Batch: SY-IT(B3) **Experiment Number:2**

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Aim of the Experiment: Fabrication of LAN cables in Computer Networks

Program/ Steps:

1. Gather the necessary tools and materials – LAN cable , RJ45 connectors, crimping tool, wire stripper, and cable tester.

2. Strip some part of the outer insulation of the LAN cable using the wire stripper.

3. Untwist and arrange the individual wires following the T568B color code sequence:

White orange

Orange

White green

Blue

White blue

Green

White brown

Brown

4. Flatten and align the wires in the correct order, ensuring they are even at the tips.

5. Cut the wires to a uniform length.

6. Insert the wires into the RJ45 connector, ensuring each wire goes into the correct slot and reaches the end of the connector.

7. Use the crimping tool to crimp the RJ45 connector onto the cable.

8. Test the cable using a cable tester to ensure all connections are working correctly.

Output/Result:

After following the steps and fabricating the LAN cable, the final result was a properly assembled LAN cable with the correct wiring configuration. Upon testing with a cable tester the cable was confirmed to be fully functional with all connections in the correct order, ensuring reliable data transmission in the network.

Post Lab Question-Answers:

1. The slowest transmission speeds are those of
    a. Twisted-pair wire
    b. Coaxial cable
    c. Fibre-optic cable
    d. Microwaves

Answer : Twisted-pair Cable.

2. Compare coaxial cable and optical fibre cable.

Coaxial Cable:

- It has a copper core surrounded by insulation and shielding, making it suitable for transmitting electrical signals.
- Coaxial cables are commonly used for cable TV and internet connections.
- They offer decent speed and reliability but are slower than optical fibre.
- Coaxial cables are more expensive than twisted-pair wires but less expensive than fiber-optic cables.

Optical Fibre Cable:

- It uses thin strands of glass or plastic to transmit data as light signals, which allows for much faster data transmission over longer distances compared to coaxial cables.
- Optical fibres are ideal for high-speed internet and large data transfers with less signal loss.
- Fiber-optic cables are the most expensive to install but offer the best performance.

Outcomes:

CO1: Understand the data communication systems, network topologies and

network devices.

Conclusion (based on the Results and outcomes achieved):

From this experiment, I learned how to practically fabricate LAN cables, which are essential for setting up computer networks. I gained hands-on experience with cutting, stripping and stripping the cables and I now understand the correct arrangement of wires. This exercise helped me grasp the importance of precision and the proper tools needed to ensure a reliable network connection.

References:

Books/ Journals/ Websites:

- Behrouz A Forouzan, Data Communication and Networking, Tata Mc Graw hill, India, 4th Edition
- A. S. Tanenbaum," Computer Networks", 4th edition, Prentice Hall

Experiment No. 2

Title: Fabrication of LAN cables in Computer Networks

Batch: **Roll No.:** **Experiment No. 2**

Aim : Fabrication of LAN cables in Computer Networks

Resources needed: Ethernet Cable – Category 5e or CAT5e or CAT6, RJ 45 Connectors, Crimping tool, PCs with internet connection

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Theory:

Transmission media:

Transmission media lies below the physical layer. A guided media provides a physical conduit from one device to another. Twisted- pair cable, coaxial cable and fiber optic cable are the most popular types of guided media.

Twisted pair cable:

Twisted –pair cable consists of two insulated copper wires twisted together. Twisted –pair cable is used for voice and data communication. The most common Twisted –pair cable is Unshielded Twisted Pair. The EIA has developed standards to classify them into seven categories. Categories are determined by cable quality, with 1 as the lowest and 7 as the highest. The most common UTP connector is RJ45.The Shielded Twisted-Pair has a metal foil or braided mesh covering that encases each pair of insulated conductors. This improves the quality but makes it bulkier and more expensive.

