CS & IT ENGINEERING

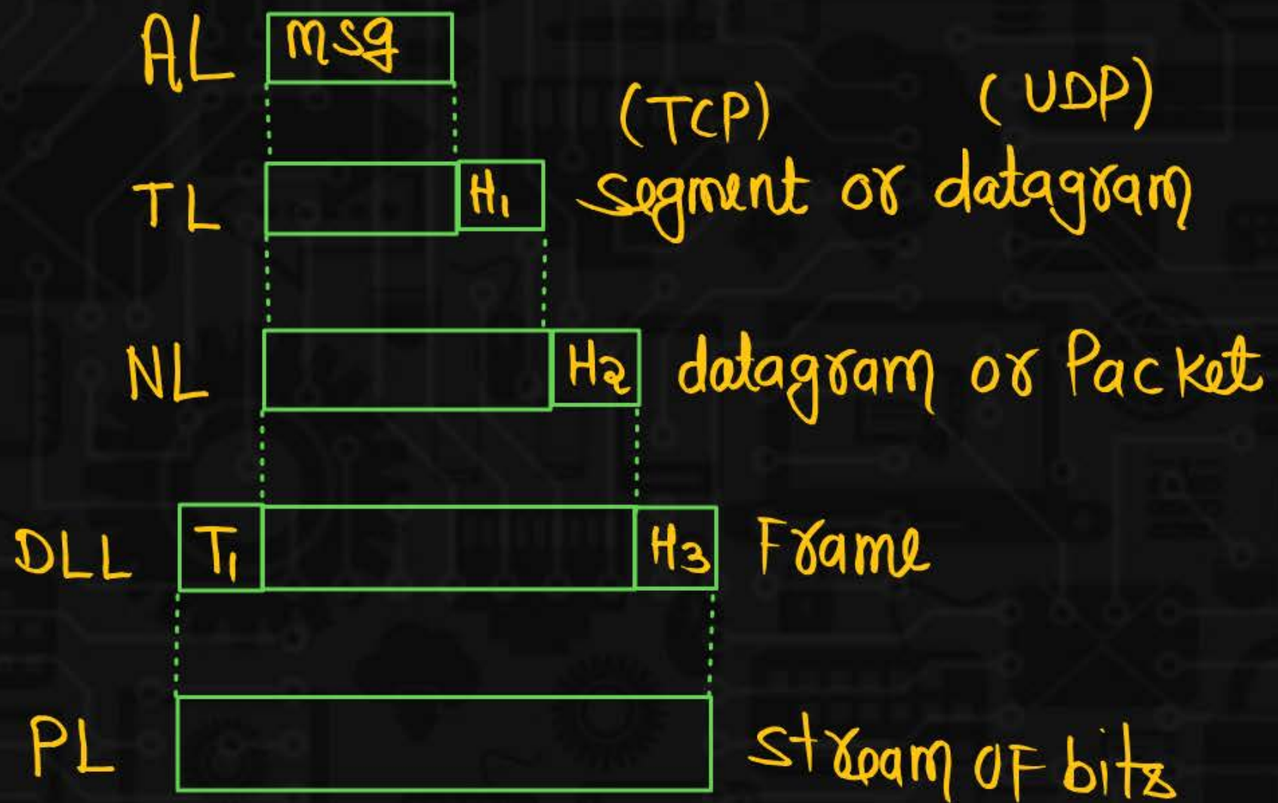
COMPUTER NETWORKS

Flow Control

Lecture No-2

By- Ankit Doyla Sir

Stop and wait Protocol



(TCP) (UDP)
segment or datagram

datagram or Packet

Frame

stream of bits

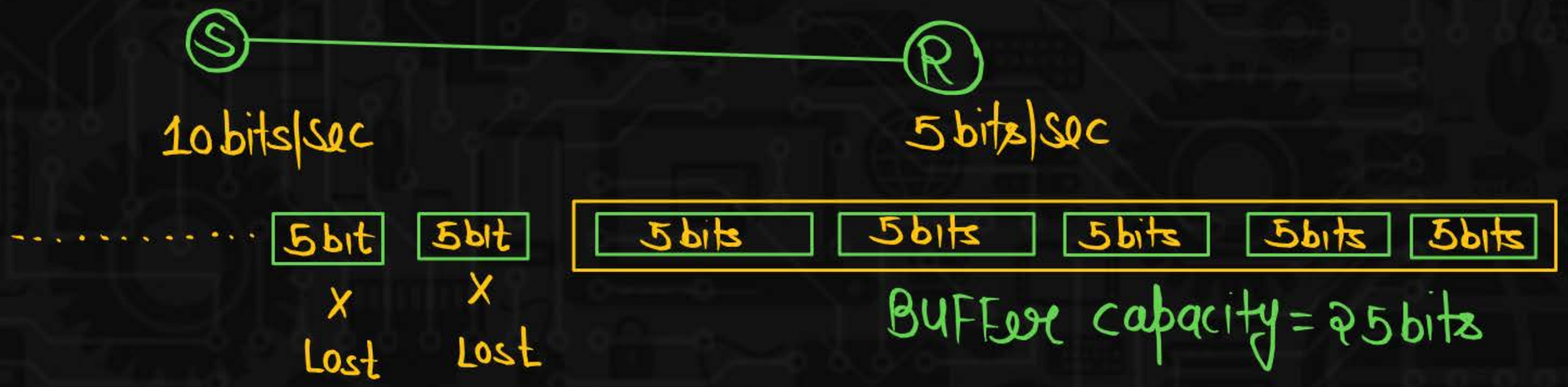
Stop and wait protocol

Flow control

1. Flow control coordinate the amount of data can be sent before receiving the acknowledgement.
2. Flow control is a set of procedure that tells the sender how much data it can transmit before it must wait for an acknowledgement from the receiver.
3. Receiver has a limited speed at which it can process incoming data and limited amount of memory in which to store incoming data.

Flow control

4. Receiver must inform the sender before the limit are reached and request that the transmitter to send fewer frames or stop temporarily.
5. Since the rate of processing is often slower than the rate of transmission, receiver has a block of memory (buffer) storing incoming data until they are processed.


S
R
10 bits/sec
5 bits/sec
5 bit
5 bit
X
Lost
X
Lost
5 bits
5 bits
5 bits
5 bits
5 bits
BUFFer capacity = 25 bits

