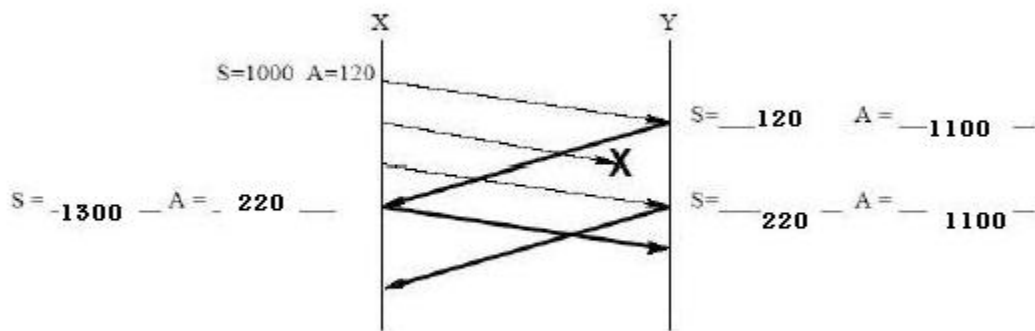


CSCN01I04 - Introduction to Computer Networks & Data Communication

Introduction to Computer Networks Answers of Sheet No. 3

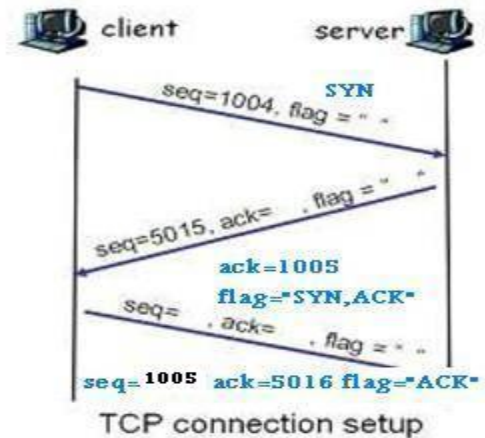
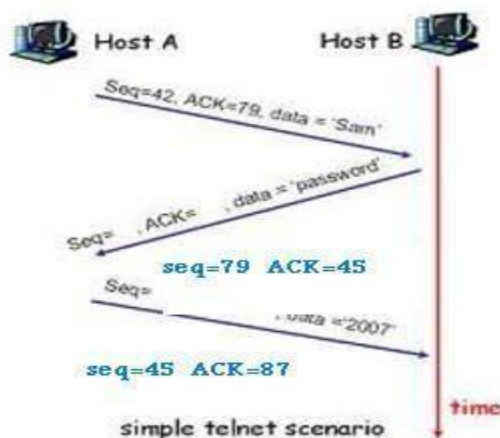
#1

The following figure shows two hosts X and Y communicating over a channel using TCP. Hosts X and Y are sending data to each other. If each TCP segment contains 100 bytes of data and the 2nd segment sent by X is lost, complete the below figure by adding the missing sequence numbers and acknowledgment numbers.



#2

Fill in the missing sequence numbers and acknowledgment numbers, knowing that each character is 1 byte long.



#3

1 → 1 KB

2 → 2 KB ($1 + 2 = 3$)

3 → 4 KB ($3 + 4 = 7$)

4 → 16 KB ($7 + 16 = 23$)

5 → 17 KB ($23 + 17 = 40$)

Total Time = $5 \times 20 = 100$ ms

#4

- a) Because at first we are in the slow-start phase the congestion window increase exponentially (double every RTT) until we reach the threshold. Then we enter the additive-increase phase where the congestion window increases 1 MSS every RTT.
- b) At $t=16$, the sender discovers that there is a lost packet because it received 3 duplicate ACKs.
- c) At $t=23$, a packet loss was detected by a timeout. When a timeout occurs, the congestion window is reset to 1, the threshold is cut to half of the last congestion window size and the sender enters the slow start phase again.