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Lab Practical #03:

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

Practical Assignment #03:

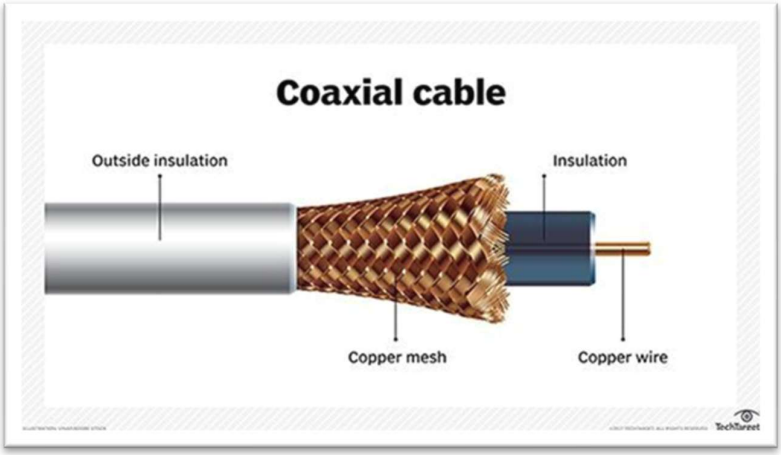
1. List various networks cable. Also, write short description.
2. Difference between guided and unguided media.
3. Give cross-wired cable and straight through cable diagram (Color Code wise).

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

❖ Cables:

a) Coaxial Cable

Coaxial cables consist of a **central copper conductor**, surrounded by a **plastic insulating layer**, a metallic shield, and an **outer insulating layer**. They are commonly used for **cable television**, **internet connections**, and older **Ethernet networks**.



b) Unshielded Twisted Pair (UTP)

UTP cables have pairs of **twisted copper wires** without additional shielding. They are widely used in **Ethernet networks** for both **residential and commercial applications** due to their **flexibility and ease of installation**.

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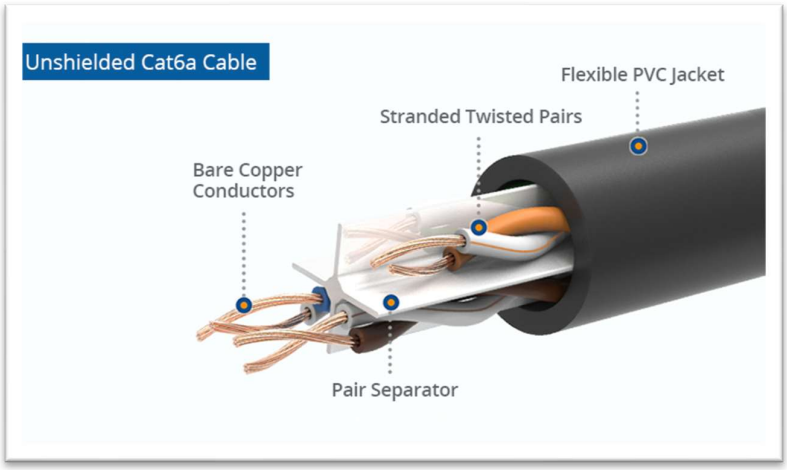
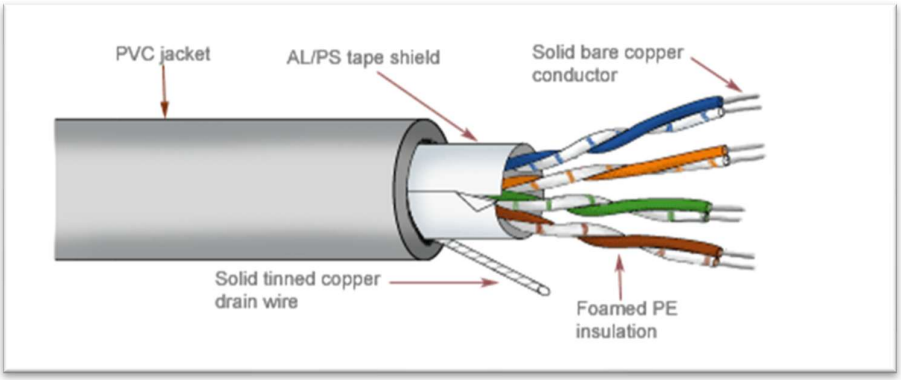


c) Shielded Twisted Pair (STP)

STP cables are similar to UTP but have an **additional shielding** to protect against **electromagnetic interference** (EMI) and radio frequency interference (RFI). They are used in environments with high interference.



d) Fiber Optic Cable

Fiber optic cables use **light to transmit data**, offering **high bandwidth and long-distance capabilities**. They consist of strands **of glass fibers surrounded** by **protective layers.**

