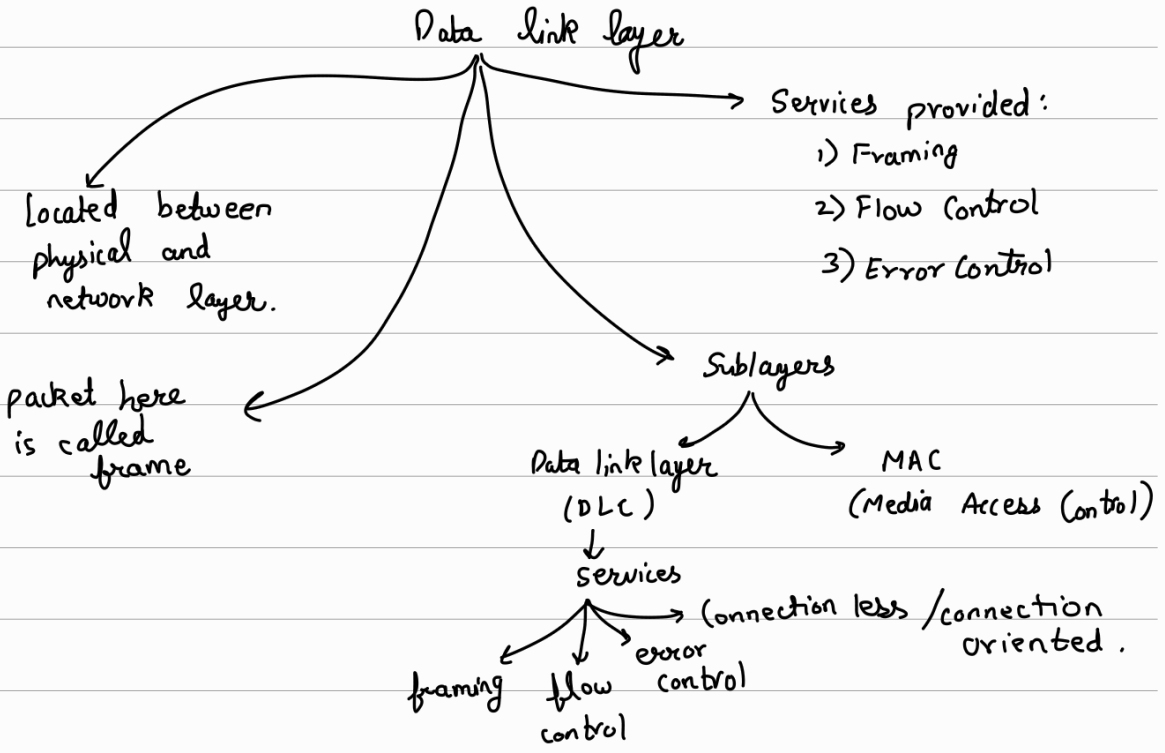
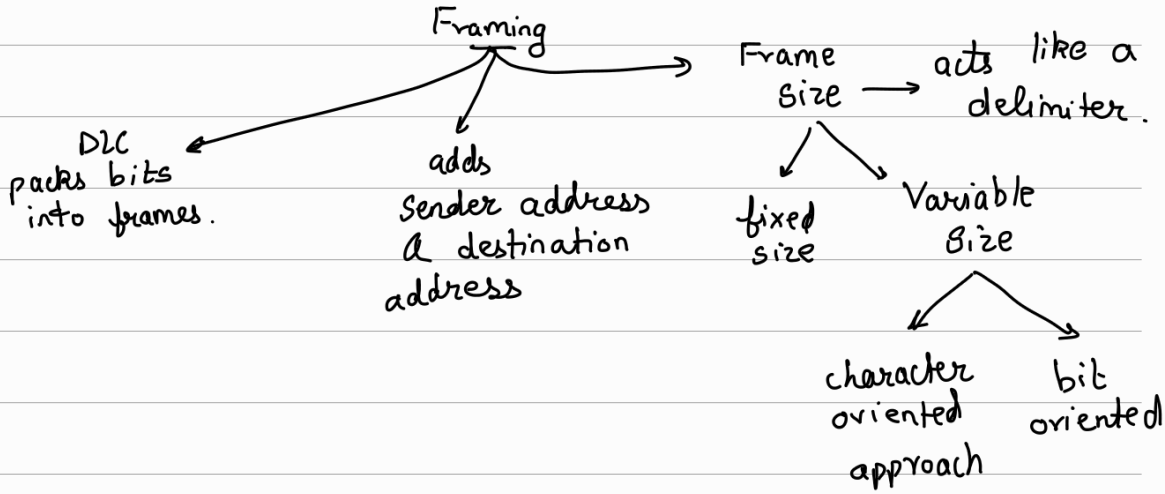
Data Link Control

