COI ASSIGNMENT

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1) A computer network is a collection of interconnected devices that can communicate and share resources.

Main uses: Communication, Resource sharing, Data sharing etc

2) Network topology refers to the arrangment of a network, including nodes and connecting lines between senders and receivers.
Common types of topology: Bus, Ring, Star, Mesh etc

3) Parity check

Data: 1011011 (7 bits)
Parity: Even (total 1s should be even)
Transmitted data: 10110111

Check sum

Original Data: 10101001 00111001

```
  10101001
  00111001
 ----------
  11100010  → sum
  00011101  → checksum
```

Transmitted = 10101001 00111001 00011101

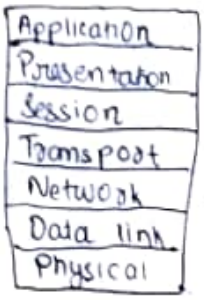
CRC

M = 1001 (K=4)
Divisor = 1011 (n-K+1)
i.e n=7
r = n-K = 7-4 = 3

```
        101
     ------
1011 | 1001000
       1011
       ----
        1000
        1011
        ----
         110
```

Tx → 1011 10

4) OSI Layer explanation



Handles the physical transmission
provides reliable data transmission

Physical layer : Handles physical transmission
Data link layer : Provides reliable data transmission
Network layer : Routes data packet different networks
Transport layer : Provides reliable end to end delivery of data
Session layer : Establish, manages and terminates session
Presentation layer : Handles data formatting and encryption
Application layer : Provides network services

5) Pure ALOHA :

- Multiple access protocol where device can transmit data at any time
- Collision occur when two or more device transmit simultaneously

Slotted ALOHA

- Divides time into slots : Device can transmit at beginning of slot

6) Selective repeat : Only lost or damaged frames are retransmitted, improving efficiency.

Go-Back-N : The senders retransmits all outstanding frames starting from the lost one, even if some were received correctly.

7) Stop and wait ARQ :

The sender transmits one frame and waits for an acknowledgment before sending the next

Selective repeat ARQ :

Only lost or damaged frames are retransmitted, improving efficiency.

8) Hamming code is an error correction technique that uses redundancy bit to detect and correct errors.

The number of redundant bit (R) is determined by

$2^r \geq m+r+1$

given $D = 10110110011$ $(m=11)$

$r = 4$

∴ redundant bits required $= 4$