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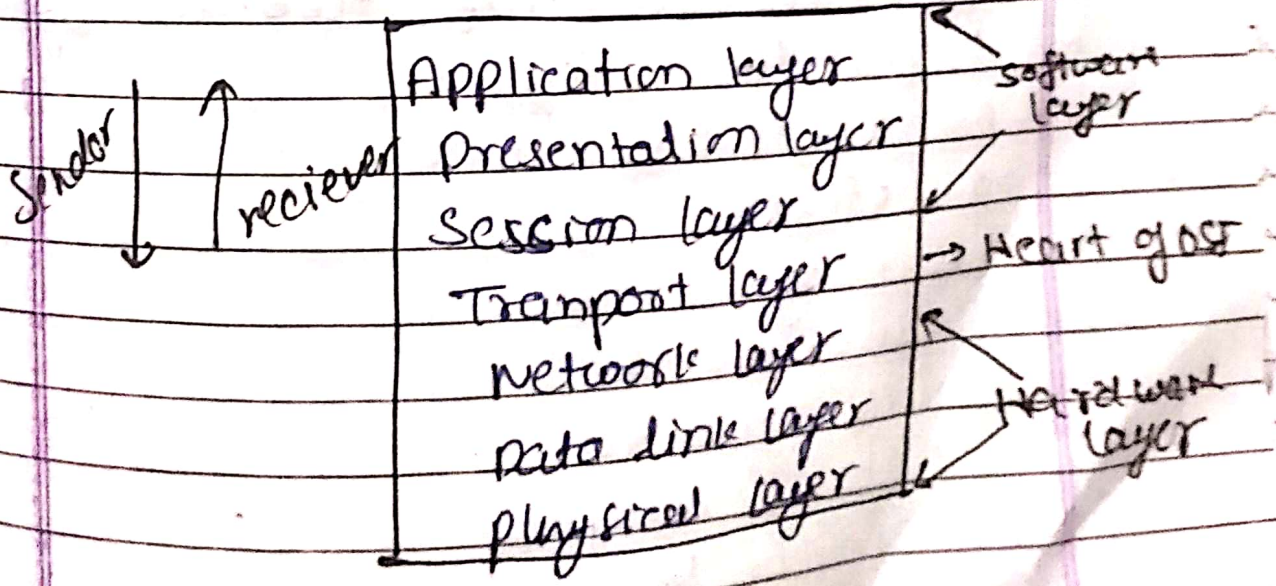
Computer Network
11T2018187

1) a) explain briefly the responsibilities and list for each layer of ISO - OSI model. How OSI model is diff from TCP/IP

Ans OSI stand for Open system Interconnection.
There are 7 layer of collaboriety to transmit the data from one person to another person



1. Physical layer.

The function of Physical layer

1. Bit synchronization:
2. Bit rate control:
3. Physical topologies:
4. Transimission mode:

Ex: Hub, repeater modem cable

2. Data Link layer

The data link layer responsible for node to node delivery of the message.

when packet arrives it is responsibilites of DLL to transmit it to the Host using MAC add.

DLL divided into two sub layer

1. Logical link layer
2. media Access control.

Function

1) Framing
2) Physical addressing
3) error control
4) Flow control
5) Access control.

Ex: Switch & Bridge are data link layer

3) Network layer
It is for transmission of data from one host to the another.

- Routing: which route is suitable from source to destination.
- Logical Addressing.
In order to identify each device on internetwork uniquely by its own ip addresses.

Ex: router work on ~~that~~ this layer & segments is reffered as packet in that layer.

4) Transport layer
It is responsible for end to end delivery.

