ASSIGNMENT - 1

★ AIM: To setup a wired LAN using layer 2 switch and IP switch of minimum 4 computers

★ PREREQUISITES:
Knowledge of components like Ethernet card, Cable type, ~~(for)~~ connections, topologies

★ THEORY:

→ Types of LAN:

A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building and has its network equipment and interconnects locally managed. By contrast, a wide area network (WAN), not only covers a large geographic distance, but also, generally involves leased telecommunication circuits or internet links.
Ethernet and Wi-Fi are the two most common types of LAN.

• Ethernet LAN:
Ethernet is the most popular LAN technology for physical layer. It defines number of conductors required for connection. Standard transmission data rate - 10 Mbps.
LAN types: Token ring, Fast ethernet, Gigabit ethernet, Fiber Distributed Data Interface (FDDI).
The IEEE Ethernet standard is 802.3. This standard defines rules for configuring Ethernet Network

- **Fast Ethernet**
  Fast ethernet standard (IEEE 802.3u) has been established for ethernet networks that need higher transmission speed.
  Raises speed from 10Mbps to 100Mbps.
  Types -
  - → 100 BASE-TX : level 5 UTP cable
  - → 100 BASE-FX : fiber optic cable
  - → 100BASE-T4 : level 3 UTP cable

- **Gigabit Ethernet**
  Developed to meet need for faster communication networks with applications such as multimedia and Voice over IP (VoIP)
  It's called 1000 Base-T because its faster than 100 Base-T.

- **10 Gigabit Ethernet**
  This is ~~[faster]~~ fastest and most recent of the Ethernet standards. It is 10 times faster than Gigabit Ethernet.
  It is based entirely on the use of optical fiber cables

→ **Steps for setting up LAN**

Step 1 Installation of Ethernet card in machine

Step 2 Crimping of Ethernet cable

Step 3 Make Straight cable in order to form Star Topology network to connect 2 different types of components.
Eg.: PC to switch or PC to router

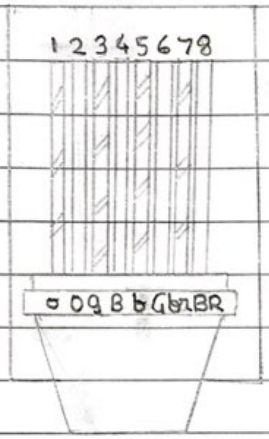
Step 4: Make Cross cable in order to form Star topology network to connect 2 similar types of components.
Eg.: PC to PC or Router to Router

CNL-1.3

→ There are 2 kinds of Ethernet cables :

• Straight through

Ethernet cables are the standard cables used for almost all purposes and are often called "patch cables".
This configuration allows for longer wire runs.



Straight-Through Configuration

Cross-Over Configuration

• Cross Over

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

Step5 Connect the cable to switch and from switch to machine
Thus it forms STAR Topology

Step6 Assign IP address to machines 1, 2, 3 and 4 and ping from one machine to another.

→ Internet Protocol Switching (IP switching)

This is a routing technique which routes data packets faster than traditional routing using layer 3 switches.
These employ Application Specific Integrated Circuits (ASIC) hardware and transfer via ATM switches

→ Types of Cable Testers

Cable test instruments are designed with a variety of focused features for particular field tasks.
Classification:
→ Certification
→ Qualification
→ Verification

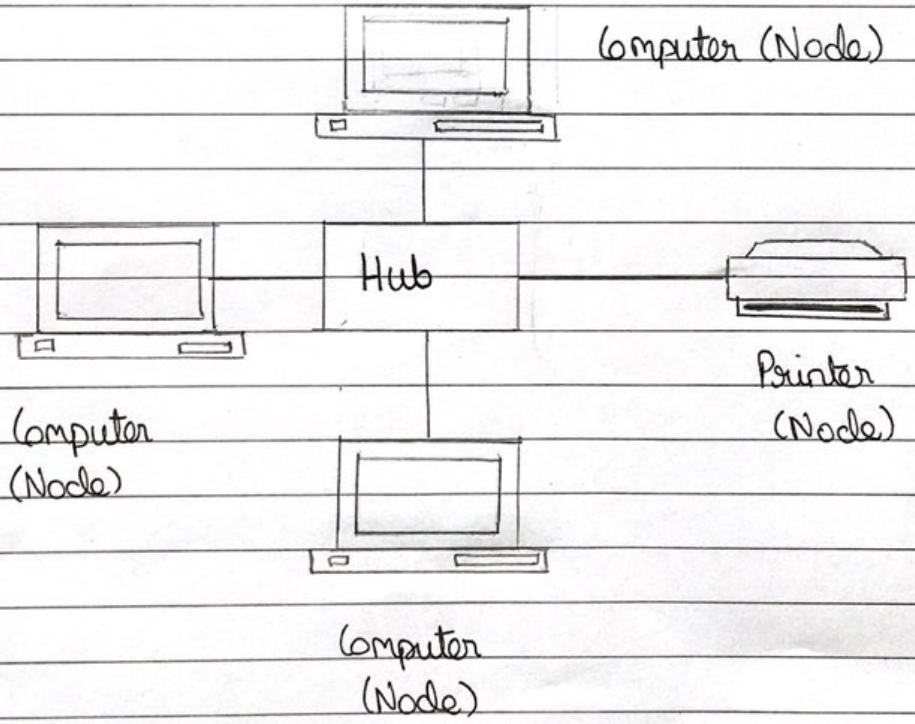
→ Wireshark - Packet Analyser Tool (Formerly known as Ethereal)

Wireshark captures packets in real time and display them in human readable format.
This includes filters, colour coding etc. to help inspect network traffic and individual packets
You can see packets sent to or from your system in real time

- Colour Coding in Wireshark
  Uses colours to identify traffic.
  Eg.:
  → Green - TCP traffic
  → Dark blue - DNS traffic
  → Light blue - UDP traffic
  → Black - TCP packets with problems

- Filtering packets using Wireshark
  Wireshark helps to close down all applications using network to [~~narrow~~] narrow down traffic.
  This can be done by typing filter into filter box in the application

→ Star Topology Diagram



CONCLUSION

In this assignment we hence learn about various topologies, and how to implement them. We learnt about several testing tools and Wireshark packet analyser.
We hence created a wired LAN using layer 2 ~~[with]~~ switch and IP switching