**CSCE 654 Project 2**

**Due 10 Apr 19**

**Problem Description:** Implement and analyze the delay performance of a tandem queue set (a pair of queues in series) that represents two earth nodes connected by a bent-pipe satellite link. Include propagation delays in each direction. After building the simulation, you will run it three times, with different mean interarrival times in each case. Simulation time in each case may need to be different. You are expected to run it long enough to see the results. How will you know if it is long enough?

Assumptions

1. One-way distance to the satellite is 42000 km.
2. Inputs will arrive to the left-most queuing structure.
3. Service time for each queue is exponentially distributed with a mean 0.5 seconds.
4. Arrivals are assumed to be Poisson distributed, with mean interarrivals as given in the following three cases. (Hint: Do not use a Poisson distribution for the interarrival times. The use of exponential interarrival times in a counting process is what makes it Poisson.)

Three cases

1. 1.0 seconds.
2. 0.52 seconds.
3. 0.5 seconds

(Hint: what is significant about case c, and why is case b nearly equal? Yes, the performance between b and c should be very different)

You may consult with other students on this part, but build the simulation, do the analysis, and write it up yourself.

**Write-up:** Your write-up should include delay plots showing the system response as well as a short narrative (1 page) explaining why you got the results you did. State any assumptions needed to accomplish the task. Provide justification for your simulation duration.

Prop delay \_1way = d/c

C =299 792 458 m / s

D = 42000

t=1.401x10^-4 s = 0.1401 ms

Sink

Src

Tandem Queue Structure