CS348 Computer Networks
Lab Excercises 1

Indian Institute of Technology, Patna
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Instructions: You have to upload the code along with the output graphs for this assignment in a tar file using the lab submission website on or before 17.01.2017. The file name should be assign1.tgz.

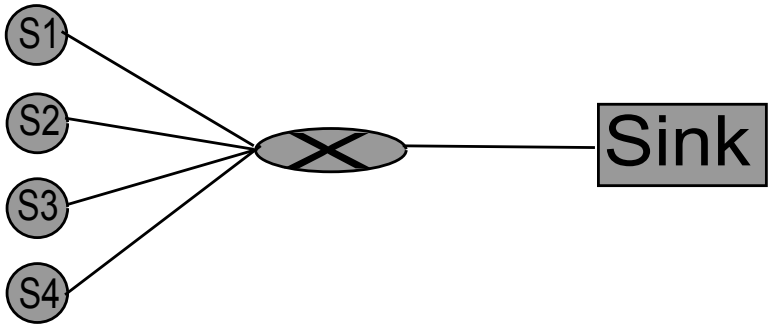

Figure 1: A switching network

Write a program to simulate the functioning of a switching network consisting of n number of sources (denoted by S in the figure 1) that are connected to a *Sink* through a switch. The number of sources can vary as desired by the user. You have to create the following objects:

1. **Source**: Every source must have an *id* that is automatically assigned. It must have a *packet sending rate* that is either constant or variable. Each source will be connected to the switch through a link that must have a given *bandwidth*.

2. **Switch**: The task of the switch is to service the arriving packets from the sources and dispatch the same to the sink. The link to the sink has a given *bandwidth*. The switch can operate using both TDM based circuit switching as well as a packet switched technology. In packet switched mode, the switch uses a single *queue*. Packets arriving from the sources are inserted in the queue in order of their arrival and dispatched to the sink by dequeuing one at a time.

3. **Packets**: Each packet must have a source id and a time stamp when it is generated. The packets have same given size that is provided by the user.

You are free to create additional objects if you want. Assume that the queues are infinitely large and all components follow a common global time. The simulation will run for a fixed given duration of time.

You have to record the following as output:

1. The average sending delay of the sources in case of packet switching and circuit switching with respect to
   (a) Number of sources
   (b) Packet Sending rate

2. If the queue size is fixed for packet switching, then the packet loss rate at the switch with respect to
   (a) Queue Size
   (b) Packet Sending rate