09/21/22.

It is self clocking.

TCP (Transmission Control Protocol):-

→ Guaranteed in-order delivery
→ Includes confirmation of delivery.
→ Has congestion control
→ implemented in O.S.

UDP (User Datagram Protocol):-

→ NO guarantee of data arrival.
→ no congestion control.
→ no delivery report.

Ports: A computer may have many N/W processes that all need to have network conversations at the same time.

→ OS needs a way to keep track of all N/W conversations. SO they give them each a number btw $0-2^{16}$.
→ OS have two separate lists - UDP & TCP ports.

TCP: Send & Receive window

→ If you are sending, you can send up to your sending window number of bytes before you have to stop and wait for an ACK.

→ If you are receiving, you tell the other computer to never send more data than you can buffer at a time.

→ Computer A's Receive window is computer B's

sending window and vice versa.

How TCP detects congestion control and Avoidance:

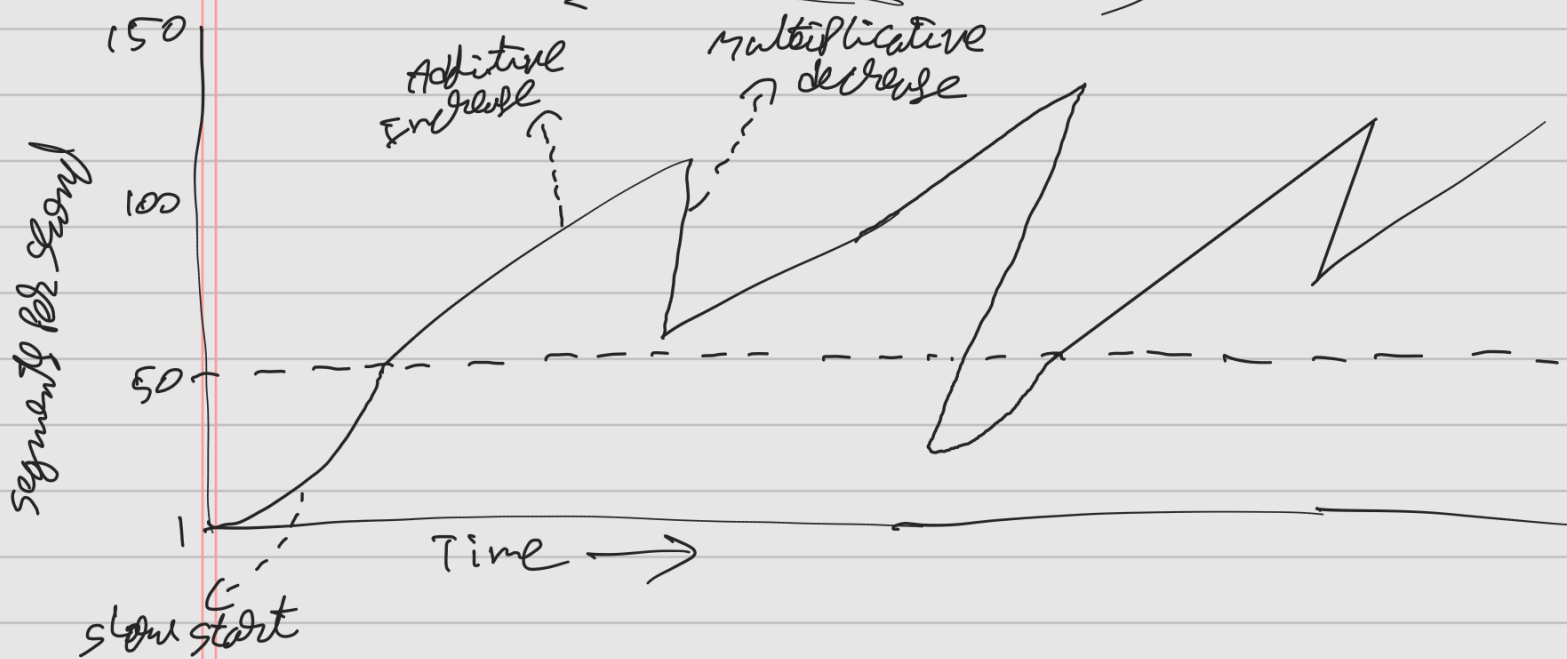
↳ Congestion is detected because TCP is self-clocking.

