

CS & IT ENGINEERING

COMPUTER NETWORKS

TCP & UDP

Lecture No-9



By- Ankit Doyla Sir



TOPICS TO
BE
COVERED



TCP timer management

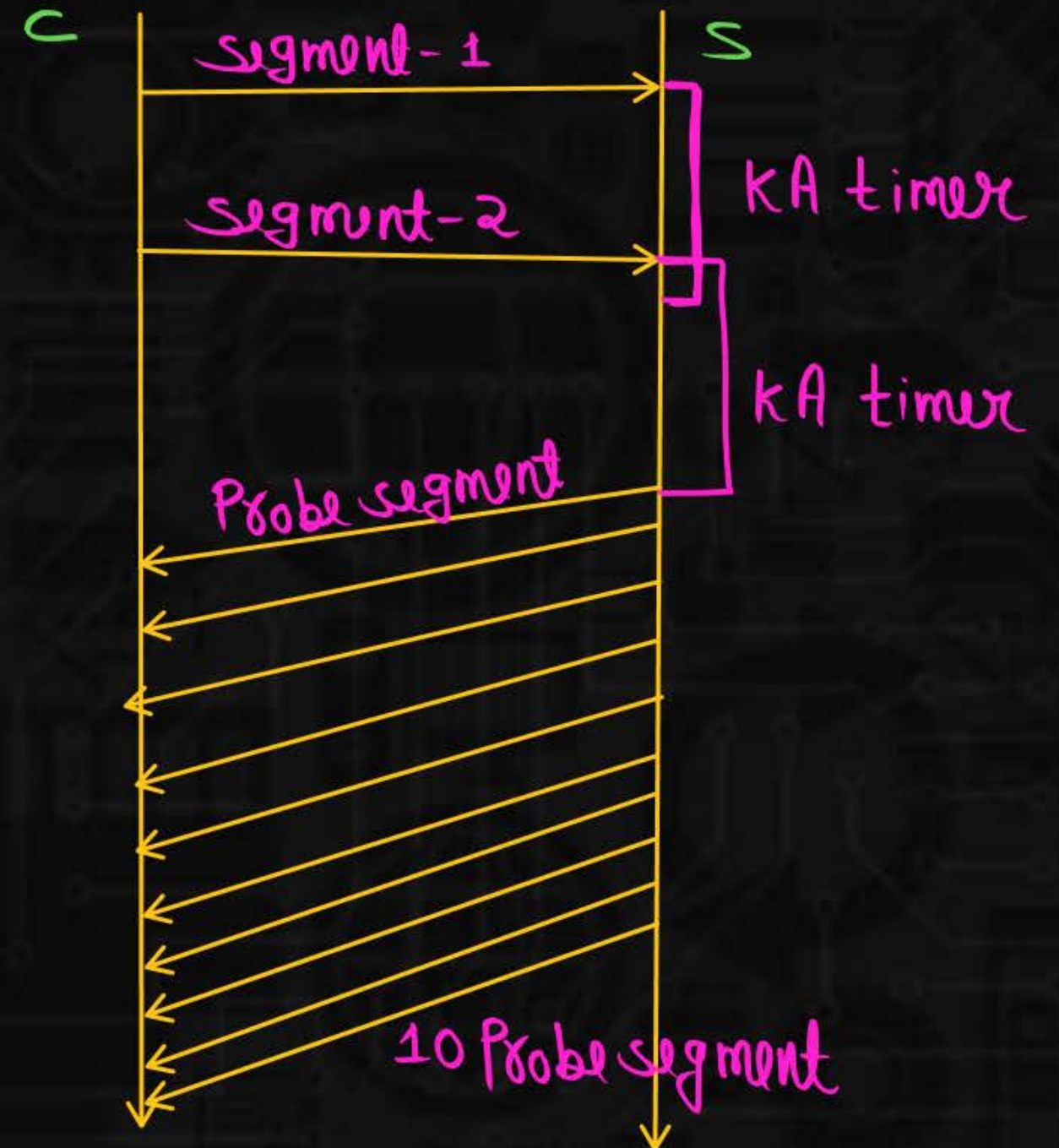
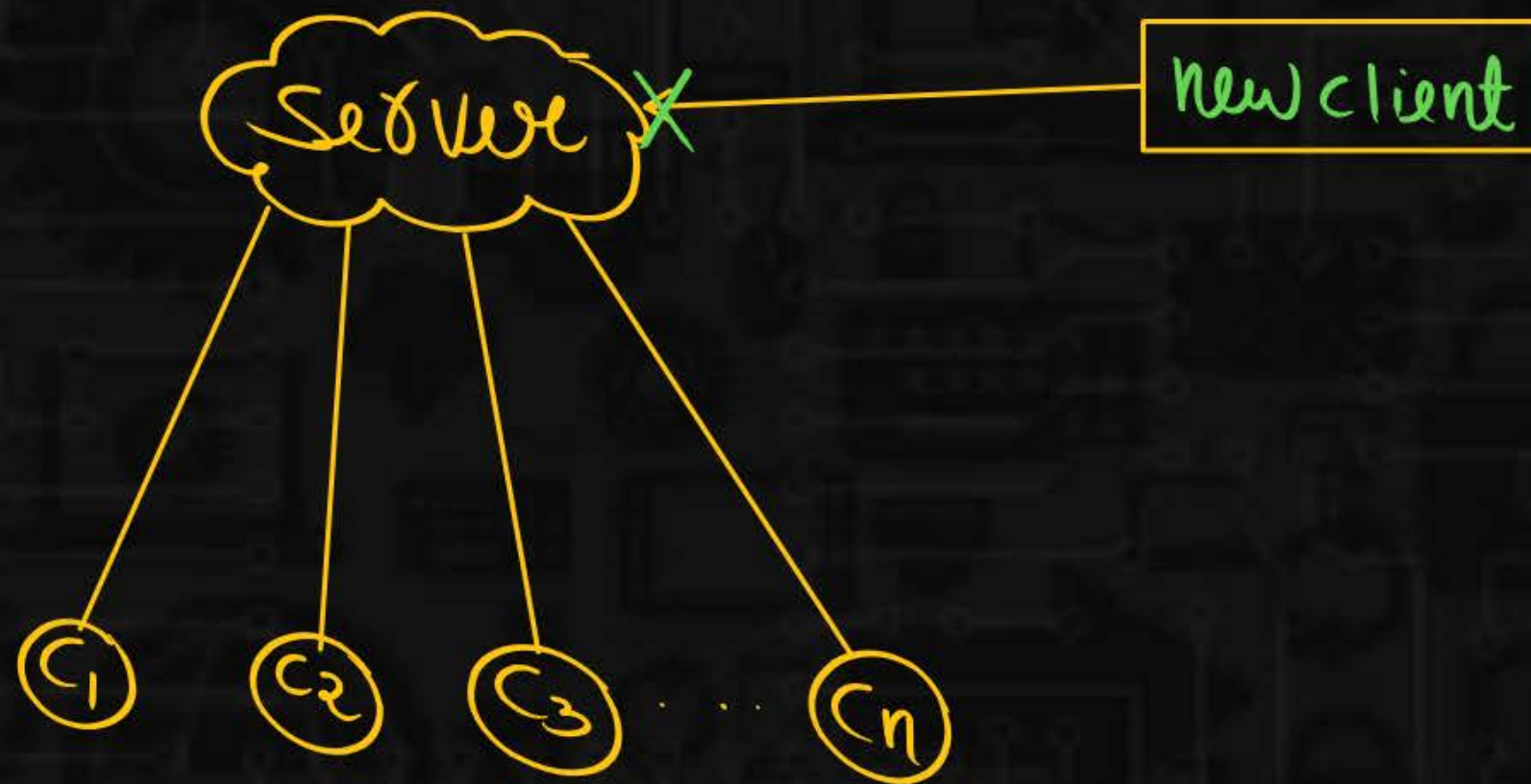
TCP Timer Management