- At sender side
segmentation & flow & Error control
- At receiver side

1) Segment & Reassembly
2) Service point addr.
It is known as Heart of OSI

2) Session layer

1) maintanence
2) Synchronization
3) dialog controller

6) Presentation
Translation
Encryption / Decryption
Compression

7) Network layer
Produce the data which has to be transfer to over the network

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Difference betw OSI & TCP

OSI	TCP
1) clear distinction b/w interface & Protocol.	Not any clear distinction b/w them
2) routing standard & protocol defined	It uses internet layer
3) seven layer	Three layer
4) min size of header is 5 byte	min size of layer no bytes

Layer in TCP/IP

1) network layer
1) physical transmission
2) It is internet layer
3) encapsulate by 2 protocol

2) Internet layer
1) IP
2) ICMP
3) ARP

3) Host to Host layer

a) TCP

b) UDP

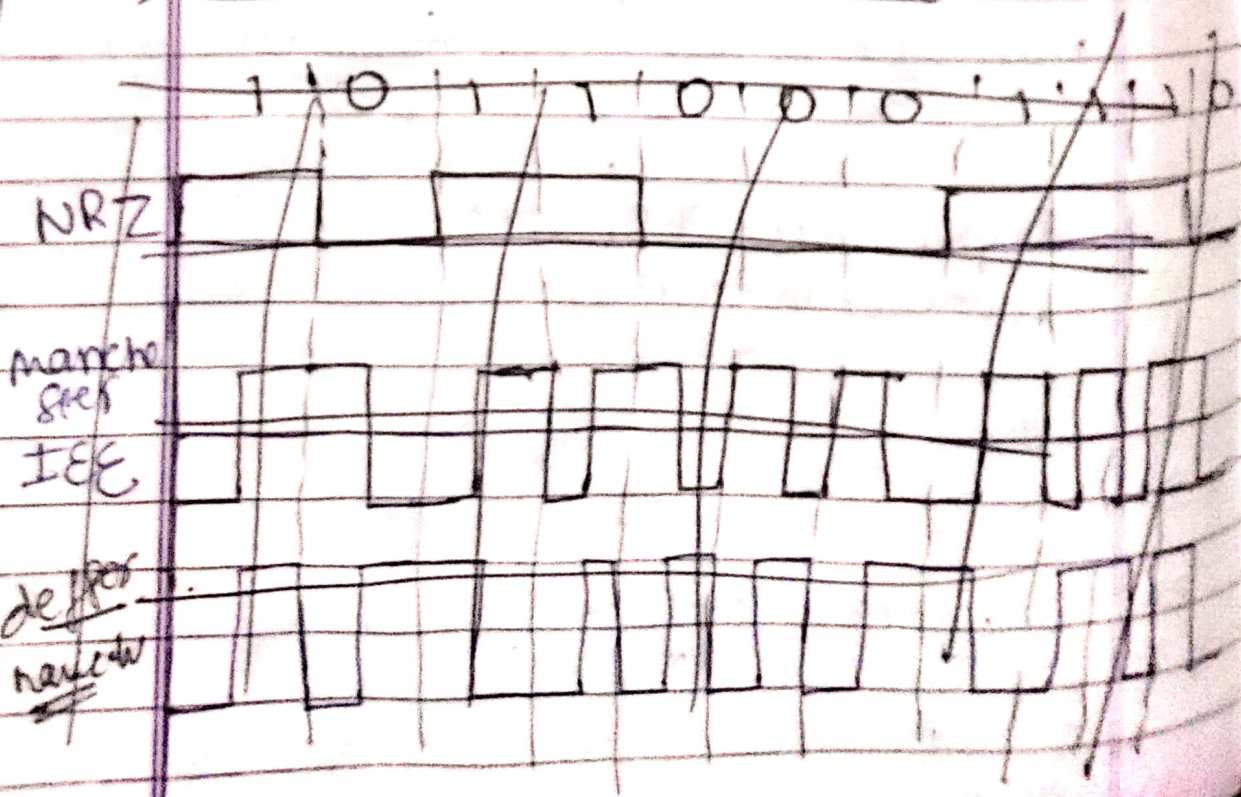
4) App layer

a) HTTP

b) SSH

c) NTP

b)



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(c) int accept(int sockfd, struct sockaddr *addr, socklen_t *addrlen);

a) sockfd: To created socket bond to local address with bind() & is listening for connection listen()

b) addr: It is pointer to a sockaddr struct. It is filled with address of the peer socket as known to the communication layer. The exact format of the add returned addr is determined by socket's address family.
when addr is NULL nothing is filled in. In this case addrlen is not used.

addrlen → It is length of size of actual peer address.

