

EXTENDS *Naturals*

VARIABLES *big*, The number of gallons of water in the 5 gallon jug.
 small The number of gallons of water in the 3 gallon jug.

$TypeOK \triangleq \wedge small \in 0 \dots 3$
 $\wedge big \in 0 \dots 5$

$Init \triangleq \wedge big = 0$
 $\wedge small = 0$

$FillSmallJug \triangleq \wedge small' = 3$
 $\wedge big' = big$

$FillBigJug \triangleq \wedge big' = 5$
 $\wedge small' = small$

$EmptySmallJug \triangleq \wedge small' = 0$
 $\wedge big' = big$

$EmptyBigJug \triangleq \wedge big' = 0$
 $\wedge small' = small$

$Min(m, n) \triangleq \text{IF } m < n \text{ THEN } m \text{ ELSE } n$

$SmallToBig \triangleq \wedge big' = Min(big + small, 5)$
 $\wedge small' = small - (big' - big)$

$BigToSmall \triangleq \wedge small' = Min(big + small, 3)$
 $\wedge big' = big - (small' - small)$

$Next \triangleq \vee FillSmallJug$
 $\vee FillBigJug$
 $\vee EmptySmallJug$
 $\vee EmptyBigJug$
 $\vee SmallToBig$
 $\vee BigToSmall$

$Spec \triangleq Init \wedge \Box[Next]_{\langle big, small \rangle}$

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