MODULE $malgtd1ex13$

EXTENDS $Naturals$, $Integers$
CONSTANTS $x0$
VARIABLES x, pc
ASSUME $x0 \in Nat$
$typeInt(u) \triangleq u \in Int$

$al0l1 \triangleq$
$\land pc = \text{“l0”}$
$\land pc' = \text{“l1”}$
$\land 0 < x$
$\land x' = x$
$al1l2 \triangleq$
$\land pc = \text{“l1”}$
$\land pc' = \text{“l2”}$
$\land x' = x - 1$

$al2l3 \triangleq$
$\land pc = \text{“l2”}$
$\land pc' = \text{“l3”}$
$\land 0 \geq x$
$\land x' = x$

$al2l1 \triangleq$
$\land pc = \text{“l2”}$
$\land pc' = \text{“l1”}$
$\land 0 < x$
$\land x' = x$
$al0l3 \triangleq$
$\land pc = \text{“l0”}$
$\land pc' = \text{“l3”}$
$\land 0 \geq x$
$\land x' = x$

$Next \triangleq al0l1 \lor al1l2 \lor al2l3 \lor al0l3 \lor al2l1 \lor \text{UNCHANGED } \langle x, pc \rangle$
$Init \triangleq pc = \text{“l0”} \land x = x0$

$inv \triangleq$
$\land typeInt(x)$
$\land pc \in \{\text{“l0”}, \text{“l1”}, \text{“l2”}, \text{“l3”}\}$
$\land pc = \text{“l0”} \Rightarrow x = x0 \land x0 \in Nat$
$\land pc = \text{“l1”} \Rightarrow 0 < x \land x \leq x0 \land x0 \in Nat$
$\land pc = \text{“l2”} \Rightarrow 0 \leq x \land x < x0 \land x0 \in Nat$

$\wedge\ pc = \text{“l3”} \Rightarrow x = 0$

$safe \triangleq \quad pc = \text{“l3”} \Rightarrow x = 0$

\ * Modification History
\ * Last modified *Thu Sep* 23 11:52:02 *CEST* 2021 by *mery*
\ * Created *Wed Sep* 09 18:19:08 *CEST* 2015 by *mery*