↳ If the clock is running slow, we have congestion.

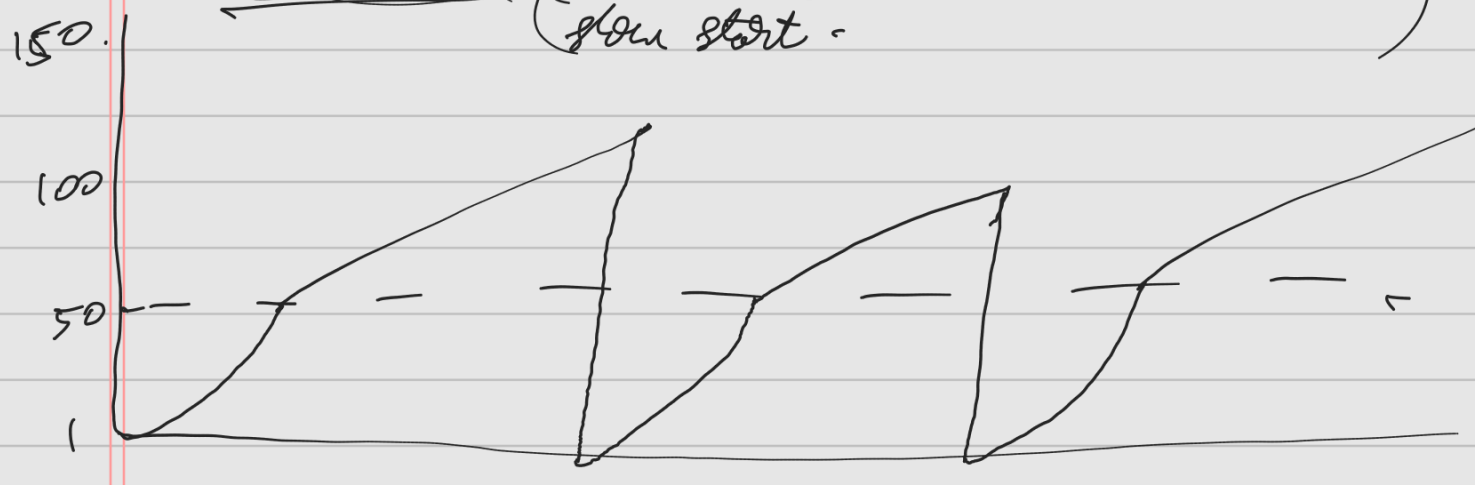
↳ If ACK's are coming in at the same Rate as I send segments, I could send at a faster Rate.

↳ If I am sending more packets than I get ACK's back, I should slow down.

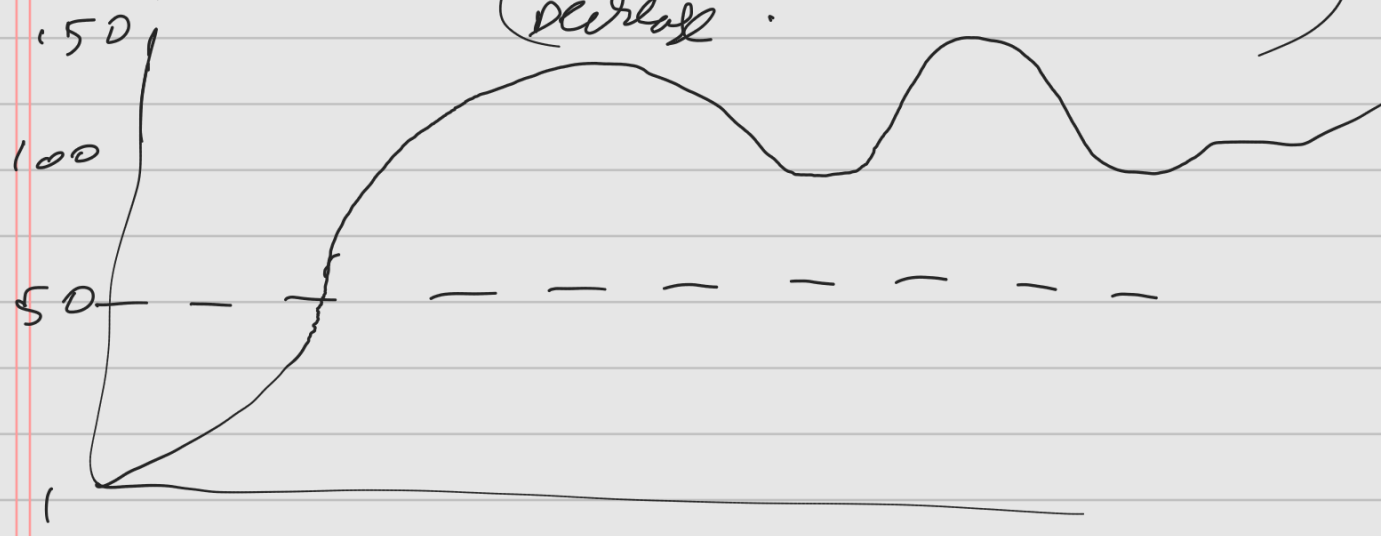
TCP Flavors :- i) TCP Reno: (AIMD)



