CSC7221: Project 1

Department of Computer Science and Engineering, CUHK
Due: Date on the final exam

This is the first part of the project. The overall project will consist of several components and you are asked to build one component at a time.

For the first component, you are asked to use the CSIM kernel to simulate $N > 1$ TCP sources going through a router.

For the TCP source, you need to provide the behavior of

- Congestion window and its dynamics. For simplicity, let us only consider the congestion avoidance phrase. That is, you only need to implement the behavior of the *additive-increase-multiplicative-decrease* (AIMD) and ignore the slow start phrase.

- You need to implement the *time-out* mechanism of TCP, for simplicity, let us assume that the timeout is fixed and it is equal to 1.0 second.

- For each TCP source, the payload of the packet is 1,500 bytes (again, treat this as an input parameter).

- For each TCP source, there is a *parameter* which represents the round-trip propagation delay. For simplicity, assume that propagation delay is 0.5 sec (but it can be changed since this can be viewed as an input to your simulator).

The TCP source will go through a single router (which can be viewed as the bottleneck router of the network). The router has the processing capacity of $C = 0.5$ Mbps. The router has a finite size queue which can only hold $B = 10$ packets. Again, you should treat these as input parameters.

For the first component, you have to let N TCP flows go through these router and test whether these flows will share the bandwidth C evenly. State the reasons why resource can (or cannot) be shared evenly.