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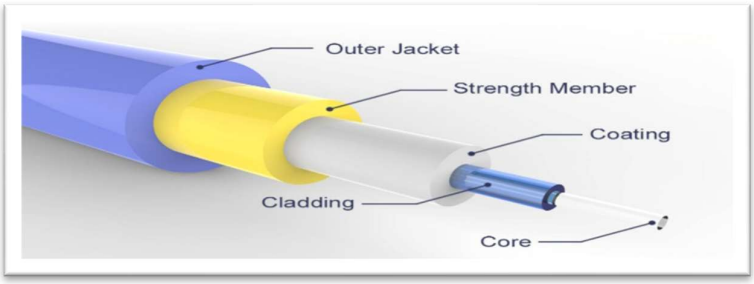
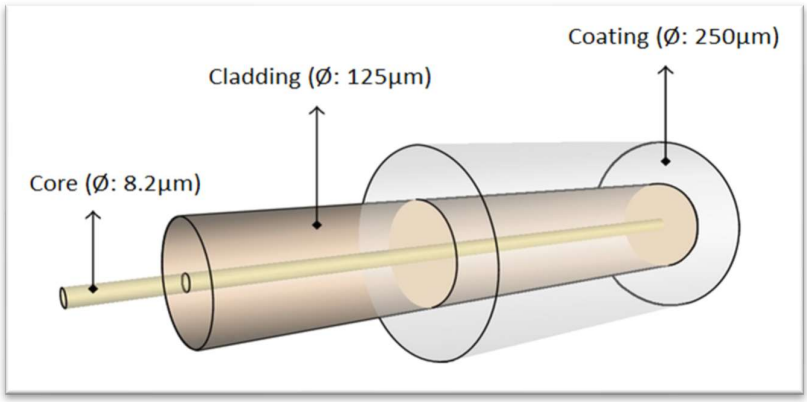


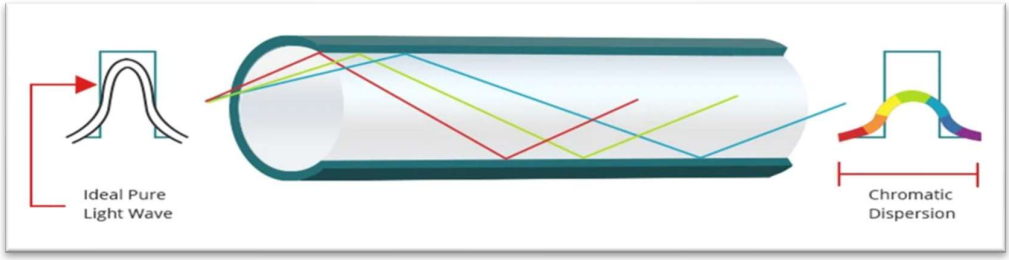
e) Single-mode Fiber (SMF)

SMF cables use a **single strand of glass fiber** and are used for **long-distance data transmission** with higher bandwidth capabilities.



f) Multi-mode Fiber (MMF)

MMF cables use multiple strands of glass fiber and are used for shorter distance data transmission with moderate bandwidth capabilities.



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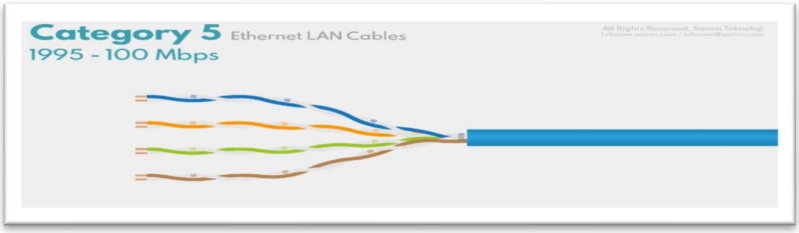
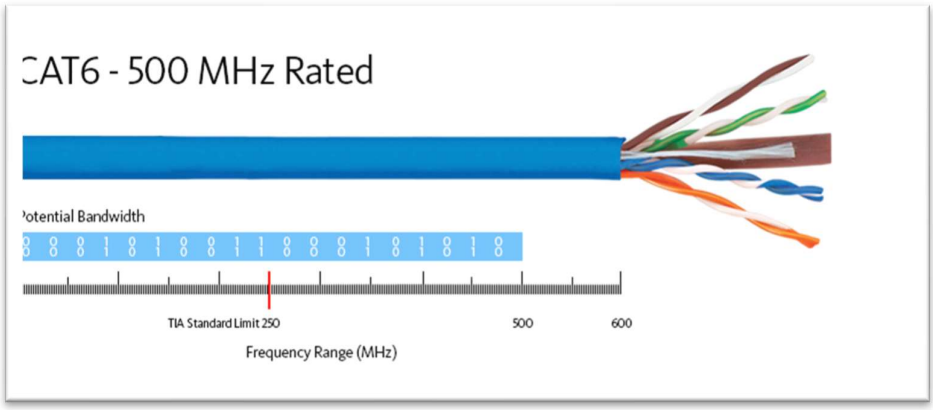
g) Category 5 (Cat 5)

