Module 6 Summary Exercises

Due Feb 16 at 1:59am **Points** 64 **Questions** 22 **Time Limit** None
Allowed Attempts 2

Instructions

Attempt History

	Attempt	Time	Score
KEPT	**Attempt 2**	56 minutes	54.61 out of 64
LATEST	**Attempt 2**	56 minutes	54.61 out of 64
	Attempt 1	40 minutes	46.61 out of 64

Score for this attempt: **54.61** out of 64
Submitted Feb 15 at 10:09pm
This attempt took 56 minutes.

Question 1   2 / 2 pts

What is the minimum TCP header size?

○ 8 bytes

○ 12 bytes

○ 4 bytes

Correct!   ◉ 20 bytes

Question 2   2 / 2 pts

In a Selective acknowledgement scheme, a received ACK indicates only that the ACK'd
segment was received.

Answer 1:

Selective

Question 3

In a Cumulative acknowledgement scheme, a received ACK indicates all segments prior to the ACK'd segment were received.

Answer 1:

Cumulative

Question 4

What is the maximum TCP header size?

○ 48 bytes

◉ 60 bytes

○ 12 bytes

○ 20 bytes

Question 5

Select the proper equation for calculating EstimatedRTT.

○ $Estimated\,RTT_{New} = \alpha \times Estimated\,RTT_{Prev} + \alpha \times Sample\,RTT_{Recent}$

◉ $Estimated\,RTT_{New} = (1 - \alpha)\,Estimated\,RTT_{Prev} + \alpha \times Sample\,RTT_{Recent}$

○ $Estimated\,RTT_{New} = (1 - \alpha)\,Estimated\,RTT_{Prev} + (1 - \alpha)\,Sample\,RTT_{Recent}$

○ $Estimated\,RTT_{New} = (1 - \alpha)\,Sample\,RTT_{Recent} + \alpha \times Estimated\,RTT_{Prev}$

Question 6

2 / 2 pts

HostA has established a TCP connection with HostB in a remote network. HostA is sending packets to HostB. Assume we have configured TCP, somehow, to ACK every segment (no ACKing every other segment). Assume that the timeout is the same for all packets. HostB's "window size" is 20000 bytes. HostB has already received and acknowledged everything sent by HostA's application up to and including byte #1,787. HostA now sends segments of the same application data stream in order:

P: 232 bytes
Q: 430 bytes
R: 405 bytes

Suppose the segments arrive at Host B in the order Q, P, and R. What is the acknowledgment number on the segment sent in response to segment R?

Correct!

2,855

Correct Answer   2,855

Question 7

0 / 2 pts

HostA has established a TCP connection with HostB in a remote network. HostA is sending packets to HostB. Assume we have configured TCP, somehow, to ACK every segment (no ACKing every other segment). Assume that the timeout is the same for all packets. HostB's "window size" is 20000 bytes. HostB has already received and acknowledged everything sent by HostA's application up to and including byte #4,197. HostA now sends segments of the same application data stream in order:

P: 411 bytes
Q: 142 bytes
R: 271 bytes

What is the sequence number on segment P?
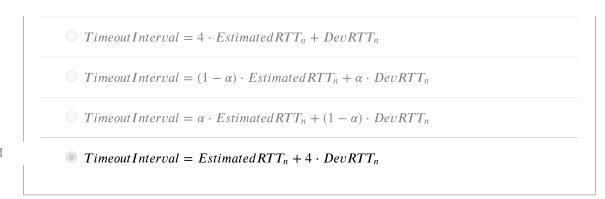
You Answered

4,751

Correct Answer   4,198

Question 8

0 / 2 pts

Assume a TCP sender is continuously sending 1,323-byte segments. If a TCP receiver advertises a window size of 7,669 bytes, and with a link transmission rate 14 Mbps an end-to-end propagation delay of 37.3 ms, what is the utilization? Assume no errors, no processing or queueing delay, and ACKs transmit instantly. Also assume the sender will not transmit a non-full segment. Give answer in percentages, rounded to one decimal place, without units (e.g. for an answer of 10.43% you would enter "10.4" without the quotes).

You Answered

5.8

Correct Answer

5   margin of error +/- 0.1

Question 9

3 / 3 pts

UDP uses an additive-increase multiplicative-decrease (AIMD) system to manage flows.

○ True

Correct!

◉ False

Question 10

3 / 3 pts

TCP implements network fairness directly.

○ True

Correct!

◉ False

Question 11

3 / 3 pts

UDP implements network fairness.