TCP timer management

- ✓ 1. Keep Alive timer
- ✓ 2. Persistent timer
- ✓ 3. Acknowledgement timer
- ✓ 4. Time wait timer
- ✓ 5. Time out timer (*)

1. Keep alive timer:

It is used to keep track of ideal connection. Server will close the connection if client does not send any data for a fixed amount of time.



Note:

Each time the server receives the packet from a client, it resets the keep alive timer. If the server does not receive packet from the client and keep alive timer expires, it sends a probe segment. If there is no response after 10 probes, it assumes that the client is down and terminates the connection.

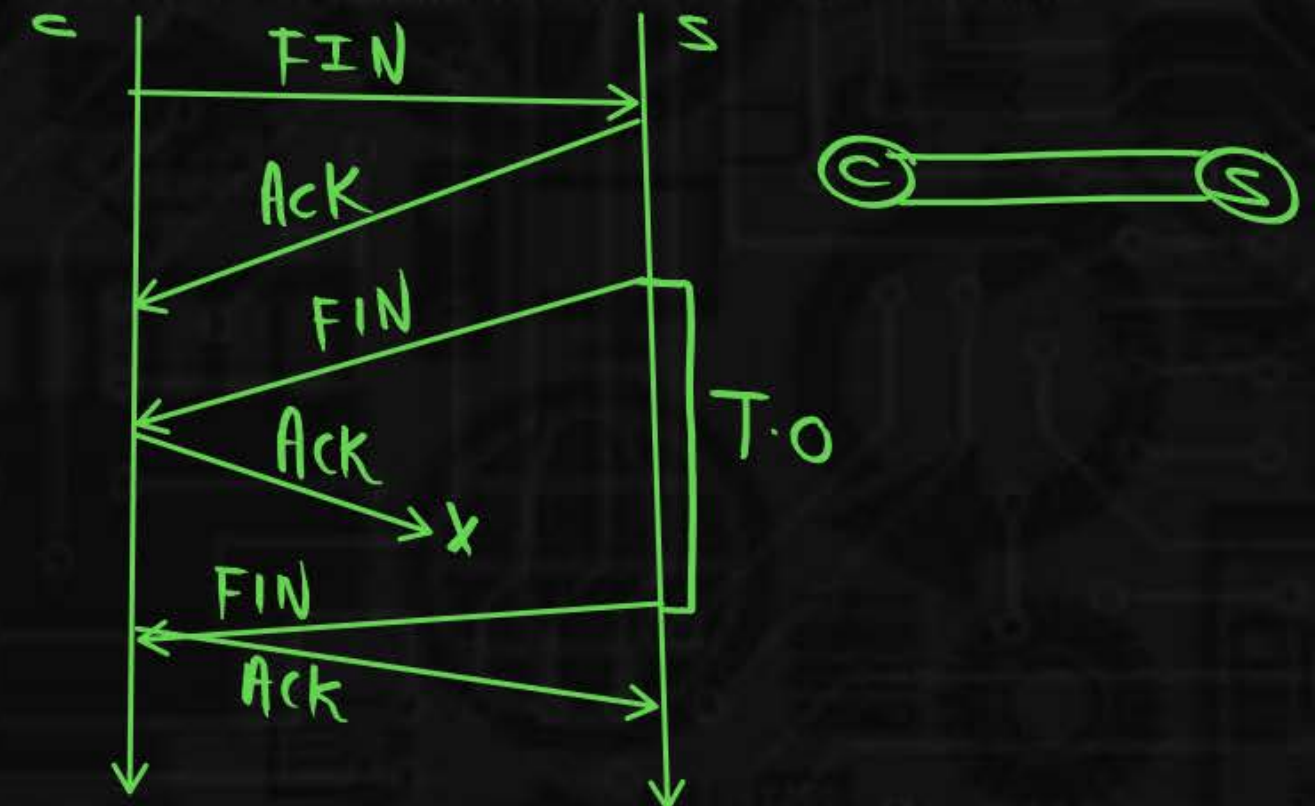
2. Acknowledgement timer :

