INTRODUCTION TO COMPUTER NETWORKS

NETWORK?

Computer Network

- First computer networks appeared in 1950s and 60s.

- Generally used within an organization (company or research lab)

- Facilitate exchange of information between people and computer.

- Share physical resources like printer.

- Early networks have common large shared storage devices.

In short Comp. Network is!

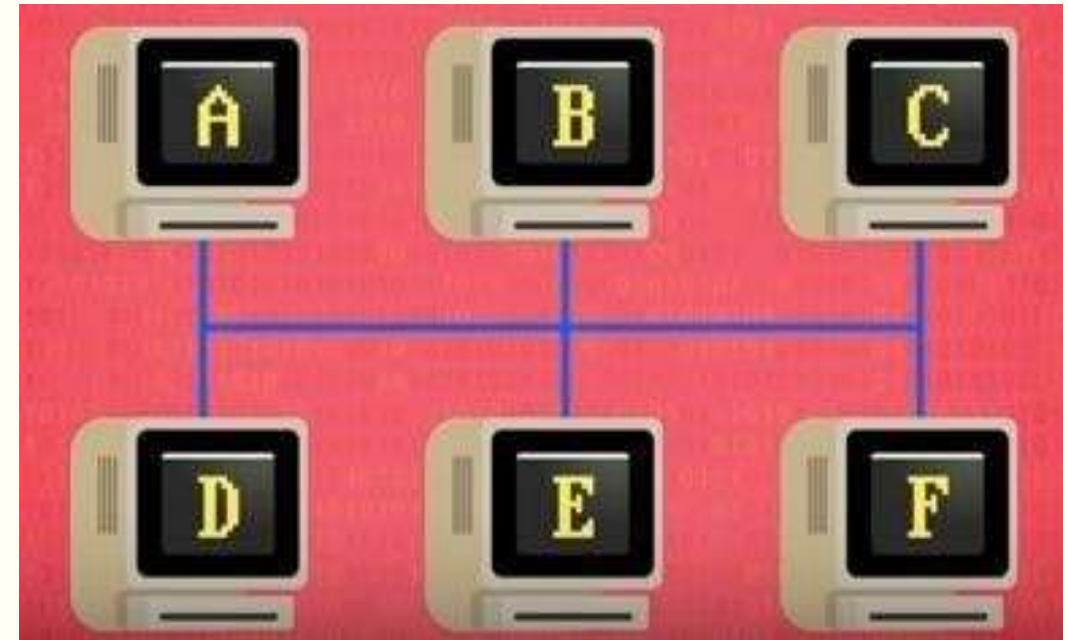"A **computer network** is a set of connected computers."

- **Computers on a network** are called **nodes**.
- The **connection between computers** can be done via **cabling**, most commonly the Ethernet cable, or wirelessly through **radio waves**.

Components of Comp. Network

- Servers
- Clients
- Transmission Media
- Shared printers and other peripherals
- Network Interface Card
- Hub
- Switch
- Router
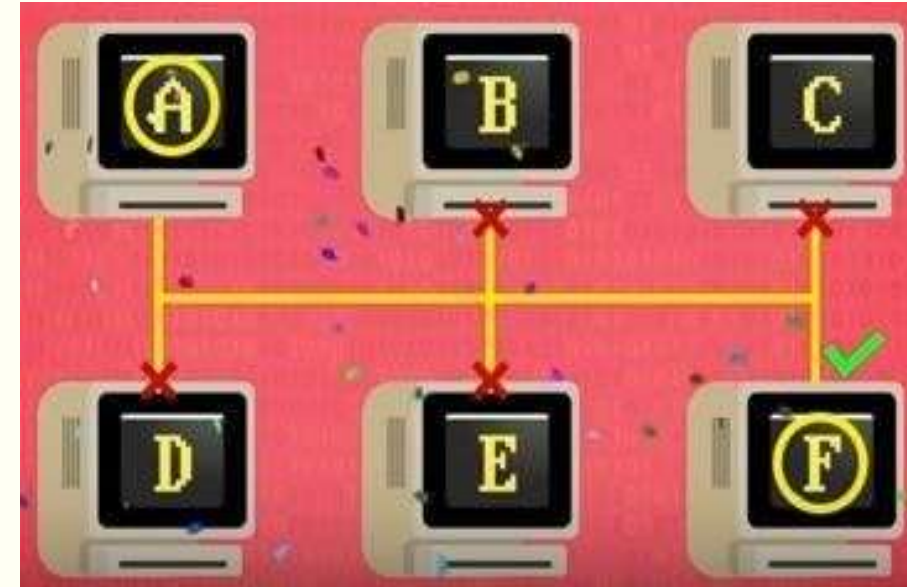- LAN Cable (Ethernet/ data cable)

Local Area Network (LAN)

- Relatively small networks of close by computers are called Local area networks.

- Ethernet
  - Famous LAN technology.
  - Developed in 1970 at Xerox park

- A series of computers connected to a single Ethernet cable.