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Returns
On success these system call, retur a non negative integer that is file descriptor for accepted socket, on error it gives -1.

int connect(int sock fd
struct sockaddr * serv-addr, socklen_t addr_len)

sock_fd → file descriptor readdress specified by addr
addr → address
addr → define before

it returns non-negative integer which is file descriper of connecting socket

Relationship
The request generated by this connect call is processed by the remote server and is an operating system buffe

waiting to be handed over to application which will be calling the accept function. The accept call is the mechanism by which the networking program on the server receives the requests that have been accepted by OS.

(v) i) Advantage of differential manchester

ii) A transition is guaranteed at least once every bit for robust clock recovery.

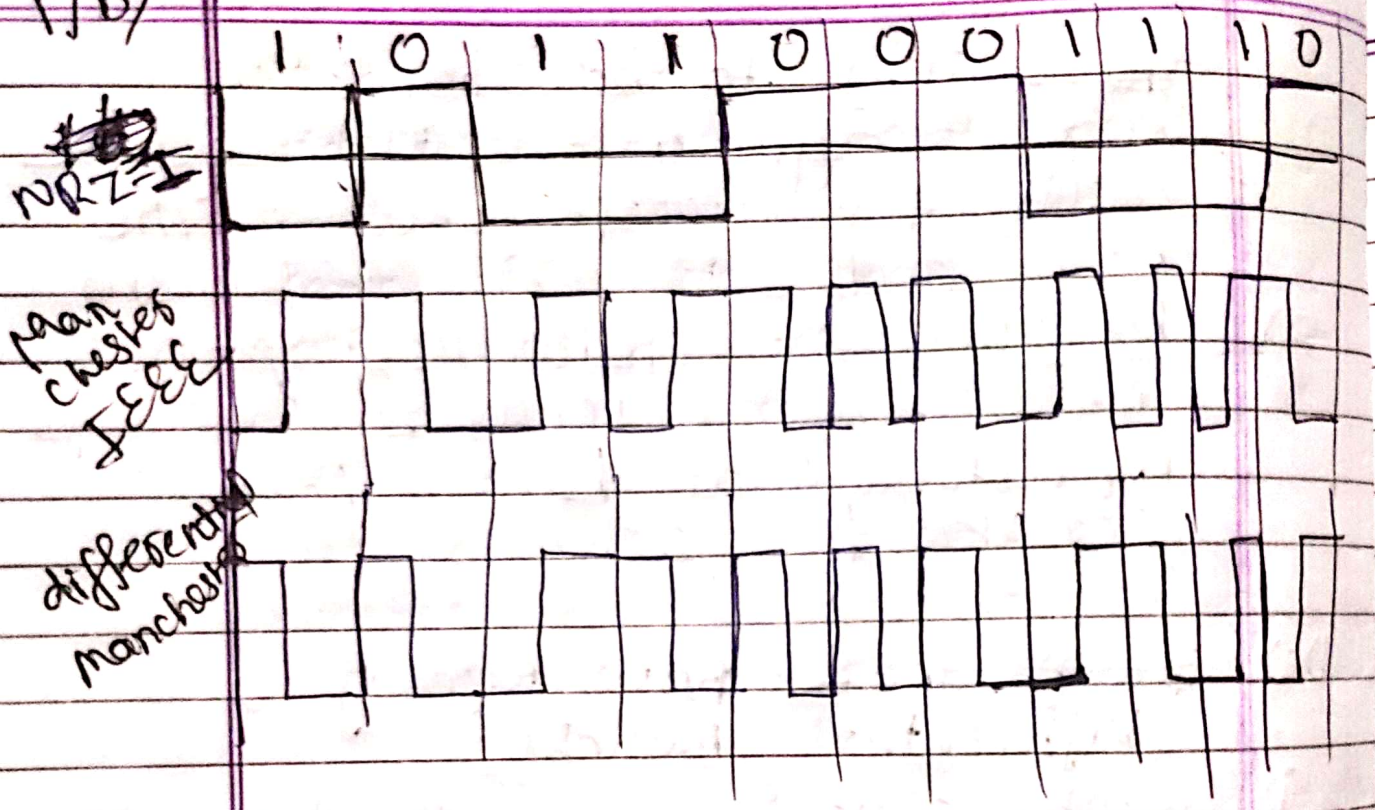
ii) In a noisy environment identifier transition is less error-prone than comparison signal value against a threshold

