

National University of Computer and Emerging Sciences, Lahore Campus
Quiz3 [BS(CS): Section D] Fall 2023

Computer Networks (Code: CS3001)

Quiz Date: November 2, 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: Host A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 126. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 80 and 40 bytes of data, respectively. In the first segment, the sequence number is 127, the source port number is 302, and the destination port number is 80. Host B sends an acknowledgment whenever it receives a segment from Host A. **(9 Marks)**

- a. What is the sequence number and destination port number in the second segment sent from Host A to B?
- b. If the first segment arrives before the second segment, then, in the acknowledgment of the first arriving segment by host B to A, what will be the acknowledgment number and the destination port number?
- c. If the second segment arrives before the first segment, then, in the acknowledgment of this received segment, what will be the acknowledgment number and source port number?

Q2: Suppose you have the following 2 bytes: 11111010 and 01100101. Compute UDP checksum assuming that UDP uses 8- bit words in computing the checksum. Also state how will the receiver know whether an error has occurred or not? **(4 marks)**

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

Q1 Solution:

- a. Sequence number in second segment = Sequence number in first segment + 80 = 127 + 80 = 207
Destination port number = 80
- b. ACK number = 207
Destination port number = 302
- c. ACK number = 127
Destination port number = 80

Q2 Solution: Adding the two bytes gives 11111010 + 01100101 = 01011111; 00000001 + 01011111 (wrap around) = 01100000; The one's complement gives 10011111 Hence the check sum is 10011111. At the receiver, all 3 bytes including the 2 bytes and checksum are added. If no errors are introduced into the packet, then clearly the sum at

the receiver will be 11111111. If one of the bits is a 0, then we know that errors have been introduced into the packet.