CS & IT ENGINEERING

COMPUTER NETWORKS

TCP & UDP

Lecture No-15

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Questions Practice

Discussion

Problem Solving on Congestion control

Q 5. Consider the effect of using slow start on a line with a 10-msec round-trip time. The receive window is 24 KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent? (BARC)

A. 20 ms

B. 40 ms

C. 90 ms

D. 30 ms

$RTT = 10msec$, $W_R = 24KB$, $MSS = 2KB$

No. of segments $= \frac{24KB}{2KB} = 12$

$TH = \frac{1}{2} W_R = 6$

9 RTT

$9 * 10msec = 90msec$

$W_R = 24KB$

OR

$TH = \frac{1}{2} W_R = 12KB$

$9RTT = 9 * 10msec = 90msec$

Q 6. On a TCP connection, current congestion window size is Congestion Window = 4 KB. The window size advertised by the receiver is Advertise Window = 6 KB. The last byte sent by the sender is LastByteSent = 10240 and the last byte acknowledged by the receiver is LastByteAcked = 8192. The current window size at the sender is: (GATE 2005)

A. 2048 Byte

B. 6144 Byte

✓ C. 4096 Byte

D. 8192 Byte

$W_C = 4KB$, $W_R = 6KB$

$W_S = \min\{W_C, W_R\}$

$W_S = \min\{4KB, 6KB\}$

$W_S = 4KB$

$W_S = 4 * 1024 Byte = 4096 Byte$

LastByteSent = 10240

LastByteAck. = 8192

10240 — 8192

2048 Byte

Q 7. Suppose that the maximum transmit window size for a TCP connection is 12000 bytes. Each packet consists of 2000 bytes. At some point of time, the connection is in slow-start phase with a current transmit window of 4000 bytes. Subsequently, the transmitter receives two acknowledgements. Assume that no packets are lost and there are no time-outs. What is the maximum possible value of the current transmit window? (GATE 2004)

