

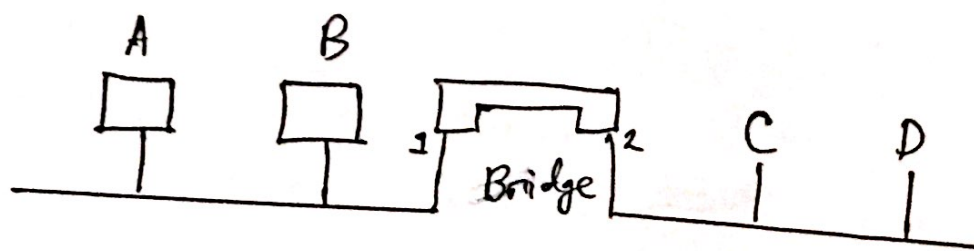
Ans. to Qno. 2

Bridges are connecting devices that are used to connect two LAN segments together. Bridges are used to

- i) Increase the bandwidth of LAN network
- ii) Reduce collision domain.

Bridges are called ~~transparent~~ transparent bridges because they do not affect the frame or change its MAC address. These transparent bridges are layer-2 devices i.e. they work on physical and data link layers.

The main job of bridges is to receive the frames and forward it to its port. The bridge uses switching table to forward to a port.



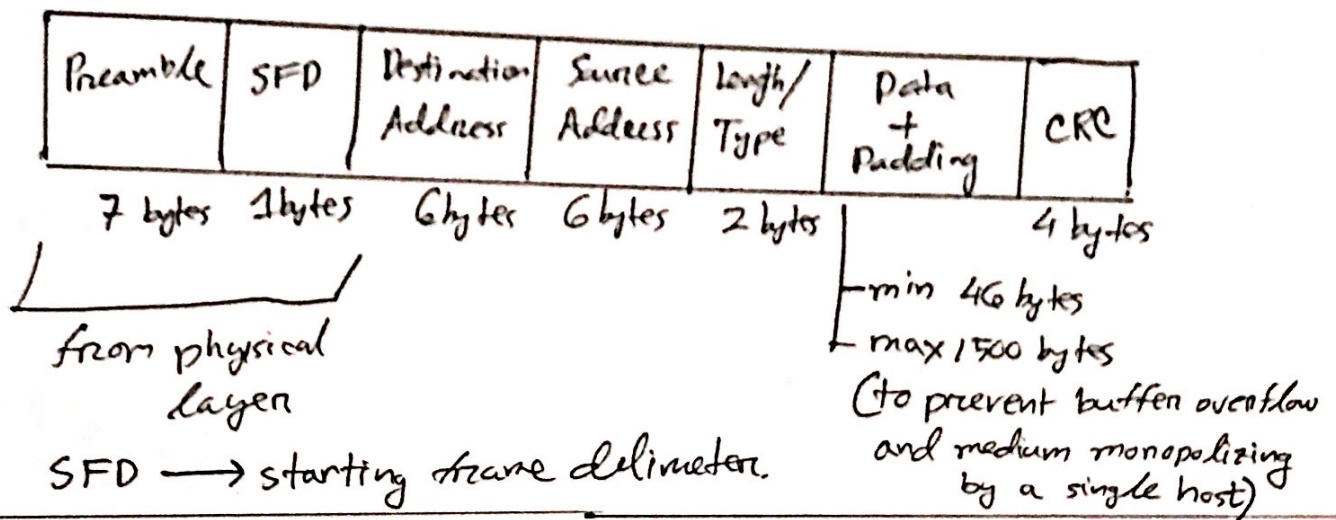
As we can see the bridge connects two LAN segments. Like a physical layer device such as repeater, the bridge amplifies the signal. On top of that, a bridge has filtering capacity.

A transparent bridge is also called learning bridge because it updates its ~~brid~~ switching table. When a ~~port~~ frame is sent from A, its MAC address and port is saved in the bridging table so that the next frames sent to A can directly be forwarded to that port. Before that the bridge had to forward frame to all ports because it doesn't know which port A is.

Ans to Q. no 1

The MAC sub-layer is vastly different for wired and wireless LAN.

MAC sub-layer for wired LAN: Wired LAN uses Ethernet as the standard protocol which is IEEE 802.3. Ethernet uses CSMA/CD primarily. An ethernet frame is comprised of



Preamble and SFD are alternating 0s and 1s. SFD is 10101011 and the last 11 denotes that from next bit the actual frame will start.