Whenever Receiver receives a segment. It will start a timer called Acknowledgement timer. Whenever Ack timer goes off the receiver send one Acknowledgment for all the segment received in this timer. This is known as commulative Ack.

3. Time wait Timer: $[2 \times \text{MSL}]$



The Time wait timer (2 MSL) is used during connection termination. The maximum Segment Life time (MSL) is the amount of time any segment can exist in the Network before being discarded. The implementation needs to choose a value for MSL. Common values are 30 sec, 1 min or even 2 min. The 2 MSL timer is used when TCP performs an Active close and send the Final Ack. The connection must stay open for 2 MSL amount of time to allow TCP to resend the final Ack in case of Ack is lost. This requires that the RTO timer at the other end times out and new FIN and Ack segment are resent.



4. Time Out Timer:



At DLL

$$RTT = T_d(F) + 2 \times P_d$$

assume $T_d(F) = 0$

$$RTT = 2 \times P_d$$

$$RTT = 2 \times 10 = 20 \text{ sec}$$

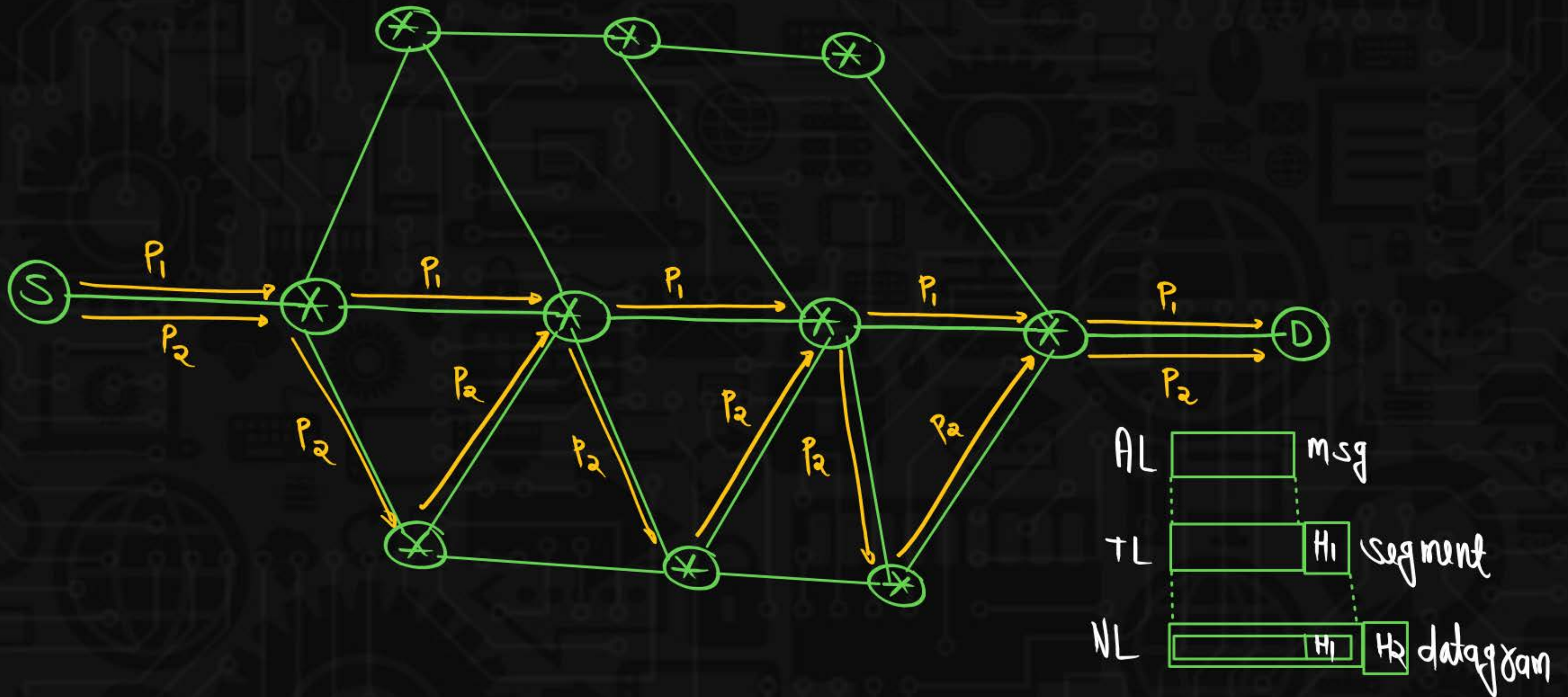
$$T_o = 2 \times RTT$$

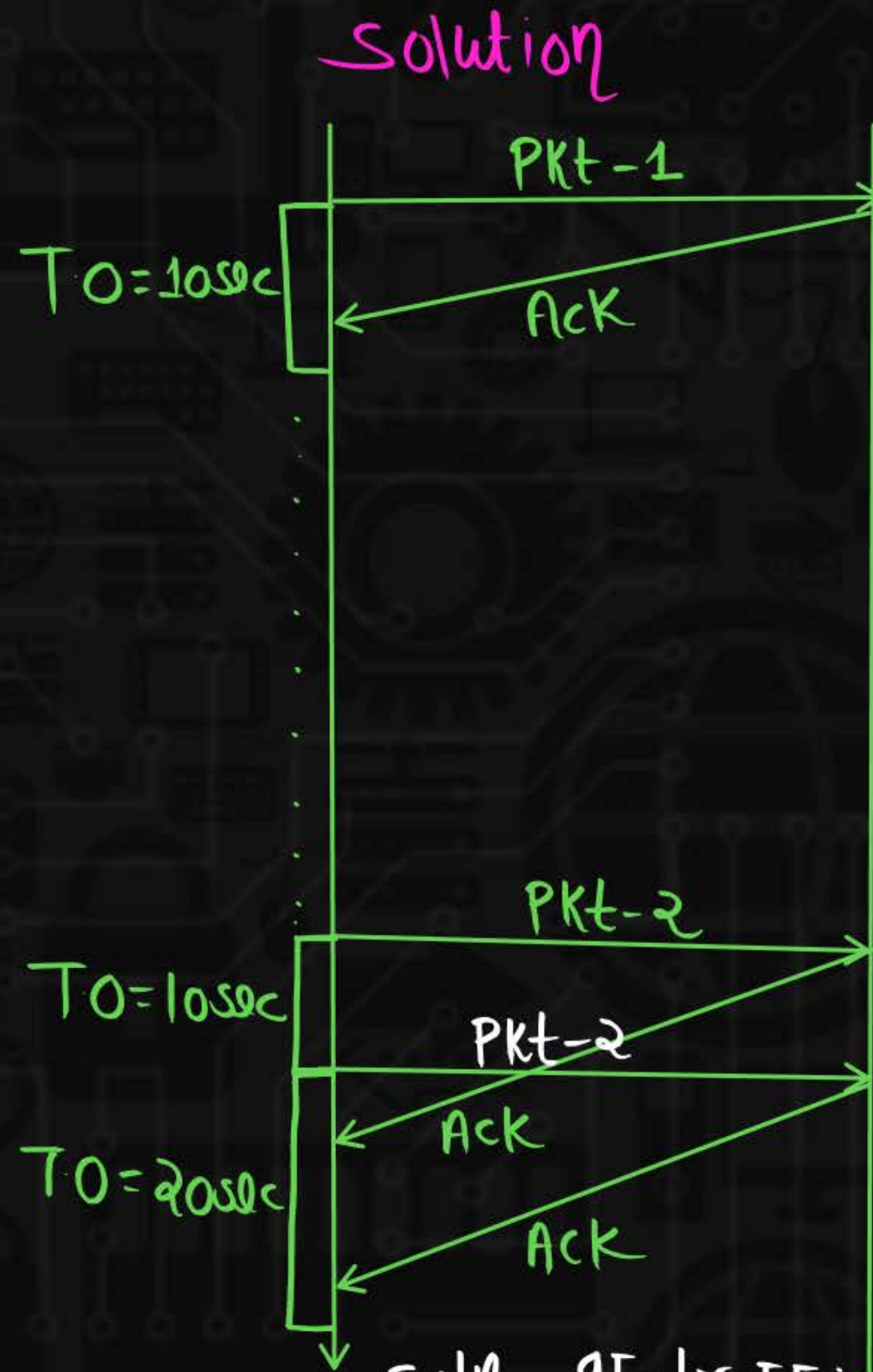
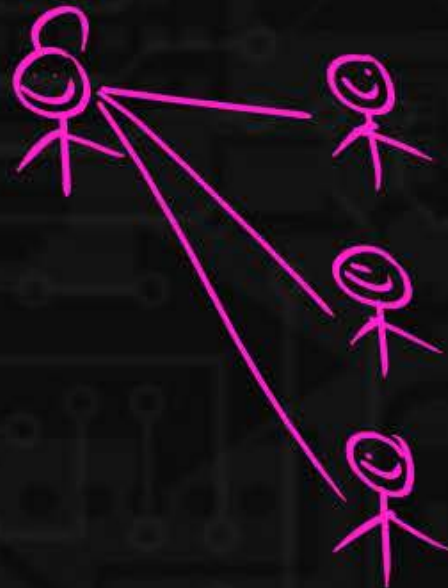
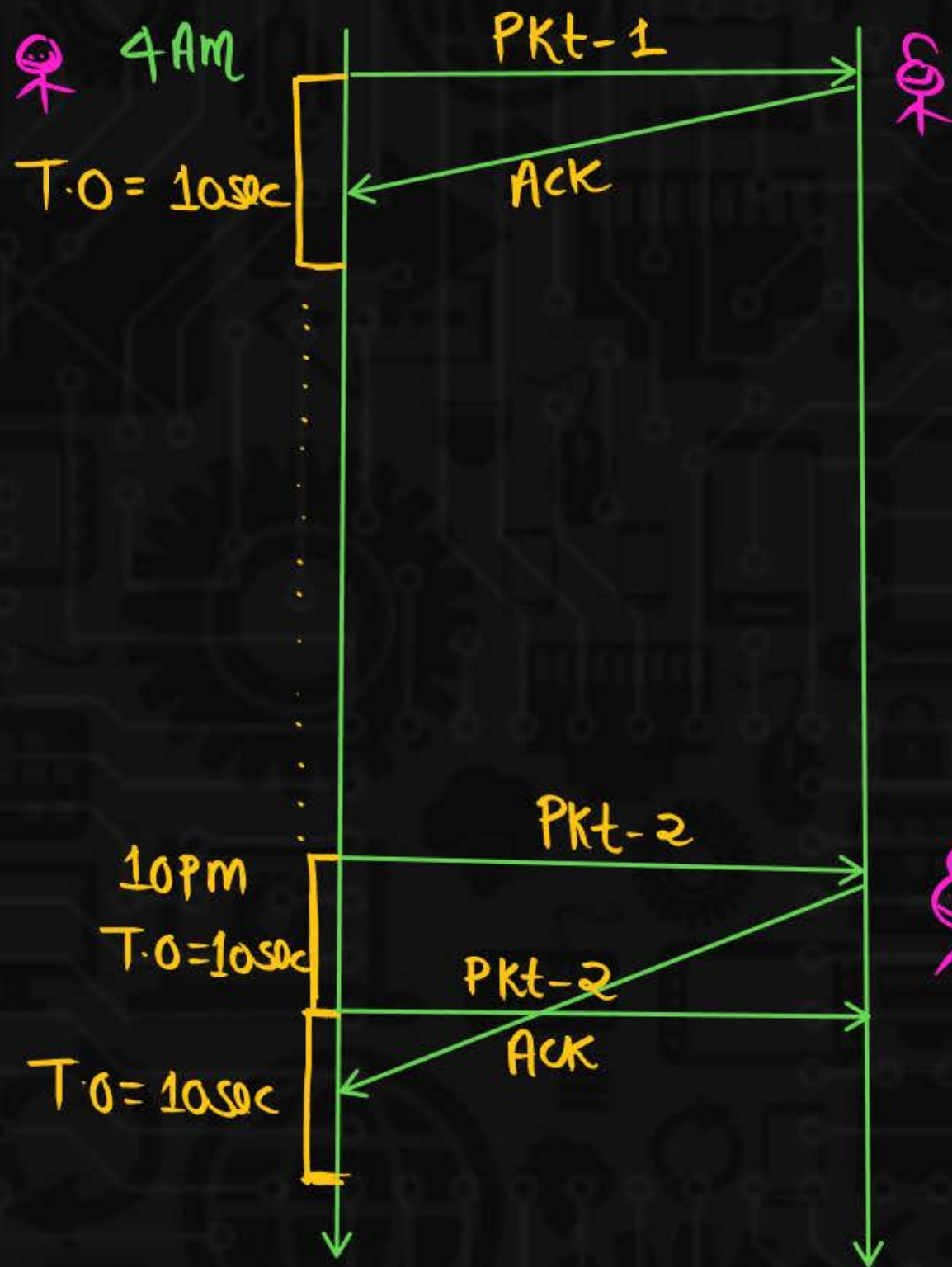
$$T_o = 2 \times 20 \text{ sec}$$

