

Lab 6

Question One

A TCP sender is just about to send a segment of size 100 bytes with sequence number 1234 and ack number 436 in the TCP header. What is the highest sequence number up to (and including) which this sender has received all bytes from the receiver?

Answer:

The answer is 1334 because $1234 + 100 = 1334$

Question Two

A TCP sender is just about to send a segment of size 100 bytes with sequence number 1234 and ack number 436 in the TCP header. Is it possible that the receiver has received byte number 1335?

Answer:

Yes.

Question 3

A TCP sender maintains a SmoothedRTT of 100ms. Suppose the next SampleRTT is 108ms. Which of the following is true of the sender?

Answer:

Whether it decreases the timeout depends on the deviation.

Question 4

A TCP sender maintains a SmoothedRTT of 100ms and DevRTT of 8ms. Suppose the next SampleRTT is 108ms. What is the new value of the timeout in milliseconds? (Numerical question)

Answer:

Timeout = smoothedRTT + $4 * \text{DevRTT}$ = $100 + 4 * 8 = 132$ milliseconds

Question 5

Which is the purpose of the receive window field in a TCP header?

Answer

Flow control as it tells the sender how much data to send.

Question 6

Roughly how much time does it take for both the TCP sender and receiver to establish connection state since the connect() call?

Answer

RTT because this is round-trip time

Question 7

TCP uses cumulative ACKs like Go-back-N, but does not retransmit the entire window of outstanding packets upon a timeout. What mechanism lets TCP get away with this?

Answer

Triple duplicate ACKs

Question 8

A sender that underestimates the round-trip time of a connection may unnecessarily induce a TCP timeout

Answer

True

Question 9

Which of the following services use TCP?

Answer

FTP and HTTP.

Question 10

Ben Bitdiddle's home network connection can upload at 125,000 bytes/second. His router has a 100,000 byte first in first out buffer for packets awaiting transmission. If the buffer is completely full, how long will it take for the buffer to clear?

Answer

0.8 seconds

Question 11

Ben Bitdiddle's home network connection can upload at 125,000 bytes/second. His router has a 100,000 byte first in first out buffer for packets awaiting transmission. At time 0, Ben's client starts sending 1,000 byte packets at 150 packets/s. When will the first packet be dropped by the router?

Answer

4 seconds

Question 12

Alyssa P. Hacker and Ben Bitdiddle communicate over a link with a capacity of 100 pkts / sec. The latency (RTT) on this link is 100 ms. If a sliding window protocol with acknowledgement packets is used, and there is a FIXED window size of 4 packets, what is the maximum rate of traffic on the link?

Answer

40 packets /s