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National University of Computer and Emerging Sciences, Lahore Campus

Quiz .....3 [BS(CS): Section A] Fall 2024

Computer Networks (Code: CS3001) **Date: October 17, 2024**

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

Name: Roll #- Section - BCS-5A

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

Q1: The table below shows various transmission rounds (i.e., RTTs 1 to 13) and size of congestion window (i.e. cwnd as MSS) at the start of each RTT of the TCP congestion control algorithm. Assume that initial value of ss_thresh is equal to16. Refer to this table, please answer the following questions: **[1.5x 6 = 9 Marks] (CLO 2)**

RTT	1	2	3	4	5	6	7	8	9	10	11	12	13
Congestion window	2	4	8	16	1	2	4	8	9	10	11	12	9 or 6
ssthresh	16	16	16	16	8	8	8	8	8	8	8	8	6

i. The data in table depicts TCP Tahoe or TCP Reno congestion control approach? Justify your answer.

Answer: TCP Reno. As TCP Tahoe doesn't have fast recovery stage on dup acks at RTT 12. The value becomes (cwnd = cwnd/2 + 3) for fast recovery on RTT 12

ii. What happened after RTT 4? What is the value of ss_thresh after RTT 4?

Answer: timeout occured as cwnd=1. ssthresh = 8 (cwnd/2)

iii. What happened after RTT 12? What is the value of ss_thresh after RTT 12?

Answer: 3 Duplicate acks received as (cwnd = cwnd/2 + 3) ssthresh = 6 (cwnd/2)

iv. Which state/phase is the TCP in at transmission round (RTT) 13.

Answer: Fast recovery.

v. Which state/phase is the TCP in between transmission rounds (RTTs) 5 to 8.

Answer: slow start

vi. Which state/phase is the TCP in between transmission rounds (RTTs) 9 to 12.

Answer: congestion avoidance

Q2: A UDP receiver has received the following data bits and checksum bits. **[6 Marks] (CLO 2)**

Data bits: 0110 0110 0110 0000 0101 0101 0101 0101 1000 1111 0000 1100

Checksum bits: 1011 0101 0011 1101

How will the receiver verify if the data received is valid or in error? (Show detailed step by step working.)

Start writing your Answer for Q2 from here onward and use the backside of this sheet if needed.

```
  0110  0110  0110  0000
+ 0101  0101  0101  0101
  1011  1011  1011  0101
```

```
  1011  1011  1011  0101
+ 1000  1111  0000  1100
  0100  1010  1100  0001
+                      1 (wraparound)
  0100  1010  1100  0010
```

```
Sum:       0100  1010  1100  0010
Checksum: +1011  0101  0011  1101
          ---------------------
          1111  1111  1111  1111
```

- All the bit are 1 so there is no error. Any zero in the final sum would indicate any error.