Lab 7 - Congestion control and Subnetting.

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You must write your answers into the boxes below.

1) Name the two reasons, according to the book, how the sender identifies congestion is occurring in the network.

network router sends direct feedback to sender

router marks or updates fields in a packet

2) What scenario causes the sender to do a *Fast Retransmit*? Explain in 1-3 sentences, without spelling mistakes.

3 duplicate Acks for the same data before segment's timer expires. In this case, sender will use Fast Retransmit.

3) TCP's common approach (AIMD) in congestion control is to

linearly increases the transmission rate, until

triple duplicate-ACK event occurs, and then

halves and linearly increases it.

4) I start from slow start. Some time has passed. My current congestion window size is 3 MSS and I just received an ack segment. What will be my congestion window size (cwnd) after receiving an ack for a segment?

4 (Write only a number)

5) I am in Slow Start and my congestion window value just exceeded the slow start threshold value. Now how do I increase my cwnd?

it still will increase linearly. (only lowercase)

6) I'm in Slow start mode and a timeout has occurred. Do congestion window size and slow start threshold values change? If yes, how do they change? If they don't change, just type "no".

ssthresh =cwnd/2, cwnd=1 mss

6.b) Do I transition to another mode? If yes, to what mode? If I don't transition, type "no".

no.

7) I'm in Congestion Avoidance mode and a timeout has occurred. Do congestion window size and slow start threshold values change? If yes, how do they change? If they don't change, just type "no".

ssthresh =cwnd/2, cwnd=1 mss

7.b) Do I transition to another mode? If yes, to what mode? If I don't transition, type "no".

slow start.

For all questions on subnetting, you must provide your calculations as proof of your answers. One photo or document must show calculations only for one specific question. Photos from your notebooks will be accepted as long as they are readable. No calculation with proper explanation == 0 points. You must ignore IP classes and use the CIDR approach for all subnetting tasks. In the last question, you must use the VLSM approach. Whenever we ask you to give the ***subnet mask***, you must give it in a form ***x.x.x.x***, where *x* is a decimal number between 0-255. The answer in a form of */x* will be counted as incorrect. Only the answers inside the boxes are counted.

8) Given the IP *35.78.90.0* and a mask */28*. Write down the first 4 subnets with the given mask, starting the last octet with 0, and using the following format (you must write the square brackets yourself):

[n]-[network address]-[broadcast address]-[subnet mask]
where:
n is a numeration, starts from 0, goes until 5;
network address - sometimes called the "network id", the IP address in the form of 4 decimal numbers, separated by the dot.
broadcast address - sometimes called the "broadcast id", the IP address in the form of 4 decimal numbers, separated by the dot.
subnet mask - explained above, on the top of page 2.

Also, submit *8.pdf* or *8.jpg* or *8.png* which includes your calculation for question 8.

[0] - [35.78.90.0] - [35.78.90.15] - [255.255.255.240]

[1] - [35.78.90.16] - [35.78.90.31] - [255.255.255.240]

[2] - [35.78.90.32] - [35.78.90.47] - [255.255.255.240]

[3] - [35.78.90.48] - [35.78.90.63] - [255.255.255.240]

9) Provide the design of 2 subnets with 18 available IP addresses in each subnet for part *a* and 2 subnets with 31 available IP addresses in each subnet for part *b*. The format must be the same as in question 8. 0 <= *n* <= 1.

a) 220.100.202.0

[0] - [220.100.202.0] - [220.100.202.31] - [255.255.255.224]

[1] - [220.100.202.32] - [220.100.202.63] - [255.255.255.224]

b) 178.142.202.0

[0] - [178.142.202.0] - [178.142.202.63] - [255.255.255.192]

[1] - [178.142.202.64] - [178.142.202.127] - [255.255.255.192]

Also, submit *9.pdf* or *9.jpg* or *9.png* which includes your calculation for question 9.

10) Given the IP address *174.45.62.255* with the mask /22. Give us the network, broadcast addresses and a subnet mask of the network, to which the given IP belongs to. A subnet mask must be given in the form of 4 decimal numbers separated by a dot.

The format (you must write the square brackets yourself):
[network address]-[broadcast address]-[subnet mask]

[174.45.60.0] - [174.45.63.255] - [255.255.252.0]

Also, submit *10.pdf* or *10.jpg* or *10.png* which includes your calculation for question 10.

11) Distribute the subnets for 5 different branches for the local hospital. We care only for the PCs using a wired connection. The network is ***101.44.78.0***. The subnet masks will depend on the number of PCs.

1-Neurology, 4 PCs.

[1] [101.44.78.0] [101.44.78.1] [101.44.78.6] [101.44.78.7] [255.255.255.248]

2-Immunology, 18 PCs.

[2] [101.44.78.8] [101.44.78.37] [101.44.78.38] [101.44.78.39] [255.255.255.224]

3-Ophthalmology, 14 PCs.

[3] [101.44.78.40] [101.44.78.41] [101.44.78.54] [101.44.78.55] [255.255.255.240]

4-Endocrinology, 6 PCs.

[4] 101.44.78.56] 101.44.78.57] 101.44.78.62] 101.44.78.63] [255.255.255.248]

5-Gastroenterology, 48 PCs.

[5] [101.44.78.64] 101.44.78.65] 101.44.78.126] 101.44.78.127] [255.255.255.192]

You must write the square brackets yourself and you must ignore spaces and dashes.
For each floor, provide a line with the following format:
[N] – [network address] – [1st usable IP] – [last usable IP] – [broadcast address] – [subnet mask]

where *N* is the floor number. Your goal is to use the IP ranges and subnets as efficiently as possible. Use VLSM, as stated in the page above. You must distribute the IP addresses in the given order, as Neurology's IP's 4th octet must start from 0. You must include calculations for each floor and submit your solution as *11.pdf* or *11.jpg* or *11.png*.