ASSIGNMENT 6

Modeling Queues using Petri Nets

In this assignment, we will learn to simulate classical queueing models like M/M/1, M/D/1 and M/M/1/K using Petri Nets in SHARPE tool.

Problem Statement C1 (Compulsory; Difficulty level *; 100 points)

Consider a mail server of IIT Delhi with three departments have separate mail servers along with an external mail server. The external mail server receives mails from all the three department mail servers. Label the main server as node 0 and other three servers as node 1, 2 and 3. The messages, each with mean arrival rate 30 messages/sec arrive from three department servers. The capacity of each duplex link is 100kb/sec with 5ms delay. Simulate for 5 minutes to get the following performance measures (consider M/M/1 queue between the transmitting and the receiving nodes) :

1. Throughput at the central server (plot throughput versus simulation time)
2. Plot queue length vs time and also calculate average queue length

Problem Statement O1 (Optional; Difficulty level **; 15 bonus marks)

Compare the throughput at the central server when the queue size for all the links are changed to 500 with that of default queue size provided in NS2. Give an explanation of the results obtained. (M/M/1/K i.e. limited queue size)

NOTE: Due to tutorial being held during the lab session, only one extra problem has been given today.

NOTE:

- The assignment must be uploaded to https://sakai.iitd.ac.in (in certain exceptional cases, the TAs may allow it to be mailed to dslab2013.iitd@gmail.com)
- Submission deadline is 6 PM today
- Submit a zip file named assignno_entryno having 2 folders:
  1. CODE: Suitable files associated with the assignment
  2. DOCUMENTATION: .pdf and .tex file of your report

Copying is counter-productive and will be penalized.

Reading instructions for the next session

In next session, we will be implementing this paper in SHARPE using petri nets.