★ MRU default :- 1500 bytes. Different values may be negotiated

★ Padding :- May be added to fill the frame up to MRU. Treated as info data (checked by FCS). PPP not responsible of recognizing & delimiting it.

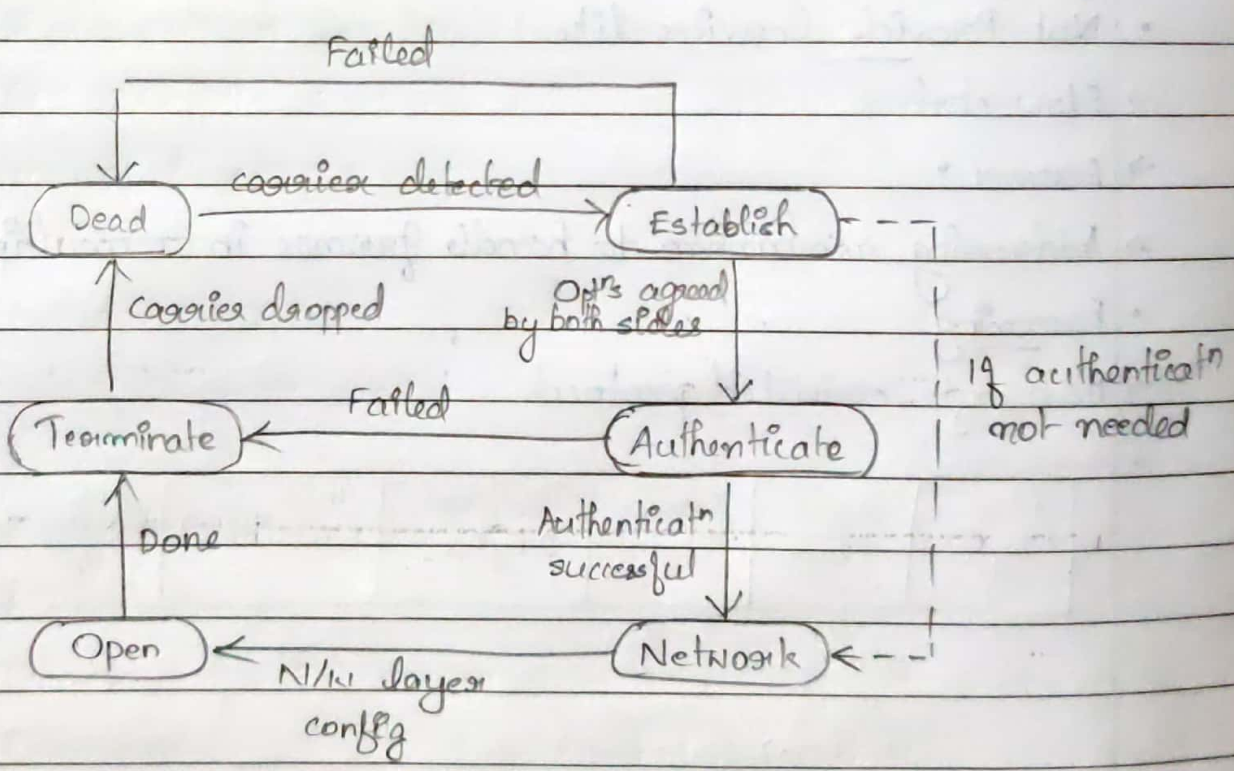
→ FCS field :-

★ It is either of 2 bytes or 4 bytes.

★ It contains the checksum

→ Byte stuffing :- Same as HDLC.

11/2/20 Transit^n Phases



(i) Dead :- Here the link is not used. There is no active carrier & line is quiet.

(ii) Establish :- Connect^n goes into this phase when 1 of the nodes start communicat^n. In this phase, 2 parties negotiate the opt^s. If it is successful, the system goes into authenticat^n phase / directly to networking phase

(iii) Authenticate:- It is opt'al. The 2 nodes may decide during establishment phase, not to skip this phase

(iv) Network:- Here, negotiat^n for n/w layer protocols take place. PPP specifies that 2 nodes establish a n/w layer agreement before data at n/w layer can be exchanged.