Flow control protocols

Noiseless Channel

(1) Simplest protocol

(2) Stop& wait protocol

Noisy Channel

(1) Stop & wait ARQ

(2) Go – back – N ARQ

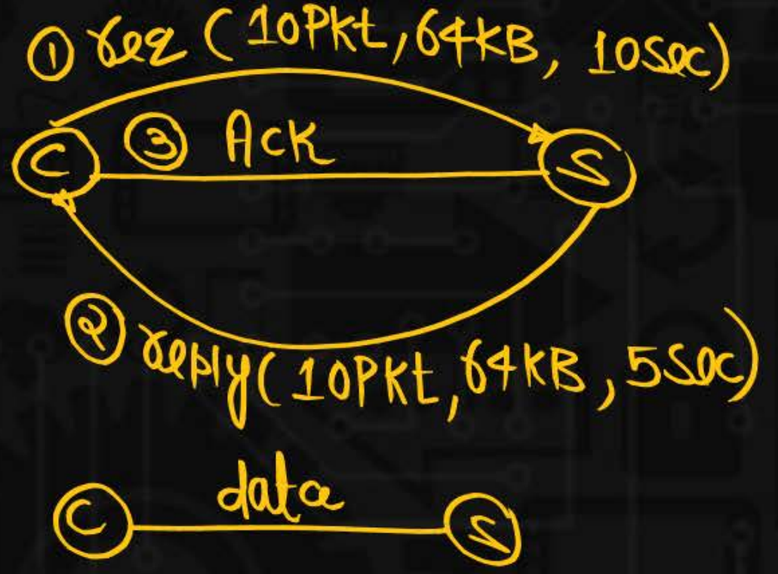
(3) Selective Repeat ARQ

Stop and Wait Protocol

1. Used in connection oriented communication.
2. Stop and wait protocol is a Flow Control for Transmission of frames over noiseless channel.
3. It provides unidirectional data transmission with flow control facilities without error control.
4. The idea of stop and wait protocol is straightforward.
5. After transmitting one Frame, the sender waits for an acknowledgement before transmitting the next frame.

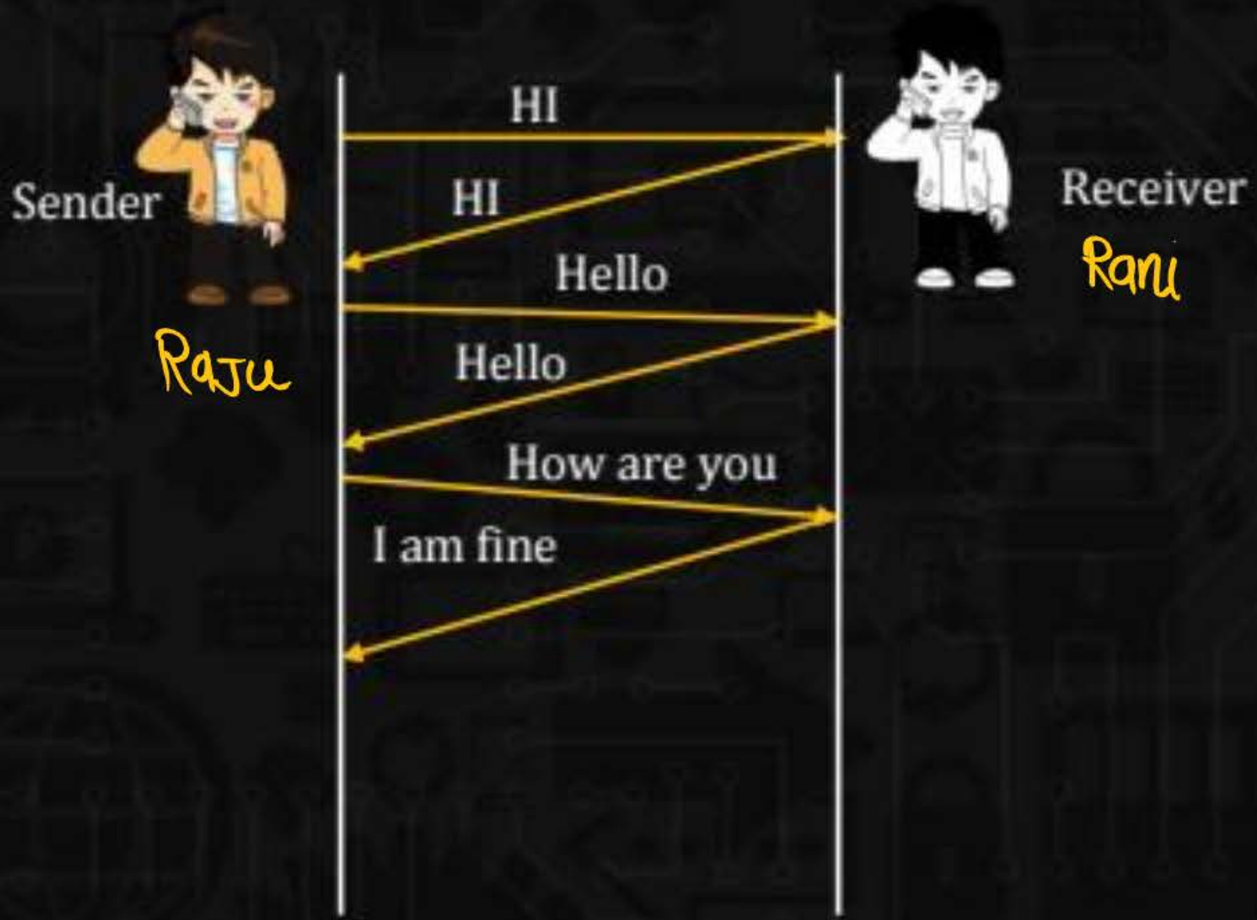
Communication

- Connection oriented
  - ⇓
  - Connection establishment
    - ⇓
    - 3 way Handshaking