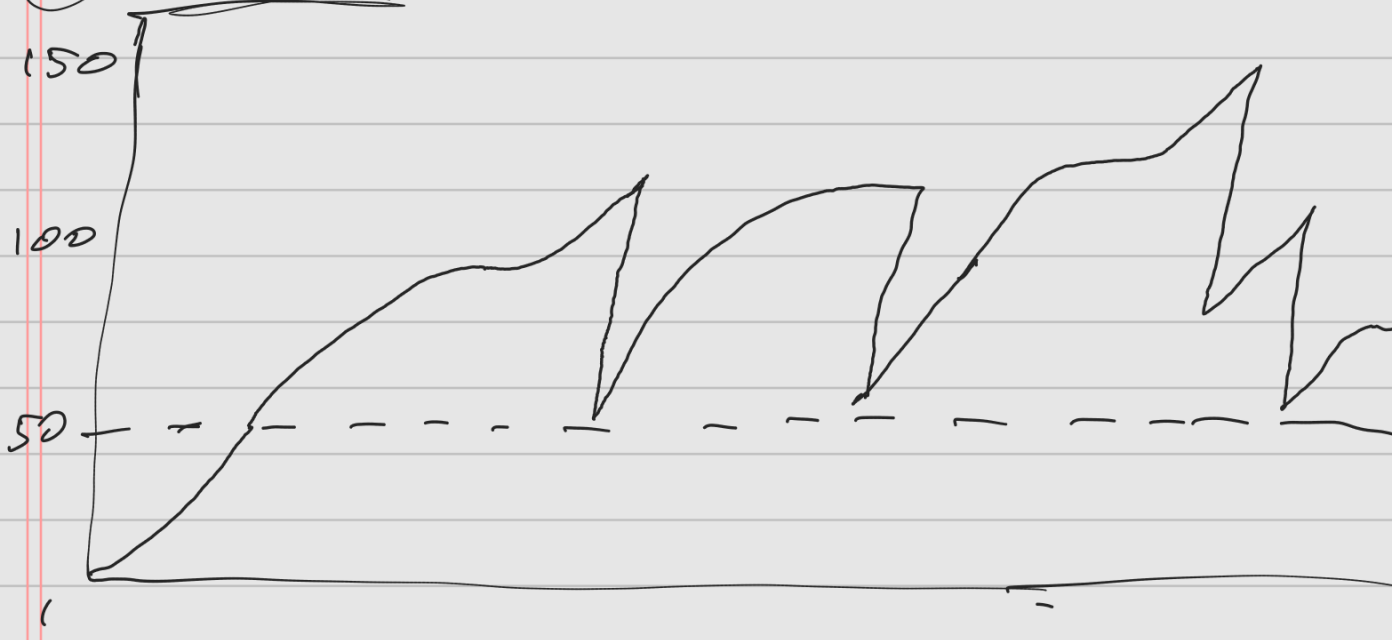
ii) TCP Tahoe:- (Always goes back to 1 and does slow start.)



(iii) TCP Cubic:- (Cubic Increase, multiplicative decrease.



(iv) TCP vegas: (detects congestion faster)



N/w Address Translation (NAT):-

How does a Router keeps track of multiple TCP connections from multiple machines?

Ans) A Router changes its IP address with the intended machine and communicates with the destination machine, after getting the Response back from the destination machine, the router sends it to the intended machine, this is called as N/w Address Translation.