



Name = Zain-ul-Abideen

I.D = 14713

Bos Software engineering

Section B

Instructor name = Mansoor Qadir

Q 1 (a) :- The open system interconnect is a conceptual framework that organizes - - - -

Ans :- By encounter from bottom, the data link layer receive bits from physical layer and form these bits in to groups called data link frames. But when we encounter from top to bottom, the data remains data in presentation layer. After presentation layer, the data comes to transport layer. Transport layer changes data in to segments. After transport layer, data link changes ~~this~~ these segments in to frames. After that physical layer changes these frames in to bits.

Functions of Data link layer

- Framing :- It receives bits when we from physical layer when we encounter from top bottom to top. And then change in to frames. It receive packets from network layer when we encounter from top to bottom. And then change those packets in to frames.

- Physical addressing :- After framing, Data link add Header to the frame in order to define physical address of sender or receiver frame.

(2)

Q 1 (b) :- Argue advantages and disadvantages of combining the session, presentation and application layer in the internet Model.

Ans:- Advantages:- 1) Single layer to study as all the functionalities is provided at this layer.

b) Higher bandwidth as number of layers reduced.

c) It reflects the real life separation of application from the TCP downward sections of the OSI Model.

Disadvantages:- Can make reasoning about architecture of network systems less effective.

b) There will be security issues as the network security and Application Security will open at a single point which may expose our network open to our threats.

c) It makes troubleshooting hard as multiple errors may reside at a single -

(3)

Q2 (a) :- There are several networks layers models proposed in OSI Model. Find all of them. Explain the differences between them.

Ans :- There are seven layer Model in OSI Model.

- 1) Application layer.
- 2) Presentation layer
- 3) Session layer
- 4) Transport layer.
- 5) Network layer
- 6) Data link layer
- 7) Physical layer.

- Physical layer :- Physical layer coordinates the functions required to carry a bit stream over a physical medium.
- Data link layer :- The data link layer transforms the physical layer a raw transmission facility to reliable link.
- Network :- It is responsible for source to destination delivery of packet possibly across multiple networks.
- Transport :- It is responsible for process to process delivery of entire message.
- Session layer :- It is network dialogue controller.
- Presentation :- It is concerned with syntax and semantics of information exchange between two layers.
- Application :- This layer enables the user, whether human or software, to access Network.

Differences b/w OSI layers:- The Application layer contain specific address. It contain the particular address of any person, university etc. For example the specific address of person can be email, gmail. While the transport layer contain port address. Port address in TCP/IP is 16 bits in length. Port address is the specific address of specific process. Network layer uses logical address. It is the IP address of a specific system. It is 32 bit address of a specific system that cannot be same to the other system. Data link layer and physical layer contain physical address. It is the MAC address. Format of these address depends upon the network. For example Ethernet uses 6 byte physical address while LocalTalk (Apple) has a 1 byte dynamic address that changes each time the station comes up. Physical layer coordinates the function required to carry a bit stream over physical medium while the data link layer transform the physical layer. In the Application, Presentation and Session layer, the data remains data, but in the transport layer that data changes to segment. In Network layer, that data changes from segment to packet and in data link layer, that data changes from packet to frame. In physical, that data change in to Bits.

(4)

Q 2(b): If a signal does not change at all, its frequency is zero. If a signal changes instantaneously, its frequency is infinite. Three components of a sine wave are amplitude, frequency and phase of signal.

Ans: The term phase describes the position of the waveform relative to time 0. If we think of wave as something that can be shifted backward or forward along the time axis, phase describes the amount of that shift. It indicates the status of first cycle.

Sine wave is comprehensively defined by its amplitude, frequency and phase. We have been using to show sine wave by time phase plot. The time phase plot shows changes in signal amplitude w.r.t time.

As time phase plot shows change in signal amplitude w.r.t time so it is the amplitude versus time plot. Time phase plot is not change in phase w.r.t time so that's why we cannot write phase explicitly in time phase plot.

(5)

Q 3 (a) :- Four connections (10 Kbps, 100 Kbps, 1 Mbps) are multiplexed together. A unit is 1 byte or 8 bits. Find (a) the duration of 1 bit before multiplexing (b) the transmission rate of the link (c) the duration of a time slot and (d) the duration of a frame.

