MODULE *maccarthy91bis*

EXTENDS *Naturals*, *TLC*, *Integers*
CONSTANTS x, min, max
VARIABLES $y1$, $y2$, z, c
$D \triangleq min \,..\, max$
ASSUME $x \geq 0$

$f \triangleq [i \in Int \mapsto \text{IF } i > 100 \text{ THEN } i - 10 \text{ ELSE } 100]$
$a \triangleq c = \text{“START”} \land y1' = x \land y2' = 1 \land c' = \text{“LOOP”} \land \text{UNCHANGED } \langle z \rangle$

$btrue \triangleq$
$\land\ c = \text{“LOOP”} \land\ y1 \leq 100$
$\land\ c = \text{“L1”}$
$\land\ \text{UNCHANGED } \langle y1,\ y2,\ z,\ c \rangle$

$bfalse \triangleq$
$\land\ c = \text{“LOOP”} \land\ y1 > 100$
$\land\ c = \text{“L2”}$
$\land\ \text{UNCHANGED } \langle y1,\ y2,\ z,\ c \rangle$

$cfalse \triangleq$
$\land\ c = \text{“L1”} \land\ y2 \neq 1$
$\land\ y1' = y1 - 10 \land y2' = y2 - 1$
$\land\ c' = \text{“LOOP”}$
$\land\ \text{UNCHANGED } \langle z \rangle$

$ctrue \triangleq$
$\land\ c = \text{“L1”} \land\ y2 = 1$
$\land\ z' = y1 - 10$
$\land\ c' = \text{“HALT”}$
$\land\ \text{UNCHANGED } \langle y1,\ y2 \rangle$

$d \triangleq$
$\land\ c = \text{“L2”}$
$\land\ y1' = y1 + 11 \land y2' = y2 + 1$
$\land\ c' = \text{“HALT”}$
$\land\ \text{UNCHANGED } \langle z \rangle$

$next \triangleq a \lor bfalse \lor btrue \lor cfalse \lor ctrue \lor d \lor \text{UNCHANGED } \langle y1,\ y2,\ z,\ c \rangle$
$init1 \triangleq y1 \in Int \land y2 \in Int \land z \in Int \land c = \text{“START”}$
$init \triangleq y1 = 0 \land y2 = 0 \land z = 0 \land c = \text{“START”}$

$Q1 \triangleq c \neq \text{“HALT”}$ c prned la valeur *HALT*
$Qpc \triangleq c = \text{“HALT”} \Rightarrow z = \text{IF } x > 100 \text{ THEN } x - 10 \text{ ELSE } 91$

$Qy1 \triangleq min \leq y1 \land y1 \leq max$
$Qover \triangleq y1 \in D \land y2 \in D \land z \in D$

$$Question \triangleq Qpc \wedge Qover$$