



Sessional-2 Examination – Semester Spring 2021

Course Title:	Data Communications and Computer Networks				Course Code:	CSC339	Credit Hours:	3(2,1)
Course Instructor/s:	Mr. Imran Raza				Program Name:	BS Computer Science		
Semester:		Batch:	BCS & BSE	Section:	All sections	Date:		
Time Allowed:	90 Min				Maximum Marks:		40	
<u>Important Instructions / Guidelines:</u>								
<ul style="list-style-type: none">• All questions are compulsory• Return the question paper along with the answer sheet								

1. Answer the following short questions:

[10]

- In a TCP connection, if the receiver announces a window size of 0, the sender will stop sending and wait for an ACK with a non-zero size. If this ACK gets lost, a deadlock occurs where the sender waits for ACK and the receiver waits for data. How TCP resolves this deadlock? (4)
- Explain ACK ambiguity and RTTs spread problems during RTO calculations. Also, discuss solutions to these problems. (3)
- Explain the advantages and disadvantages of Nagle's algorithms with the help of an example. (3)

2. Host A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 136. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 80 and 60 bytes of data, respectively. In the first segment, the sequence number is 137, the source port number is 312, and the destination port number is 80. Host B sends an acknowledgement whenever it receives a segment from Host A. [10]

- In the second segment sent from Host A to B, what are the sequence number, source port number, and destination port number? (3)
- If the first segment arrives before the second segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number, the source port number, and the destination port number? (3)
- If the second segment arrives before the first segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number? (4)

3. Answer the following questions related to SYN cookies.

[10]

- Why is it necessary for the server to use a special initial sequence number in the SYNACK? (2)
- Suppose an attacker knows that a target host uses SYN cookies. Can the attacker create half-open or fully open connections by simply sending an ACK packet to the target? Why or why not? (4)
- Suppose an attacker collects a large number of initial sequence numbers sent by the server. Can the attacker cause the server to create many fully open connections by sending ACKs with those initial sequence numbers? Why? (4)

4. Consider the scenario given below and answer the following questions: [10]

- Evaluate the given scenario and propose a better TCP variant implementing Fast Retransmit and Fast Recovery (FRR) algorithm. What could be the cause of duplicate ACK and Why does it perform congestion avoidance rather than slow start as a part of Fast Recovery? (5)
- How the proposed mechanism will handle multiple segment losses during FRR to improve TCP's performance? (5)

