Test of Discrete Event Systems - 11.10.2018

Exercise 1

The simplified logic of a lift can be described as follows. The lift is waiting with the sliding door open (waiting state). When it receives a request to move to another floor, it starts closing the sliding door. If, during this operation, an impulse is received from the photocell located at the sliding door, for security reasons the sliding door is opened, and the lift returns in the waiting state. Otherwise, the lift moves according to the request. As soon as the destination floor is reached, the sliding door is opened, and then the lift is put in the waiting state. At initialization, the lift is in the waiting state.

1. Model the logic of the lift.

Exercise 2

A machine performs operations of three types, denoted by a, b and c. For technical reasons, an operation of type c cannot be performed immediately after two consecutive operations both of type a, or both of type b. At initialization, no operation has been performed.

1. Model the logic of the machine.
2. Model a system designed to support the scheduling of the operations on the machine: given a sequence of operations, the system returns whether the sequence is feasible for the machine, or not.

Exercise 3

A zero-order holder transforms an asynchronous sequence of bits 0 and 1 in a continuous-time binary signal $y(t)$. The zero-order holder implements the logical implication of the last two bits received. At initialization, assume to have received an indefinite sequence of bits 1.

1. Model the logic of the zero-order holder.

Exercise 4

A production system is composed of a machine M_1, a one-place buffer B, and another machine M_2, connected in series. Raw parts arriving when M_1 is busy, are rejected. If M_1 terminates a job and B is full, M_1 keeps the part (and therefore it is not available for a new job) until the part can be moved to B. Assume that the production system is initially empty.

1. Model the logic of the production system.