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19K-1121

CN ASSIGNMENT

Date:

CHAPTER # 3 & 4

Question # 1

(a) UDP is faster than TCP. UDP is preferred to avoid TCP packet loss retransmission and congestion control. UDP achieve higher throughput than TCP.

(b) If the developer implements reliability and congestion control in the application layer, then reliable data transfer is possible.

Question #2

(a) UDP traffic are blocked by most firewalls. Whereas TCP's congestion control and reliability mechanisms ensures complete delivery of data.

(b) The congestion problem in UDP can be controlled by congestion control in the application layer (by using QUIC protocol) In TCP, congestion control is already available.

Question #3

(a) Both segments, from HostA and HostB will be directed to the same socket at Host C. Each packet has a source address, which will help Host C in identifying the sender of that packet

(b) The requests are being sent through different sockets but same port. Because, on each request a new socket is established (ip & port combination)

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Question #4

(a) Sequence number helps in identifying that whether the packet is new or retransmission. It also helps in retransmitting lost packets.

(b) Timers helps in detecting lost packets. If time limit for receiver's Ack is crossed than packet is considered to be lost.

(c) A timer would still be necessary in detecting when the packet is loss. It also keep tracks of packet transmission time.

Question #5

(a) Data in first segment would be

$110 - 90 = 20$ bytes

(b) The acknowledgement number will be 90

Question #6

(a) To avoid congestion, transmission speed is reduced. If data rate is steady, TCP reduces the transmission speed (taking account of threshold), so that congestion is avoided

(b) There is no need of sequence number as acknowledgements are available. Acknowledgement does the same thing and tells about the data receiving or data lost.

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Question #7

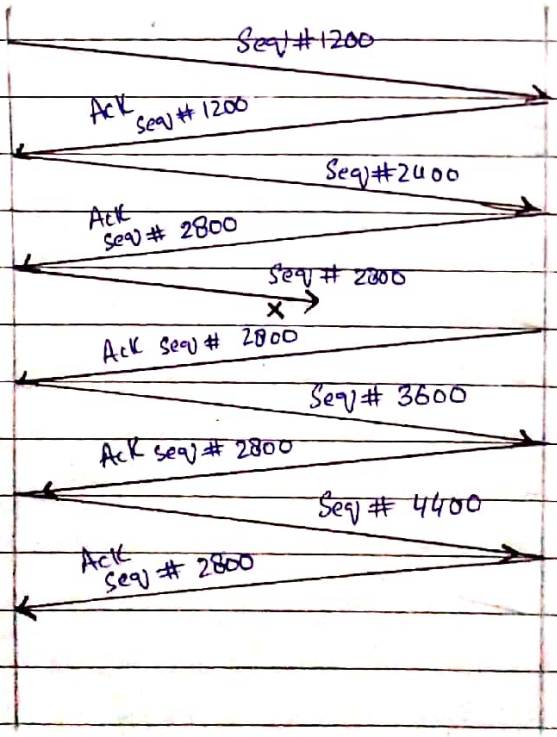
(a) True. It is possible for sender to receive acknowledgement for a packet that falls outside of its current window

i) Host A sends packet 1 to Host B at t_0. (window 1)
ii) Host B acknowledges at time t_1.
iii) Sender (Host A) times out at t_2 and sends packet 1 again. at t_2.
iv) Host B receives duplicate packets at t_3. (sends packet 1 ack again at t_3)
v) Host A receives ack (previously sent at t_1) at t_4.
vi) Host A slides to window 2.
vii) Host A receive ack (of duplicate transmission) at t_5.
viii) Host A receives ack of packet 1 outside its window.

(b) True, it is possible.

Question #8

(a)



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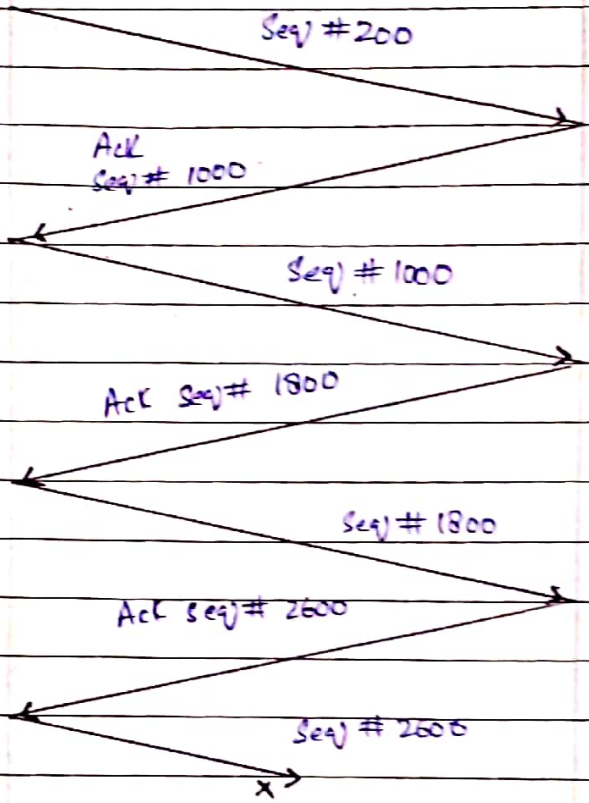
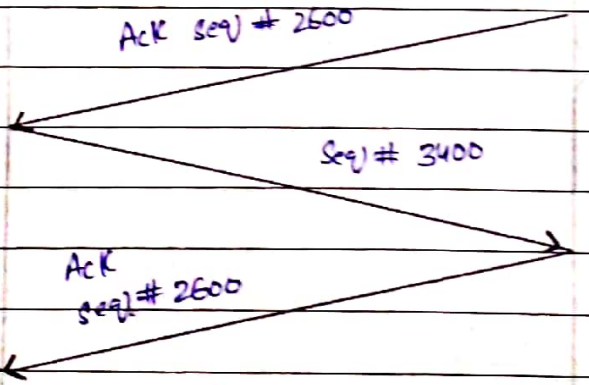
(b)