- When the computer wants to transmit data to another electrical signal onto the cable.

Media Access Control

- As the cable is shared so every computer plugged into the network, sees the transmission but does not know if the data is intended for them or not.

- To solve this problem Ethernet requires that each computer has its own(unique) media access control address called MAC address.

Carrier Sense Multiple Access

THE GENERAL TERM FOR THIS APPROACH IS CARRIER SENSE MULTIPLE ACCESS, OR CSMA FOR SHORT. THE 'CARRIER', IN THIS CASE, IS ANY SHARED TRANSMISSION MEDIUM THAT CARRIES DATA – COPPER WIRE IN THE CASE OF ETHERNET, AND THE AIR CARRYING RADIO WAVES FOR WIFI.

Bandwidth

- Rate at which the carrier can transmit data is called its "Bandwidth".
- An internet connection with a larger bandwidth can move a set amount of data (say, a video file) much faster than an internet connection with a lower bandwidth.

- Collision

- As the network computer increases, the probability that the two computers will attempt to write data at the same time also increases.
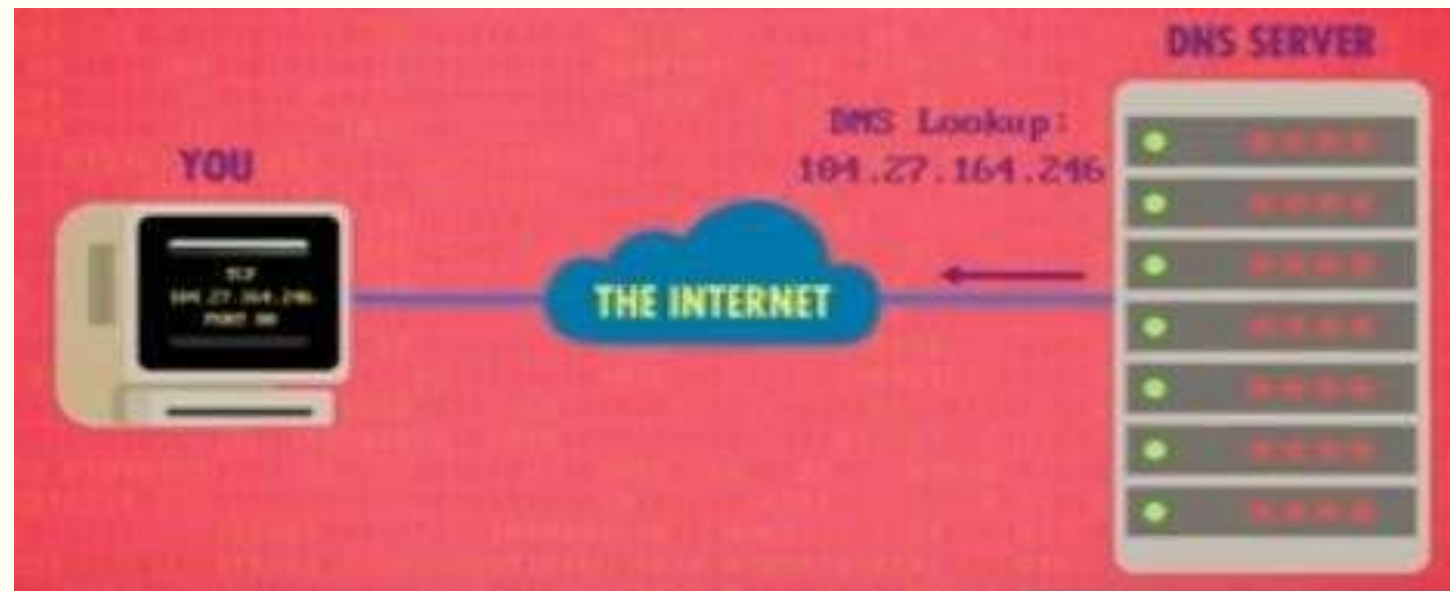
How to fix collision?

- When transmitting computers detect a collision they wait for a brief period before attempting to retransmit e.g. 1 sec.

- This does not work if all the computers use the same wait duration, they will collide again.

- So random period is added in the fix period.
  - 1.5 sec for one comp
  - 1.3 sec for 2nd comp

- Does not completely solve the problem.

- Extra trick (Exponential Backoff)
  - Increase waiting time after every collision.

Internet

- Biggest computer network.

- Computer is connected to a large distributed network called the internet.

- Multiple paths to get data from one location to another.

- For your computer the first connection is to your local area network.

- This then connect to a **wide area network** which is likely to be a router   run by your internet service provider.

Domain Name System

- Its the phonebook of the Internet. Humans access information online through domain names, like fb.com or Insurance.com.
- **DNS translates domain names to IP addresses so browsers can load Internet resources.**

World Wide Web

- An application that is running on million of servers accessed by web browser.

- Fundamental building block of www is a web page.

- Web pages are connected through hyper links.

- In order to link to one another, Each web page has a unique address called URL.