,\ S,\ U$	$::=$		
	$\mid$	X	
	$\mid$	$\mathsf{List}\ A$	
	$\mid$	$\forall(X <: A).B$	
	$\mid$	$\top$	
	$\mid$	$\mathbb{C}$	
	$\mid$	$\mathbb{S}$	
	$\mid$	Unit	
	$\mid$	Nat	
	$\mid$	$?$	
	$\mid$	$A_1 \to A_2$	
	$\mid$	$A_1 \times A_2$	
	$\mid$	(A)	S
Γ	$::=$		
	$\mid$	$.$	
	$\mid$	$\Gamma, X <: A$	
	$\mid$	$\Gamma, x : A$	

$\boxed{\Gamma \vdash A : \star}$

$$\frac{\Gamma_1 \vdash A : \star}{\Gamma_1, X <: A, \Gamma_2 \vdash X : \star}\ \text{K\_VAR}$$

$$\frac{}{\Gamma \vdash \mathsf{Unit} : \star}\ \text{K\_UNIT}$$

$$\frac{}{\Gamma \vdash \mathsf{Nat} : \star}\ \text{K\_NAT}$$

$$\frac{}{\Gamma \vdash ? : \star} \quad \text{K\_UNITYPE}$$

$$\frac{\Gamma \vdash A : \star}{\Gamma \vdash \mathsf{List}\ A : \star} \quad \text{K\_LIST}$$

$$\frac{\Gamma \vdash A : \star \quad \Gamma \vdash B : \star}{\Gamma \vdash A \to B : \star} \quad \text{K\_ARROW}$$

$$\frac{\Gamma \vdash A : \star \quad \Gamma \vdash B : \star}{\Gamma \vdash A \times B : \star} \quad \text{K\_PROD}$$

$$\frac{\Gamma, X <: A \vdash B : \star}{\Gamma \vdash \forall (X <: A).B : \star} \quad \text{K\_FORALL}$$

$\boxed{\Gamma\ \mathrm{Ok}}$

$$\frac{}{\cdot\ \mathrm{Ok}} \quad \text{OK\_EMPTY}$$

$$\frac{\Gamma\ \mathrm{Ok} \quad \Gamma \vdash A : \star}{(\Gamma, X <: A)\ \mathrm{Ok}} \quad \text{OK\_TYPEVAR}$$

$$\frac{\Gamma\ \mathrm{Ok} \quad \Gamma \vdash A : \star}{(\Gamma, x : A)\ \mathrm{Ok}} \quad \text{OK\_VAR}$$

$\boxed{\Gamma \vdash A <: B}$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash A <: A} \quad \text{S\_REFL}$$

$$\frac{\Gamma \vdash A <: B \quad \Gamma \vdash B <: C}{\Gamma \vdash A <: C} \quad \text{S\_TRANS}$$

$$\frac{X <: A \in \Gamma \quad \Gamma\ \mathrm{Ok}}{\Gamma \vdash X <: A} \quad \text{S\_VAR}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash A <: \top} \quad \text{S\_TOP}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash \mathsf{Nat} <: \mathbb{C}} \quad \text{S\_NATC}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash \mathsf{Unit} <: \mathbb{C}} \quad \text{S\_UNITC}$$

$$\frac{\Gamma \vdash A <: \mathbb{C}}{\Gamma \vdash \mathsf{List}\ A <: \mathbb{C}} \quad \text{S\_LISTC}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash ? <: \mathbb{C}} \quad \text{S\_U}$$

$$\frac{\Gamma \vdash A <: \mathbb{C} \quad \Gamma \vdash B <: \mathbb{C}}{\Gamma \vdash (A \to B) <: \mathbb{C}} \quad \text{S\_ARROWC}$$

$$\frac{\Gamma \vdash A <: \mathbb{C} \quad \Gamma \vdash B <: \mathbb{C}}{\Gamma \vdash (A \times B) <: \mathbb{C}} \quad \text{S\_PRODC}$$

$$\frac{}{\Gamma \vdash \mathbb{S} <: \mathbb{C}} \quad \text{S\_SL}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash \mathsf{Nat} <: \mathbb{S}} \quad \text{S\_NATS}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash \mathsf{Unit} <: \mathbb{S}}\ \textsc{S\_UnitS}$$

$$\frac{\Gamma \vdash A <: \mathbb{S}}{\Gamma \vdash \mathsf{List}\ A <: \mathbb{S}}\ \textsc{S\_ListS}$$

$$\frac{\Gamma \vdash A <: \mathbb{S} \quad \Gamma \vdash B <: \mathbb{S}}{\Gamma \vdash (A \to B) <: \mathbb{S}}\ \textsc{S\_ArrowS}$$

$$\frac{\Gamma \vdash A <: \mathbb{S} \quad \Gamma \vdash B <: \mathbb{S}}{\Gamma \vdash (A \times B) <: \mathbb{S}}\ \textsc{S\_ProdS}$$

$$\frac{\Gamma \vdash A <: B}{\Gamma \vdash (\mathsf{List}\ A) <: (\mathsf{List}\ B)}\ \textsc{S\_List}$$

$$\frac{\Gamma \vdash A_1 <: A_2 \quad \Gamma \vdash B_1 <: B_2}{\Gamma \vdash (A_1 \times B_1) <: (A_2 \times B_2)}\ \textsc{S\_Prod}$$

$$\frac{\Gamma \vdash A_2 <: A_1 \quad \Gamma \vdash B_1 <: B_2}{\Gamma \vdash (A_1 \to B_1) <: (A_2 \to B_2)}\ \textsc{S\_Arrow}$$

$$\frac{\Gamma, X <: A \vdash B_1 <: B_2}{\Gamma \vdash (\forall (X <: A).B_1) <: (\forall (X <: A).B_2)}\ \textsc{S\_Forall}$$

