MODULE *appex2_3*

EXTENDS *Naturals*, *TLC*, *Integers*
CONSTANTS $x0$, min, max, u
VARIABLES x, y, z, pc
$D \triangleq min \,..\, max$

Précondition
ASSUME $x0 \in D \land \ x0 \geq 2$

définitiobs

$diviseurs(X) \triangleq \{\ m \in 1 \,..\, X :\ X\%m = 0\}$
$prime(X) \triangleq \ (diviseurs(X) = \{1, X\}) \land X \neq 1$
$Locs \triangleq \{\text{"START"}, \text{"HALT"}, \text{"POINT"}\}$

$start \triangleq pc = \text{"START"} \land y' = 2 \land pc' = \text{"POINT"} \ \land$ UNCHANGED $\langle x, z\rangle$

$case1 \triangleq$
$\land pc = \text{"POINT"} \land \ y \geq x$
$\land z' =$ TRUE
$\land pc' = \text{"HALT"}$
$\land PrintT(y)$
$\land$ UNCHANGED $\langle x, y\rangle$

$case21 \triangleq$
$\land pc = \text{"POINT"} \ \land y < x \land (x\%y = 0)$
$\land pc' = \text{"HALT"}$
$\land z' =$ FALSE
$\land$ UNCHANGED $\langle x, y\rangle$

$case22 \triangleq$
$\land pc = \text{"POINT"} \ \land y < x \land (x\%y \neq 0)$
$\land y' = y + 1$
$\land$ UNCHANGED $\langle x, z, pc\rangle$

$eprint \triangleq$
$\land pc = \text{"HALT"}$
$\land PrintT(z)$
$\land PrintT(x)$
$\land$ UNCHANGED $\langle x, y, z, pc\rangle$

$Next \triangleq$
$\lor start \ \lor case1 \lor \ case21 \lor case22$
$\lor$ UNCHANGED $\langle x, y, z, pc\rangle \lor eprint$

$Init \ \triangleq \ x = x0 \land y = u \land z = u \ \land \ pc = \text{"START"}$

$Q1 \triangleq pc \neq$ "HALT" pc prned la valeur $HALT$
$Q2 \triangleq pc =$ "HALT" $\Rightarrow (x = x0) \wedge (z \equiv (diviseurs(x) = \{1,\, x\} \wedge x \neq 1))$
$Q3 \triangleq pc =$ "HALT" $\Rightarrow (x = x0) \wedge (z = prime(x))$
$Q4 \triangleq pc \in Locs$

$Q \triangleq Q2 \wedge Q3 \wedge Q4$