MODULE *sequential_circuits*

synchronous composition of sequential circuits

for $i = 0$

$r\_i' = r\_i \land x\_i$

$y\_i' = x\_i \lor \neg(r\_i)$

for $i = 1$
$r1' = x1 \lor r1$
$y1' = x1 \land r1$

Initially $r0 = 0$, $r1 = 1$, $x0 \in \{0, 1\}$, $x1 \in \{0, 1\}$

EXTENDS *Integers*

VARIABLES $r0$, $r1$, $x0$, $x1$, $y0$, $y1$

$Init0 \triangleq$
$\land\ r0 = \text{FALSE}$
$\land\ (x0 = \text{FALSE} \lor x0 = \text{TRUE})$
$\land\ y0 = \text{FALSE}$

$Init1 \triangleq$
$\land\ r1 = \text{TRUE}$
$\land\ (x1 = \text{FALSE} \lor x1 = \text{TRUE})$
$\land\ y1 = \text{FALSE}$

$Init \triangleq Init0 \land Init1$

$Next0 \triangleq$
$\land\ (y0' = (x0 \lor (\neg r0)))$
$\land\ (r0' = (r0 \land x0))$
$\land\ \text{UNCHANGED } x0$

$Next1 \triangleq$
$\land\ (r1' = (x1 \lor r1))$
$\land\ (y1' = (x1 \land r1))$
$\land\ \text{UNCHANGED } x1$

$SLOG\_TOGETHER \triangleq \text{UNCHANGED } \langle r0, r1, x0, x1, y0, y1\rangle$

$Next \triangleq (Next0 \land Next1) \lor SLOG\_TOGETHER$

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