x variables

i integer literals

$\tau,\ \sigma$	::=		types
	$\mid$	$\mathbb{Z}$	
	$\mid$	`void`	
	$\mid$	$\tau_1 \to \tau_2$	
	$\mid$	$\tau_1 \times \tau_2$	
	$\mid$	(τ)	S
e	::=		annotated terms
	$\mid$	u^τ	
u	::=		raw terms
	$\mid$	x	
	$\mid$	i	
	$\mid$	$\lambda(x : \tau).e$	bind x in e
	$\mid$	$e_1\ e_2$	
	$\mid$	$e_1 \times e_2$	
	$\mid$	$e \cdot \mathtt{l}$	
	$\mid$	$e \cdot \mathtt{r}$	
	$\mid$	$e_1\ p\ e_2$	
	$\mid$	$\mathsf{if0}(e_1, e_2, e_3)$	
	$\mid$	$\mathsf{let}\ x = e\ \mathsf{in}\ u$	bind x in u
	$\mid$	$\mathsf{halt}\ e$	
	$\mid$	(u)	S
p	::=		primitives
	$\mid$	$+$	
	$\mid$	$-$	
Γ	::=		contexts
	$\mid$		
	$\mid$	$\Gamma, x : \tau$	

$\boxed{\Gamma \vdash_{\mathrm{T}} e : \tau}$ annotated typing

$$\frac{\Gamma \vdash_{\mathrm{T}} u : \tau}{\Gamma \vdash_{\mathrm{T}} u^\tau : \tau}\ \mathrm{T\_ANT\_ANN}$$

$\boxed{\Gamma \vdash_{\mathrm{T}} u : \tau}$ typing

$$\frac{\Gamma(x) = \tau}{\Gamma \vdash_{\mathrm{T}} x : \tau}\ \mathrm{T\_TERM\_VAR}$$

$$\frac{}{\Gamma \vdash_{\mathrm{T}} i : \mathbb{Z}}\ \mathrm{T\_TERM\_INT}$$

$$\frac{\Gamma, x_1 : \tau_1 \vdash_{\mathrm{T}} e : \tau_2}{\Gamma \vdash_{\mathrm{T}} \lambda(x_1 : \tau_1).e : \tau_1 \to \tau_2}\ \mathrm{T\_TERM\_LAM}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e_1 : \tau_1 \to \tau_2 \quad \Gamma \vdash_{\mathrm{T}} e_2 : \tau_1}{\Gamma \vdash_{\mathrm{T}} e_1\ e_2 : \tau_2}\ \mathrm{T\_TERM\_APP}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e_1 : \tau_1 \quad \Gamma \vdash_{\mathrm{T}} e_2 : \tau_2}{\Gamma \vdash_{\mathrm{T}} e_1 \times e_2 : \tau_1 \times \tau_2} \ \textsc{T\_term\_pair}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e : \tau_1 \times \tau_2}{\Gamma \vdash_{\mathrm{T}} e \cdot \mathtt{l} : \tau_1} \ \textsc{T\_term\_prl}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e : \tau_1 \times \tau_2}{\Gamma \vdash_{\mathrm{T}} e \cdot \mathtt{r} : \tau_2} \ \textsc{T\_term\_prr}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e_1 : \mathbb{Z} \quad \Gamma \vdash_{\mathrm{T}} e_2 : \mathbb{Z}}{\Gamma \vdash_{\mathrm{T}} e_1 \, p \, e_2 : \mathbb{Z}} \ \textsc{T\_term\_prim}$$

$$\frac{\Gamma \vdash_{\mathrm{T}} e_1 : \mathbb{Z} \quad \Gamma \vdash_{\mathrm{T}} e_2 : \tau \quad \Gamma \vdash_{\mathrm{T}} e_3 : \tau}{\Gamma \vdash_{\mathrm{T}} \mathsf{if0}(e_1, e_2, e_3) : \tau} \ \textsc{T\_term\_if0}$$

$\boxed{\Gamma \vdash_{\mathrm{K}} e : \tau}$ annotated typing

$$\frac{\Gamma \vdash_{\mathrm{K}} u : \tau}{\Gamma \vdash_{\mathrm{K}} u^{\tau} : \tau} \ \textsc{K\_ant\_ann}$$

$\boxed{\Gamma \vdash_{\mathrm{K}} u : \tau}$ typing

$$\frac{\Gamma(x) = \tau}{\Gamma \vdash_{\mathrm{K}} x : \tau} \ \textsc{K\_term\_var}$$

$$\frac{}{\Gamma \vdash_{\mathrm{K}} i : \mathbb{Z}} \ \textsc{K\_term\_int}$$

$$\frac{\Gamma, x : \tau \vdash_{\mathrm{K}} e : \mathtt{void}}{\Gamma \vdash_{\mathrm{K}} \lambda(x : \tau).e : \tau \to \mathtt{void}} \ \textsc{K\_term\_Lam}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e_1 : \tau_1 \quad \Gamma \vdash_{\mathrm{K}} e_2 : \tau_2}{\Gamma \vdash_{\mathrm{K}} e_1 \times e_2 : \tau_1 \times \tau_2} \ \textsc{K\_term\_pair}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e : \tau \quad \Gamma, x : \tau \vdash_{\mathrm{K}} u : \mathtt{void}}{\Gamma \vdash_{\mathrm{K}} \mathsf{let}\, x = e \,\mathsf{in}\, u : \mathtt{void}} \ \textsc{K\_term\_let}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e : \tau_1 \times \tau_2}{\Gamma \vdash_{\mathrm{K}} e \cdot \mathtt{l} : \tau_1} \ \textsc{K\_term\_prl}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e : \tau_1 \times \tau_2}{\Gamma \vdash_{\mathrm{K}} e \cdot \mathtt{r} : \tau_2} \ \textsc{K\_term\_prr}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e_1 : \mathbb{Z} \quad \Gamma \vdash_{\mathrm{K}} e_2 : \mathbb{Z}}{\Gamma \vdash_{\mathrm{K}} e_1 \, p \, e_2 : \mathbb{Z}} \ \textsc{K\_term\_prim}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e' : \tau \to \mathtt{void} \quad \Gamma \vdash_{\mathrm{K}} e : \tau}{\Gamma \vdash_{\mathrm{K}} e' \, e : \mathtt{void}} \ \textsc{K\_term\_app}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e : \mathbb{Z} \quad \Gamma \vdash_{\mathrm{K}} e_1 : \mathtt{void} \quad \Gamma \vdash_{\mathrm{K}} e_2 : \mathtt{void}}{\Gamma \vdash_{\mathrm{K}} \mathsf{if0}(e, e_1, e_2) : \mathtt{void}} \ \textsc{K\_term\_if0}$$

$$\frac{\Gamma \vdash_{\mathrm{K}} e : \tau}{\Gamma \vdash_{\mathrm{K}} \mathsf{halt}\, e : \mathtt{void}} \quad \mathrm{K\_TERM\_HALT}$$

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Definition rules:         22 good    0 bad
Definition rule clauses:  53 good    0 bad
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