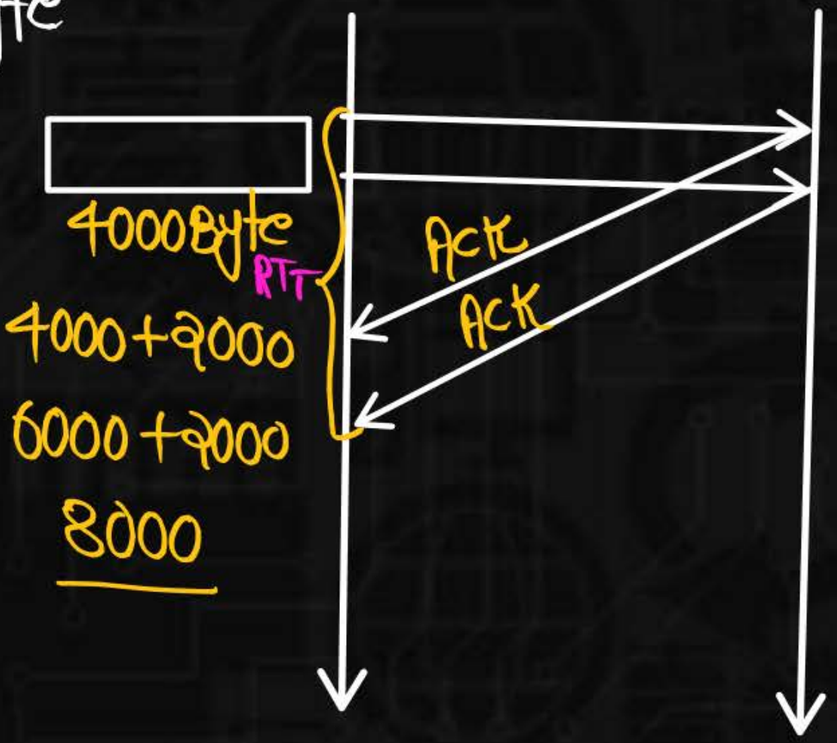
Packet size = 2000 Byte

A. 4000 bytes

B. 8000 bytes ✓

C. 10000 bytes

D. 12000 bytes



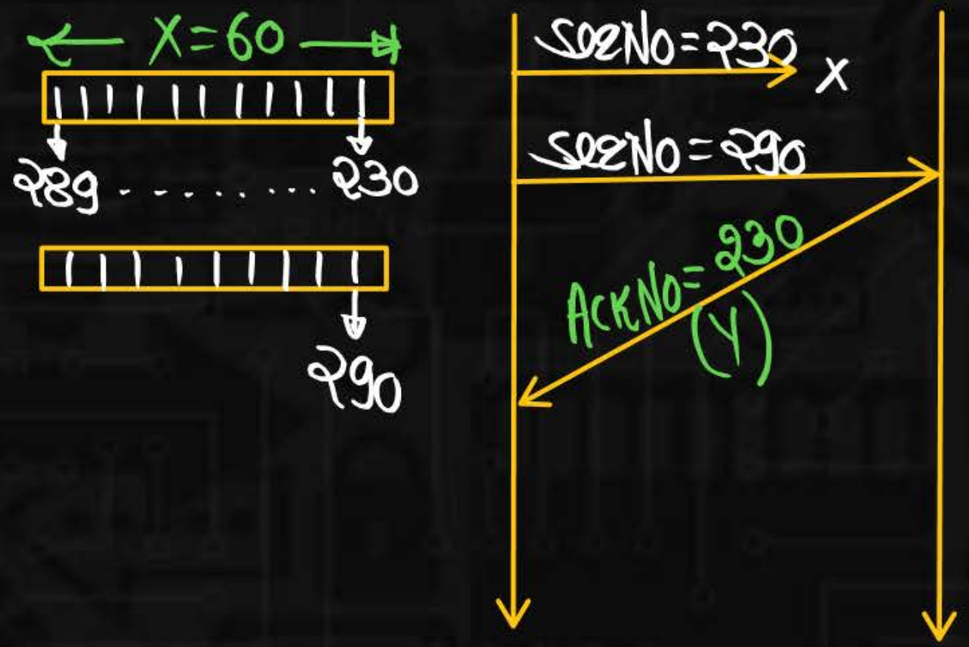
Q 8. Consider a TCP connection in a state where there are no outstanding ACKs. The sender sends two segments back to back. The sequence numbers of the first and second segments are 230 and 290 respectively. The first segment was lost, but the second segment was received correctly by the receiver. Let X be the amount of data carried in the first segment (in bytes), and Y be the ACK number sent by the receiver. The values of X and Y (in that order) are: (GATE 2007)

A. 60 and 290

B. 230 and 291

C. 60 and 231

✓ D. 60 and 230



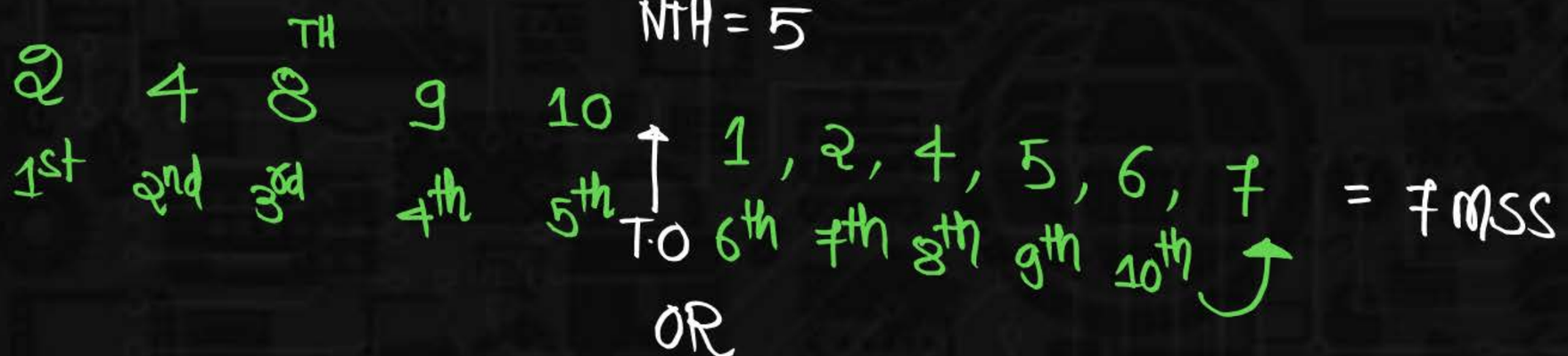
Q 9. Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of the slow start phase is 2 MSS and the threshold at the start of the first transmission is 8 MSS. Assume that a timeout occurs during the fifth transmission. Find the congestion window size at the end of the tenth transmission: (GATE 2012)(MTA)

