MODULE *crackers4*

CONSTANTS *Things*, *People*
VARIABLES *desires*, *holds*

$$
\begin{array}{l}
Init \triangleq \land\ desires = [p \in People \mapsto \{\}] \\
\qquad\quad \land\ holds\ \ = [p \in People \mapsto \{\}]
\end{array}
$$

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$$
\begin{array}{l}
Desire(p) \triangleq \land\ desires[p] = \{\} \\
\qquad\qquad\quad \land \exists\, t \in Things : \\
\qquad\qquad\qquad \land\ desires' = [desires \text{ EXCEPT } ![p] = \{t\}] \\
\qquad\qquad\qquad \land \text{UNCHANGED } holds
\end{array}
$$

$$
\begin{array}{l}
Acquire(p) \triangleq \exists\, t \in desires[p] : \\
\qquad\qquad\quad \land\ t \notin holds[p] \\
\qquad\qquad\quad \land\ holds' = [holds \text{ EXCEPT } ![p] = holds[p] \cup \{t\}] \\
\qquad\qquad\quad \land \text{UNCHANGED } desires
\end{array}
$$

$$
\begin{array}{l}
Satiated(p) \triangleq \land\ desires[p] \neq \{\} \\
\qquad\qquad\quad \land \forall\, t \in desires[p] : t \in holds[p] \\
\qquad\qquad\quad \land\ desires' = [desires \text{ EXCEPT } ![p] = \{\}] \\
\qquad\qquad\quad \land \text{UNCHANGED } holds
\end{array}
$$

$$
\begin{array}{l}
TidyUp(p) \triangleq \land\ desires[p] = \{\} \\
\qquad\qquad\quad \land \exists\, t \in holds[p] : \\
\qquad\qquad\qquad \land\ holds' = [holds \text{ EXCEPT } ![p] = holds[p] \setminus \{t\}] \\
\qquad\qquad\qquad \land \text{UNCHANGED } desires
\end{array}
$$

$$
\begin{array}{l}
Next \triangleq \exists\, p \in People : \\
\qquad\quad \lor\ Desire(p) \\
\qquad\quad \lor\ Acquire(p) \\
\qquad\quad \lor\ Satiated(p) \\
\qquad\quad \lor\ TidyUp(p)
\end{array}
$$

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$$
\begin{array}{l}
TidiesUp \triangleq \neg\exists\, p \in People : \\
\qquad\qquad\quad \land\ desires[p] \neq \{\} \\
\qquad\qquad\quad \land \exists\, l \in holds[p] : l \notin desires[p]
\end{array}
$$

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$$Spec \triangleq Init \land \Box[Next]_{\langle desires,\, holds \rangle}$$