- connectionless
  - ⇓

Stop and Wait Protocol



Primitives of Stop wait Protocol

Sender Side:

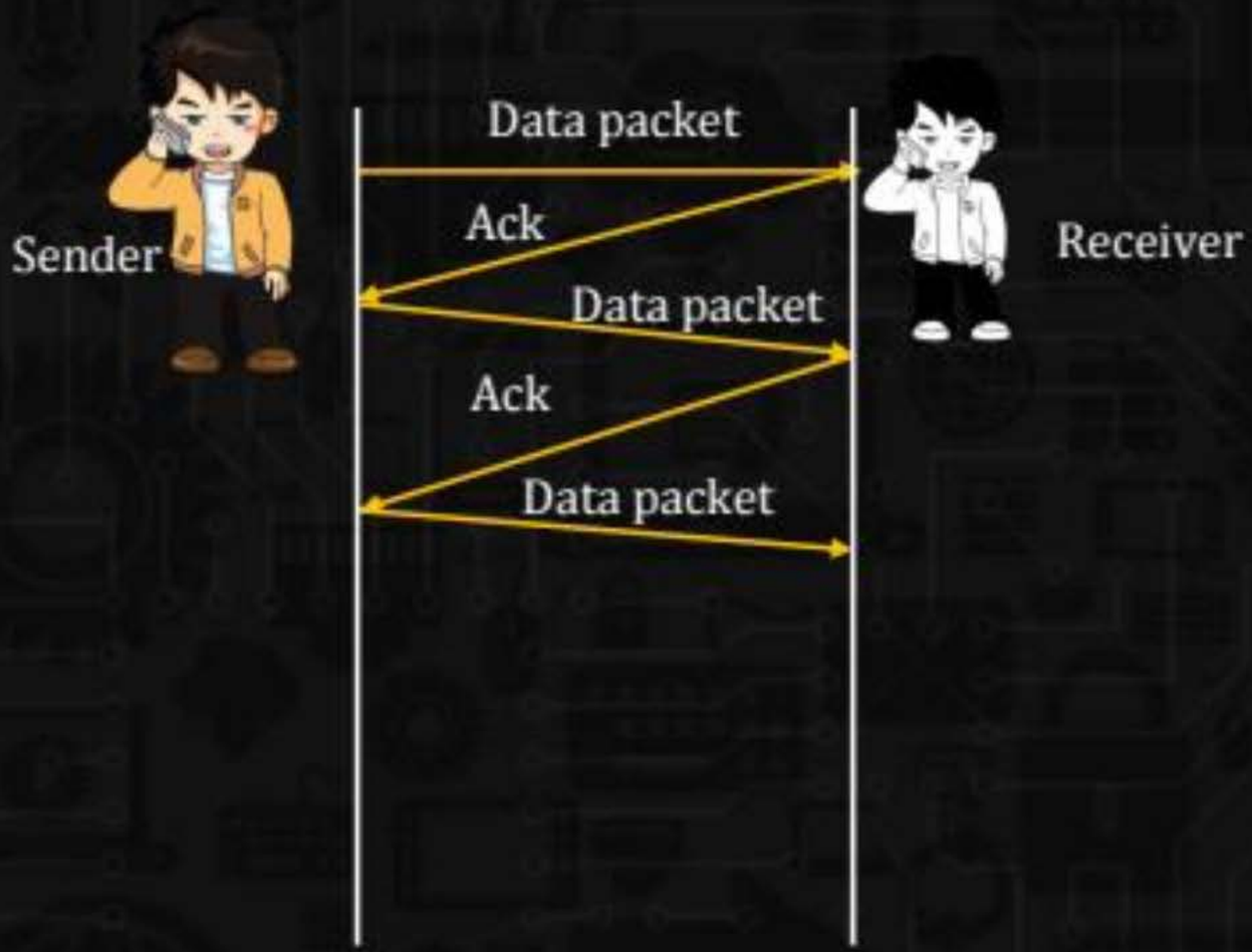
Rule 1 : Send one data packet at a time.

