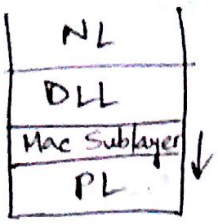
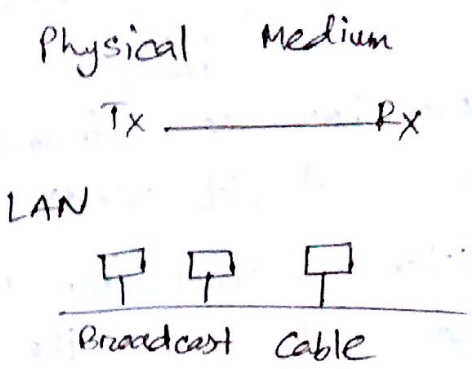
Chap-04

Mac Sublayer





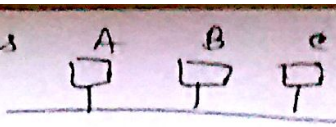
48 bit MAC address (Medium Access Control)

MAC sublayer

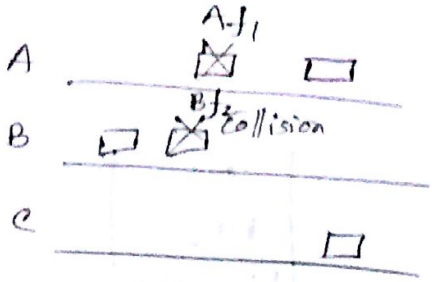
Protocols:

1. ALOHA protocol
   - Pure
   - slotted
2. CSMA protocol
   - 1 persistent.
   - Non " .
   - P " .
3. CSMA/CD protocol
4. CSMA/CA protocol.

1. ALOHA



i) Pure ALOHA

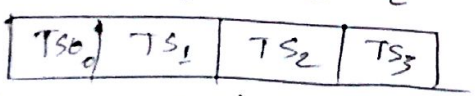


- If a host has data frame ready to send, it sends over the channel.
- If collision occures, then waits random amount of time and retransmit the frame.

$S + K = G$ [$0 < K < 1$]

$S = GP_0 \Rightarrow P_0 = e^{-2G}$

Throughput $S = Ge^{-2G}$ $\Big| P = 0.18 = 18\%$.

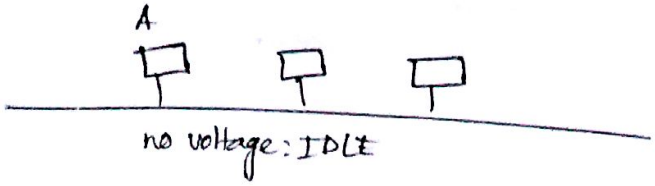


Slotted Aloha centralized $P = 0.36 = 36\%$.

$S = Ge^{-G}$

2. CSMA protocol (Carrier Sense Multiple Access):

Carrier IDLE : No data frame.
OCCUPIED : data frame.



Check collision checking ~~ap~~ amplitude of sending signal. Amplitude change ~~হলে~~ ~~হবে~~ collision occur ~~হয়~~,

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1) CSMA protocols:

a. 1 - persistent CSMA:

- When a host has data to send, it first listens to the channel.
- If the channel is free, it transmit the frame.
- If collision occurs, host awaits random amount of time & starts the process again
- since the host transmits with a probability of 1, whenever it finds the channel idle, this protocol is a greedy one.

b. non persistent CSMA:

- Continuous check করে না
- When a host has data to send, it first listens to the channel. If the channel is busy, it waits random amount of time.
-

Same as 1- persistent CSMA.

c.) p persistent CSMA:

- It applies to slotted channel
- When a host is ready to send, it senses the channel.
- If the channel is free, it transmits with probability of p.
- ~~If the channel is free~~
- With a probability $q = (1-p)$ it defers until the next slot.
- If that slot is also idle, it either transmits or defers again with probability p & q.
- The process is repeated until i) either the frame has been transmitted or ii) another host has started transmission
- In ii) case, it acts as if there had been collision

