NPS - Home assignment - 1

2300030642

1. Cyclic Redundancy check (CRC)

Frame : 11010111011

$x^4 + x + 1$ (binary : 10011)

Append four zeroes to frame : 11010111010000

11010 , 10011 → 1, 101

10110 , 10011 → 1, 011

01110 , 10011 → 0, 111

11100 , 10011 → 1, 011

:

The final is 0110

append that to frame :

11010110110110

2. Components of Computer Networks:

1) NIC (Network Interface card) : enables devices to connect to the network

2) Switches : connect multiple devices in a LAN

3) Routers : Direct data between different networks

4) Modems : convert digit to analog signal

5) Cables and connectors : connectivity

6) Hub : wireless connectivity.

5.

→ Sender transmits multiple frames in a window

→ Receiver acknowledges correctly received frames.

→ If an error is detected, the sender retransmits from the erroneous frame onward.

→ sliding window ensures continuous transmission and controlled flow.

4.

Message: 7 1 4 2 6 9 8 3 5

Frames: $F_1 = 2, F_2 = 4, F_3 = 3$

Byte count:

F_1 (2, 7, 1)

F_2 (4 4 2 6 9)

F_3 (3 8 3 5)

final byte: 2 7 1 4 4 2 6 9 3 8 3 5

5.

Feature	Client	Peer-to-peer
Control	centralized	Decentralized
Scalability	High	limited
Security	Stronger	weaker
performance	for large	for small
Example	web services	file sharing

6. 10100011 0

P1, P2, P4, P8

P1 (1, 3, 5, 7, 9) → 0

P2 (2, 3, 6, 7, 10) → 1

P4 (4, 5, 6, 7) → 0

P8 (8, 9, 10) → 1

final code : 11010001100

7. Mc 10110 1

P1 (1, 3, 5, 7) → 1

P2 (2, 3, 6, 7) → 0

P3 (4, 5, 6, 7) → 1

Encode message with parity bit

ex : flip bit at position 5.

efficient for error detection and correction