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Lab Practical #03:

Study of different types of network cables & connectors and crimping a LAN.

Practical Assignment #03:

1. List various networks cable. Also, write short description.
   - **a.) Twisted Pair Cable:-**
     Types: UTP (Unshielded Twisted Pair), STP (Shielded Twisted Pair)
     Description: Twisted pair cables are widely used in LANs. They consist of pairs of copper wires twisted together to minimize electromagnetic interference.
   - **b.) Coaxial Cable:-**
     Types: Baseband transmission and Broadband transmission
     Description: Coaxial cables are made of a central copper conductor, an insulating layer, metallic shielding, and a plastic cover. Used in cable TV, Internet, and CCTV systems.
   - **c.) Fiber Optic Cable:-**
     Types: Single-mode and Multi-mode
     Description: Fiber optic cables transmit data using light, providing extremely high speed and bandwidth. Used in long-distance and high-performance networks.

2. Difference between guided and unguided media.

Feature	Guided Media	Unguided Media
Medium	Wired (physical path)	Wireless (air as medium)
Interference	Less due to shielding	More due to natural and artificial sources
Signal Direction	Directed	Omnidirectional (usually)
Examples	Twisted Pair, Coaxial, Fiber Optic	Radio waves, Microwaves, Infrared
Usage	Mostly LAN, MAN, WAN	Mobile communication, satellite communication

3. Give cross-wired cable and straight through cable diagram (Color Code wise).

1. List various networks cable and connectors. Also, write short description.

a) Network Cable Name: Twisted Pair Cable

- **Description**:
  -It is a physical media made up of a pair of cables twisted with each other.
  -It is cheap as compared to other transmission media.
  -Installation of the cable is easy, and it is a lightweight cable.
  -The frequency range for the cable is from 0 to 3.5 KHz.
  -It consists of two insulated copper wires arranged in a regular spiral pattern.
  -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.

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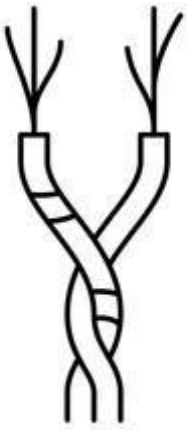
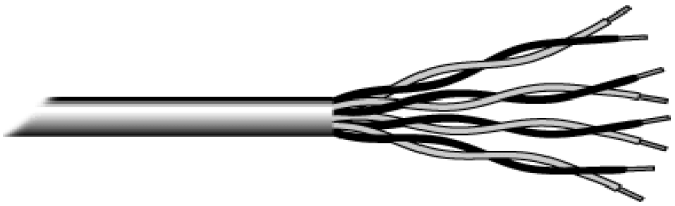
-The wires are separately insulated.
-It is widely used in different kinds of data and voice infrastructure.
-The use of two wires twisted together helps to reduce crosstalk and electromagnetic induction.

- **Diagram**:



b) Network Cable Name: Unshielded Twisted Pair Cable

- **Description**:
  - An unshielded twisted pair is widely used in telecommunication systems.
  - Commonly used as ordinary telephone wires.
  - It has weak immunity against noise and interference.
  - Different categories of UTP cable:
  - Category 1: Used for telephone lines that have low-speed data.
  - Category 2 & 3: Can support up to 4 Mbps and 16 Mbps.
  - Category 4: Can support up to 20 Mbps and is suitable for long-distance communication.
  - Category 5: Can support up to 200 Mbps.
- **Diagram**:



c) **Network Cable Name: shielded Twisted Pair Cable**

- **Description**:
  - A Shielded Twisted Pair (STP) cable has a metallic mesh shielding around the twisted wires.
  - The shielding allows for a higher data transmission rate.
  - Installation is easy but requires proper grounding.
  - STP cable has higher attenuation than UTP.

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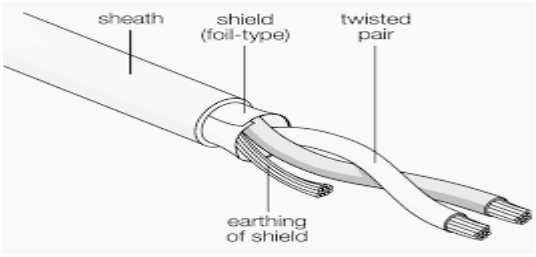
- It is more expensive compared to UTP and coaxial cables.
- STP provides better noise resistance and reduces electromagnetic interference.
- It has a higher capacity than unshielded twisted pair cables.
- STP is mainly used in exterior network installations (e.g., outside of buildings).

- **Diagram**:



2. Difference between guided and unguided media.

Aspect	Guided Media	Unguided Media
Definition	Transmission of data through **physical medium** like cables	Transmission of data through **air** or vacuum without physical medium
Medium Type	Wired (Physical path is provided)	Wireless (No physical path)
Direction of Signal	Directional – signals follow a specific path	Omnidirectional – signals spread in all directions
Interference	Less prone to electromagnetic interference	More prone to noise and interference
Security	More secure due to confined transmission path	Less secure, signals can be intercepted easily
Installation Cost	Costlier due to cable and setup	Comparatively cheaper
Examples	- Twisted Pair Cable - Coaxial Cable - Fiber Optic Cable	- Radio Waves - Microwaves - Infrared Waves
Usage	Used in LANs, MANs, and WANs	Used in mobile networks, satellite, wireless LANs

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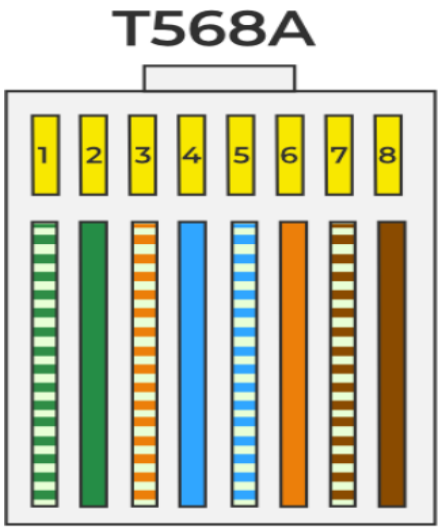
3. Give cross-wired cable and straight through cable diagram (Color Code wise).

a) Cross-wired Cable Diagram (Color Code)



b) Straight Through Cable Diagram (Color Code)