MODULE *DieHard*

EXTENDS *Integers*

VARIABLES *small*, *big*

$$\begin{aligned}
&Invariants \triangleq \land small \in 0 \,..\, 3 \\
&\qquad\qquad\ \land big \in 0 \,..\, 5
\end{aligned}$$

$$\begin{aligned}
&Init \triangleq \land small = 0 \\
&\qquad\ \land big = 0
\end{aligned}$$

$$\begin{aligned}
&FillSmall \triangleq \land small' = 3 \\
&\qquad\qquad\ \land big' = big
\end{aligned}$$

$$\begin{aligned}
&FillBig \triangleq \land big' = 5 \\
&\qquad\qquad\ \land small' = small
\end{aligned}$$

$$\begin{aligned}
&EmptySmall \triangleq \land small' = 0 \\
&\qquad\qquad\ \land big' = big
\end{aligned}$$

$$\begin{aligned}
&EmptyBig \triangleq \land big' = 0 \\
&\qquad\qquad\ \land small' = small
\end{aligned}$$

$$\begin{aligned}
&PourSmallInBig \triangleq \lor \land small + big \leq 5 \\
&\qquad\qquad\qquad\qquad\ \land big' = big + small \\
&\qquad\qquad\qquad\qquad\ \land small' = 0 \\
&\qquad\qquad\qquad\qquad \lor \land small + big > 5 \\
&\qquad\qquad\qquad\qquad\ \land big' = 5 \\
&\qquad\qquad\qquad\qquad\ \land small' = 0
\end{aligned}$$

$$\begin{aligned}
&PourBigInSmall \triangleq \lor \land small + big \leq 5 \\
&\qquad\qquad\qquad\qquad\ \land small' = big + small \\
&\qquad\qquad\qquad\qquad\ \land big' = 0 \\
&\qquad\qquad\qquad\qquad \lor \land small + big > 5 \\
&\qquad\qquad\qquad\qquad\ \land small' = 5 \\
&\qquad\qquad\qquad\qquad\ \land big' = 0
\end{aligned}$$

$$\begin{aligned}
&Next \triangleq \lor FillSmall \\
&\qquad\ \lor EmptySmall \\
&\qquad\ \lor FillBig \\
&\qquad\ \lor EmptyBig \\
&\qquad\ \lor PourSmallInBig \\
&\qquad\ \lor PourBigInSmall
\end{aligned}$$