

National University of Computer and Emerging Sciences, Lahore Campus
Quiz3 [BS(CS): Section B] Fall 2024

Computer Networks (Code: CS3001)

Date: October 17, 2024

Total Marks: 15

Duration: 20 -Minutes

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

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

Q1: Station A needs to send a message consisting of 9 packets (numbered as 1 to 9) to station B using a sliding window (window size 3) and Go-Back-N error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no ACKs from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? Moreover, what are packet numbers which get lost during this process. You are required to show the necessary work/steps to arrive with your answers. **(3 + 6 = 9 Marks)**

Q2: Suppose that TCP's current estimated values for the round-trip time (estimated RTT) and deviation in the RTT (Dev RTT) are 200 msec and 8 msec, respectively. Suppose that the next measured value of the RTT is 200 msec. You are required to compute TCP's new value of estimated RTT, Dev RTT, and the TCP timeout interval after the measured RTT values is obtained. Use the values of $\alpha = 0.125$ and $\beta = 0.25$? **(6 Marks)**

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

Q1 Solution:

Let packets are numbered as 1 to 9.

Window size = 3

Every 5th packet gets dropped

Step 1 view	3rd packet (3)	2 nd packet (number 2)	1 st packet (number 1)
Step 2 view (after ACK for number 1)	4th packet (number 4)	3rd packet (number 2)	2 nd packet (number 2)
Step 3 view (after ACK for number 2)	5th packet (number 5)	4th packet (number 4)	3rd packet (number 3)
Step 4 view (after ACK for number 3)	6th packet (number 6)	5th packet (number 5)	4th packet (number 4)
Step 5 view (after ACK for number 4)	7th packet (number 7)	6th packet (number 6)	5th packet (number 5)
Step 6 view (After loss of 5 th - number 5)	10th packet (number 7)	9th packet (number 6)	8th packet (number 5)

Step 7 view (after ACK for number 5)	11th packet (number 8)	10th packet (number 7)	9th packet (number 6)
Step 8 view (after ACK for number 6)	12th packet (number 9)	11th packet (number 8)	10th packet (number 7)
Step 9 view (After loss of 10 th - number 7)	15th packet (number 9)	14th packet (number 8)	13th packet (number 7)
Step 10 view (after ACK for number 7)		15th packet (number 9)	14th packet (number 8)
Step 11 view (after ACK for number 8)			15th packet (number 9)
Step 12 view (After loss of 15 th - number 9)			16th packet (number 9)
Step 13 view (after ACK for number 9)			

Total number of packets sent: 16

Packet numbers which get lost: 5 (5th packet), 7 (10th packet) and 9 (15th packet)

Note: Kindly verify that answers are provided after performing necessary steps (not necessarily as mentioned above, concept should be clear).

Q2 Solution:

Note: 2 marks for each correctly calculated answer

RTT estimate is made as follows after measured RTT:

$$\text{EstimatedRTT} = \alpha * \text{SampleRTT} + (1 - \alpha) * \text{EstimatedRTT}$$

$$\text{EstimatedRTT} = 0.125 * 200 + (1 - 0.125) * 200$$

$$= 0.125 * 200 + 0.875 * 100 = 25 + 175 = 200 \text{ msec}$$

$$\text{DevRTT} = \beta * | \text{SampleRTT} - \text{EstimatedRTT} | + (1 - \beta) * \text{DevRTT}$$

$$= 0.25 * | 200 - 200 | + (1 - 0.25) * 8$$

$$= 0.25 * 0 + 0.75 * 8$$

$$= 0 + 6 = 6 \text{ msecs}$$

$$\text{Timeout Interval} = \text{EstimatedRTT} + 4 * \text{DevRTT}$$

$$= 200 + 4 * 6 = 224$$

=224 msec