

**Fall 2014**  
**CS 376 Assignment 3: Discrete Event Systems**  
**Due: Wednesday, October 8**

**Problem 1** A generator has two input ports, "in1" and "in2". When it receives a value on "in1" it *immediately* switches to an inter-arrival-time given by that value. Receiving a value on "in2", it switches to the new inter-arrival-time. The initial state has sigma = 0 and inter-arrival-time = 10.

- a) Present a detailed DEVS model of the generator.
- b) Draw a timing diagram (input, state, and output trajectories) to show the behavior when an input of 5 is injected at time = 13 on port "in1" and an input of 10 is injected at time 25 on port "in2".

**Problem 2:** Consider a three-processor system with two classes of job arrivals shown in the figure. The size of the buffers at all processors is assumed to be infinite. The jobs are assumed to be periodic and the event times are as follows:

Interarrival times for Class 1 jobs: 20 units of time  
Interarrival times for Class 2 jobs: 21 units of time  
Processing times for Class 1 jobs at processor 1: 5 units of time  
Processing times for Class 2 jobs at processor 2: 7 units of time  
Processing times for all jobs at processor 3: 10 units of time

- a) Present a DEVS model for this system including components for the generators, processors (with buffer), and transducer. Show only the components and their interconnections.
- b) Draw a timing diagram describing the behavior of the system for the first 6 jobs (3 of Class 1 and 3 of Class 2) including arrival and departure of jobs, and the queue length of the three processors.
- c) Implement and simulate the model in SimEvents (use server blocks). Analyze the turnaround time and throughput of the system.

