

w-first^{0,22}

$\text{first}(e)$
 \equiv_{def} if $\text{time}(e)=_2 0 \rightarrow \text{true}_2$
; $\text{isnull}(\text{a}(\text{loc}(e); \text{time}(e)-1)) \rightarrow \text{first}(\langle \text{loc}(e), \text{time}(e)-1 \rangle)$
else false_2 fi
(*recursive*)

clarification:

$\text{w-first}(w; e)$
 \equiv_{def} if $\text{w-time}(w; e)=_2 0 \rightarrow \text{true}_2$
; $\text{w-isnull}(w; \text{w-a}(w; \text{w-loc}(w; e); (\text{w-time}(w; e)-1))) \rightarrow$
 $\text{w-first}(w; \langle \text{w-loc}(w; e), \text{w-time}(w; e)-1 \rangle)$
else false_2 fi
(*recursive*)