Disadvantage

It needs more bandwidth than any other encodings

It is self clocking & operate by sensing

13) b)



2) Three things that IPv6 introduce that should make routing simpler.

i) Built in (QoS) quality of service that distinguish delay sensitive packets

→ Quality of service refer to any technology that manage data traffic

ii) Built in network layer security

Internet hosted security (IPsec) was designed to provide network layer security

iii) More simplified header structure

When compared to IPv4, IPv6 has much simpler header structure which is essentially designed to minimize the time & efforts that go into header processing.

2) b) Link state routing Algorithm

Link state algorithm can transmit routing information to all

other sending the same protocol, not just objectly connected neighbours this way all router are recieving first hand information. This makes the router more reliable. Hence, router create by link state routing protocols generally have lower administrative distance

They generally use slightly a more ~~advanced~~ advanced algorithm for computing the best route to a destination. One commonly used algo is dijkstra's shortest path

Difference blw Link state & Distance vector Protocal

Link state	Distance vector
• Based on dijkstra	Based on Bellman ford
• support contigous subnets	supports discontigous subnets
• cost is metric of link steate routing protocol	distance vector routing uses hop count and composite metric
• supports VLSM CIDR	Doesnot support VLSM CIDR

(5) Question 1 d)

suppose that a ~~equalized~~ digitalized TV picture is to be No of pixel = $30 \times 480 \times 500 = 7.2 \times 10^6$ pls

$C = 5 \times 7.2 \times 10^6$

$= 36 \times 10^6$ bits/s

$= 36$ Mbps

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$$C = B \log_2\left(1 + \frac{S}{N}\right)$$

$$B = \frac{C}{\log_2(1 + S/N)}$$

$$B = \frac{36 \times 10^6}{\log_2(1 + 3162.27)}$$

$$= \frac{36 \times 10^6}{11.62}$$

$$= 3.098 \times 10^6 \text{ Hz}$$

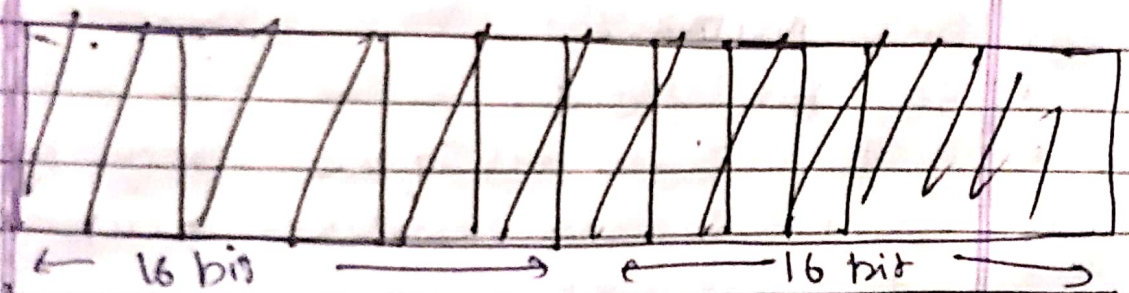
$$\boxed{B = 3.1 \text{ MHz}}$$

2)c)

→ TCP is transport layer protocol.

