Stack Machine Specification

nop: $(PC_p, PC'_p, w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{nop } 0\rangle}_{(p,N)} (PC_p + 1, PC_p, w_p, \rho, \xi)_\sigma$

ipush: $(PC_p, PC'_p, w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{ipush } z\rangle}_{(p,N)} (PC_p + 1, PC_p, zw_p, \rho, \xi)_\sigma$

load: $(PC_p, PC'_p, w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{load } v\rangle}_{(p,N)} (PC_p + 1, PC_p, \sigma(v)w_p, \rho, \xi)_\sigma$

store: $(PC_p, PC'_p, zw_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{store } v\rangle}_{(p,N)} (PC_p + 1, PC_p, w_p, \rho, \langle p, z\rangle\xi)_{\sigma[v\mapsto z]}$

jpc: $(PC_p, PC'_p, zw_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{jpc } a\rangle}_{(p,N)} \begin{cases} (a, PC_p, w_p, \rho, \xi)_\sigma & \text{if } z \neq 0 \\ (PC_p + 1, PC_p, w_p, \rho, \xi)_\sigma & \text{if } z = 0 \end{cases}$

jmp: $(PC_p, PC'_p, w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{jmp } a\rangle}_{(p,N)} (a, PC_p, w_p, \rho, \xi)_\sigma$

op: $(PC_p, PC'_p, z_1 z_2 w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{op } k\rangle}_{(p,N)} (PC_p + 1, PC_p, \texttt{op}_k(z_1, z_2)w_p, \rho, \xi)_\sigma$
where $\texttt{op}_1 \equiv +, \texttt{op}_2 \equiv \times, \texttt{op}_3 \equiv -, \texttt{op}_4 \equiv <, \texttt{op}_5 \equiv ==$.
$z_1 < z_2$ and $z_1 == z_2$ are 1 when the relations hold and 0 otherwise.

label: $(PC_p, PC'_p, w, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{label } n\rangle} (PC_p + 1, PC_p, \langle n + 1 - PC'_p, p\rangle\rho, \xi)$

rjmp: $(PC_p, PC'_p, w, \langle a, N + 1 - p\rangle\rho, \xi)_\sigma \xrightarrow{\langle \texttt{rjmp } 0\rangle}_{(p,N)} (a, PC_p, w, \rho, \xi)_\sigma$

restore: $(PC_p, PC'_p, w, \rho, \langle z, N + 1 - p\rangle\xi)_\sigma$
$\xrightarrow{\langle \texttt{restore } v\rangle}_{(p,N)} (PC_p + 1, PC_p, w, \rho, \xi)_{\sigma[v\mapsto z]}$

alloc: $(PC_p, PC'_p, w_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{alloc } v\rangle}_{(p,N)} (PC_p + 1, PC_p, 0w_p, \rho, \xi)_{\sigma[v\mapsto 0]}$

free: $(PC_p, PC'_p, zw_p, \rho, \xi)_\sigma \xrightarrow{\langle \texttt{free } v\rangle}_{(p,N)} (PC_p + 1, PC_p, w_p, \rho, \xi)_{\sigma\setminus v}$