Rule 2 : Send the next packet only after receiving the ACK for the previous packet.

Receiver Side:

Rule 1 : Receive and consume the data packet.

Rule 2 : After consuming packet, Ack need to be sent.


Sender
Data packet
Ack
Data packet
Ack
Data packet
Receiver

Problems of stop & wait Protocol

Lost data Packet

Note :

- Sender wait for Ack for an infinite amount of time
- Receiver wait for data an infinite amount of time

Deadlock

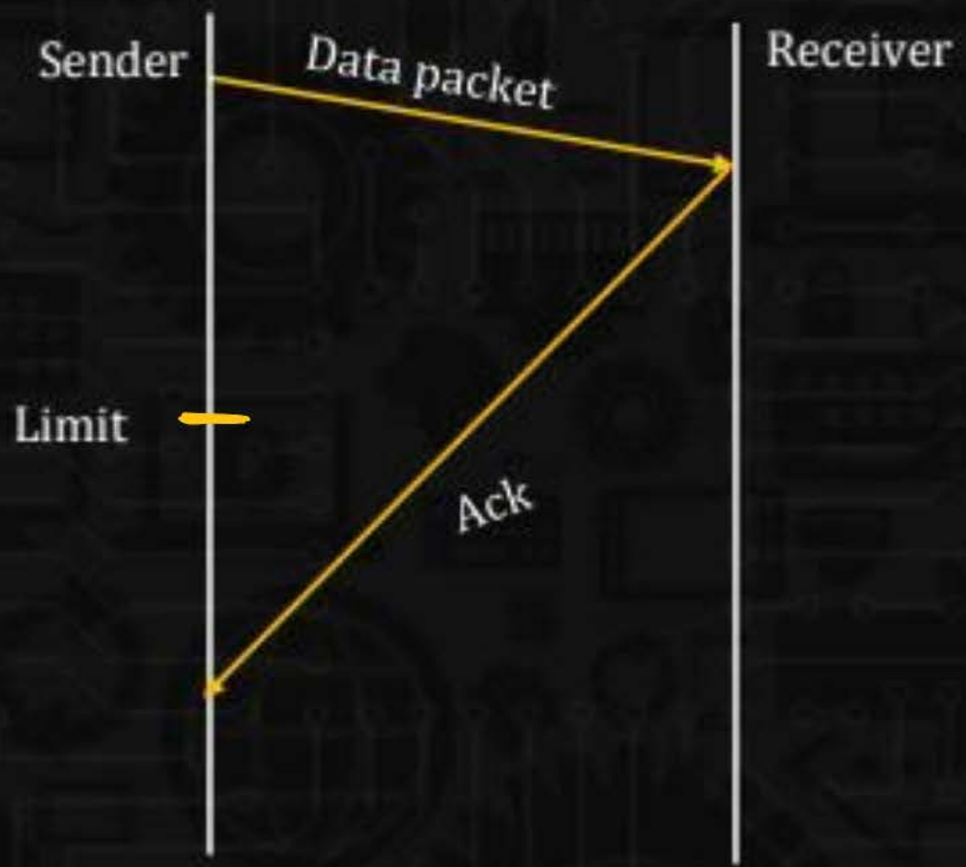
Problems of stop & wait Protocol

Lost Ack

Note :