A. 8 MSS

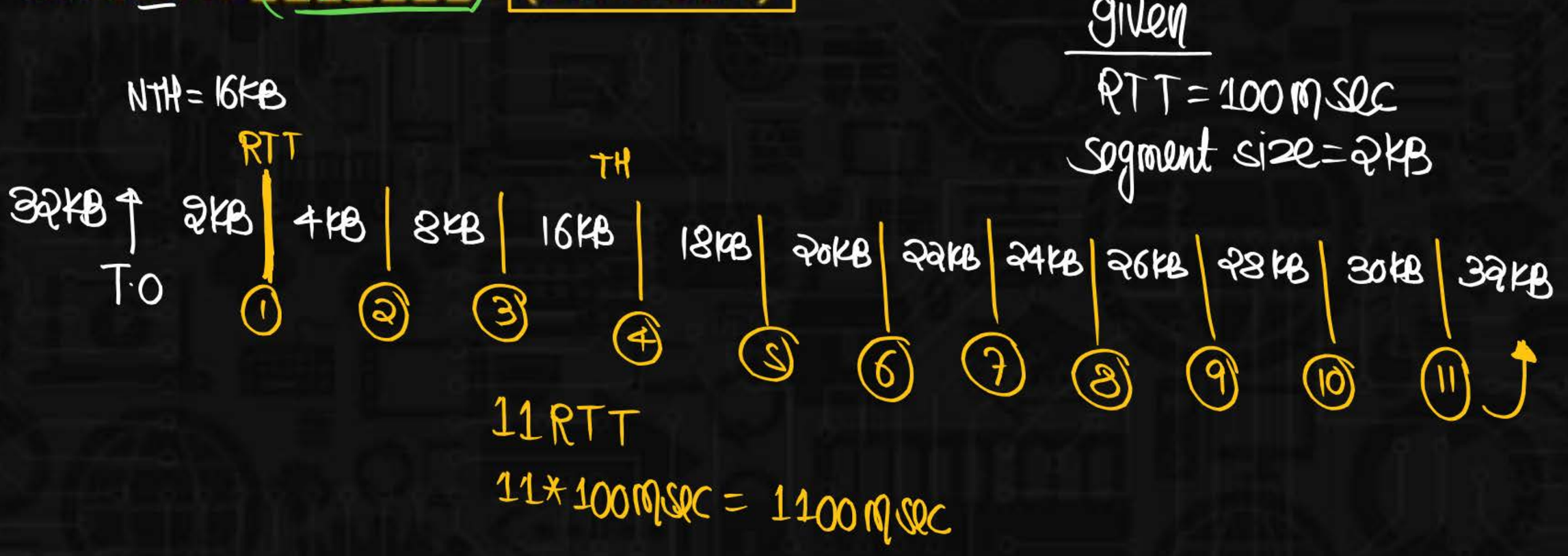
B. 14 MSS

C. 7 MSS

D. 12 MSS



Q 10. Let the size of congestion window of a TCP connection be 32 KB when a timeout occurs. The round trip time of the connection is 100 msec and the maximum segment size used is 2 KB. The time taken (in msec) by the TCP connection to get back to 32 KB congestion window is (1100-1300). (GATE 2014)