$$T_o = 40 \text{ sec}$$



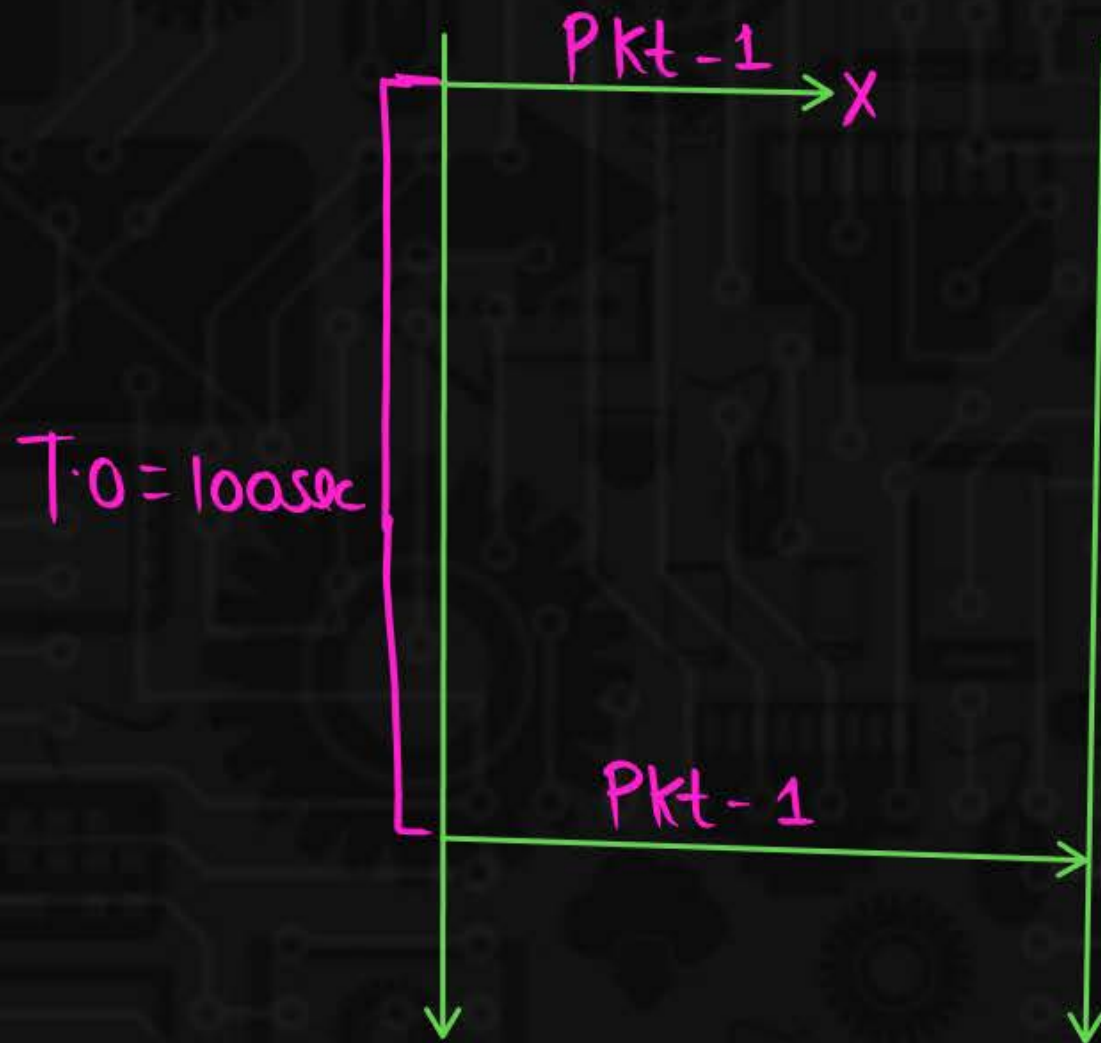
Time out timer at Transport Layer





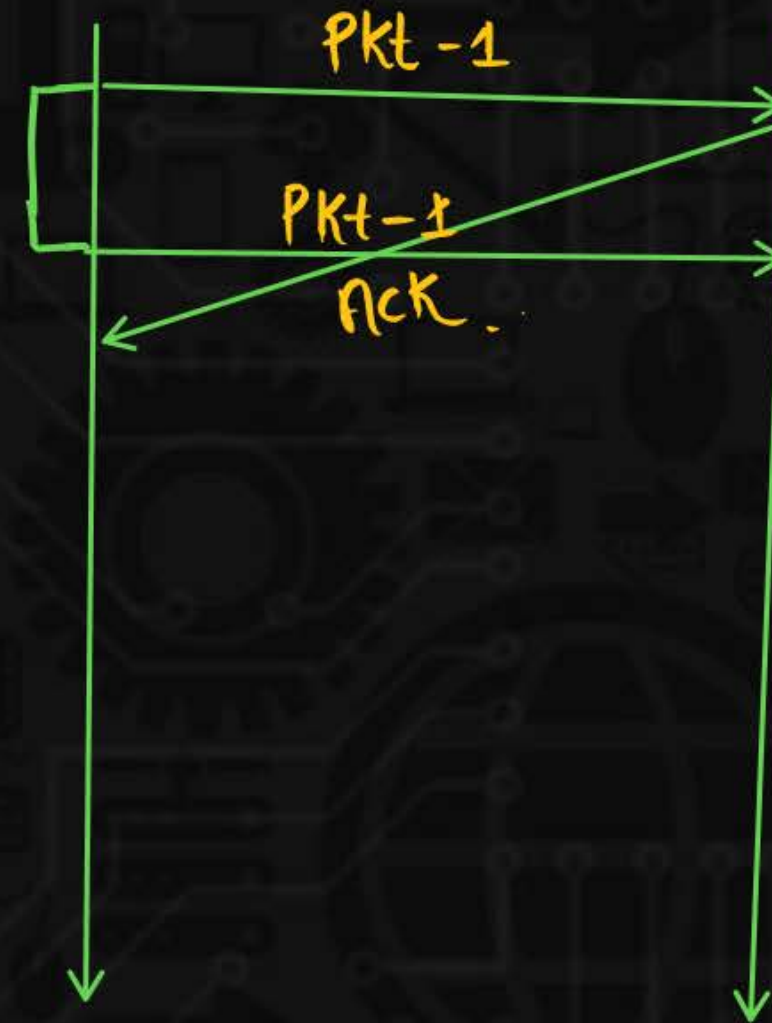
Soln. If traffic increase then increase the time out timer

Case I



Case II

$T.O = 10\text{sec}$



Note

Note: If time out timer is very large than lost Pkt will be retransmitted late
For ex: After 100sec