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Question #9

(a) Estimated RTT = 15 ms ; deviation = 1.9 ms.
Sample RTT = 20 ms

Estimated RTT = (0.875 x 15) + (0.125 x 20)
= 15.625 ms
Deviated RTT = (0.75 x 1.9) + (0.25)(20 - 15.625)
= 2.519 ms

RTO = 15.625 + 4(2.519)
= 25.7 ms Ans

(b) Estimated RTT = 25 ms ; deviation = 2.8 ms
Sample RTT = 30 ms

Estimated RTT = (0.875 x 25) + (0.125 x 30)
= 25.625 ms
Deviated RTT = (0.75 x 2.8) + 0.25(30 - 25.625)
= 3.194 ms

RTO = 25.625 + 4(3.194)
= 38.4 ms Ans

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Question #10

(a) 1-5 , 23-26
(b) 5-16 , 17-22
(c) Triple duplicate acknowledgement
(d) Timeout
(e) 32
(f) 26
(g) 9
(h) 7th Round
(i) window size would be 9/2 = 4.5 ≈ 4
threshold = 4

Question #11

i) Problem 1

↳ Address Class C
↳ Default subnet mask = 255.255.255.0
↳ Custom Subnet mask = 255.255.255.240 (128+64+32+16)
↳ Total no. of subnets = 16 -> (2^4)
↳ Total no. of host address = 16 -> (2^4)
↳ No. of usable address = 14 -> ($2^4 - 2$)
↳ No of bits borrowed = 4

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(ii) Problem 2

↳ ~~255~~ 255.255.0.0

↳ Address Class B

↳ Custom Subnet mask => (128+64+32+16+8+4+2+1 = 255)

(128 + 64 = 192)

= 255.255.255.192

↳ Total subnets = 2^{10} = 1024

↳ Total Host address = 2^6 = 64

↳ Usable addresses = 64 - 2 = 62

↳ Bits borrowed = 10

(iii) Problem 3

↳ Address Class B

↳ Default subnet = 255.255.0.0

↳ Custom Subnet => (128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255)

(128 + 64 = 192)

= 255.255.255.192

↳ Total subnets = 2^{10} = 1024

↳ Total Host address = 2^6 = 64

↳ Usable address = 64 - 2 = 62

↳ Bits borrowed = 10

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Question #12

For Netcom (required hosts = 50)

-> Total Host address = $2^6 = 64$
-> Subnets = $2^2 = 4$

0 – 63	(192.168.1.1 – 192.168.1.63)
64 – 127	(192.168.1.65 – 192.168.1.127)
128 – 191	(192.168.1.129 – 192.168.1.191)
192 – 255	(192.168.1.193 – 192.168.1.254)

For Cyber-Safe (required hosts = 48)

-> Total Host address = $2^6 = 64$
-> Subnets = $2^2 = 4$

0 – 63	(192.168.1.1 – 192.168.1.63)
64 – 127	(192.168.1.65 – 192.168.1.127)
128 – 191	(192.168.1.129 – 192.168.1.191)
192 – 255	(192.168.1.193 – 192.168.1.254)

For CNSP_Zone (required hosts = 120)

-> Total host addresses = $2^7 = 128$
-> Subnets = $2^1 = 2$

0 – 127	(192.168.1.1 – 192.168.1.127)
128 – 255	(192.168.1.129 – 192.168.1.255)

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Question #13

	Total Length	Flag	Fragment's Offset
Original Packet	1000 + 20	1	0
Fragment #1	1000 + 20	1	1000/8
Fragment #2	1000 + 20	1	2000/8
Fragment #3	1000 + 20	1	3000/8
Fragment #4	1000 + 20	1	4000/8
Fragment #5	960	0	5000/8