Exercises on Transition Systems

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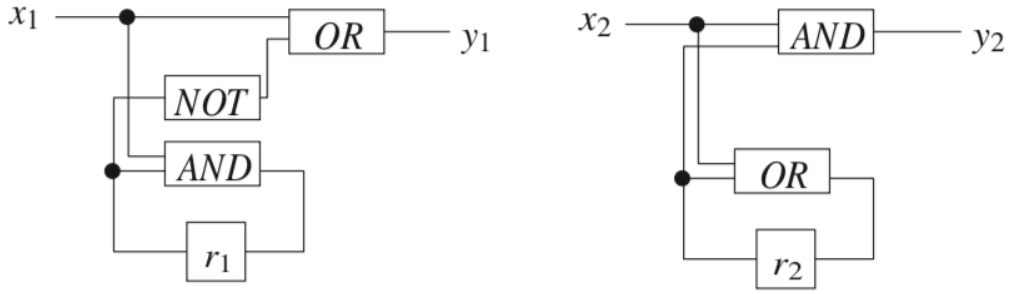
Ex. 2.1

Question

Consider the following two sequential hardware circuits:



(a) Give the transition systems of both hardware circuits.
(b) Determine the reachable part of the transition system of the synchronous product of these transition systems. Assume that the initial values of the registers are r1=0 and r2=1.

Answer

Ex. 2.2

Question

We are given three (primitive) processes P1,P2, and P3 with shared integer variable x. The program of process Piis as follows:

Algorithm 1 Process P_i

for $k_i = 1, \ldots, 10$ **do**
  LOAD(x);
  INC(x);
  STORE(x);
od

That is, Pi executes ten times the assignment x := x+1. The assignment x := x+1 is realized using the three actions LOAD(x), INC(x) and STORE(x). Consider now the parallel program:

Algorithm 2 Parallel program P

$x := 0$;
$P_1 \;||\; P_2 \;||\; P_3$

Does P have an execution that halts with the terminal value x = 2?

Answer

Ex. 2.3

Question

Answer

Ex. 2.4

Question

Answer

Ex. 2.5

Question

Answer

Ex. 2.6

Question

Answer

Ex. 2.7

Question

Answer

Ex. 2.8

Question

Answer

Ex. 2.9

Question

Answer

Ex. 2.10

Question

Answer

Ex. 2.11

Question

Answer