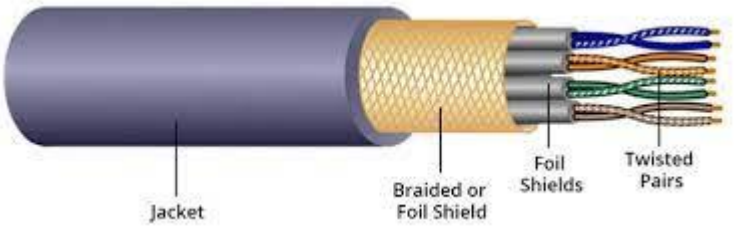


Figure 1: Twisted pair cable

Coaxial cable:

Coaxial cable consists of a central conductor and a shield, It can carry signals of higher frequency ranges than the twisted- pair cables. Coaxial cable is used in cable TV networks and traditional Ethernet LANs.

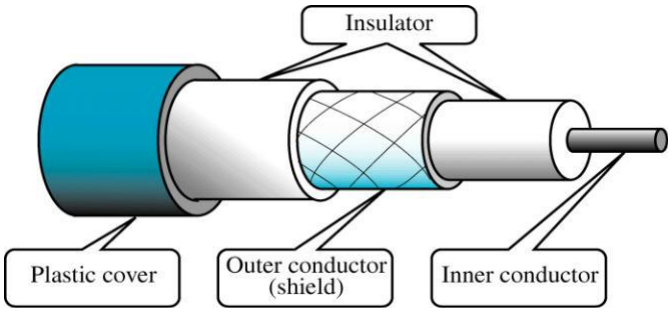


Figure 2: Coaxial cable

Fibre- optic cable:

Fibre- optic cables are composed of a glass or plastic inner core surrounded by cladding, all encased in an outer jacket. It carries data signal in the form of light. The signal is propagated along the inner core by reflection. It is used in backbone networks, cable networks and Fast Ethernet networks.

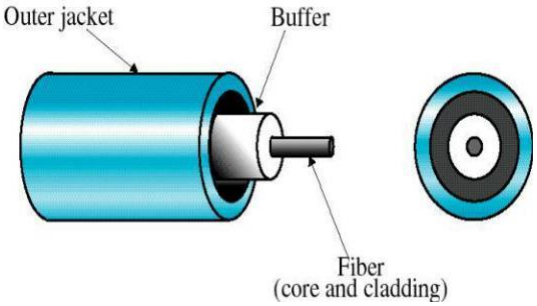


Figure 3: Optical fibre cable

Unguided Media:

Unguided Media(free space) transport electromagnetic waves without the use of physical conductor. Wireless waves can be radio waves, microwaves or infrared waves:

Ethernet cable:

There is two kinds of Ethernet cable is used for communication.

1. Straight Through
2. Cross over cable

1. Straight Through cable:

STRAIGHT THROUGH Ethernet cables are the standard cable used for almost all purposes and are often called “patch cables”. It is highly recommended you duplicate the color order as shown on the left. Note how the green pair is not side-by-side as are all the other pairs. This configuration allows for longer wire runs.

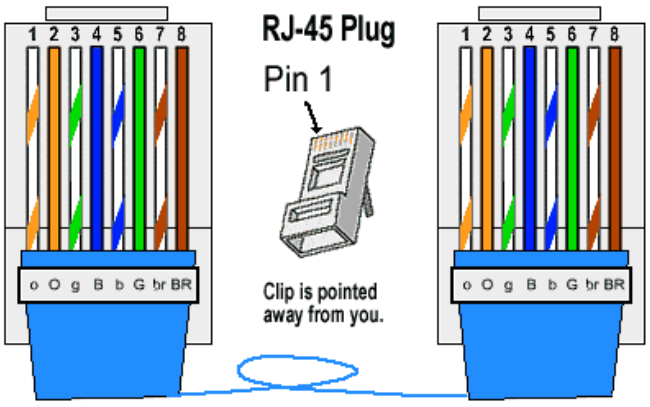


Figure 4: RJ45 Plug-Straight through

Important Instruction: Always remember that both end connector clip facing away from you when check the color.

2. Crossover cable-

The purpose of a Crossover Ethernet cable is to directly connect one computer to another computer (or device) without going through a router, switch or hub.