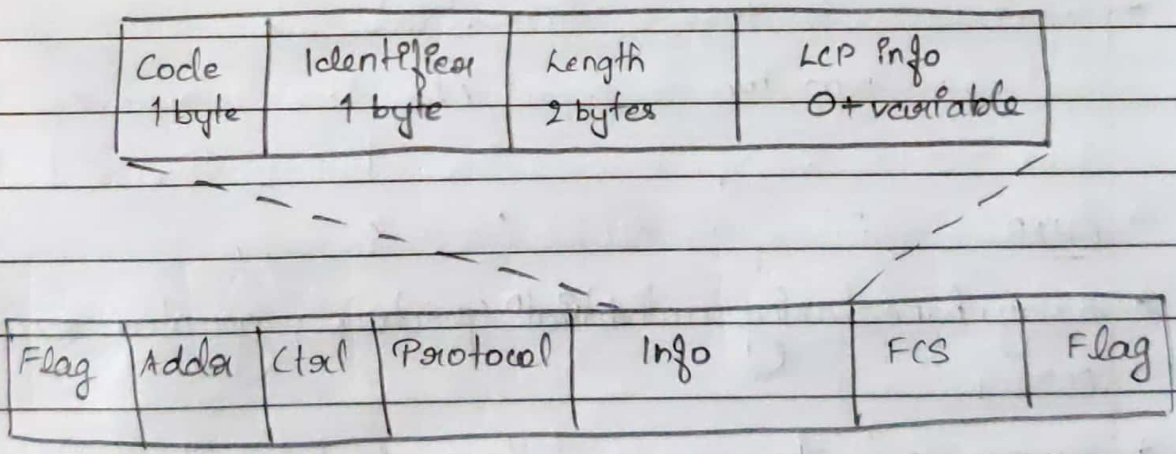
(v) Open:- Here, data transfer takes place.

(vi) Terminate:- Here connect^n is terminated

- 3 sets of protocols are defined to make PPP powerful:

(i) Link Control Protocol (LCP)

- Responsible for establishing, maintaining, configuring & terminating links.
- LCP - PDU Format:



Code 1 byte	Identifier 1 byte	Length 2 bytes	LCP info 0+variable

Flag	Addr	Ctrl	Protocol	Info	FCS	Flag

→ Code (1 byte) = type of LCP packet

→ Identifier (1 byte)

→ Length (2 bytes)

→ Data: variable

- Packet types

→ Link Config packets

→ Link Terminatⁿ packets

→ " Maintenance "

(ii) Authenticatⁿ Protocol

- Authenticatⁿ:- Validating the identity of a user who needs to access a set of resources.
- PPP has 2 protocols:

→ PAP (Password Authenticatⁿ Protocol)

→ CHAP (Challenge Handshake Authenticatⁿ Protocol)

→ PAP

★ 2 step process:

- The user who wants to access a system sends an authenticatⁿ identificatⁿ & password
-

→ CHAP

★ 3 way handshaking authenticatⁿ protocol; greater security than PAP

★ System sends the user a challenge packet with a challenge value

★ User applies predefined functⁿ that takes challenge value & user's password & create a result.

★ User sends result in response packet to system

★ System does the same

★ If both same, access granted.

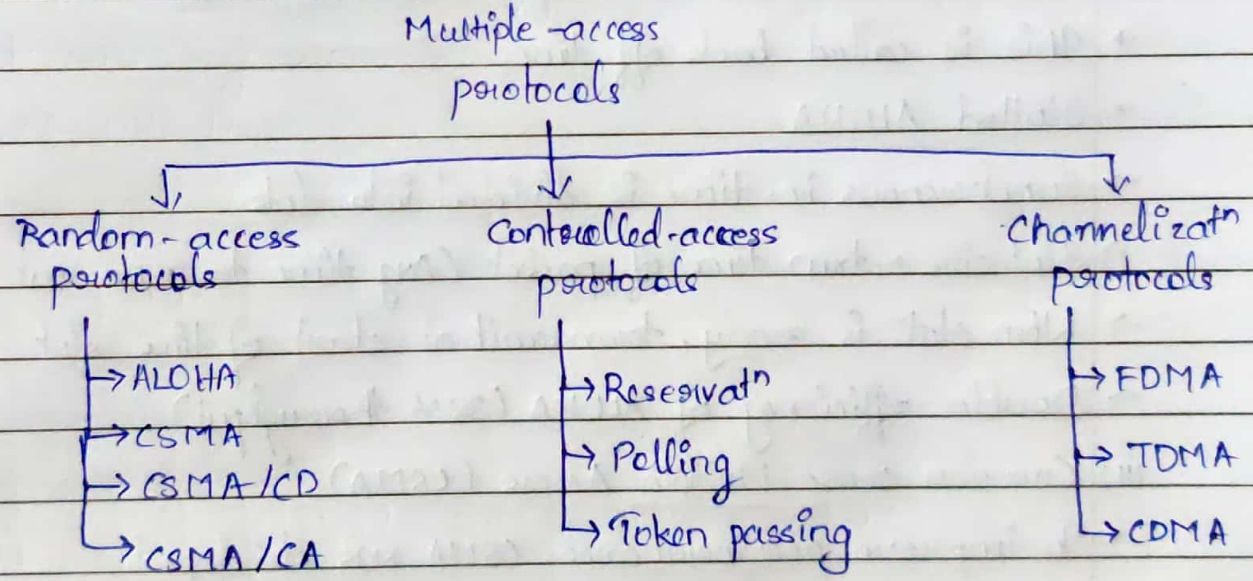
11/2/20

(iii) Network Ctrl Protocol

- PPP can carry a n/w layer data packet from protocols defined by internet OSI, Xerox, Appletalk & so on.
- To do this, PPP has defined a specific NCP for each n/w protocol

12/2/20 Media Access Sublayer

- When multiple nodes / stat'ⁿs are connected & use a common link, called a multipoint / broadcast link, we need multiple access protocols to coordinate access to the link.



