

Lab 6

C00224660
Josh Browne

Question 1:

(C) 435

** The acknowledgement number that is about to be sent is 436. Which means the last received sequence number (from the receiver) is 435. (ie $436 - 1$)

PS. I am assuming the question is asking for the highest sequence number in a received packet. If I am wrong and the question means 'what is the highest sequence number sent out by the sender?' , then the answer is (A) 1233

Question 2:

(2) Yes

** because what the sender is just about to send could possibly be a retransmission

Question 3:

(2) Will increase timeout.

** new sample means SmoothRTT changes, this means timeout changes as its calculation uses SmoothRTT

Question 4:

FORMULAS USED:

$$\text{SmoothedRTT}_i = (1 - \alpha) * \text{SmoothedRTT}_{i-1} + \alpha * \text{SampleRTT}_i$$

$$\text{DevRTT}_i = (1 - \beta) * \text{DevRTT}_{i-1} + \beta * |\text{SampleRTT}_i - \text{SmoothedRTT}_i|$$

INFO USED:

$$\alpha = 0.125$$

$$\beta = 0.25$$

$$\text{DevRTT} = 8\text{ms}$$

$$\text{SmoothedRTT} = 100\text{ms}$$

$$\text{next SampleRTT} = 108$$

CALCULATIONS:

$$\text{newSmoothedRTT} = (0.875) * 100 + 0.125 * 108 = 101$$

$$\text{newDevRTT} = (0.75) * 8 + 0.25 * |108 - 101| = 7.75$$

$\text{timeout} = \text{SmoothedRTT} + 4 * \text{DevRTT}$

$\text{timeout} = 101 + 4 * 7.75 = \underline{132}$

Question 5:

(C) Flow Control.

** This is because the window size will be reduced if the client cannot process the data fast enough. This allows for control on the data intake speed so that it is manageable.

Question 6:

(B) 1.5 RTT

** This is because of the '3 way handshake'. (e.g 2 ways = 1 RTT, 3 ways = 1.5 RTT)

Question 7:

(B) Triple duplicate ACKs

** Slide 81 explains. 3 duplicate ACKs is the client requesting for retransmission of a packet before the timer runs out, this is called fast retransmission because you don't have to wait for timer.

Question 8:

True.

** its possible that the underestimated RTT is underestimated enough that the timeout is not long enough for the acknowledgment packet to be recieved in time.

Question 9:

SMTP, HTTP and FTP use TCP.

Question 10:

(C) 0.8 seconds

** $100,000 / 125,000 = 0.8$

Question 11:

(C) 4 seconds

** Ben client sends 150,000 bytes/sec , Router sends 125,000 bytes / sec AND leftover bytes accumulate in the buffer. Every second 25,000 bytes accumulate in buffer so it fills in 4 secs.

Question 12:

(B) 40 pkts / s

** 1 packet takes 0.01 sec to send. Because sliding window protocol, we wait for acknowledgement before sending any more than 4 (window size). Acknowledgement takes 0.1 sec, so $4 * 10 = 40$