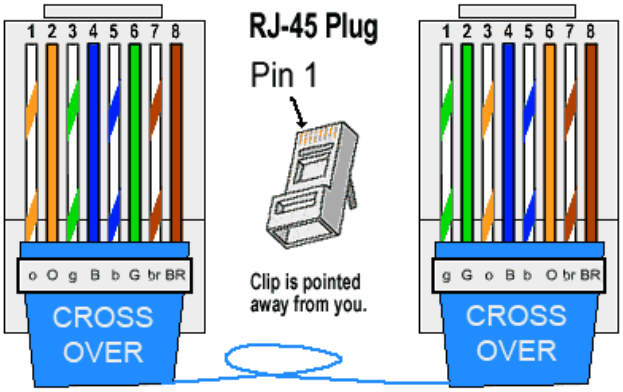


Figure 5: RJ45 Plug- Cross over

Activity:

Use the following tools for making Ethernet cable.

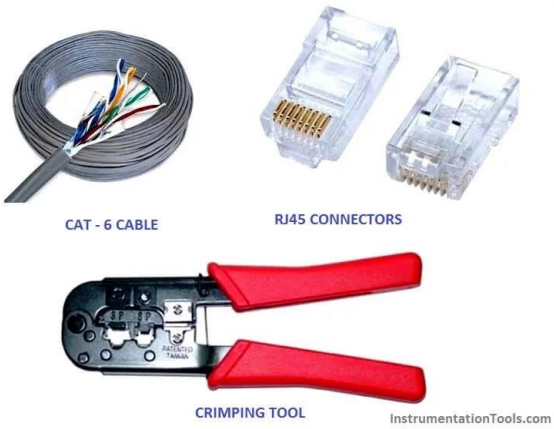


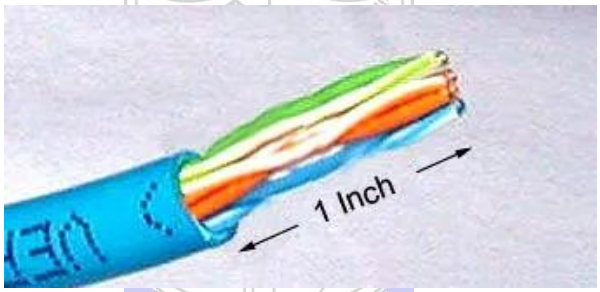
Figure 6: Tools to be used

The two standards for wiring Ethernet cables are T568A and T568B. T568B is the most common and is what we'll be using for our straight Ethernet cable. The table 1 below shows the proper orientation of the colored wires to the pins.

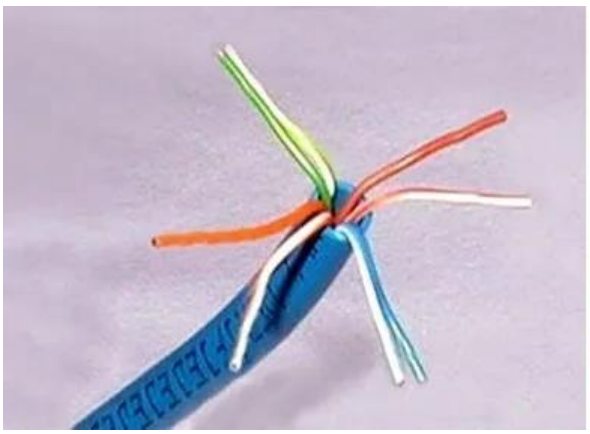
Table 1: Color coding for T568B Standard

