—————— MODULE *DieHard* ——————

EXTENDS *Integers*
VARIABLES *small*, *big*

In the movie Die Hard 3, our heros, *John McClain* (Bruce *Willis*) and Zeus (Samuel *L.* Jackson), are at the bidding of the evil *Peter Krieg* (Jeremy Irons). First they are sent to the pay phone, then to the subway, and finally to the park. It is here that they must make exactly four gallons from five and three gallon jugs. They did it just in time.

$TypeOK \triangleq \land small \in 0 \mathrel{..} 3$
$ \land big \in 0 \mathrel{..} 5$

$Init \triangleq \land big \quad = 0$
$ \land small \quad = 0$

$FillSmall \triangleq \land small' = 3$
$ \land big' = big$

$FillBig \triangleq \land big' = 5$
$ \land small' = small$

$EmptySmall \triangleq \land small' = 0$
$ \land big' = big$

$EmptyBig \triangleq \land big' = 0$
$ \land small' = small$

$SmallToBig \triangleq \lor \land big + small \leq 5$
$ \land big' = big + small$
$ \land small' = 0$
$ \lor \land big' = 5$
$ \land small' = small - (5 - big)$

$BigToSmall \triangleq \lor \land big + small \leq 3$
$ \land small' = big + small$
$ \land big' = 0$
$ \lor \land small' = 3$
$ \land big' = small - (3 - big)$

$Invariant \triangleq big \neq 4$

$Next \triangleq \lor FillSmall$
$ \lor FillBig$
$ \lor EmptySmall$
$ \lor EmptyBig$
$ \lor SmallToBig$
$ \lor BigToSmall$

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