



Lehrstuhl für Simulation

Applied Discrete Modelling

Assignment 2 “Quality Tester”: CTMCs

System Specification

A quality tester is fed by material flows from two different sources. Only one of the two sources can be active, either *source 0* or *source 1*. The average duration of an activity period of source 0 is 2 minutes. The average duration of source 1 being active is 3 minutes. At the beginning of the simulation source 0 is active.

Assuming, that in each time step, one item is produced, the probability for the item to test OK is 0.9 for source 0 and 0.95 for source 1.

Implementation

Extend your DTMC solution program to discretize any CTMC using a given time step. The program should import CTMC specifications in the format given in the exercise.

Tasks and Questions

Specify and draw the CTMC representing the system.

Use your program to answer the following questions:

- What is the probability that source 0 is active after 8 minutes for different discretization time steps (e.g. 2, 1, 0.5, 0.25, 0.1)?
- What is the probability of source 0 being active in steady state for different discretization time steps (e.g. 2, 1, 0.5, 0.25, 0.1)?
- What is the average probability of testing an item OK in steady state?