Assignment 08

Submission Deadline: Monday, 11th January, 2020. 01.00 PM

Q 01: Consider the network scenario given in Figure 1. Assume that we know the bottleneck link along the path from the server to the client is the first link with rate **$R_s$bits/sec**. Suppose we send a pair of packets back to back from the server to the client, where client is connected to the router with **R_c bits/sec** and there is no other traffic on this path. Assume each packet of size **L bits**, and both links have the same propagation delay given by **d_{prop}**. **[5 Marks]**

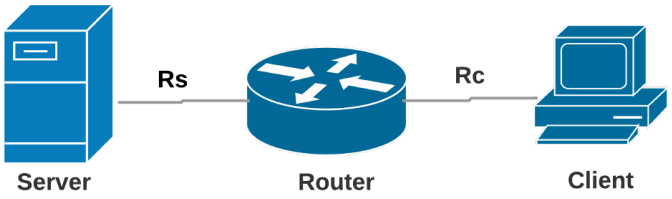

Figure. 1

a) What is the packet inter-arrival time at the destination (client)? Meaning how much time elapses from when the last bit of the first packet arrives until the last bit of the second packet arrives?

b) Now assume a change in the above scenario where instead of first the second link is the bottleneck (i.e. $R_c < R_s$). Would it be possible that the second packet gets queued at the input queue of the second link? Explain.

c) Now suppose that the server sends the second packet *T* seconds after sending the first packet. How large must *T* be to ensure no queuing before the second link? Explain. [Use the same bottleneck as 2.2 i.e. $\boldsymbol{R_c < R_s}$.]

Q 02: Suppose that TCP's current estimated values for the round trip time (estimatedRTT) and deviation in the RTT (DevRTT) are 210 msec and 49 msec, respectively. Suppose that the next three measured values of the RTT are 280, 210, and 220 respectively.

Compute TCP's new value of estimatedRTT, DevRTT, and the TCP timeout value after each of these three measured RTT values is obtained.Use the values of $\alpha = 0.125$ and $\beta = 0.25$. **[5 Marks]**

After the first RTT estimate is made:

estimatedRTT =
DevRTT =
TimeoutInterval =

After the second RTT estimate is made:

EestimatedRTT =
DevRTT =
TimeoutInterval =

After the third RTT estimate is made:

EestimatedRTT =
DevRTT =
TimeoutInterval =