services provided by DLL
- framing
- error control
- flow control (one is fast & other is slow)
- Physical addressing   - This is speed matching
- Access control   Mechanism.

- It tells the sender how
much data it can transmit
before it ~~was~~ must wait
for an acknowledgment
from the receiver.

flow control
protocols

Noiseless   Noisy
Channels   Channel.
                   - stop & wait ARQ
· Stop & wait   - Go back N ARQ   sliding window
                   - Selective Repeat ARC   protocol.

1) Stop & wait
   - is dLL protocol for transmission of frames
   over noiseless channels.

   - It provides unidirectional data transmission
   with flow control facilities but without
   error control facilities.

   - The idea is straight forward

   - After transmitting one frame, the sender
   waits for an acknowledgement before
   transmitting the next frame.

sender side

Rule1 - Send one data packet at a time

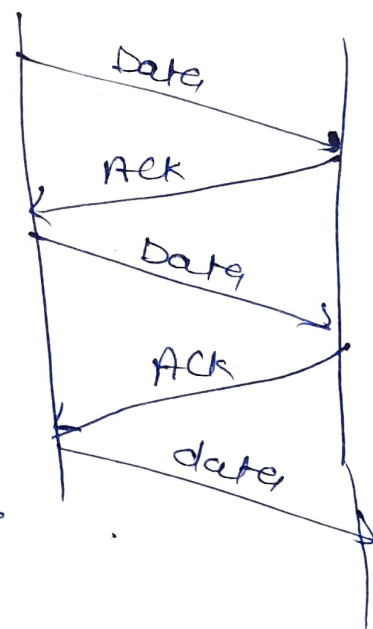Rule2 Send the next packet only after receing Ack for the previous

Receiver side

Rule1 Receive & consume data packet

Rule2 After consuming packet, Ack need to be sent (flow control)

Problems

1) due to lost data

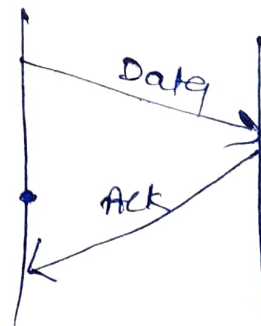senderwent for infinite amount of time for ack
Receiver for data

2) Due to lost Ack

sender waits for ack for a infinite amount of time

3) Due to delayed Ack/data

After timeout, a delayed ack is received ~~might~~

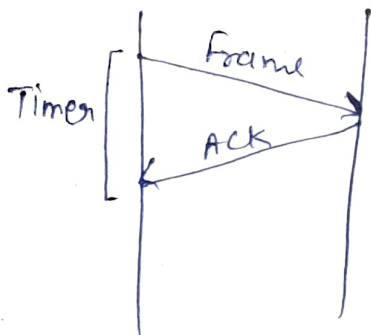delayed ack might be wrongly considered as ack of some other data packet.
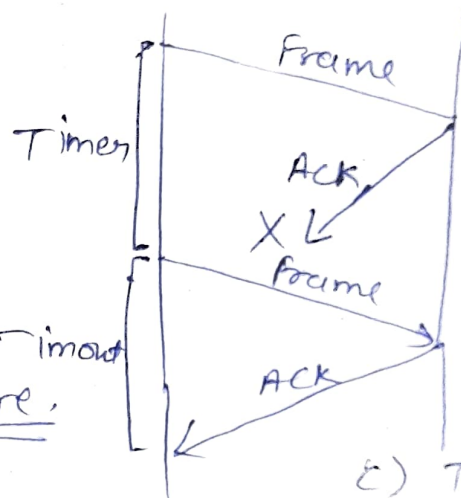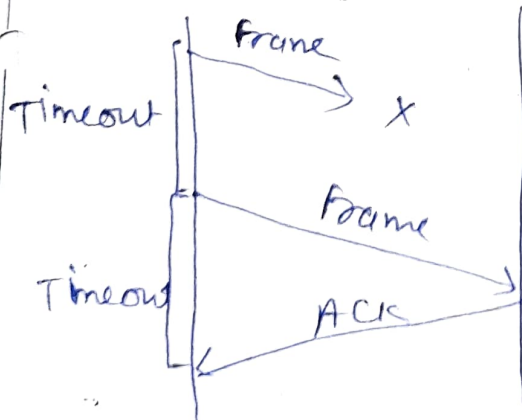
Stop and wait ARQ (Automatic Repeat Request) protocol.

= Stop & wait + Timeout timer + Sequence No.

a) Ack is received before timeout expire.

c) The Ack is lost

b) The original frame is lost after timeout expired.
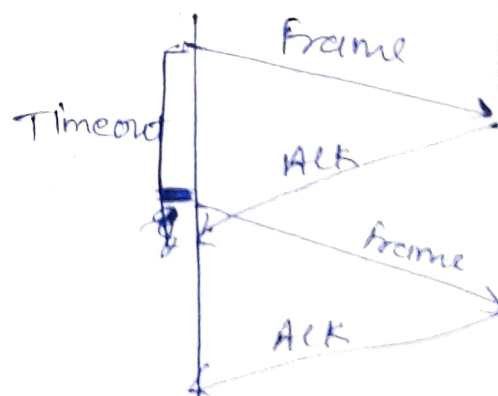
d) The time out fires too soon. Ack is late. Ack received & retransmit again.