

Q

Write short note on

i) Hub: A hub, also called a network hub, is a common connection point for devices in a network. Hubs are devices commonly used to connect segments of a LAN. The hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

Hubs and switches serve as a central connection for all of your network equipment and handles a data type known as frames. Frames carry your data. When a frame is received, it is amplified and then transmitted on to the port of the destination PC.

ii) Switch: In networks, a device that filters and forwards packets b/w LAN segments. Switches operate at the data link layer (layer 2) and sometimes the network layer (layer 3) of the OSI Reference Model and therefore support many packet protocols. LANs that use switches to join segments are called switched LANs or, in the case of Ethernet networks, switched Ethernet LANs.

iii) A small lever or button. The switch is on the back of printers and on expansion

boards are called DIP switches. A switch that has just two positions is called a toggle switch.

3) iii) Another word for option or parameter - a symbol that you add to a command to modify command's behaviour

3) Router :- A router is a device that forwards data packets along networks. A ~~network~~ Router is connected to at least two networks, commonly two LANs or WANs, or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect.

Routers use headers and forwarding tables to determine the best path for forwarding the packets, and they use protocols such as ICMP to communicate with each other and configure the best route b/w any two hosts.

4) Gateway :- A gateway is a node on a network that serves as an entrance to another network. In enterprises, the gateway is the computer that routes the traffic from a workstation to the outside network that is serving the web pages. At home, the gateway is the ISP that connects the user

to the internet.

In enterprises, the gateway node often acts as a proxy server and a firewall. The gateway is also associated with both a router, which use header and forwarding tables to determine where packets are sent, and a switch, which provides the actual path for the packet in and out of the gateway.

5) Bridges → A bridge operates at data link layer. A bridge is a repeater, with add on functionality of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2 port device.

6) Guided medium

If Twisted pair copper cables, are widely used due to low cost and ease of installation. A cable can have 4, 5 or 6 pairs of twisted wires. Each category differs in the supported data rate. Category 6 cable will support gigabit-Ethernet. Twisted pair cables can be unshielded (UTP) or shielded (STP).

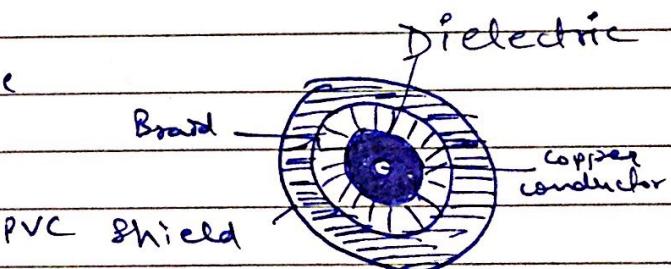
UTP : very low cost and easy to use

STP : high cost, difficult installation.

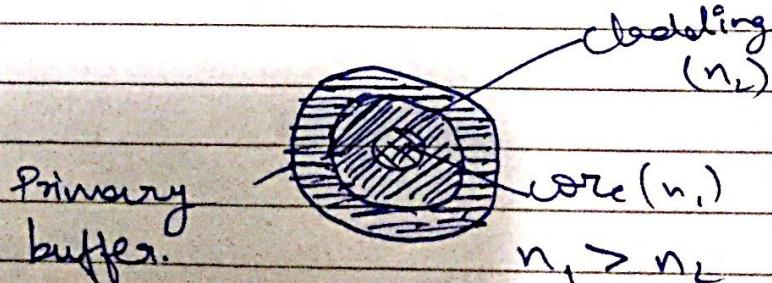
Introduced in 1980's by IBM, each twisted pair is foil shielded, also includes a braided wire that is earthed at one end.

ii) Coaxial Cable: Copper conductor carries the bits, and is surrounded by an insulating material. The braided metal shield that protects the digital signal travelling along the core by absorbing external noise.

Benefits: a) high immunity to noise
 b) can be used over large distances



iii) Optical fibre: Optical fibres carry information in form of light. The digital information is first converted into light beam by an LED or ~~laser~~ laser emitting diode. The beam goes through multiple total internal reflection from source end to destination end, hence suffering very less loss. Optical fibres can carry data along a few kilometres before needing a repeater.



O

Write a program in C to implement bit stuffing

Aw

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
```

```
void main()
```

```
{ int max a[20], b[30], i, j, R, count, n;
```

```
printf("Enter frame size ");
```

```
scanf("%d", &n);
```

```
printf("Enter the frame in the form of 0 and 1");
```

```
for (i=0; i<n; i++) {
```

```
scanf("%d", &a[i]);
```

```
}
```

```
i = 0;
```

```
count = 1,
```

```
j = 0;
```

```
while (i < n)
```

```
{ if (a[i] == 1) {
```

```
b[j] = a[i];
```

```
for (k = i + 1; a[k] == 1 && count < 5; k++) {
```

```
j++;
```

```
b[j] = a[k];
```

```
count++;
```

```
if (count == 5) {
```

```
j++;
```

```
b[j] = 0;
```

```
}
```

```
i = k;
```

```
}
```

```
}
```

```
else
{
    b[j] = a[i];
}
i++;
j++;
}

printf ("After Bit Stuffing");
for (i=0; i<j; i++) {
    printf ("%d", b[i]);
}
getch();
}
```

Output :-

Enter frame size 12

Enter frame in the form of 0 and 1 : 01011111001

After Bit Stuffing : 0101111101001

Q Write a program for error detection

Ans #include <bits/stdc++.h>

using namespace std;

```
int main(){
    int arr[9], parity, arr2[9];
    int no = 0;
    int ans = 0;

    cout << "Enter data bits";
    for (int i=8; i>0; i--) {
        cin >> arr[i];
        if (arr[i] == 1) no++;
    }
}
```

cout << "Enter 0 for even parity and
1 for odd";
cin >> parity;

```
if (parity) {
    if (no%2 == 0) arr[0] = 1;
    else arr[0] = 0;
}
```

```
else {
    if (no%2 == 0) arr[0] = 0;
    else arr[0] = 1;
}
```

}

```

cout << "Enter 9 bit recd data";
for(int i=8; i>=0; i--) {
    cin >> arr2[i];
}
for(int i=0; i<9; i++) {
    ans += arr[i] ^ arr2[i];
}
if(!ans) cout << "data received is correct"
        << endl;
else cout << "data recd is wrong" << endl;
return 0;
}

Output of the code
Output :
Enter the data bits 10101010
Enter 0 for even parity and 1 for odd 0
Enter 9 bit received data 101010100
data received is correct

```