

# ASSIGNMENT - II

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① What do you mean by guided media? Discuss briefly different types of Guided Media.

It's the transmission media in which signals are copied to a specific path using wire or cable (physical medium). These are those that provide a conduit from one device to another, which include Twisted pair cable, Coaxial cable and fibre optic cable. A signal travelling along any of these media is directed and contained by the physical limits of the medium. Twisted pair & coaxial cable use metallic conductors that accept and transport signals in the form of electric current. Optic fibre is a cable that accepts and transports signals in the form of light.

## TWISTED PAIR:

Twisted pair is a physical media made up of pair of cables twisted with each other. This is the most commonly used cable and cheaper than others. It is light weighted and can be installed easily, and they support many types of network. The degree of reduction in noise interference is determined by the number of turns per foot. Increasing the number of turns per foot decreases noise interference.

### 1) Unshielded twisted pair:

It is the most common type of telecommunication when compared with shielded twisted pair cable which consists of two conductors usually copper, each with its own color plastic insulator.

#### ADVANTAGES:

- It's cheap
- Installation is easy
- Can be used for high speed LAN.

#### DISADVANTAGES:

- Can only be used for shorter distances.

### 2) Shielded twisted pair:

This cable has a metal foil braided-mesh covering which encases each pair of insulated conductors. It is faster than most of the cables and expensive than co-axial cable.

#### ADVANTAGES:

- Easy to install.
- Adequate performance
- Increases the signalling rate
- Eliminates cross talk.

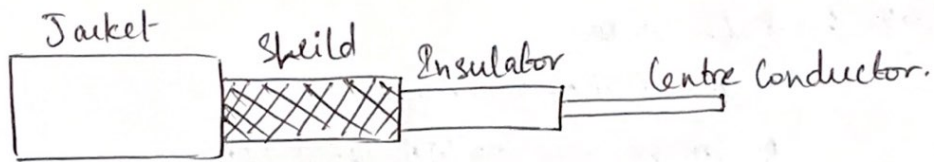
#### DIS-ADVANTAGES:

- Difficult to manufacture.
- Heavy.



## COAXIAL CABLE :

this is a very commonly used transmission media, for example, TV wire is usually a coaxial cable. It contains two conductors parallel to each other. It has a higher frequency as compared to twisted pair cable.



### Coaxial cable is of two types

- ① Base-band transmission: process of transmitting single signal at high speed.
- ② Broad-band transmission: process of transmitting multiple signals simultaneously.

ADVANTAGES :

- \* Data can be transmitted at high speed
- \* Provides higher band width
- \* Better shielding as compared to twisted pair.

DIS-ADVANTAGES :

- \* Expensive
- \* Any fault occurs in the cable causes the failure of the entire network.

## FIBRE OPTIC:

Fibre optic cable is a cable that uses electrical signals for communication. It holds the optical cable coated with fibre that are used to send the data by pulses of light. The plastic coating protects the fibre from heat, cold, electromagnetic interference from other types of wiring. Fibre optics provide faster data transmission than copper wires.

- ADVANTAGES :
- \* Higher bandwidth
  - \* Less signal attenuation
  - \* Immunity to electromagnetic interference
  - \* Light weight
  - \* Great immunity to tapping.
  - \* Resistance to corrosive materials.

- DIS-ADVANTAGES :
- \* Installation and maintenance
  - \* Unidirectional light propagation
  - \* High cost.



## ② Compare and contrast byte-stuffing and bit-stuffing.

Data link layer is responsible for something called framing, which is the division of stream of bits from network layer into manageable units. Each frame consists of a sender's address and a destination address. Frames could be of fixed size or variable size. In fixed size framing, there is no need for defining the boundaries as the size of itself can be used to define the end and beginning of the frame. In variable size framing we need a way to define the end and beginning of the next frame. To separate frames an 8-bit flag is added, but the problem with that is, any pattern used for the flag could also be a part of the information. There are two ways to overcome this problem.

### ① BYTE STUFFING

A byte, which has a predefined bit pattern is added to the data section of the frame when there is a character with the same pattern as the flag. Whenever the receiver encounters the ESC character, it removes from the data section and treats the next character as data, not flag.

But problem arises when text contains one or more escape characters followed by a flag. To solve this, the escape characters that are part of the text are marked by another escape character.

## ② BIT STUFFING

Mostly a flag is a special 8-bit pattern "01111110" used to define the beginning and end of the frame.

Problem with the flag is same as that was in case of byte stuffing. So in this protocol what we do, is, if we encounter 0 and 5 consecutive 1 bits, an extra 0 is added after these bits. This extra 0 will be removed from the data by the receiver. The extra ~~one~~ bit is added after one 0 followed by five 1's regardless of the value of the next bit. Also, as sender side always knows which sequence is data and which is flag it will only add this extra bit in the data sequence not in the flag sequence.