○ True

● False

Question 12

3 / 3 pts

TCP has a congestion control mechanism.

● True

○ False

Question 13

3 / 3 pts

In host-inferred congestion control, congestion is detected based on delayed and/or dropped packets.

Answer 1:

host-inferred

Question 14

3 / 3 pts

The rate of CongWin size increase (in terms of MSS) while in TCP's Slow-Start phase is Exponential .

Answer 1:

Exponential

Question 15

3 / 3 pts

Select the proper equation for TCP's calculation of the Timeout Interval.

$\bigcirc$ $TimeoutInterval = 4 \cdot EstimatedRTT_n + DevRTT_n$

$\bigcirc$ $TimeoutInterval = (1 - \alpha) \cdot EstimatedRTT_n + \alpha \cdot DevRTT_n$

$\bigcirc$ $TimeoutInterval = \alpha \cdot EstimatedRTT_n + (1 - \alpha) \cdot DevRTT_n$

Correct!

$\bullet$ $TimeoutInterval = EstimatedRTT_n + 4 \cdot DevRTT_n$

Question 16   3 / 3 pts

Select the proper equation for TCP's calculation of DevRTT.

$\bigcirc$ $DevRTT_n = (1 - \beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{old} - EstimatedRTT_{n-1}|$

$\bigcirc$ $DevRTT_n = \beta \cdot DevRTT_{n-1} + (1 - \beta) \cdot |SampleRTT_{new} - EstimatedRTT_{n-1}|$

$\bigcirc$ $DevRTT_n = (1 - \beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{new} - EstimatedRTT_n|$

Correct!

$\bullet$ $DevRTT_n = (1 - \beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{new} - EstimatedRTT_{n-1}|$

Question 17   3.5 / 4 pts

Select the appropriate **new** CongWin sizes for the following TCP Reno congestion scenario. Assume **ssthresh** is initially set to 4 MSS:

1. Connection Established with new server host. CongWin =

   [Select]   ⌄

2. ACK(s) received from first segment set. CongWin =   [Select]   ⌄

3. ACK(s) received from next segment set. CongWin =   [Select]   ⌄

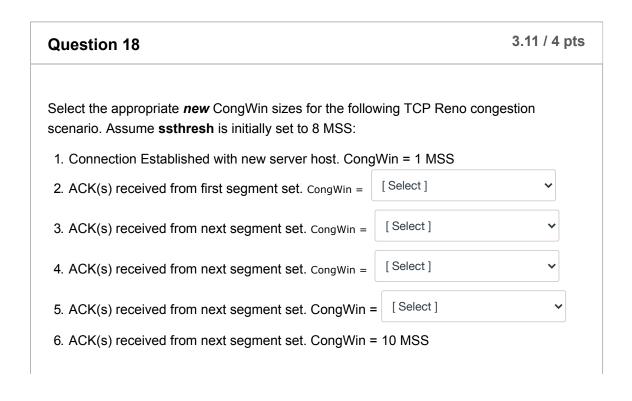4. ACK(s) received from next segment set. CongWin =   5 MSS
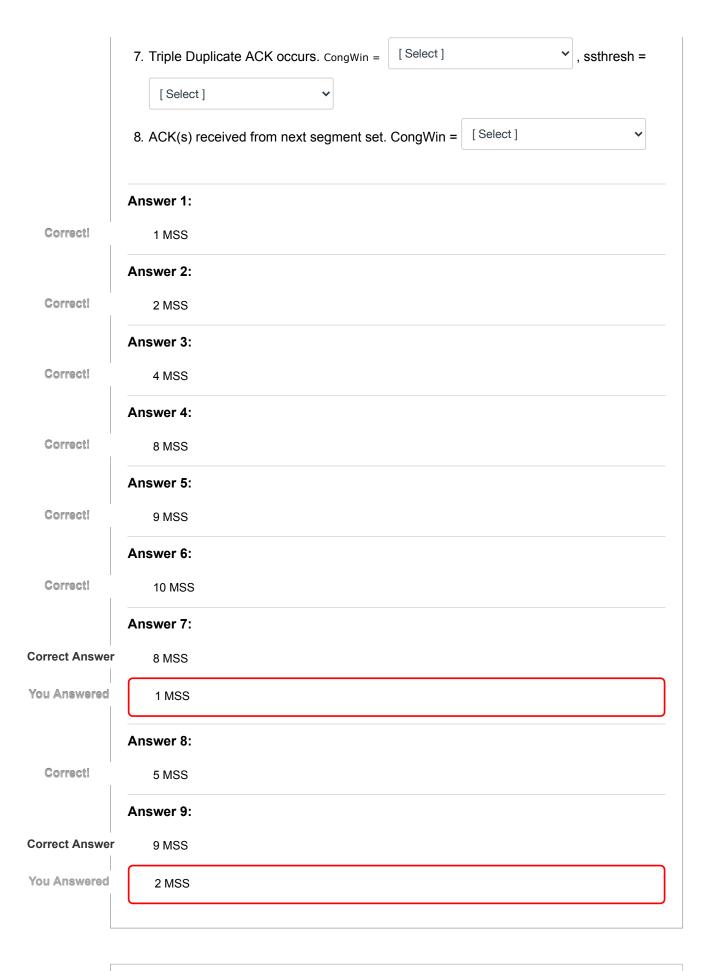
5. ACK(s) received from next segment set. CongWin =   [Select]   ⌄