- Sender wait for an infinite amount of time for Ack

3. Delay Ack



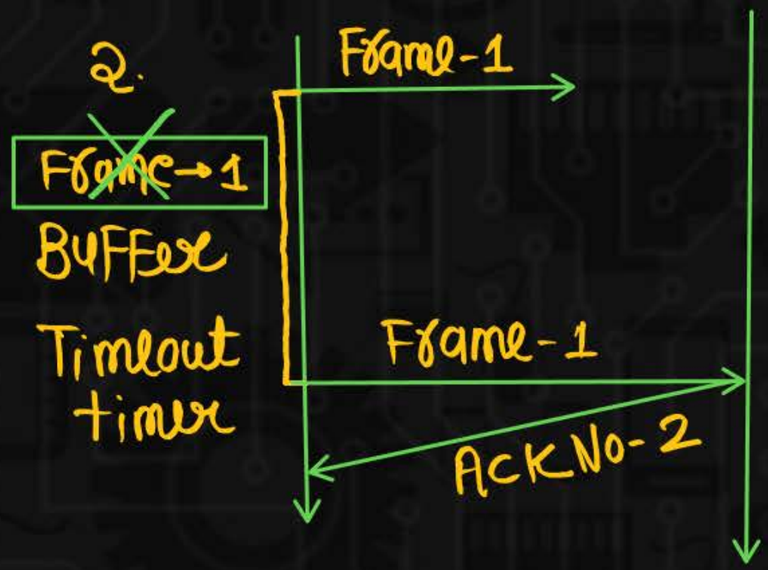
Note :

- Delay Ack might be wrongly considered as an Ack of some other Packet.

- Above 3 Problems are resolved by using stop and wait ARQ (Automatic Repeat Request)

Stop & Wait ARQ

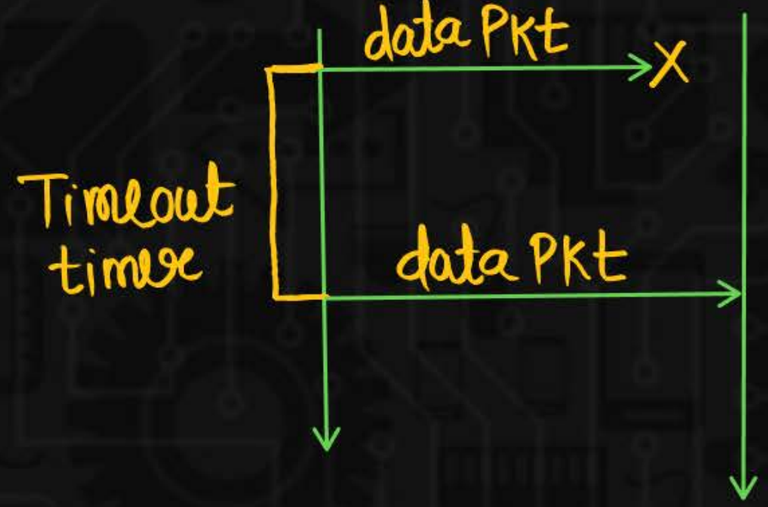
1. It Provides both Error control and flow control
2. Error control in stop and wait ARQ is done by keeping a copy of sent frame until it receives an acknowledgement.
3. Sender start a timer when it send a frame. If ACK is not received with in the allocated time period, the sender assume that the frame was lost or damage and resends it.
4. Receiver send an Acknowledgement to sender if it receive a frame correctly.
5. ACK number always define the number of the Next expected Frame.


