

Homework 4 Sp25

- Due Apr 24 at 11:59pm
- Points 7
- Questions 7
- Available Apr 14 at 10am - May 1 at 11:59pm
- Time Limit None
- Allowed Attempts 5

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Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	842 minutes	5 out of 7

❗ Correct answers are hidden.

Score for this attempt: 5 out of 7

Submitted Apr 15 at 12:46am

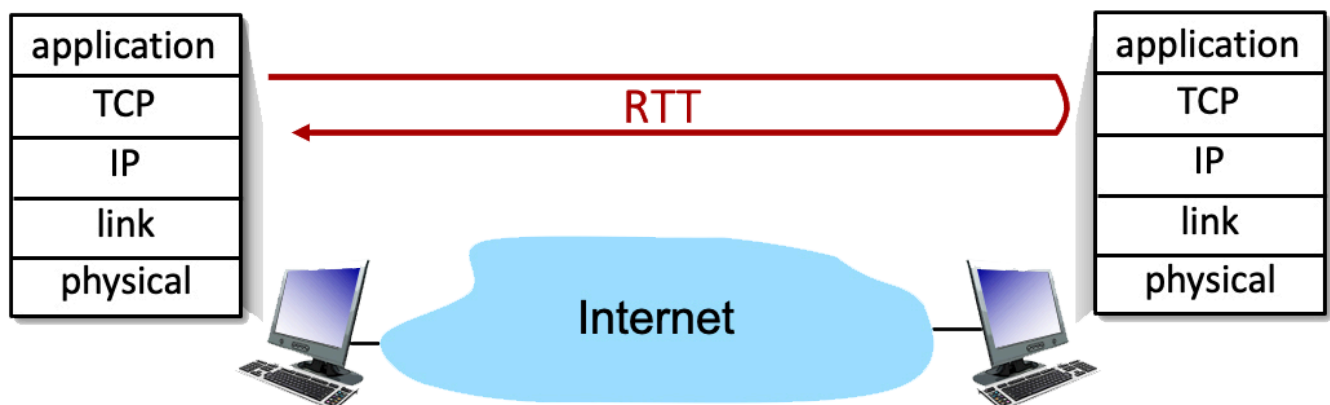
This attempt took 842 minutes.



Question 1

1 / 1 pts

Suppose that TCP's current estimated values for the round trip time (estimatedRTT) and deviation in the RTT (DevRTT) are 360 msec and 40 msec, respectively.



The next measured values of the RTT is 410.

Compute TCP's new value of DevRTT, estimatedRTT, and the TCP timeout value after the measured RTT value is obtained. Use the values of $\alpha = 0.125$, and $\beta = 0.25$.

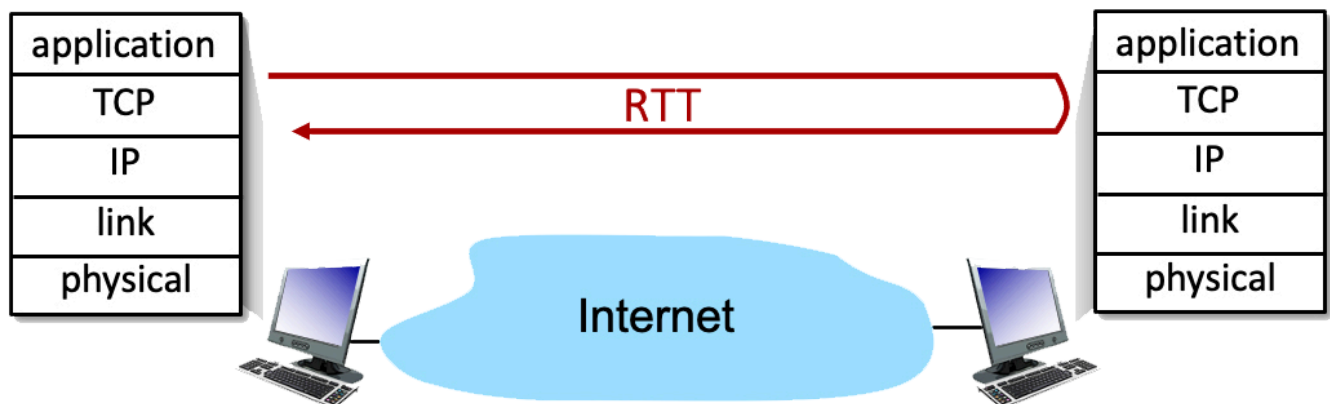
- ☐ estimatedRTT: 378.66 msec DevRTT: 48.58 msec Timeout: 572.98 msec
- ☐ estimatedRTT: 370.10 msec DevRTT: 46.24 msec Timeout: 555.07 msec
- ☐ estimatedRTT: 380.10 msec DevRTT: 48.24 msec Timeout: 573.07 msec
- ☐ estimatedRTT: 358.97 msec DevRTT: 66.01 msec Timeout: 623.01 msec
- ☐ estimatedRTT: 378.66 msec DevRTT: 41.04 msec Timeout: 542.80 msec
- ☐ estimatedRTT: 373.90 msec DevRTT: 44.31 msec Timeout: 515.15 msec
- ☒ estimatedRTT: 366.25 msec DevRTT: 42.50 msec Timeout: 536.25 msec
- ☐ estimatedRTT: 372.97 msec DevRTT: 45.31 msec Timeout: 554.22 msec

