**NORTH-EX PUBLIC SCHOOL**
**(Senior secondary, affiliated to CBSE)**
**School block, Jain Nagar, Sector-38, Rohini, Delhi-81**
**LESSON PLAN FOR CLASS XII (COMPUTER SCIENCE)**

*Note- Before reading about the topic you must check this link which will help you in understanding the topics.*

You can download this or if you do not have facility to get printout then you can ask your ward to copy it in a simple notebook and must do exercise in the notebook.

## TOPIC: - Computer Networks

1.  **Network:**

Network provides salient features which have made our life easy and comfortable, be it sending an email, withdrawing money from atm machine, online railway or airline reservation, or sharing audio and video files. Apart from these, the most extensively used feature is the Print command sent from a computer to get a printout from a printer attached to some other computer. All this involves a network.

**It is a network that connects various computers to each other and handles a large volume of data.**

2.  **Computer Network:**

A **Computer Network** is a collection on interconnected computers and other devices to share data and other resources (hardware and software resources). Two computers or devices are said to be **interconnected** if they are capable of sharing and exchanging information with each other by following a protocol (set of rules).
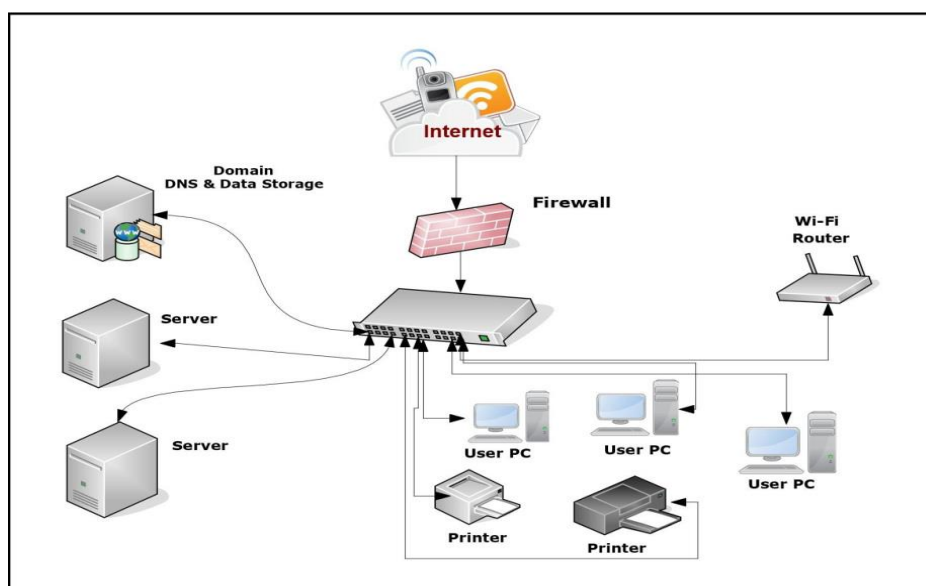


*Fig. 1: The Network Diagram*

**2.1 Advantages of Computer Networks:**

A network uses a distributed processing system in which a task is divided among several devices which are interconnected to each other. Therefore, instead of a single computer being responsible for completing the entire task, all the interconnected computers are responsible for completing the task assigned to them. This leads to better performance with high processing speed.

Network have several advantages which are described below:

2.1.1 **Resource Sharing:** The primary use of a network is to share among users' programs/applications, data and peripheral devices connected to the network. We must have noticed in our networked computer labs that when a print command is given on one computer, the document printed by the printer is attached to some other system. This allows printing of documents by several users and, hence, the printer is shared by multiple users on the network. Other resources like hard disk, DVD drive, scanner, etc., can also be shared on a computer network. For example, sharing database, audio and video files, antivirus software, application software, printers and scanners, etc.

2.1.2 **Reduced communication cost:** Sharing resources also reduces communication cost. Using public network, we can send a large quantity of data at a low cost. Internet and Mobile networks are playing a very important role in sending and receiving text, image, audio and video data at a low cost.

2.1.3 **Reliability of Data:** Reliability means backing up of data, i.e., data can be copied and stored on multiple computers. In a network system, all computers are connected to each other. Thus, the information or message which is shared by each device is stored on their respective workstation(computer). If due to some reason (hardware crash, etc.), the data can be accessed from another workstation for future use. This leads to smooth functioning and further processing without disruption.

2.1.4 **Central storage of Data:** Files can be stored on a central node (the file server) that can be shared and made available to each and every user in an organization. With centralized processing, data is stored and retrieved from a single central location. Thus, there is no duplication of data and almost no data redundancy


**2.2 Elementary Terminology of Networks:**

2.2.1 **Nodes (Workstations):** The term refers to computers that are attached to a network and are seeking to share resources.

