———————————— MODULE $jugs$ ————————————

EXTENDS $Integers$
VARIABLE $BigJug$, $SmallJug$
CONSTANTS $BigCapacity$, $SmallCapacity$

$Init \triangleq (BigJug = 0) \wedge (SmallJug = 0)$
$CurrentTotal \triangleq BigJug + SmallJug$

$FillBig \triangleq$
    $\wedge BigJug' = BigCapacity$
    $\wedge SmallJug' = SmallJug$

$FillSmall \triangleq$
    $\wedge SmallJug' = SmallCapacity$
    $\wedge BigJug' = BigJug$

$DumpBig \triangleq$
    $\wedge BigJug' = 0$
    $\wedge SmallJug' = SmallJug$

$DumpSmall \triangleq$
    $\wedge SmallJug' = 0$
    $\wedge BigJug' = BigJug$

$SmallToBig \triangleq$
    $\vee$
        $\wedge (CurrentTotal \geq BigCapacity)$
        $\wedge (BigJug' = BigCapacity)$
        $\wedge (SmallJug' = CurrentTotal - BigCapacity)$
    $\vee$
        $\wedge (CurrentTotal < BigCapacity)$
        $\wedge (BigJug' = CurrentTotal)$
        $\wedge (SmallJug' = 0)$

$BigToSmall \triangleq$
    $\vee$
        $\wedge (CurrentTotal \geq SmallCapacity)$
        $\wedge (SmallJug' = SmallCapacity)$
        $\wedge (BigJug' = CurrentTotal - SmallCapacity)$
    $\vee$
        $\wedge (CurrentTotal < SmallCapacity)$
        $\wedge (SmallJug' = CurrentTotal)$
        $\wedge (BigJug' = 0)$

$Next \triangleq$

$\lor$ *FillBig*
$\lor$ *FillSmall*
$\lor$ *DumpBig*
$\lor$ *DumpSmall*
$\lor$ *SmallToBig*
$\lor$ *BigToSmall*

$$TypeOk \triangleq (SmallJug \leq SmallCapacity) \land (BigJug \leq BigCapacity)$$

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