⋮

IncorrectQuestion 2

0 / 1 pts

Suppose that TCP's current estimated values for the round trip time (estimatedRTT) and deviation in the RTT (DevRTT) are 360 msec and 40 msec, respectively. The next measured values of the RTT is 420.



Compute TCP's new value of DevRTT, estimatedRTT, and the TCP timeout value after the measured RTT value is obtained. Use the values of $\alpha = 0.125$, and $\beta = 0.25$.

- ☐ estimatedRTT: 358.97 msec DevRTT: 66.01 msec Timeout: 623.01 msec

- ☐ estimatedRTT: 370.10 msec DevRTT: 46.24 msec Timeout: 555.07 msec
- ☐ estimatedRTT: 378.66 msec DevRTT: 41.04 msec Timeout: 542.80 msec
- ☐ estimatedRTT: 378.66 msec DevRTT: 48.58 msec Timeout: 572.98 msec
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- ☐ estimatedRTT: 373.90 msec DevRTT: 44.31 msec Timeout: 515.15 msec
- ☐ estimatedRTT: 380.10 msec DevRTT: 48.24 msec Timeout: 573.07 msec



IncorrectQuestion 3

0 / 1 pts

When a TCP receiver receives a data segment with a sequence number higher than expected, what action does it typically take that contributes to the eventual generation of triple duplicate ACKs by the receiver?

- ☐ It sends a negative acknowledgment (NACK) indicating the missing sequence number
- ☐ It buffers the out-of-order segment and waits for the missing segment without sending any immediate acknowledgment
- ☒ It acknowledges the highest in-order sequence number it has received so far (sending a duplicate ACK for the expected sequence number)
- ☐ It discards the out-of-order segment immediately without acknowledging



Question 4

1 / 1 pts

In the TCP windowing simulator described in the lecture, under what condition does the sender switch from the exponential “slow start” phase to linear “congestion avoidance”?

- ☐ When the receiver window size is exceeded
- ☐ When a packet loss is detected
- ☒ When the congestion window (cwnd) is equal to or greater than the slow start threshold

☐ When the round-trip time suddenly increases



Question 5

1 / 1 pts

If a TCP sender experiences a timeout, what is the typical adjustment made to the congestion window?

- ☒ It is set to one Maximum Segment Size
- ☐ It is increased exponentially (slow start)
- ☐ It remains unchanged
- ☐ It is decreased multiplicatively (e.g., halved)



Question 6

1 / 1 pts

In the context of TCP reliable transport, what is the purpose of setting a retransmission timeout (RTO)?

- ☐ To signal the receiver to close the connection if packets are delayed
- ☐ To provide the receiver with a deadline for acknowledging packets
- ☒ To ensure that lost segments are eventually retransmitted if acknowledgements are not received within a certain period
- ☐ To allow the sender to proactively reduce its sending rate to avoid congestion



Question 7

1 / 1 pts

Scenario: Consider a TCP connection where the sender and receiver communicate over a link with a 20 ms round-trip delay. The sender's initial sequence number is **3000**, and it sends an initial window of **3 segments**, each segment containing **600 bytes** of data. All three segments are transmitted back-to-back at time **t = 0 ms**:

1. Segment 1 has sequence numbers **[3000 : 3599]**
2. Segment 2 has sequence numbers **[3600 : 4199]**

3. Segment 3 has sequence numbers **[4200 : 4799]**

Suppose **Segment 2** is lost in the network, while Segments 1 and 3 arrive at the receiver. Assume each arriving segment is processed immediately upon arrival.

- Segment 1 arrives at the receiver at **t = 10 ms**, and the receiver sends an ACK for bytes up to **3599**.
- Segment 3 arrives at **t = 11 ms**, but it has sequence numbers **[4200 : 4799]**, which are “out of order.”

What **ACK number** does the receiver send to the sender upon receiving Segment 3 out of order?

3600

Quiz Score: 5 out of 7