Cat 5 cables are used for **Ethernet networks and support speeds up to 100 Mbps**. They consist of **four twisted pairs of copper wire**.



h) Category 6 (Cat 6)

Cat 6 cables support speeds up to **10 Gbps over short distances** and are used in Ethernet networks. They offer better performance and **reduced crosstalk** compared to Cat 5e.



❖ Connectors:

i) RJ45

The RJ45 connector is an **8-pin modular** plug commonly used for Ethernet networking. It connects twisted pair cables to networking devices **like routers, switches, and computers**.

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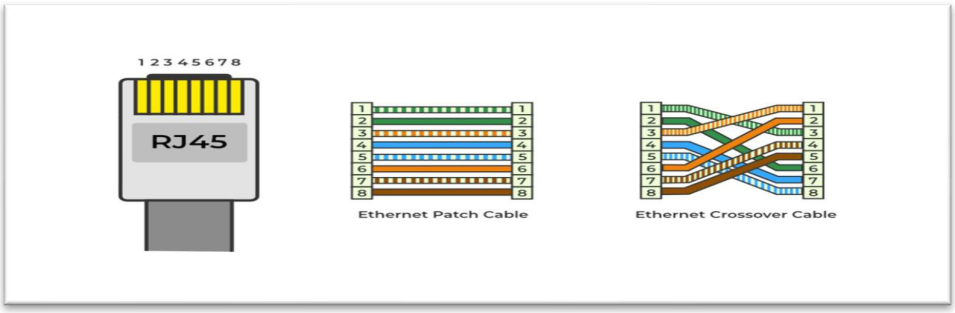
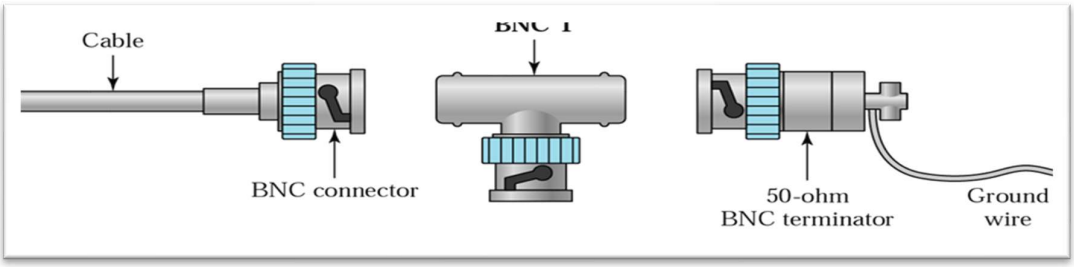


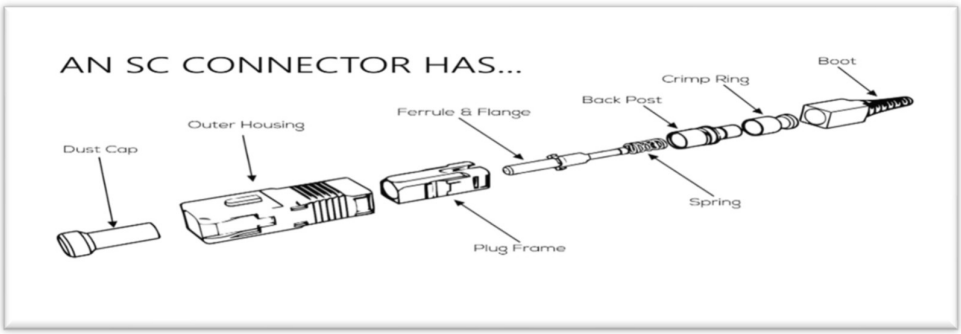
j) BNC (Bayonet Neill-Concelman)

BNC connectors are **quick connect/disconnect RF connectors** used with coaxial cables. They are widely used in television, radio, and other radio-frequency applications.



k) SC (Subscriber Connector)

SC connectors are used for **fiber optic cables**. They are **push-pull connectors** that provide excellent performance **for single-mode and multi-mode** fiber applications.



l) HDMI (High-Definition Multimedia Interface)