Ans

Ans :- (a) Duration of bit before multiplexing is

$$\frac{\text{Limit bit}}{\text{individual connection}} = \frac{1}{1 \text{ Kbps}}$$

$$\frac{1}{1000 \text{ bps}} = 0.001 \text{ s or } 1 \text{ ms}$$

b) Transmission rate of link is 4 Kbps.

c) Duration of each time slot is one fourth of rate of link

$$\frac{1}{\text{Rate of link}} = \frac{1}{4 \text{ ms}} \text{ or } 250 \text{ } \mu\text{s}$$

d) Duration of frame rate is 1 ms

6

Q3 (b) - We need a three stage space division switch with total inputs of 10,000. We use 1000 crossbars at first and third stages and 16 crossbar at the middle stage.

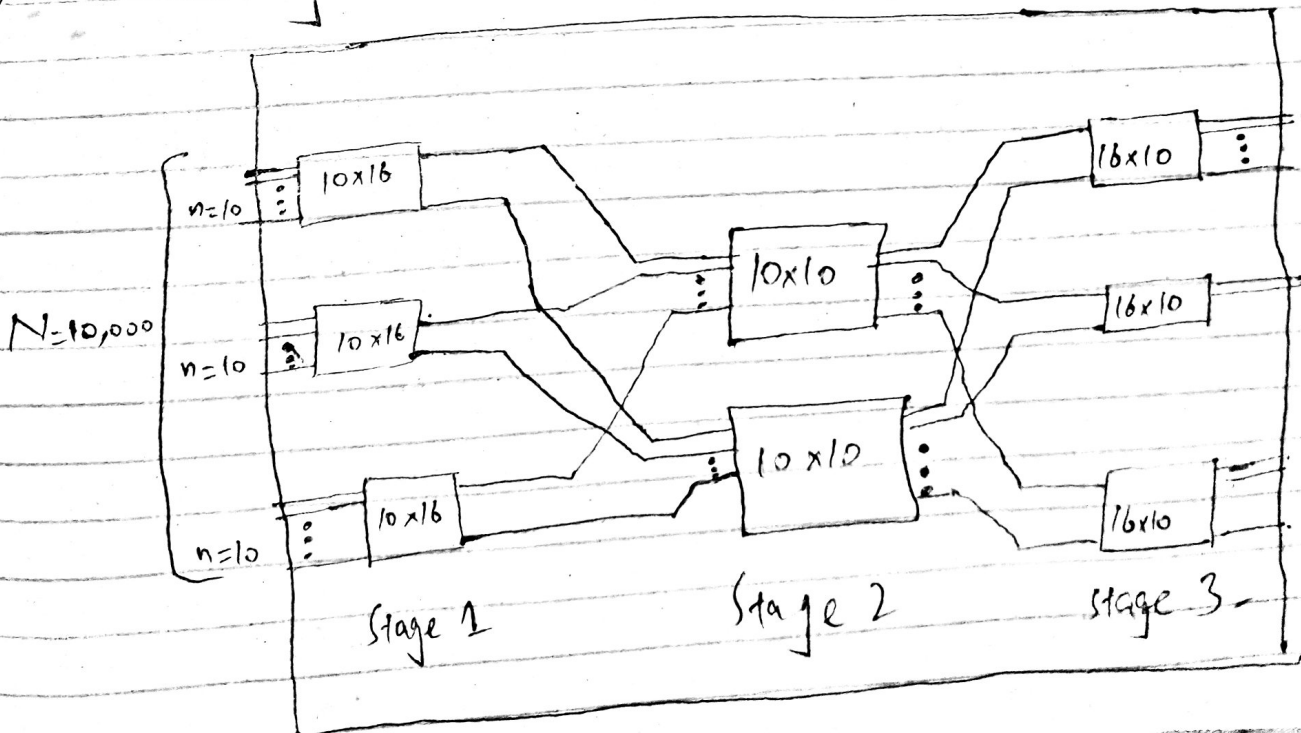
- Draw configuration Diagram.
- Calculate total number of cross points.
- Find possible number of simultaneous connections.
- Find possible number of simultaneous connections if we use one single crossbar (1000x1000).
- Find blocking factor and ratio of the number of connections in c and in d.

Solⁿ - $N = 10,000$
 $n = 1000$
 $K = 16$

In first stage we have $\frac{10,000}{1000} = 10$ crossbars of size 10×16 .

In second stage we use 16 crossbars of size 10×10 .

In third stage we use 10 crossbars of size 16×10 .



b) Total number of crosspoints
 $= 10(10 \times 16) + 16(10 \times 10) + 10(16 \times 10)$
 $= 1600 + 1600 + 1600$
4800 crosspoints.

c) Total number of simultaneous connections are
 $16 \times 10 = 160$

d) for single crossbar (1000x1000) we have
100 simultaneous connections.

e) Blocking factor is 60%.