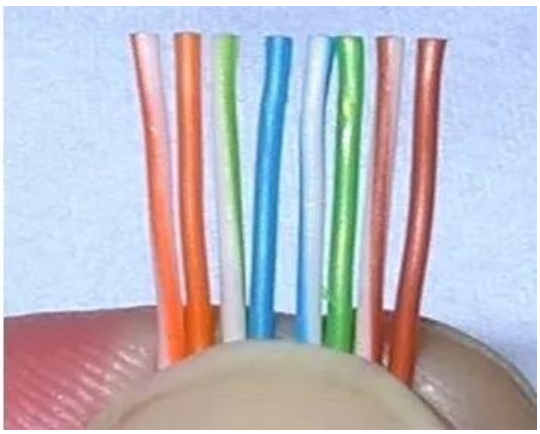
T568B Standard	
Pin 1	White/Orange
Pin 2	Orange
Pin 3	White/Green
Pin 4	Blue
Pin 5	White/Blue
Pin 6	Green
Pin 7	White/Brown
Pin 8	Brown

Step 1: Cut into the plastic sheath about 1 inch (2.5 cm) from the end of the cut cable. Do not cut deep which may cause damage the insulation of core.

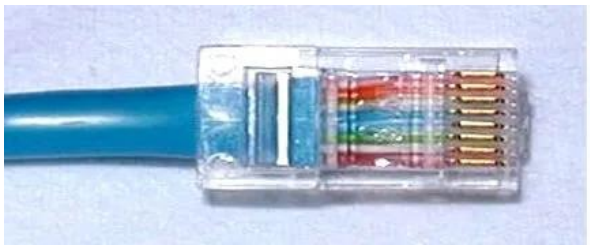
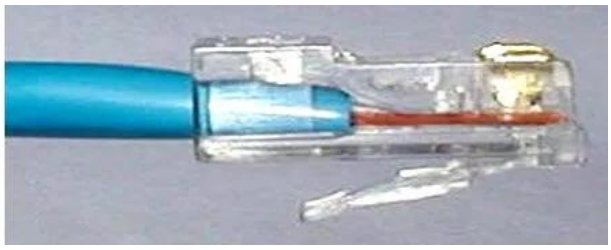


Step 2: Unwind and pair the similar colors. Pinch the wires between your fingers and straighten them out in a sequence of color as u want to make cable (Straight cable or cross over cable). The color order is important to get correct

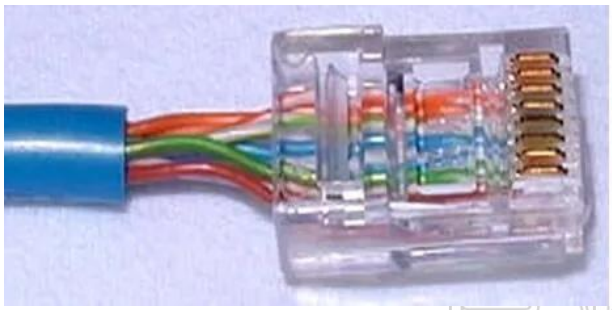




Step 3: A straight cut across the 8 wires to shorten them to 1/2 Inch (1.3 cm) from the cut sleeve to the end of the wires by crimping tool. Carefully push all 8 unstrapped colored wires into the connector. Plastic sleeve should be inserted proper in connector.

Wrong way: The plastic sleeve is not inside the connector where it can be locked into place. The wires are too long. The wires should extend only 1/2 inch from the blue cut sleeve. The wires do not go all the way to the end of the connector. The wires are too short




Step 4: Crimping the cable- Carefully place the connector into the Ethernet Crimper and cinch down on the handles tightly. The copper splicing tabs on the connector will pierce into each of the eight wires. There is also a locking tab that holds the plastic sleeve in place for a tight compression fit. When you remove the cable from the crimper, that end is ready to use.

For a standard ‘straight through’ cable, repeat all steps and wire colour order on the other end of the cable. For a crossover cable, the other end will have a different colour order as shown by the crossover picture above.

Step 5: Test the cable- Check the continuity of connectors using ping from a computer.

Questions:

1. The slowest transmission speeds are those of
    a. Twisted-pair wire
    b. Coaxial cable
    c. Fibre-optic cable
    d. Microwaves

2. Compare coaxial cable and optical fibre cable.

Outcomes:

Conclusion:

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of faculty in-charge with date

References:

Books/ Journals/ Websites:

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- A. S. Tanenbaum," Computer Networks", 4th edition, Prentice Hall