Q 11. Consider a TCP connection between a client and a server with the following specifications; the round trip time is 6 ms, the size of the receiver advertised window is 50 KB, slow-start threshold at the client is 32 KB, and the maximum segment size is 2 KB. The connection is established at time t = 0. Assume that there are no timeouts and errors during transmission. Then the size of the congestion window (in KB) at time t + 60 ms after all acknowledgements are processed is __(44KB)__. (GATE CS 2020)

RTT = 6 msec

W_R = 50 KB

Slow start threshold = 32 KB

Segment size = 2 KB

t = 0

(t + 60) msec = ?

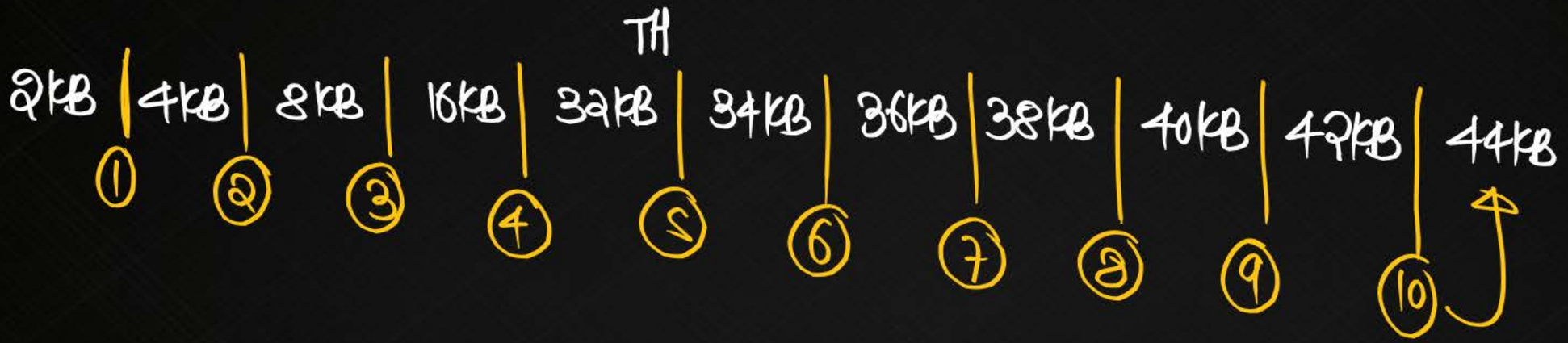
At t = 0 → 2KB
At t+6 → 4KB
At t+12 → 8KB
At t+18 → 16KB
At t+24 → 32KB (TH)
At t+30 → 34KB
At t+36 → 36KB
At t+42 → 38KB
At t+48 → 40KB