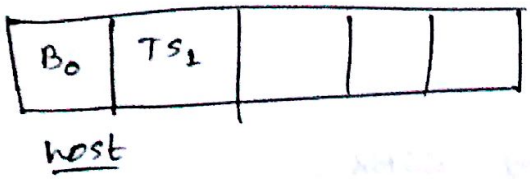
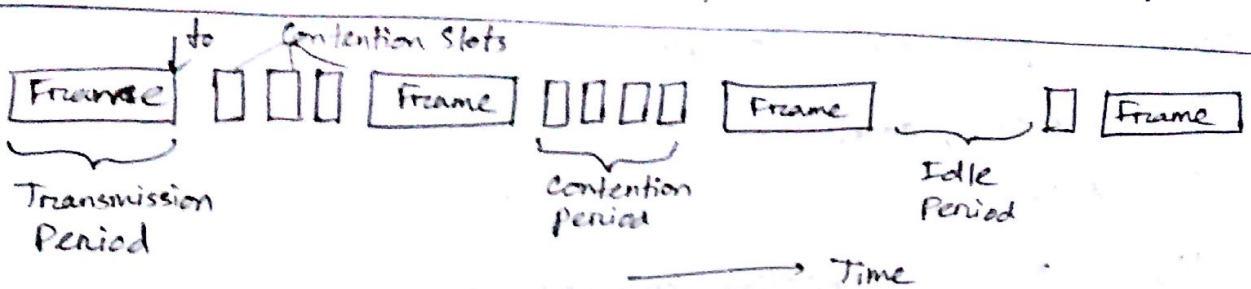
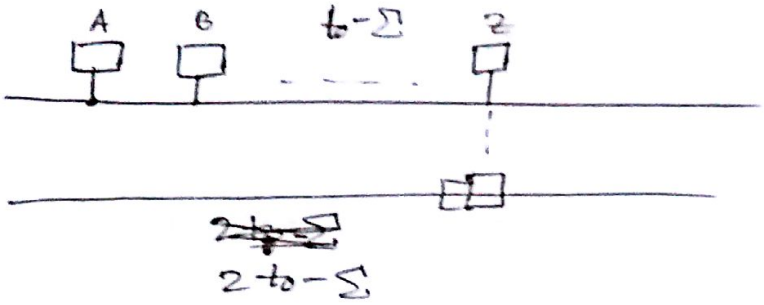


Fig: 4.4 Channel utilization vs throughput of ALOHA & CSMA protocols

iii) CSMA/CD protocol:

Carrier Sense Multiple Access / Collision Detection:

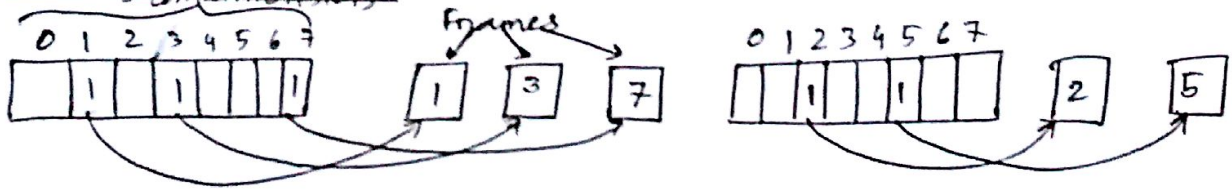




iv) CSMA/CA protocol:

CSMA/ Collision avoidance

a) Bitmap protocol:



b) Binary countdown protocol:

Station 1: 0 1 1 1
Station 2: 1 0 0 1
Station 3: 1 1 0 0
Station 4: 1 1 1 0

Bit time
0 1 2 3
1 X
1 1 X
1 1 1 0

[First 0 পেলে x হবে]

[Monday 06.07.15
MAC Sublayer Quiz-02]