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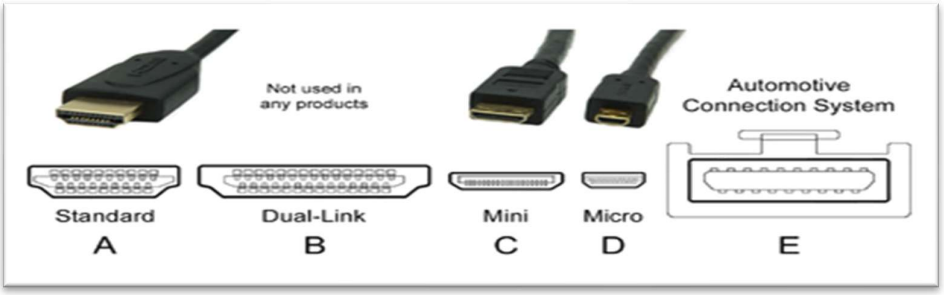
HDMI connectors transmit **high-definition video** and **audio signals between devices** such as **TVs, monitors, and gaming consoles**. They support both **standard and high-definition** formats.



2. Difference between guided and unguided media

Guided and unguided media are two **primary categories** of **transmission media** used in **networking and telecommunications**. Here's a breakdown of their differences:

❖ Guided Media

1. **Definition**:
    - Guided media refers to transmission media where signals are guided along a **physical path**.
2. **Types**:
    - **Twisted Pair Cables**: Pairs of insulated copper wires twisted together. Examples include Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP).
    - **Coaxial Cables**: Consists of a central conductor, insulating layer, metallic shield, and outer insulating layer.
    - **Fiber Optic Cables**: Use light to transmit data through strands of glass or plastic fibers.
3. **Characteristics**:
    - **Physical Confinement**: Signals are confined to the physical pathway.
    - **High Bandwidth**: Can support high data rates, especially fiber optic cables.

- **Less Interference**: Protected from external electromagnetic interference, especially with shielded cables.
- **Distance**: Generally suitable for shorter to medium distances, except for fiber optics which can handle long distances effectively.

4. **Use Cases**:
   - Local Area Networks (LANs)
   - Telephony
   - Cable TV
   - Internet Backbone (Fiber Optics)

❖ Unguided Media

1. **Definition**:
   - Unguided media refers to transmission media where signals are transmitted without a physical path, typically through the air or vacuum.
2. **Types**:
   - **Radio Waves**: Used for radio broadcasting, TV, and wireless networking.
   - **Microwaves**: Used for satellite communications and long-distance wireless transmission.
   - **Infrared**: Used for short-range communication like remote controls and some wireless devices.
3. **Characteristics**:
   - **No Physical Confinement**: Signals are not confined to a physical path and can travel freely through space.
   - **Variable Bandwidth**: Bandwidth can vary based on frequency and technology used.
   - **More Interference**: Susceptible to external interference from other signals and environmental factors.
   - **Distance**: Suitable for various distances, from short-range (infrared) to long-range (microwave and satellite).

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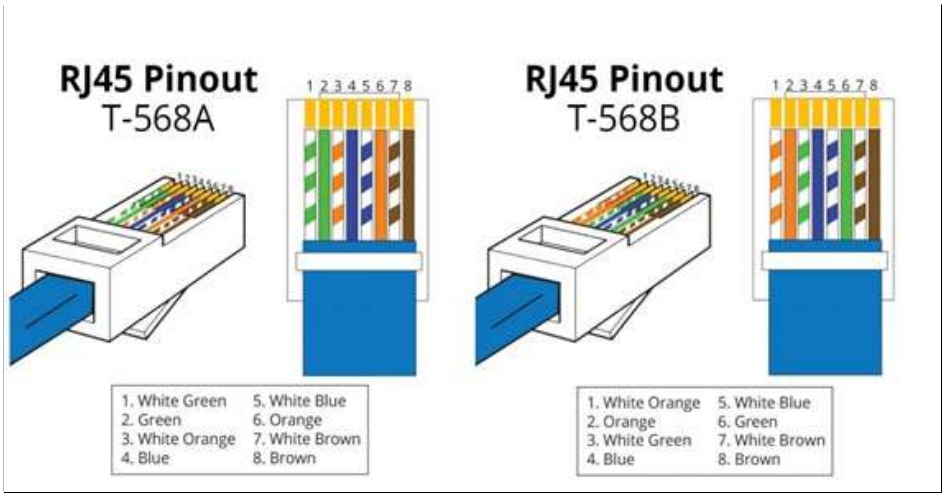
4. **Use Cases**:
    - Wireless Local Area Networks (WLANs)
    - Satellite Communications
    - Bluetooth and Infrared Devices
    - Mobile Telephony

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)

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