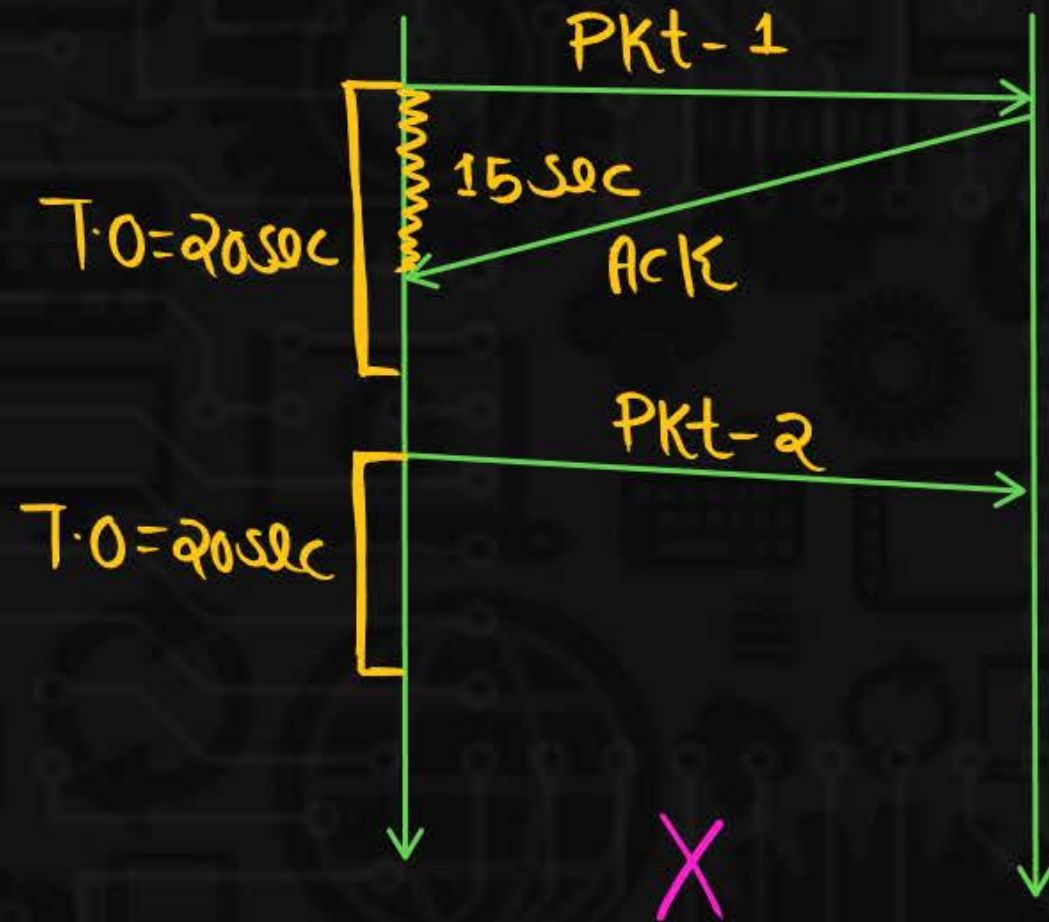
Case I

IRTT = 10sec (Assume)

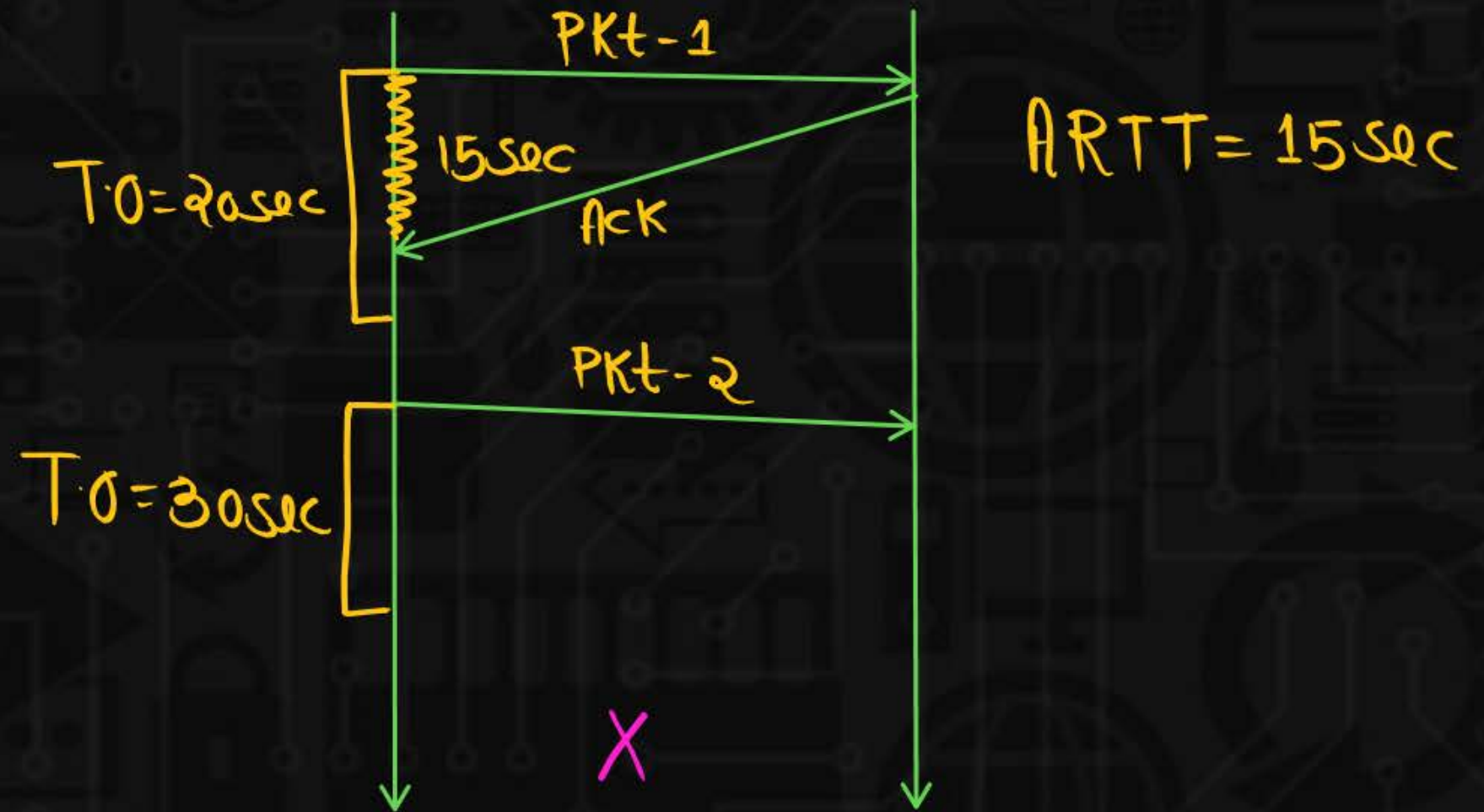
$$T.O = 2 \times RTT$$

$$T.O = 2 \times 10\text{sec}$$

$$T.O = 20\text{sec}$$



Case II



Note: The value of time out timer should be such that:

- i) It decrease when there is a low traffic in the network
- ii) It Increase when there is a High traffic in the network