6. Timeout occurs. CongWin =   1 MSS , ssthresh = 4 MSS

7. ACK(s) received from next segment set. CongWin = 2 MSS

Answer 1:

1 MSS

Answer 2:

2 MSS

Answer 3:

4 MSS

Answer 4:

5 MSS

Answer 5:

6 MSS

Answer 6:

1 MSS

Answer 7:

You Answered

4 MSS

Correct Answer

3 MSS

Answer 8:

2 MSS

Question 18

3.11 / 4 pts

Select the appropriate *new* CongWin sizes for the following TCP Reno congestion scenario. Assume **ssthresh** is initially set to 8 MSS:

1. Connection Established with new server host. CongWin = 1 MSS

2. ACK(s) received from first segment set. CongWin = [Select] ▾

3. ACK(s) received from next segment set. CongWin = [Select] ▾

4. ACK(s) received from next segment set. CongWin = [Select] ▾

5. ACK(s) received from next segment set. CongWin = [Select] ▾

6. ACK(s) received from next segment set. CongWin = 10 MSS

7. Triple Duplicate ACK occurs. CongWin = [Select] , ssthresh =

[Select]

8. ACK(s) received from next segment set. CongWin = [Select]

Answer 1:

1 MSS

Answer 2:

2 MSS

Answer 3:

4 MSS

Answer 4:

8 MSS

Answer 5:

9 MSS

Answer 6:

10 MSS

Answer 7:

Correct Answer   8 MSS

You Answered   1 MSS

Answer 8:

5 MSS

Answer 9:

Correct Answer   9 MSS

You Answered   2 MSS

Question 19   0 / 4 pts

Given a nodal delay of 68.6ms when there is no traffic on the network (i.e. usage = 0%), what is the effective delay when network usage = 10.8% ? (Give answer is miliseconds, rounded to one decimal place, without units. So for an answer of 0.10423 seconds you would enter "104.2" without the quotes).

218.5

Correct Answer   76.9 margin of error +/- 0.1

Question 20   4 / 4 pts

A host starts a TCP transmission with an EstimatedRTT of 44.7ms (from the "handshake"). The host then sends 3 packets and records the RTT for each:

SampleRTT1 = 26.5 ms

SampleRTT2 = 39.1 ms

SampleRTT3 = 41 ms

(NOTE: SampleRTT1 is the "oldest"; SampleRTT3 is the most recent.)

Using an exponential weighted moving average with a weight of 0.4 given to the most recent sample, what is the EstimatedRTT for packet #4? Give answer in miliseconds, rounded to one decimal place, without units, so for an answer of 0.01146 seconds, you would enter "11.5" without the quotes.

39.3

Correct Answer   39.3 margin of error +/- 0.1

Question 21   4 / 4 pts

Given a 2 Gbps link with TCP applications A, B, and C.

- Application A has 37 TCP connections to a remote web server
- Application B has 1 TCP connection to a mail server
- Application C has 19 TCP connections to a remote web server.

According to TCP "fairness", during times when all connections are transmitting, how much bandwidth should Application C have? (Give answer in Mbps, rounded to one decimal place, without units. So for an answer of 1234,567,890 bps you would enter "1234.6" without the quotes.)

Correct!

666.6

Correct Answer   666.7   margin of error +/- 0.1

Question 22   4 / 4 pts

Imagine a mythical set of protocols with the following details.

Maximum Link-Layer data frame: 1,255 bytes

Network-Layer header size: 29 bytes

Transport-Layer header size: 22 bytes

What is the size, in bytes, of the MSS? (Give answer without units)

Correct!

1,204

Correct Answer   1,204

Quiz Score: **54.61** out of 64