JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY

COMPUTER NETWORKS (15B11CI511)
BTECH 5TH SEM 2019
Submission Deadline: 18/10/2019

Assignment-1 [CO3]

Q.1 Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to a stationary satellite revolving around the earth at 3×10^4 km altitude. Assuming that each segment carries 1 KB of data, what is the minimum number of bits you need for the sequence number in the following cases? Assume the speed of light is $3*10^8$ m/s.
(a) RWS=1
(b) RWS=SWS

Q.2 TCP segments being sent from host A to host B and an ACK being returned. Consider the initial segment with sequence no 10 and each segment has length of 10 bytes. Suppose that after receiving the acknowledgement ACK with ACK number 20, A sends packets with sequence numbers 20, 30, 40, 50, 60, 70, 80, 90 and 100. Sometime later, it receives ACKs with sequence numbers 40, 40, 60, 60, 60, 60, 60. (Assume that A sends no additional data segments in the meantime.) Complete the diagram in a way that is consistent with the given information and what you know about the way TCP behaves. What sequence number would you expect to see in the next packet sent by A?

Q.3 For a sender S Table 1 and Table 2 shows segment sent and acknowledgement received respectively. Table1 contains information of segment's sequence number, data length and time of sending. Table 2 contains acknowledgment number and time of receiving. Time is given in hh:mm:ss format. Draw a neat timeline diagram and evaluate measured RTT (RTTm), Smoothed RTT (RTTs), RTT Deviation(RTT_D) and Retransmission timeout when initial RTO is 7s.

Table1

Sequence No	Data length	timestamp
1400	100	00:00:00
1500	100	00:00:04
1600	200	00:00:13
1800	50	00:00:21
1850	50	00:00:24

Table2

ACK No	Timestamp
1500	00:00:09
1600	00:00:10
1800	00:00:19
1850	Lost in network
1900	00:00:35

Q.4 Consider an instance of TCP's Additive Increase Multiplicative Decrease(AIMD) algorithm where the window size at the start of the slow start phase is 2 MSS and the threshold at the start of the first transmission is 8 MSS. Assume that a time out occurs during the fifth transmission. Find the congestion window size at the end of the tenth transmission.