→ It continously receives data from the application layer

TCP Header



Source port	Destination port
Sequence Number	
Acknowrege Number	
Header length 4bit / Reserved 6 bits / URG / ACK / PSH / RST / SYN / FIN	Window size / Adve Window
Check sum	Urgent partner
(0-40 bytes) Options	
Data (optional)	

TCP Header

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Source port
- 16 bit field
- port of the sending app.

destination port
- 16 bit field
- identifies the port of receiving application

3) Seq Number
- 32 bit field
- TCP assign unique seq number
- contains the sequence number of first data type

4) Acknowledgement Number
- 32 bit field
- It contains sequence number of data byte.
- It always sequence number of a last recieved data byte

5) Header Length
- 4 bit field
- contain the length of TCP
- it helps in knowing from where the data begin.

6) Reserved bit
6 bit field
These bits are not used

7) URG bit
It indicates the reciever that certain amount of data within curren seg.

8) Ack bit
for All seg except request Ack bit set to 1

9) PSH → push the entire buffer No wait is done

10) RST → TCP connection Tranfer of data done

11) SYN → Request segment sent for connection
↓
for synchronization

FIN → Determine to terminate the TCP connection

WINDOW SIZE
16 bit
how ~~data~~ much data sender can receiver without ack.

Flags
Indicate to particular state connection or to provide some additional useful information

2d) Run dijkstra

	d(r)	d(a)	d(b)	d(c)	d(d)	d(s)
i)	0	∞	∞	∞	∞	∞
ii)	0	2	6	∞	∞	∞
iii)	0	2	5	8	∞	∞
iv)	0	2	5	7	13	∞
v)	0	2	5	7	8	15
vi)	0	2	5	7	8	10

path are

$x \rightarrow a \rightarrow b \rightarrow d \rightarrow s$

2) e) for the following run vector algo

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(3)

