MODULE *hlmc2*

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Le problème de l'homme, du loup, du mouton et du chou
Version ensembliste basique

EXTENDS *Naturals*, *FiniteSets*

$Entites \triangleq \{\text{“H”}, \text{“L”}, \text{“M”}, \text{“C”}\}$

$Rives \triangleq \{\text{“G”}, \text{“D”}\}$

VARIABLES
$posG$, $posD$

$$
\begin{aligned}
&TypeOK \triangleq \\
&\quad \Box(\land posG \subseteq Entites \\
&\qquad \land posD \subseteq Entites \\
&\qquad \land posG \cap posD = \{\} \\
&\qquad \land posG \cup posD = Entites)
\end{aligned}
$$

$$
\begin{aligned}
&pasMiam1(pos) \triangleq \\
&\quad \land (\{\text{“L”}, \text{“M”}\} \subseteq pos \Rightarrow \text{“H”} \in pos) \\
&\quad \land (\{\text{“C”}, \text{“M”}\} \subseteq pos \Rightarrow \text{“H”} \in pos)
\end{aligned}
$$

$$
\begin{aligned}
&pasMiam \triangleq \\
&\quad pasMiam1(posG) \land pasMiam1(posD)
\end{aligned}
$$

$ToujoursOk \triangleq \Box pasMiam$

$$
\begin{aligned}
&Solution \triangleq \\
&\quad \Box\neg(posD = Entites)
\end{aligned}
$$

$$
\begin{aligned}
&Init \triangleq \\
&\quad \land posG = Entites \\
&\quad \land posD = \{\}
\end{aligned}
$$

$$
\begin{aligned}
&bougeGD(S) \triangleq \\
&\quad \land S \subseteq posG \\
&\quad \land \text{“H”} \in S \\
&\quad \land Cardinality(S) \leq 2 \\
&\quad \land posG' = posG \setminus S \\
&\quad \land posD' = posD \cup S \\
&\quad \land pasMiam'
\end{aligned}
$$

$$
\begin{aligned}
&bougeDG(S) \triangleq \\
&\quad \land S \subseteq posD \\
&\quad \land \text{“H”} \in S
\end{aligned}
$$

$\land\ Cardinality(S) \leq 2$
$\land\ posD' = posD \setminus S$
$\land\ posG' = posG \cup S$
$\land\ pasMiam'$

$Next \triangleq \exists\, s \in \text{SUBSET}\ Entites :$
$\quad bougeGD(s) \lor bougeDG(s)$

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