2.
Frame-1
Frame→1
BUFFer
Timeout
timer
Frame-1
ACK No-2

Stop & Wait ARQ

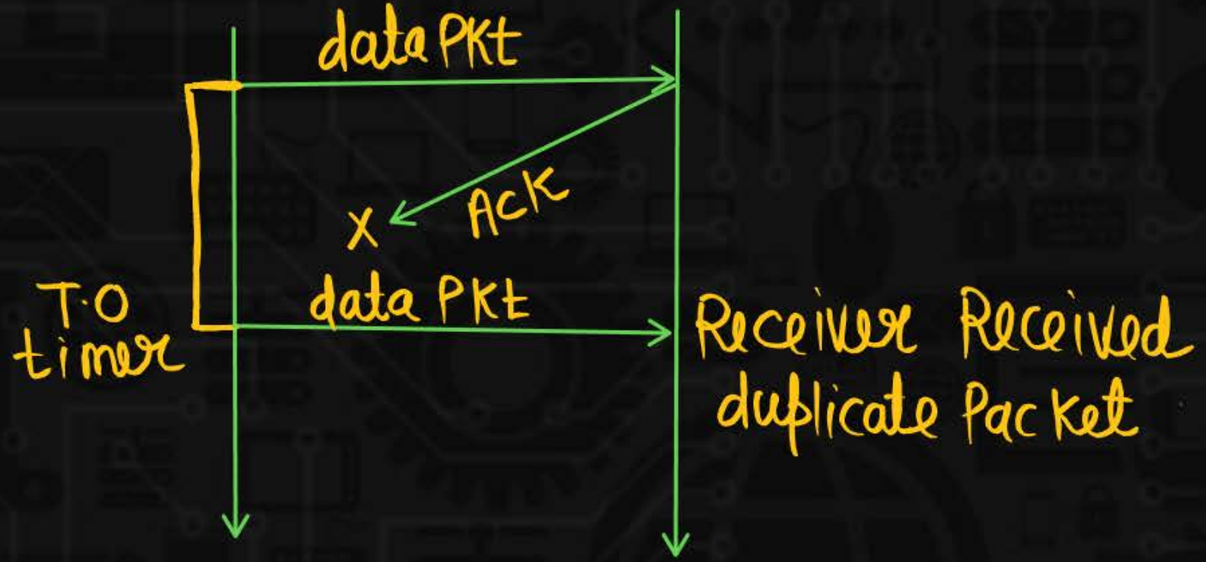
6. Stop and wait ARQ = Stop and wait + Time out + sequence Number (Data) + sequence Number(ACK)