a) Data - 100100

0	0	0	P_4	1	0	0	P_3	1	P_2	P_1
11	10	9	8	7	6	5	4	3	2	1

parity bits $2^0 = 1$

$2^2 = 4$

$2^3 = 8$

$2^4 = 16$

P_1 = bits ⇒ 3, 5, 7, 9, 11

P_2 = bits ⇒ 3, 6, 7, 10, 11

P_3 = bits ⇒ 5, 6, 7

P_4 = bits ⇒ 9, 10, 11

$P_1 = 1$ because

Total no of 1 at position 3, 5, 7, 9, 11 is one which is odd

$P_2 = 0$ because

no of 1 on 3, 6, 7, 10, 11 is two which is even

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B Pg 2.1 →

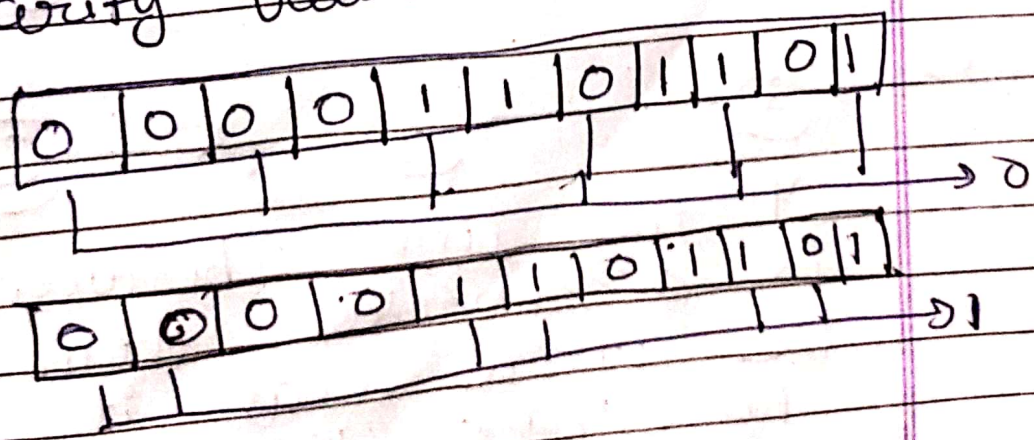
Hamming code

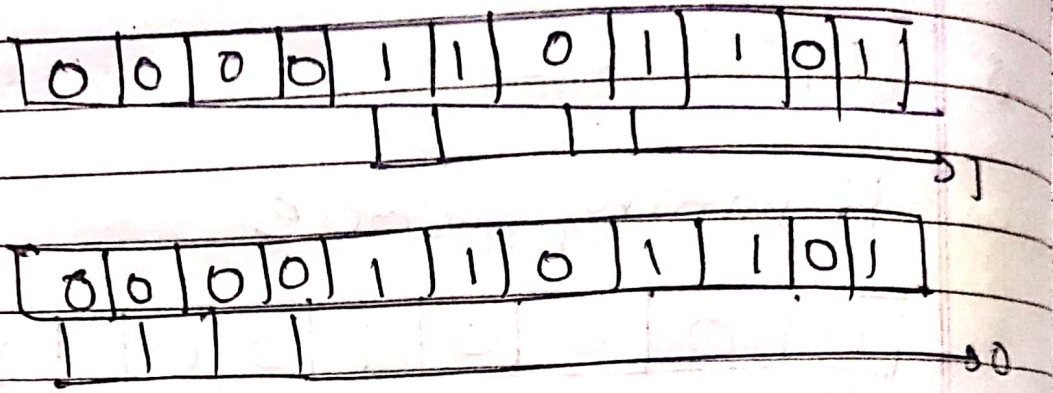
0	0	0	0	1	0	0	1	1	0	1
11	10	9	8	7	6	5	4	3	2	1

b) Here it is given that the sixth bit is having error i.e it is changed from 0 to 1 so reciever gets

0	0	0	0	1	1	0	1	1	0	1
11	10	9	8	7	6	5	4	3	2	1

Since their is error therfore new parity value

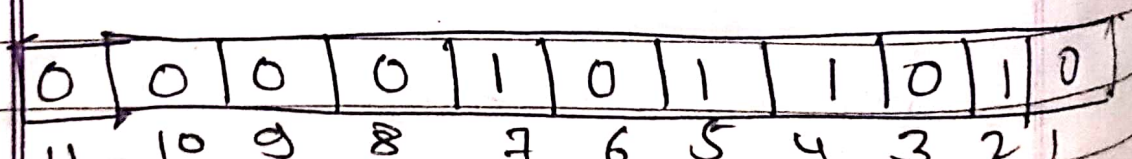




since we notice that there's
chang in parity bits there

To correct the order

The new parity bit sequence
is 0110 which is 6 in
decimal



c)

If the link between B & C
is disconnected then B will
be aware that it can
no longer reach C through

that links and will remove it from its table. But before doing it is possible that it will recieve an update from A which we say that it can reach C at a cost of 2 and B can get to A at a cost say 1 so it will update a route to C via A at a cost of 3.

A will then recieve update from B and update it cost to 4. This way both the routers will keep on sending bad info to each other till infinity which is called as **count to infinity problem**

3rd octect of netmask 2 :
11111100
3rd octect of machine 6
01010000 & op result: 01010000
3rd octect of machine 7
01010001 op result 01010000
3rd octect of m

Ans

50) To get the subent id. we need to perform and operation on the ip add

255 has all 1's whereas 0 has all 0's therefor performing & operation on ther third octet is enough
as first two octeat will always be 172.68 for first 5 machine and 172.80 for last 5 machine

machine 1:

	3rd octect	of result
machine 1	10100000	10100000
" 2	10110011	10110000
" 3	10110001	10110000
" 4	10110010	10110000
" 5	10100010	10100000

3rd octect of netmask 2 : 11111100

machine 6	10101000	10101000
" 7	10101001	10101000
" 8	10101100	10101100
" 9	10101100	10101100
" 10	10101101	10101100

No of ids = 4

Network ids = ⊕	machine
172.68.160.0	1, 5
172.68.176.0	2, 3, 4
172.80.168.0	6, 7
172.80.172.0	8, 9, 10