

Week 6 Summary Exercises

Due Nov 10 at 11:59pm**Points** 64**Questions** 22**Available** Nov 3 at 12am - Nov 10 at 11:59pm 8 days**Time Limit** 360 Minutes**Allowed Attempts** 2[Take the Quiz Again](#)

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	340 minutes	64 out of 64

Score for this attempt: **64** out of 64

Submitted Nov 8 at 12:05am

This attempt took 340 minutes.

Question 1

2 / 2 pts

Match the event with the TCP receiver action:

Event	TCP Receiver Action
Arrival of out-of-order segment with higher-than-expected sequence number.	Immediately send duplicate ACK, indicating sequence number of next expected byte.

Answer 1:

Correct!

Immediately send duplicate ACK, indicating sequence number of next expected byte.

Question 2

2 / 2 pts

What is the minimum TCP header size?

- ☐ 4 bytes
- ☐ 12 bytes
- ☐ 8 bytes
- ☒ 20 bytes

Correct!

Question 3

2 / 2 pts

A TCP fast-retransmit will occur after...

- ☐ There is no such thing as fast retransmit.
- ☐ Four duplicate ACKs for the same segment.
- ☒ Three duplicate ACKs for the same segment.
- ☐ Three ACKs for the same segment.

Correct!

Question 4

2 / 2 pts

The TCP sequence numbers are used to implement in-order delivery .

Answer 1:

in-order delivery

Correct!

Question 5

2 / 2 pts

Select the proper equation for calculating EstimatedRTT.

Correct!



$$EstimatedRTT_{New} = (1 - \alpha) EstimatedRTT_{Prev} + \alpha \times SampleRTT_{Recent}$$



$$EstimatedRTT_{New} = \alpha \times EstimatedRTT_{Prev} + \alpha \times SampleRTT_{Recent}$$



$$EstimatedRTT_{New} = (1 - \alpha) EstimatedRTT_{Prev} + (1 - \alpha) SampleRTT_{Recent}$$



$$EstimatedRTT_{New} = (1 - \alpha) SampleRTT_{Recent} + \alpha \times EstimatedRTT_{Prev}$$

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 #2,838. HostA now sends segments of the same application data stream in order:

P: 436 bytes

Q: 498 bytes

R: 466 bytes

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

Correct!

Correct Answer

4,239

Question 7**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 #1,255. HostA now sends segments of the same application data stream in order:

P: 324 bytes

Q: 300 bytes

R: 201 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!**Correct Answer**

2,081

Question 8**2 / 2 pts**

Assume a TCP sender is continuously sending 1,144-byte segment. If a TCP receiver advertises a window size of 8,895 bytes, and with a link transmission rate 40 Mbps an end-to-end propagation delay of 14.4 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).

Correct!**Correct Answer**

5.5 margin of error +/- 0.1

Question 9**3 / 3 pts**

The rate of CongWin size increase (in terms of MSS) while in TCP's Congestion Avoidance phase is Linear .

Answer 1:

Linear

Correct!**Question 10****3 / 3 pts**

TCP implements network fairness indirectly.

☒ True☐ False**Correct!****Question 11****3 / 3 pts**

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

☐

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

☐

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

☐

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

☒

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

Correct!

Question 12

3 / 3 pts

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

Correct!

☒ $TimeoutInterval = EstimatedRTT_n + 4 \cdot DevRTT_n$



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



$TimeoutInterval = 4 \cdot EstimatedRTT_n + DevRTT_n$



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

Question 13

3 / 3 pts

What are some causes of network congestion? (Check all that apply)

Correct!

☒ Reliable Data Transfer schemes.

Correct!

☒ High utilization.

Correct!

☒ Dropped TCP Packets.

Correct!

☒ Parallel TCP Connections.

Correct!

☒ Typical Internet Usage.

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:

Correct!

Exponential

Question 15

3 / 3 pts

TCP implements network fairness directly.

Correct!

☐ True

☒ False

Question 16

3 / 3 pts

TCP has a congestion control mechanism.

Correct!

☒ True

☐ False

Question 17

4 / 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 =

[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 =

[Select] ▼

5. ACK(s) received from next segment set. CongWin =

[Select] ▼

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

7. Timeout occurs. CongWin = 1 MSS , ssthresh =

[Select] ▼

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

[Select] ▼

Answer 1:

Correct!

1 MSS

Answer 2:

Correct!

2 MSS

Answer 3:

Correct!

4 MSS

Answer 4:

Correct!

8 MSS

Answer 5:

Correct!

9 MSS

Answer 6:

Correct!

10 MSS

Answer 7:

Correct!

1 MSS

Answer 8:

Correct!

5 MSS

Answer 9:

Correct!

2 MSS

Question 18

4 / 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 =

2. ACK(s) received from first segment set. CongWin =

3. ACK(s) received from next segment set. CongWin =

4. ACK(s) received from next segment set. CongWin =

5. ACK(s) received from next segment set. CongWin = 9 MSS

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

7. Triple Duplicate ACK occurs. CongWin =

ssthresh =

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

Answer 1:**Correct!**

1 MSS

Answer 2:**Correct!**

2 MSS

Answer 3:**Correct!**

4 MSS

Answer 4:**Correct!**

8 MSS

Answer 5:**Correct!**

9 MSS

Answer 6:**Correct!**

10 MSS

Answer 7:**Correct!**

8 MSS

Answer 8:**Correct!**

5 MSS

Answer 9:**Correct!**

9 MSS

Question 19**4 / 4 pts**

A host starts a TCP transmission with an EstimatedRTT of 38.3ms (from the “handshake”). The host then sends 3 packets and records the RTT for each:

SampleRTT1 = 28.9 ms

SampleRTT2 = 16.2 ms

SampleRTT3 = 32.6 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 milliseconds, rounded to one decimal place, without units, so for an answer of 0.01146 seconds, you would enter "11.5" without the quotes.

Correct!

Correct Answer

29.4 margin of error +/- 0.1

Question 20

4 / 4 pts

Given a 5 Gbps link with TCP applications A, B, and C.

Application A has 48 TCP connections to a remote web server

Application B has 3 TCP connection to a mail server

Application C has 3 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!

Correct Answer

277.8 margin of error +/- 0.1

Question 21

4 / 4 pts

Imagine a mythical set of protocols with the following details.

Maximum Link-Layer data frame: 1,117 bytes

Network-Layer header size: 11 bytes

Transport-Layer header size: 7 bytes

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

Correct!

Correct Answer

1,099

Question 22

4 / 4 pts

Given a effective delay of 32ms when network usage is 77%, what is the effective delay when network usage = 13% ? (Give answer is milliseconds, rounded to one decimal place, without units. So for an answer of 0.10423 seconds you would enter "104.2" without the quotes).

Correct!

Correct Answer

8.5 margin of error +/- 0.1

Quiz Score: **64** out of 64