National University of Computer and Emerging Sciences, Lahore Campus
Quiz ……3 [BS(CS): Section C] Fall 2023

**Computer Networks (Code: CS3001)**   **Quiz Date: October 31, 2023**

Total Marks: 15   **Duration: 20 -Minutes**

Name --- Roll #-------------------------------- Section --------

Instructions: Attempt all questions on this sheet. You can make use of rough sheet (do not attach to this sheet).

Q1: Suppose that TCP's current estimated values for the round trip time (*estimatedRTT*) and deviation in the RTT (*DevRTT*) are 360 msec and 25 msec, respectively. Suppose that the next three measured values of the RTT are 270 msec, 230 msec, and 250 msec respectively. Compute TCP's new value of *DevRTT, estimatedRTT,* and timeout value after first measured RTT value i.e., 270 msec is obtained. Use values of $\alpha = 0.125$, and $\beta = 0.25$. Round your answers to two decimal places after leading zeros. (3+3+1 = 7 Marks) [CLO 3]

Q2: Consider the figure below in which a TCP sender and receiver communicate over a connection in which the sender->receiver segments may be lost. The TCP sender sends an initial window of 5 segments. Suppose the initial value of the sender->receiver sequence number is 215 and the first 5 segments *each* contain 209 bytes. The delay between the sender and receiver is 7 time units, and so the first segment arrives at the receiver at t=8. As shown in the figure below, 3 of the 5 segment(s) are lost between the segment and receiver.   (5 + 3 = 8 Marks)   [CLO 3]
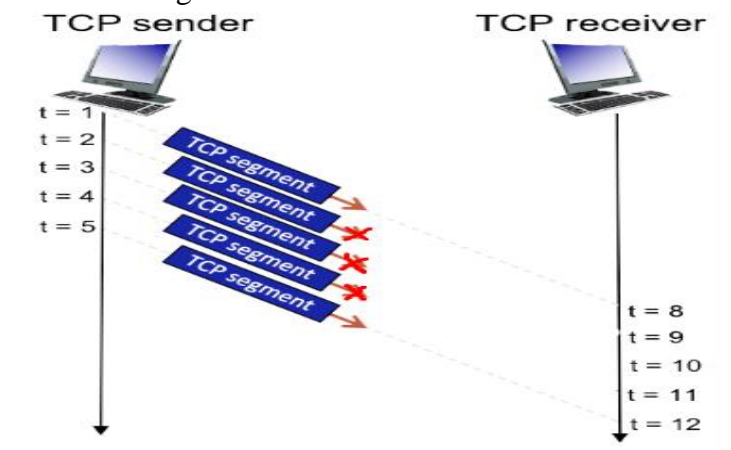
A. Give the sequence numbers associated with each of the 5 segments sent by the sender.
B. Give the ACK numbers the receiver sends in response to each of the segments. If a segment never arrives use 'x' to denote it.

Start writing your Answers to Q2 onward from here and then use backside of this sheet.

Q1 Answer:

A. segment 1: 215, segment 2: 424, segment 3: 633, segment 4: 842, segment 5: 1051,
B. segment 1: 424, segment 2: x, segment 3: x, segment 4: x, segment 5: 424

Q2 Answer:

RTT estimate is made as follows after measured RTT:

EstimatedRTT = α * SampleRTT+ (1- α) * EstimatedRTT

EstimatedRTT = 0.125 * 270 + (1-0.125) * 360

=0.125* 270 + 0.875 * 360 =33.75 + 315 = 348.75 msec

*DevRTT = ß * | SampleRTT- EstimatedRTT|+(1- ß)* DevRTT*

=0.25 * |270-360*| + (1-0.25) *25

=0.25 * 90 + 0.75 * 25

=22.5 + 18.75 = 41.25 msecs

Timeout Interval = EstimatedRTT + 4 DevRTT*

= 348.75 + 4 *41.25

=513.75 msecs

* Note: If student has used newly calculated value of EstimatedRTT i.e, 348.75, then consider the same as correct. Then, DevRRT will be equal to 38.4375 while Timeout Interval will be equal to 502.5