$\boxed{\Gamma \vdash A \sim B}$

$$\frac{}{\Gamma \vdash A \sim A}\ \textsc{C\_Refl}$$

$$\frac{\Gamma \vdash A <: \mathbb{C}}{\Gamma \vdash A \sim ?}\ \textsc{C\_Box}$$

$$\frac{\Gamma \vdash A <: \mathbb{C}}{\Gamma \vdash ? \sim A}\ \textsc{C\_Unbox}$$

$$\frac{\Gamma \vdash A \sim B}{\Gamma \vdash (\mathsf{List}\ A) \sim (\mathsf{List}\ B)}\ \textsc{C\_List}$$

$$\frac{\Gamma \vdash A_2 \sim A_1 \quad \Gamma \vdash B_1 \sim B_2}{\Gamma \vdash (A_1 \to B_1) \sim (A_2 \to B_2)}\ \textsc{C\_Arrow}$$

$$\frac{\Gamma \vdash A_1 \sim A_2 \quad \Gamma \vdash B_1 \sim B_2}{\Gamma \vdash (A_1 \times B_1) \sim (A_2 \times B_2)}\ \textsc{C\_Prod}$$

$$\frac{\Gamma, X <: A \vdash B_1 \sim B_2}{\Gamma \vdash (\forall (X <: A).B_1) \sim (\forall (X <: A).B_2)}\ \textsc{C\_Forall}$$

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

$$\frac{x : A \in \Gamma \quad \Gamma\ \mathrm{Ok}}{\Gamma \vdash x : A}\ \textsc{varP}$$

$$\frac{}{\Gamma \vdash \mathsf{box} : \forall (X <: \mathbb{S}).(X \to ?)}\ \textsc{Box}$$

$$\frac{}{\Gamma \vdash \mathsf{unbox} : \forall (X <: \mathbb{S}).(? \to X)}\ \textsc{Unbox}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash \mathsf{triv} : \mathsf{Unit}}\ \textsc{unitP}$$

$$\frac{\Gamma\ \mathrm{Ok}}{\Gamma \vdash 0 : \mathsf{Nat}}\ \textsc{zeroP}$$

$$\frac{\Gamma \vdash t : \mathsf{Nat}}{\Gamma \vdash \mathsf{succ}\, t : \mathsf{Nat}}\ \textsc{succ}$$

$$\frac{\begin{array}{c}\Gamma \vdash t : C \quad \mathsf{nat}(C) = \mathsf{Nat} \\ \Gamma \vdash t_1 : A \quad \Gamma, x : \mathsf{Nat} \vdash t_2 : A\end{array}}{\Gamma \vdash \mathsf{case}\, t\, \mathsf{of}\, 0 \to t_1, (\mathsf{succ}\, x) \to t_2 : A}\ \textsc{ncase}$$

$$\frac{\Gamma\, \mathrm{Ok} \quad \Gamma \vdash A : \star}{\Gamma \vdash [] : \forall (X <: \top).\mathsf{List}\, X}\ \textsc{empty}$$

$$\frac{\Gamma \vdash t_1 : A \quad \Gamma \vdash t_2 : \mathsf{List}\, A}{\Gamma \vdash t_1 :: t_2 : \mathsf{List}\, A}\ \textsc{cons}$$

$$\frac{\Gamma \vdash t_1 : A_1 \quad \Gamma \vdash t_2 : A_2}{\Gamma \vdash (t_1, t_2) : A_1 \times A_2}\ \textsc{pair}$$

$$\frac{\Gamma, x : A \vdash t : B}{\Gamma \vdash \lambda (x : A).t : A \to B}\ \textsc{lam}$$

$$\frac{\Gamma, X <: A \vdash t : B}{\Gamma \vdash \Lambda (X <: A).t : \forall (X <: A).B}\ \textsc{Lam}$$

$$\frac{\Gamma \vdash t : \forall (X <: B).C \quad \Gamma \vdash A <: B}{\Gamma \vdash [A]t : [A/X]C}\ \textsc{typeApp}$$

$$\frac{\Gamma \vdash t : A \quad \Gamma \vdash A <: B}{\Gamma \vdash t : B}\ \textsc{Sub}$$

$$\frac{\begin{array}{c}\Gamma \vdash t : C \quad \mathsf{list}(C) = \mathsf{List}\, A \\ \Gamma \vdash t_1 : B \quad \Gamma, x : A, y : \mathsf{List}\, A \vdash t_2 : B\end{array}}{\Gamma \vdash \mathsf{case}\, t\, \mathsf{of}\, [] \to t_1, (x :: y) \to t_2 : B}\ \textsc{lcase}$$

$$\frac{\begin{array}{c}\Gamma \vdash t_1 : C \quad \mathsf{fun}(C) = A_1 \to B \\ \Gamma \vdash t_2 : A_2 \quad \Gamma \vdash A_1 \sim A_2\end{array}}{\Gamma \vdash t_1\, t_2 : B}\ \textsc{app}$$

$$\frac{\Gamma \vdash t : B \quad \mathsf{prod}(B) = A_1 \times A_2}{\Gamma \vdash \mathsf{fst}\, t : A_1}\ \textsc{fst}$$

$$\frac{\Gamma \vdash t : B \quad \mathsf{prod}(B) = A_1 \times A_2}{\Gamma \vdash \mathsf{snd}\, t : A_2}\ \textsc{snd}$$

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Definition rules:         56 good    0 bad
Definition rule clauses: 107 good    0 bad
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