location, x, m	address		
integer, n	integer		
thread_id, t	thread id		
memory, M	::=		memory (function from addresses to integers)
expression, e	::=		expression
	|	n	integer literal
	|	x	read from address x
	|	$x = e$	write value of e to address x
	|	$e; e'$	sequential composition
	|	$e + e'$	plus
	|	$\mathsf{lock}\, x$	lock mutex at address x
	|	$\mathsf{unlock}\, x$	unlock mutex at address x
process, p	::=		process
	|	$t{:}e$	thread
	|	$p \mid p'$	parallel composition
state, s	::=		state
	|	$\langle p, M \rangle$	process p and memory M
label, l	::=		label
	|	$\mathsf{W}\, x{=}n$	write
	|	$\mathsf{R}\, x{=}n$	read
	|	$\mathsf{LOCK}\, x$	lock
	|	$\mathsf{UNLOCK}\, x$	unlock
	|	τ	internal action (tau)
thread_label, $t : l$	::=		thread label
	|	$t{:}l$	label

$\boxed{e \xrightarrow{l} e'}$ e does l to become e'

$$\frac{}{x \xrightarrow{\mathsf{R}\, x=n} n}\ \textsc{read}$$

$$\frac{}{x = n \xrightarrow{\mathsf{W}\, x=n} n}\ \textsc{write}$$

$$\frac{e \xrightarrow{l} e'}{x = e \xrightarrow{l} x = e'}\ \textsc{write\_context}$$

$$\frac{}{n; e \xrightarrow{\tau} e}\ \textsc{seq}$$

$$\frac{e_1 \xrightarrow{l} e_1'}{e_1; e_2 \xrightarrow{l} e_1'; e_2}\ \textsc{seq\_context}$$

$$\frac{n = n_1 + n_2}{n_1 + n_2 \xrightarrow{\tau} n}\ \textsc{plus}$$

$$\frac{e_1 \xrightarrow{l} e_1'}{e_1 + e_2 \xrightarrow{l} e_1' + e_2}\ \textsc{plus\_context\_1}$$

$$\frac{e_2 \xrightarrow{l} e_2'}{n_1 + e_2 \xrightarrow{l} n_1 + e_2'} \quad \text{PLUS\_CONTEXT\_2}$$

$$\frac{}{\mathsf{lock}\, x \xrightarrow{\mathsf{LOCK}\, x} 0} \quad \text{LOCK}$$

$$\frac{}{\mathsf{unlock}\, x \xrightarrow{\mathsf{UNLOCK}\, x} 0} \quad \text{UNLOCK}$$

$\boxed{p \xrightarrow{t:l} p'}$ p does $t : l$ to become p'

$$\frac{e \xrightarrow{l} e'}{t{:}e \xrightarrow{t:l} t{:}e'} \quad \text{THREAD}$$

$$\frac{p_1 \xrightarrow{t:l} p_1'}{p_1|p_2 \xrightarrow{t:l} p_1'|p_2} \quad \text{PAR\_CONTEXT\_LEFT}$$

$$\frac{p_2 \xrightarrow{t:l} p_2'}{p_1|p_2 \xrightarrow{t:l} p_1|p_2'} \quad \text{PAR\_CONTEXT\_RIGHT}$$

$\boxed{M \xrightarrow{t:l} M'}$ M does $t : l$ to become M'

$$\frac{M(x) = n}{M \xrightarrow{t:\mathsf{R}\, x=n} M} \quad \textsc{Mread}$$

$$\frac{}{M \xrightarrow{t:\mathsf{W}\, x=n} M \oplus (x \mapsto n)} \quad \textsc{Mwrite}$$

$$\frac{M(x) = 1}{M \xrightarrow{t:\mathsf{LOCK}\, x} M \oplus (x \mapsto 0)} \quad \textsc{Mlock}$$

$$\frac{}{M \xrightarrow{t:\mathsf{UNLOCK}\, x} M \oplus (x \mapsto 1)} \quad \textsc{Munlock}$$

$\boxed{s \xrightarrow{t:l} s'}$ s does $t : l$ to become s'

$$\frac{p \xrightarrow{t:l} p' \qquad M \xrightarrow{t:l} M'}{\langle p,\, M\rangle \xrightarrow{t:l} \langle p',\, M'\rangle} \quad \textsc{Ssync}$$

$$\frac{p \xrightarrow{t:\tau} p'}{\langle p,\, M\rangle \xrightarrow{t:\tau} \langle p',\, M\rangle} \quad \textsc{Stau}$$

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Definition rules:        19 good    0 bad
Definition rule clauses: 32 good    0 bad
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