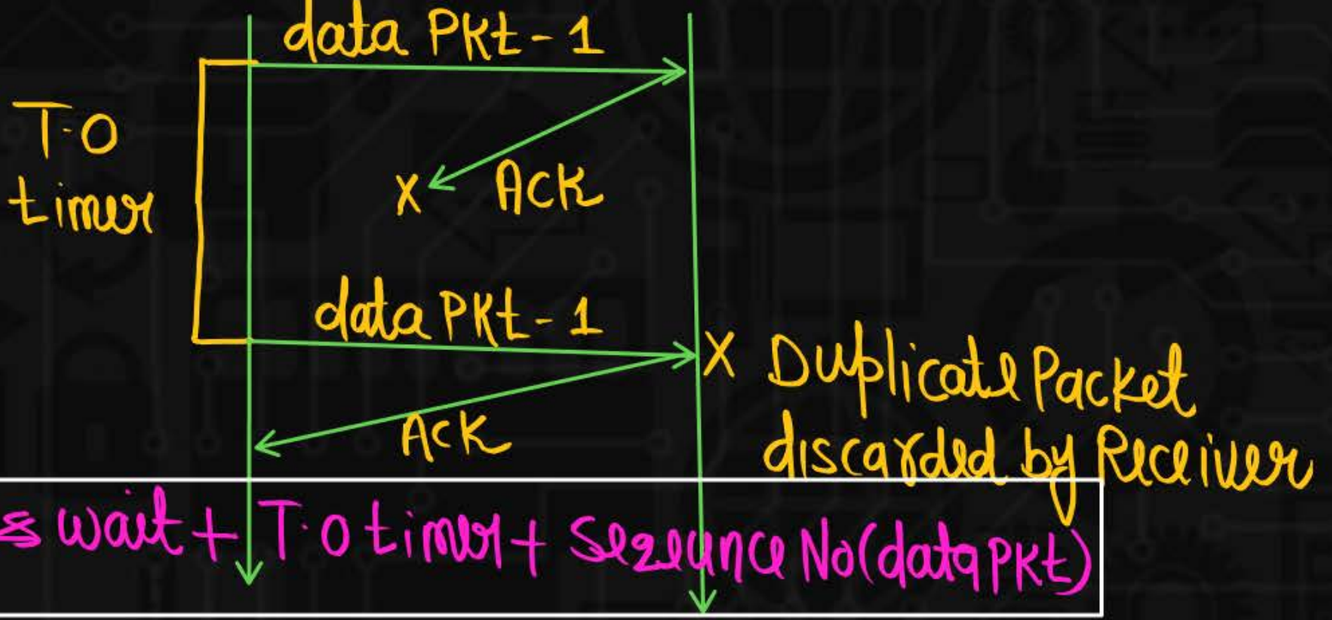
Soln: ① Lost data PKt



Stop & wait + Timeout timer

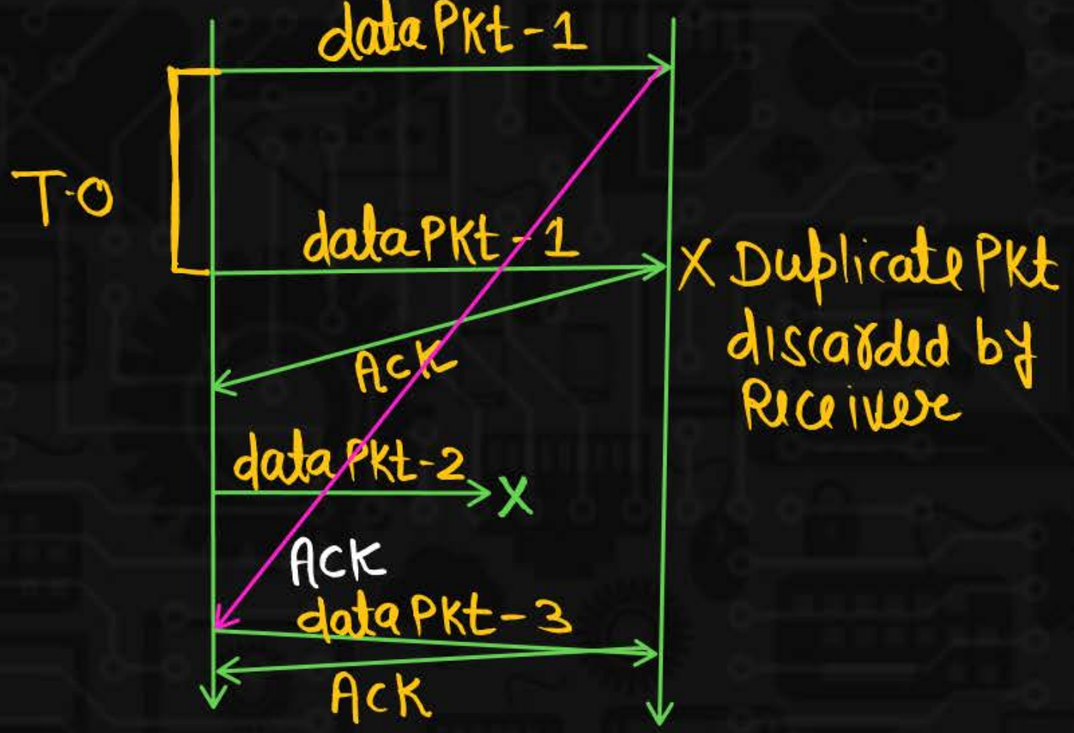
② Lost Ack





Stop & wait + T·O timer + Sequence No(data PKt)

3. delay Ack



stop & wait + T·O + Seq No(Data Pkt) + Seq No(Ack)

⇓

stop & wait ARQ


(9PM)
THANK YOU
GW
SOLDIERS !