Random Access

In random access, no statⁿ is superior to another & none is assigned control over another. No statⁿ permits, or doesn't permit, another statⁿ to send. At each instance, a statⁿ that has data to send uses a procedure defined by the protocol to make a decision on whether or not to send.

(i) ALOHA.

- Original ALOHA protocol is called pure ALOHA
- Pure ALOHA

→ If you have a packet, just send it.

→ " multiple people try it & so there is collision, then try resending it.

→ Theoretical analysis shows a throughput of only 18%

→ If all statns try to resend their frames after the time, each statn waits a random amount of time before resending its frame.

→ This randomness will help to avoid collision

→ This is called back off time.

- Slotted ALOHA

→ Synchronous i.e. time is divided into slots.

→ Slot size = txm time of packet (Avg time to send out frame)

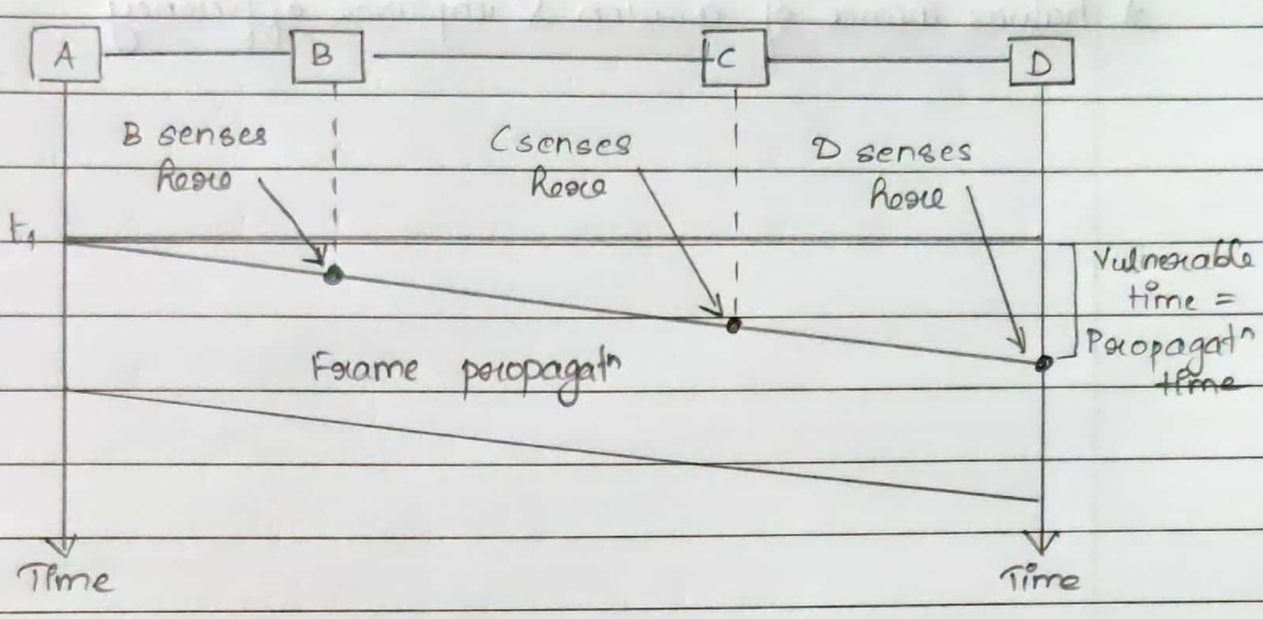
→ When statn is ready, transmit at start of time slot

→ Doubles efficiency of ALOHA (38% throughput)

(ii) Carrier Sense Multiple Access (CSMA)

- To improve performance, CSMA was developed.
- Chance of collision can be reduced if a statn senses the medium before trying to send.
- Listen to channel. If busy then wait for a random time & then listen again
- If not busy then transmit
- Collision may still happen.

Scanned by CamScanner



- Persistence Method

→ 1-Persistent :-

★ After the stat^n finds the line idle, it sends its frame immediately

★ This method has highest chance of collision

★ Bcoz 2 & or more stat^ns may find the line idle & send their frames immediately.

→ Non-Persistent

★ A stat^n has a frame to send senses the channel.

★ If line idle, it sends immediately

★ If busy, it waits a random amount of time & then senses the line again.

★ Reduces chance of collision

→ P-Persistent

★ It is used if channel has time slots with a slot durat^n equal to or > max. propagat^n time

★ Combines advantages of other 2

12/2/20

★ Reduces chance of collision & improves efficiency