Basic Algorithm

$$NRTT = \alpha(IRTT) + (1-\alpha)ARTT$$

$$0 \leq \alpha \leq 1 \quad \alpha = 0.5 = \frac{1}{2}$$

Pkt-1

$$IRTT = 10 \text{ sec}$$

$$T.O = 2 \times RTT$$

$$T.O = 2 \times 10 \text{ sec}$$

$$T.O = 20 \text{ sec}$$

$$ARTT = 15 \text{ sec}$$

$$\begin{aligned} NRTT &= \alpha(IRTT) + (1-\alpha)ARTT \\ &= 0.5 \times 10 + 0.5 \times 15 \\ &= 5 + 7.5 = 12.5 \text{ sec} \end{aligned}$$

Pkt-2

$$IRTT = 12.5 \text{ sec}$$

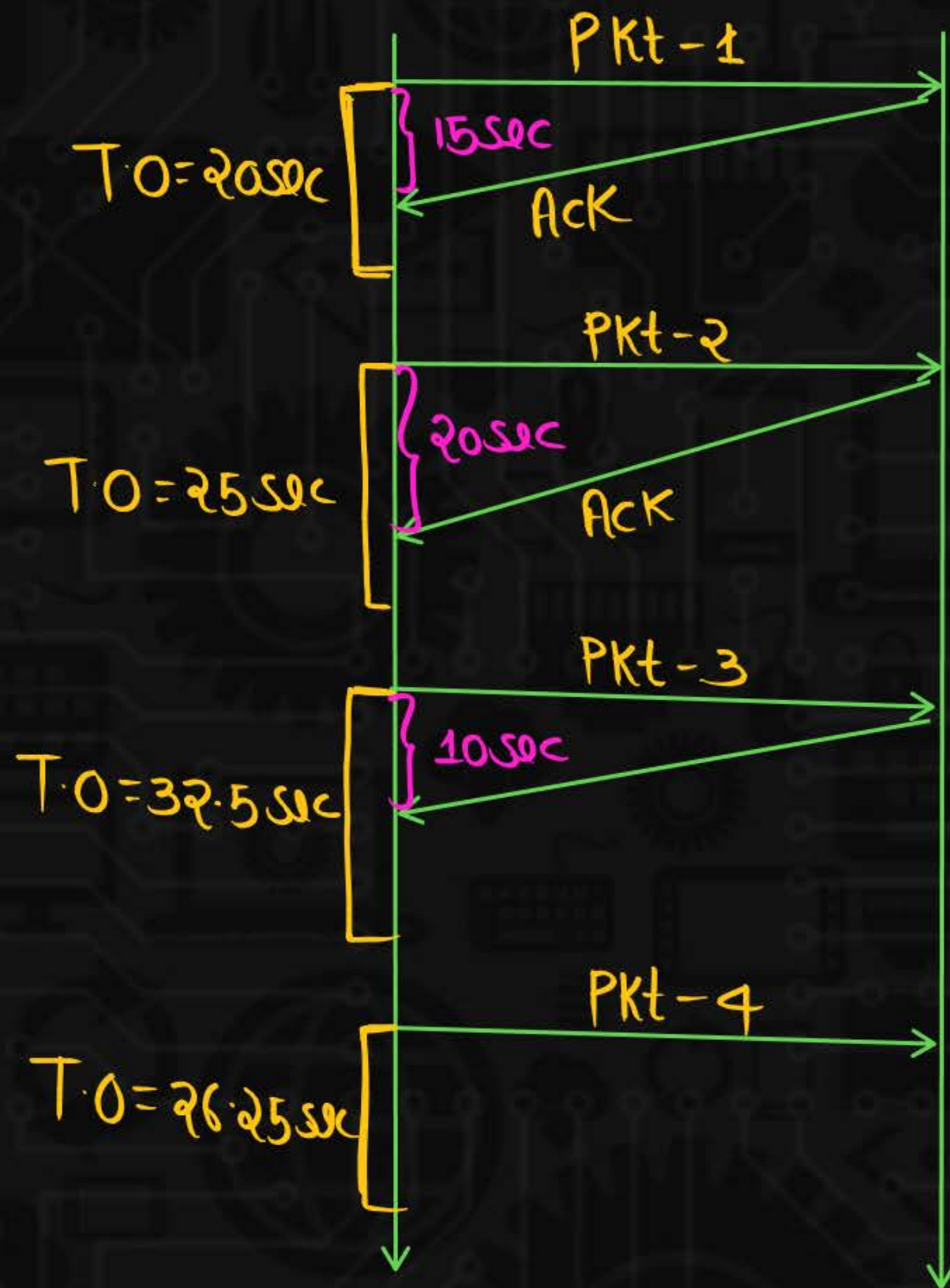
$$T.O = 2 \times RTT$$

$$T.O = 2 \times 12.5 \text{ sec}$$

$$T.O = 25 \text{ sec}$$

$$ARTT = 20 \text{ sec}$$

$$\begin{aligned} NRTT &= \alpha(IRTT) + (1-\alpha)ARTT \\ &= 0.5 \times 12.5 + 0.5 \times 20 \\ &= 6.25 + 10 = 16.25 \text{ sec} \end{aligned}$$



PKT-3

$$RTT = 16.25 \text{ sec}$$

$$T.O = 2 \times RTT$$

$$T.O = 2 \times 16.25$$

$$T.O = 32.5 \text{ sec}$$

$$ARTT = 10 \text{ sec}$$

$$NRTT = \alpha (RTT) + (1 - \alpha) ARTT$$

$$= 0.5 \times 16.25 + 0.5 \times 10$$

$$= 8.125 + 5 = 13.125$$

PKT-4



$$RTT = 13.125 \text{ sec}$$

$$T.O = 2 \times RTT$$

$$T.O = 2 \times 13.125$$

$$T.O = 26.25 \text{ sec}$$