APSTNDP





Character Oriented Approach

AKA byte oriented

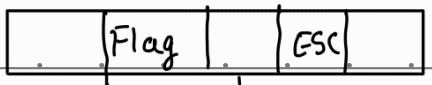
Header carries source/destn addr

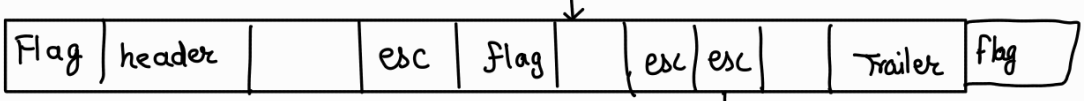
Trailer → error detection redundant bits

To separate frames an 8 bit Flag is added at start and end. (Flag) → Protocol dependent characters.

Problem

- any character used for flag can be part of information. → this causes receiver to end reading data mid way.
- Solution → Byte Stuffing. → data section stuffed with extra byte 'esc' character





every 'Flag' and 'ESC' replaced by 'ESC | Flag' or 'ESC | ESC'.

'F' flag → indicates Flag is part of data

An 'ESC' character to ESC character to avoid invalid read of ESC character

Bit Oriented Framing → Bit Stuffing

↓

Stuff a bit (0)

↓

after 5 consecutive 1's stuff a 0.

/ /

producer - Consumer Problem {Flow Control}

Overwhelmed receiver - when data being sent is faster that what receiver can receive.

PS

These are my class notes.
Empty pages indicate I was absent or highly confused/sleepy.
Read relevant topics from book for the same.

High Level Data link Control:

→ two common transfer modes

1) NRM (Normal Response Mode)

2) ABM (Asynchronous balanced Mode)

NRM..

Station configuration is unbalanced.

Primary sends → cmd Secondary(r) responds

ASD:

Each station can send/respond cmd.

HDLC Frames

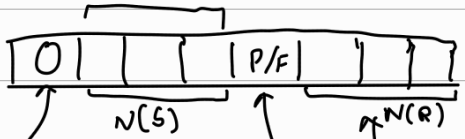
I-Frames → contains user information

S-Frames

U-Frames

FCS → Frame check Sequence

Instructional frame



first bit '0' I-frame

Sequence number of the frame

Poll / Final

↳ secondary to Primary (0)

when frame Sent by primary to secondary Poll i.e. 1

Acknowledgement Number

Supervisory frame

Code

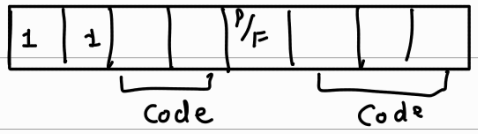
00
Receive Ready

01
Reject
- NAK frame
- Here N(R) is negative acknowledgement number

10
- Receive Not Ready
- Announces receiver is busy, acts as a congestion control mechanism.

11
- Selective Reject
- N(R) Neg. ACK

U-Frame : Unnumbered Frame.



These 5 bits can create upto 32 extra

Point to point protocol (PPP)

→ Services at DLL

→ States:

1) Dead state - No active carrier and the line is quiet.

2) Establishment- state

3) Data transfer state.

* Authentication step is optional.

. Protocols:

Link control protocols

Two Authentication Protocols,

Network Control protocols.

Link Control Protocol:

Establish Maintainance

Terminate Configuration

Authentication Protocol

- Password Authentication Protocol.

Challange packet handshake protocol.

multi point protocol. Hard style.