

ecl-halt^{0,22}

$\text{ecl-halt}(ds;da;x)$
 $\equiv_{\text{def}} \text{ecl_ind}(x;k,\text{test}.\lambda n,L. n = 0$
 $\quad \& (\exists L':\text{event-info}(ds;da) \text{ List}, s:\text{State}(ds), v:\text{Valtype}(da;k).$
 $\quad \quad L = (L' @ [(k, s, v)]) \& \text{test}(s,v)$
 $\quad \quad \& (\forall t \in L'. \neg \text{let } k',s,v = t \text{ in } k = k' \& \text{test}(s,v));a,b,ha,hb.\lambda n,L. 0 < n \& ha(n,L)$
 $\vee (\exists L_1, L_2:\text{event-info}(ds;da) \text{ List}.$
 $\quad L = (L_1 @ L_2) \& ha(0,L_1) \& hb(n,L_2));a,b,ha,hb.\lambda n,L.$
 $(n = 0$
 $\quad \Rightarrow ha(0,L) \& (\exists L':\text{event-info}(ds;da) \text{ List}. L' \leq L \& hb(0,L'))$
 $\quad \quad \vee hb(0,L) \& (\exists L':\text{event-info}(ds;da) \text{ List}. L' \leq L \& ha(0,L'))))$
 $\& (0 < n$
 $\quad \Rightarrow ha(n,L) \& (\forall m:\mathbb{N}, L':\text{event-info}(ds;da) \text{ List}. L' \leq L \Rightarrow hb(m,L') \Rightarrow L' = L \& n \leq m)$
 $\quad \quad \vee hb(n,L)$
 $\quad \quad \& (\forall m:\mathbb{N}, L':\text{event-info}(ds;da) \text{ List}.$
 $\quad \quad \quad L' \leq L \Rightarrow ha(m,L') \Rightarrow L' = L \& n \leq m));a,b,ha,hb.\lambda n,L. ha(n,L)$
 $\& (\forall m:\mathbb{N}, L':\text{event-info}(ds;da) \text{ List}. L' \leq L \Rightarrow hb(m,L') \Rightarrow L' = L \& n \leq m)$
 $\vee hb(n,L)$
 $\quad \& (\forall m:\mathbb{N}, L':\text{event-info}(ds;da) \text{ List}. L' \leq L \Rightarrow ha(m,L') \Rightarrow L' = L \& n \leq m);a,ha.\lambda n,L.$
 $0 < n \& \text{star-append}(\text{event-info}(ds;da);ha(0);ha(n))(L);a,m,ha.ha;a,m,ha.\lambda n,L. 0 < n$
 $\& ha(n,L)$
 $\vee n = m \& ha(0,L);a,l,ha.\lambda n,L. ha(n,L) \& \neg(n \in l) \vee n = 0 \& (\exists m \in l.ha(m,L)))$

clarification:

$\text{ecl-halt}(ds;da;x)$
 $\equiv_{\text{def}} \text{ecl_ind}(x;k,\text{test}.\lambda n,L. n = 0 \in \mathbb{Z}$
 $\quad \& (\exists L':\text{event-info}(ds;da) \text{ List}, s:\text{State}(ds), v:\text{Valtype}(da;k).$
 $\quad \quad L = (L' @ ((k, s, v).\text{nil})) \in \text{event-info}(ds;da) \text{ List} \& \text{test}(s,v)$
 $\quad \quad \& \text{l_all}(L';\text{event-info}(ds;da);t.\neg \text{let } k',s,v = t \text{ in}$
 $\quad \quad \quad k = k' \in \text{Knd} \& \text{test}(s,v));a,b,ha,hb.\lambda n,L. 0 < n$
 $\quad \& ha(n,L)$
 $\vee (\exists L_1:\text{event-info}(ds;da) \text{ List}, L_2:\text{event-info}(ds;da) \text{ List}.$
 $\quad L = (L_1 @ L_2) \in \text{event-info}(ds;da) \text{ List} \& ha(0,L_1) \& hb(n,L_2));a,b,ha,hb.\lambda n,L.$
 $(n = 0 \in \mathbb{Z}$
 $\quad \Rightarrow ha(0,L)$
 $\quad \quad \& (\exists L':\text{event-info}(ds;da) \text{ List}. L' \leq L \in \text{event-info}(ds;da) \text{ List} \& hb(0,L'))$
 $\quad \quad \quad \vee hb(0,L)$
 $\quad \quad \quad \& (\exists L':\text{event-info}(ds;da) \text{ List}. L' \leq L \in \text{event-info}(ds;da) \text{ List} \& ha(0,L'))))$
 $\& (0 < n$
 $\quad \Rightarrow ha(n,L)$
 $\quad \quad \& (\forall m:\mathbb{N}, L':\text{event-info}(ds;da) \text{ List}.$
 $\quad \quad \quad L' \leq L \in \text{event-info}(ds;da) \text{ List}$

$$\begin{aligned}
& \Rightarrow hb(m, L') \\
& \Rightarrow L' = L \in \text{event-info}(ds; da) \text{ List} \ \& \ n \leq m) \\
\vee \ & hb(n, L) \\
& \ \& \ (\forall m: \mathbb{N}, L': \text{event-info}(ds; da) \text{ List}. \\
& \quad L' \leq L \in \text{event-info}(ds; da) \text{ List} \\
& \quad \Rightarrow ha(m, L') \\
& \quad \Rightarrow L' = L \in \text{event-info}(ds; da) \text{ List} \ \& \ n \leq m)); a, b, ha, hb. \lambda n, L. \ ha(n, L) \\
& \ \& \ (\forall m: \mathbb{N}, L': \text{event-info}(ds; da) \text{ List}. \\
& \quad L' \leq L \in \text{event-info}(ds; da) \text{ List} \\
& \quad \Rightarrow hb(m, L') \\
& \quad \Rightarrow L' = L \in \text{event-info}(ds; da) \text{ List} \ \& \ n \leq m) \\
\vee \ & hb(n, L) \\
& \ \& \ (\forall m: \mathbb{N}, L': \text{event-info}(ds; da) \text{ List}. \\
& \quad L' \leq L \in \text{event-info}(ds; da) \text{ List} \\
& \quad \Rightarrow ha(m, L') \\
& \quad \Rightarrow L' = L \in \text{event-info}(ds; da) \text{ List} \ \& \ n \leq m); a, ha. \lambda n, L. \ 0 < n \\
& \ \& \ \text{star-append}(\text{event-info}(ds; da); ha(0); ha(n))(L); a, m, ha. ha; a, m, ha. \lambda n, L. \ 0 < n \ \& \ ha(n, L) \\
& \ \vee \ n = m \in \mathbb{Z} \ \& \ ha(0, L); a, l, ha. \lambda n, L. \ ha(n, L) \ \& \ \neg(n \in l \in \mathbb{N}) \\
& \ \vee \ n = 0 \in \mathbb{Z} \ \& \ \text{lexists}(l; \mathbb{N}; m. ha(m, L))
\end{aligned}$$