

w-machine-constraint^{11,40}

w-machine-constraint(w)

$$\begin{aligned}
&\equiv_{\text{def}} \forall i:\text{Id}. \\
&\quad \text{let } Choose, Trans, Send = \text{w-machine}(w; i) \text{ in} \\
&\quad \forall t:\mathbb{N}. \\
&\quad (\neg(\uparrow \text{isnull}(a(i; t)))) \\
&\Rightarrow ((\lambda x. s(i; t+1).x) = (\lambda x. q. \text{Trans}(\text{kind}(a(i; t)), \text{val}(a(i; t)), \lambda x. s(i; t).x, x, q + 1)) \\
&\quad \& ((\uparrow \text{islocal}(\text{kind}(a(i; t)))) \\
&\quad \Rightarrow (\exists x:\mathbb{N} \\
&\quad \quad ((\uparrow \text{isl}(Choose(\text{act}(\text{kind}(a(i; t))), x, \lambda x. s(i; t).x(0)))) \\
&\quad \quad c \wedge (\text{val}(a(i; t)) = \text{outl}(Choose(\text{act}(\text{kind}(a(i; t))), x, \lambda x. s(i; t).x(0))))) \\
&\quad \& m(i; t) = Send(\text{kind}(a(i; t)), \text{val}(a(i; t)), \lambda x. s(i; t).x(0))
\end{aligned}$$

clarification:

w-machine-constraint(w)

$$\begin{aligned}
&\equiv_{\text{def}} \forall i:\text{Id}. \\
&\quad \text{let } Choose, Trans, Send = \text{w-machine}(w; i) \text{ in} \\
&\quad \forall t:\mathbb{N}. \\
&\quad (\neg(\uparrow \text{w-isnull}(w; \text{w-a}(w; i; t)))) \\
&\Rightarrow ((\lambda x. \text{w-s}(w; i; (t+1); x)) \\
&\quad = \\
&\quad (\lambda x. q. \text{Trans} \\
&\quad \quad (\text{w-kind}(w; \text{w-a}(w; i; t)) \\
&\quad \quad , \text{w-val}(w; \text{w-a}(w; i; t)) \\
&\quad \quad , \lambda x. \text{w-s}(w; i; t; x) \\
&\quad \quad , x \\
&\quad \quad , q + 1)) \\
&\quad \in x:\text{Id} \rightarrow \mathbb{Q} \rightarrow \text{w-vartype}(w; i; x) \\
&\quad \& ((\uparrow \text{islocal}(\text{w-kind}(w; \text{w-a}(w; i; t)))) \\
&\quad \Rightarrow (\exists x:\mathbb{N} \\
&\quad \quad ((\uparrow \text{isl}(Choose(\text{act}(\text{w-kind}(w; \text{w-a}(w; i; t))), x, \lambda x. \text{w-s}(w; i; t; x)(0)))) \\
&\quad \quad c \wedge (\text{w-val}(w; \text{w-a}(w; i; t)) \\
&\quad \quad = \\
&\quad \quad \text{outl}(Choose(\text{act}(\text{w-kind}(w; \text{w-a}(w; i; t))), x, \lambda x. \text{w-s}(w; i; t; x)(0)) \\
&\quad \quad \in \text{w-valtype}(w; i; \text{w-a}(w; i; t)))))) \\
&\quad \& \text{w-m}(w; i; t) \\
&\quad = \\
&\quad Send(\text{w-kind}(w; \text{w-a}(w; i; t)), \text{w-val}(w; \text{w-a}(w; i; t)), \lambda x. \text{w-s}(w; i; t; x)(0)) \\
&\quad \in (\text{Msg}(w.M) \text{ List})
\end{aligned}$$