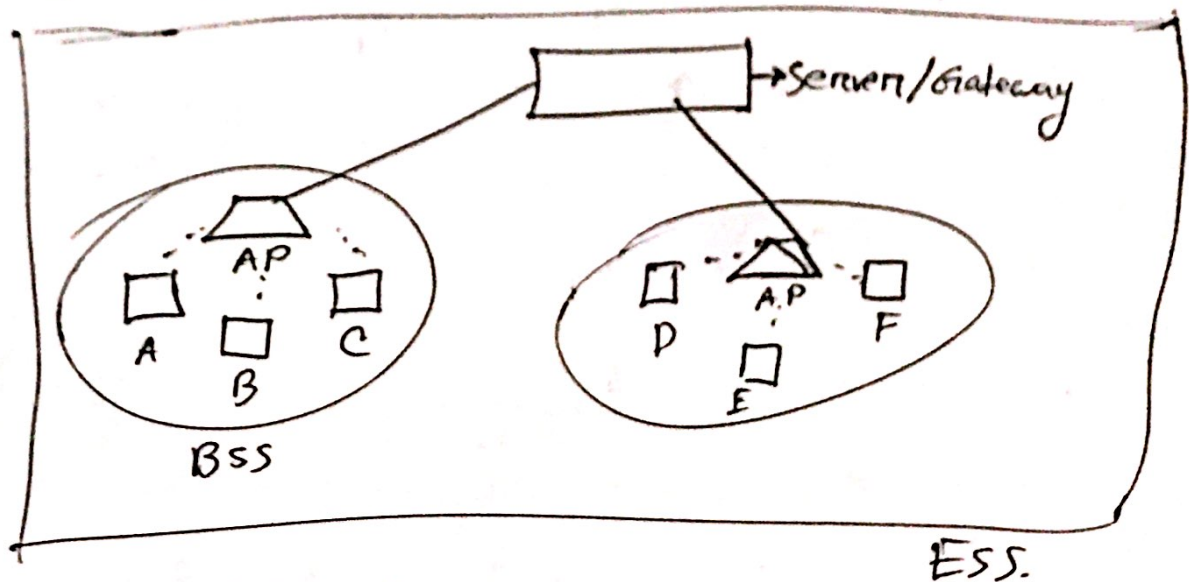
The data has a minimum length for CSMA/CD to work properly. CSMA/CD needs frame time to be twice of propagation time. For 10 mbps standard ethernet, the minimum ~~frame~~ data length is 46 bytes.

CSMA/CD is used in wired LAN to detect collision. Once collision is detected, frame transmission is aborted. CSMA/CD is done using ~~sensing~~ a persistency method to sense the medium. After sensing, if the medium

is idle, it continuously sends and receives. It will stop receiving when collision occurs and thus can detect collision successfully.

MAC sub-layer for wireless LAN: The wireless LAN is different as it uses IEEE 802.11. Instead of CSMA/CD, other techniques are used to avoid collision.

For wireless LAN, the architecture is



BSS → Basic service set

ESS → Extended service set

As we can see a heterogeneous structure is here. The MAC protocol is sub-divided into

(i) ~~PP~~ Point Co-ordination Function (PCF)

(ii) Distributed Co-ordination Function (DCF)

For DCF, we use CSMA/CA or collision avoidance.

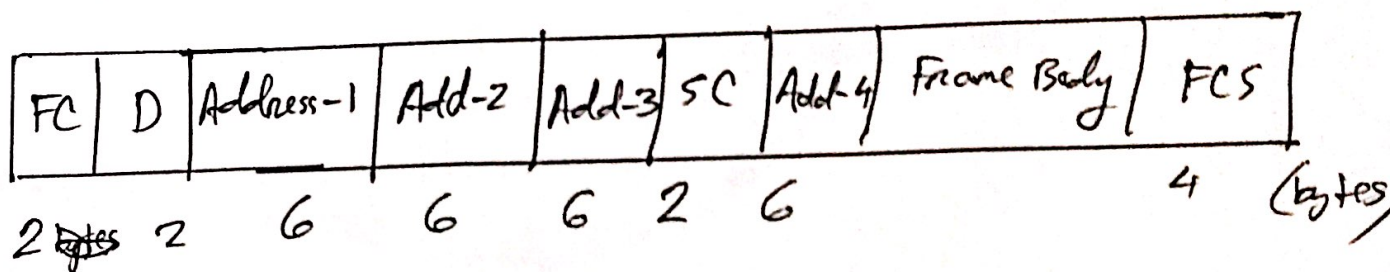
Here CSMA/CD is not used because

(i) Signal fading / attenuation

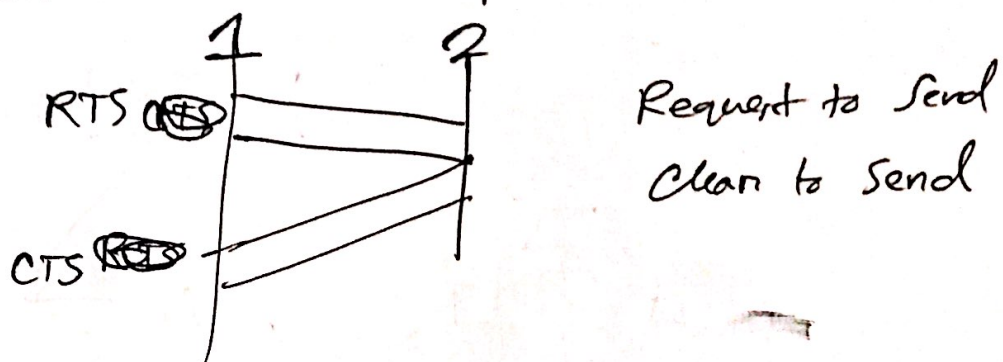
(ii) Devices are not sophisticated to send and receive

(iii) Hidden station problem.

The frame for wireless LAN is



Here is CSMA/CA CTS and RTS are used as handshaking to prevent hidden station problem.



When unwanted stations get RTS they get in NAV and stop sensing the medium.

CSMA/CA uses IFS + contention window.