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# INTRODUCTION OF THE COURSE LAB

## WHAT TO DO TO BE SUCCESSFUL IN THIS LAB:

**Safety comes first in any laboratory.**
If in doubt about any procedure, or if it seems unsafe to you, STOP. Ask your lab instructor for help.

**A. What to bring to each laboratory session:**

**FOR EXAMPLE:**

1. Bring a "scientific" calculator.
2. Bring this lab manual.

**B. Prepare for each laboratory session:**

Each laboratory consists of a series of related problems that can be solved using the same basic concepts and principles. Sometimes all lab groups will work on the same problem, other times groups will work on different problems and share results.

1. Before beginning a new lab, carefully read the Introduction, Objectives and Preparation sections.
2. Each lab contains several different experimental problems. Before you come to a lab, complete the assigned *Prediction* and *Warm-up*. The Warm-up helps you build a prediction for the given problem, so it is usually helpful to complete the Warm-up before making the prediction.

**C. Attendance**

Attendance is required at all labs **without exception**. If something disastrous keeps you from your scheduled lab, contact your lab instructor **immediately**. The instructor will arrange for you to attend another lab section that same week. **There are no make-up labs in this course.**

# LAB 1:

## Basic cable construction and testing (straight, cross-over, roll-over)

## Introduction:

Cable is medium through which information usually moves from one network to device to another network device. There are several types of cable which are commonly used with LANs. The type of cable chosen for a network is related to the network's topology, protocol, and size. Some common cable used in network are following.

1. Unshielded Twisted Pair (UTP) Cable
2. Shielded Twisted Pair (STP) Cable (has a protective "foil" that surrounds the cable to prevent strong sources of Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI))
3. Coaxial Cable (use in TV cable)
4. Fiber Optic Cable

Twisted pair cabling comes in two varieties: shielded and unshielded. Unshielded twisted pair (UTP) is the most popular and is generally the best option for school networks (See fig. 1).

The cable has four pairs of wires inside the jacket. Each pair is twisted with a different number of twists per inch to help eliminate interference from adjacent pairs and other electrical devices

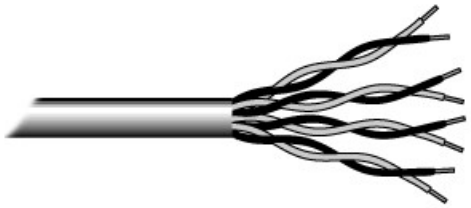


**Figure 1 Unshielded Twisted Pair (UTP) Cable**

**Unshielded Twisted Pair Connector RJ-45**

The standard connector for unshielded twisted pair cabling is an RJ-45 (Registered Jack) connector. This is a plastic connector that looks like a large telephone-style connector (See fig. 2). A slot allows the RJ-45 to be inserted only one way.

**Figure 2 RJ-45 Connector**

## Categories of Ethernet cable:-

Commonly use Ethernet cable is cat5 other are given in table bellow

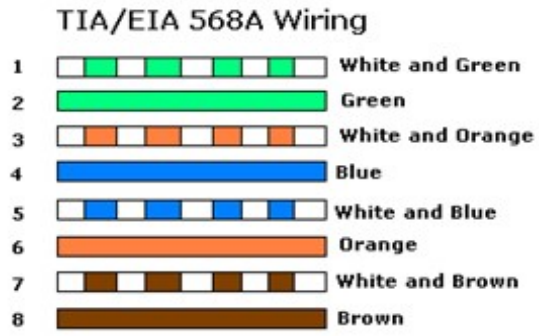
| Categories of Ethernet Cables | Signal Carrying Capacity | Typical Uses |
|---|---|---|
| Cat 5 | Ethernet and Fast Ethernet | Home, Home Office, Small Office |
| Cat 5e (enhanced) | Ethernet, Fast Ethernet, and Gigabit Ethernet (short distance) | Home, Small Office, Gaming Consoles, Computer Networks, |
| Cat 6 | Ethernet, Fast Ethernet, and 1 Gigabit Ethernet (consistent) | Large Networks, Data Centers, Offices, Cat 6 Certified Networks |
| Cat 6a (Augmented) | Ethernet, Fast Ethernet, and 10 Gigabit Ethernet | Large Data Centers, Large Offices, Server Farms, Future Proofing New Equipment |

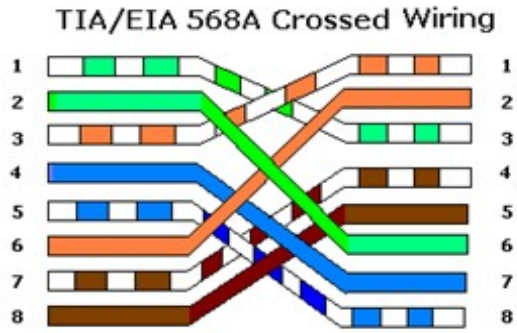
## Type of Connectivity:-

There are three type of connectivity

1) Straight through (To connect different type of devices e.g. Router to switch)
2) Cross over (To connect Some type of devices e.g. Switch to switch)
3) Roll over (To configure router or switch)

Figure 3 show two standard used to make straight and cross cable





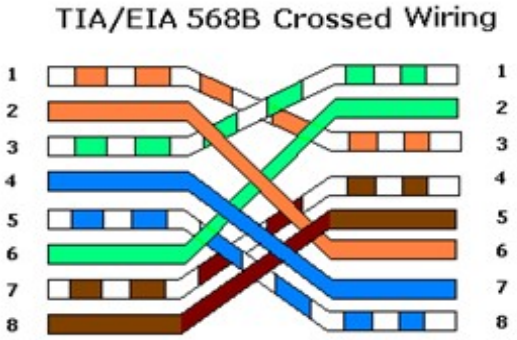



**Figure A**

***Shows the Pin Out of Straight through Cables***

**Figure B**

***Shows the Pin Out of Crossover Cables***

## Objectives:

To familiarize the students with the type and construction of different cables used in data networks.

## Preparation:

Basically two different color schemes standards are used in the cable construction.

1) EIA/TIA 568 A (Electronic Industry Association/Telecommunication Industry Association)

2) EIA/TIA 568 B

## Equipment:

1. Cat-5 Cable
2. Crimping Tool
3. Clipper
4. RJ45 Connectors
5. Cable Tester

## Task:

1. Construct EIA/TIA 568A straight through and cross over cable
2. Test them with Cable Tester