} Slow start Phase

At t+54 → 42KB

At t+60 → 44KB

OR



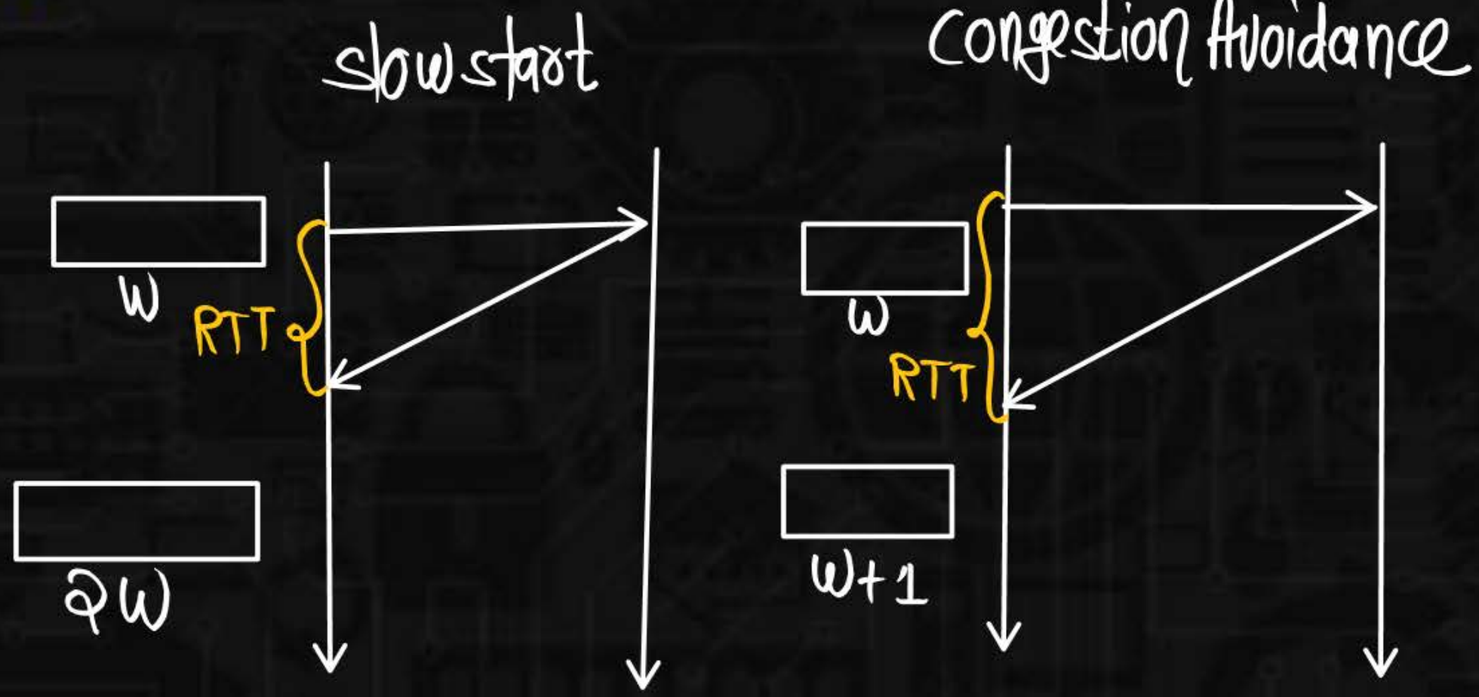
Q 12. Let the window size be a 'w' at the beginning of RTT. Assuming there are no losses in the RTT. What are the respective window sizes for 'slow start' and congestion avoidance after completion of RTT ?

A. $2w - 1, \frac{2w+1}{2}$

B. $w + 1, \frac{2w}{2}$

C. $W + 1, w - 1$

D. $2w, w + 1$



Q 13. Suppose that the TCP congestion window is set to 18 K bytes and a timeout occurs. How big will the window be in the fifth transmission if the next four transmission bursts are all successful? Assume that the maximum segment size is 1 KB. (ISRO)

A. 7 KB

B. 8 KB

C. 9 KB

D. 10 KB

Q 14. Let the size of congestion window of TCP connection be 64 KB when a time out occurs. The round trip time of a connection is 80 msec and maximum segment size used is 4 KB. The time taken by the TCP connection to get back to 64 KB congestion window is (BARC)

A. 1100

B. 880

C. 440

D. 600

NTH = 32KB

11 RTT

11 * 80 msec

880 msec

Q 15. While establishing TCP connection both Ws and Wr are established as 48,000 bytes. Maximum segment size (MSS) is 3,000 bytes. At one point if sender receives 4 acknowledgments, the window size in next transmission is _____ bytes.

(H.W)

Q 16. In TCP congestion control, the congestion window

A. Increases exponentially

B. Increases exponentially up to threshold value after that increases linearly

C. Increases exponentially up to threshold value after that increases linearly up to the sender's window size

(H·W)

D. None of the above

Q 17. In TCP congestion control AIMD algorithm current congestion window size is 16 MSS. Timeout occurs at sender end, then what is the congestion window size at sender end during fifth transmission ?

H.W

A. 8 MSS

B. 9 MSS

C. 16 MSS

D. 32 MSS


THANK YOU
GW
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