2.2.2 **Server:** A computer that facilitates the sharing of data, software and hardware resources on the network.

2.2.3 **Network Interface Unit (NIU) (MAC Address):** A network interface unit is an interpreter that helps in establishing communication between the server and the client.

2.2.4 **IP Address:** Every machine on a TCP bar IP Network has a unique identifying number called an IP Address.

2.2.5 **Domain Name:** It is a way to identify and locate the computers connected to the internet. It must be unique.

## 2.3 Structure of a Network:

A network comprises several components along with their functionalities that contribute to its smooth functioning. To form a network, a lot of hardware devices are required which are described as follows:

➢ **Sender:** A device or a computer that sends the data.
➢ **Receiver:** A device or a computer that receives the data.
➢ **Message:** Message is the information to be communicated. It may be text, image, audio or video.
➢ **Transmission Medium:** A transmission medium is a physical path through which the data flows from sender to receiver. A cable or wire or Radio waves can be the medium.
➢ **Protocol:** A set of rules that governs data transmission. It represents the communication methods which are to be followed by the sending and receiving devices.
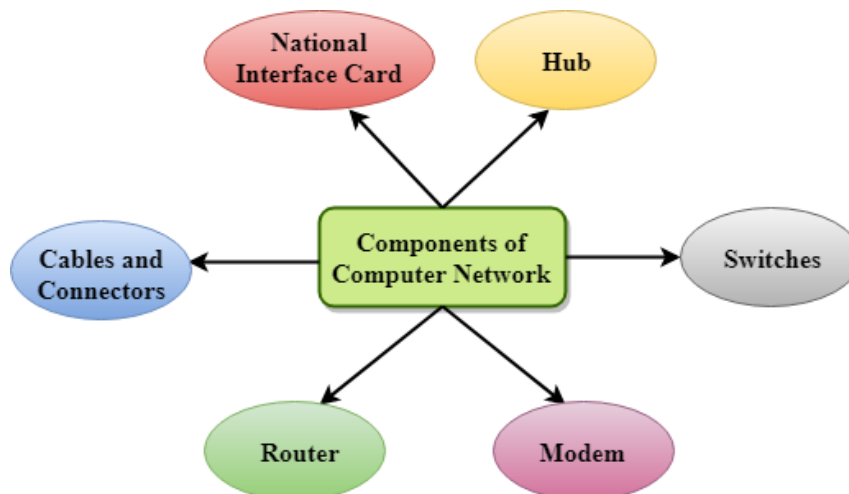


*Fig. 2 Components of a Computer Network*

## 2.4 Types of Networks

A computer network may be small or big depending upon the number of computers and other network devices linked together. Thus, networks vary in size, complexity and geographical spread. A computer network can be on a table, in a room, building, city, country, across continents or around the world.

On the basis of geographical spread, networks may be classified as-
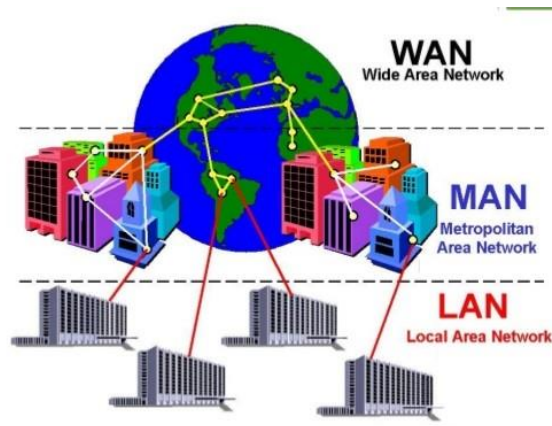
➢ **PAN**
➢ **LAN**
➢ **MAN**
➢ **WAN**

*Fig. 3: Classification of Computer Networks*

### 2.4.1   Personal Area Network (PAN):

**The network that belongs to a single person or user is known as PAN.** PANs are small networks used to establish communication between a computer and other handheld devices in the **proximity of up to 10 metres** using wired USB connectivity or wireless systems like Bluetooth or Infrared. PANs are used to connect computers, laptops, mobiles and other IT-enabled devices to transfer files including emails, digital photos, audio and video etc. The Bluetooth technology implements PAN.



*Fig. 4: A PAN (Personal Area Network)*

### 2.4.2   Local Area Network (LAN):

**LAN** is a privately owned computer network covering a small geographical area (small physical area), like a home, office, or a building such as a school. It can cover an area spread over a few metres to a radius of a few kilometres.

Occasionally, a LAN can span a group of nearby buildings. In addition to operating in a limited space, a LAN is owned, controlled and managed by a single person or organization. A LAN can be set up using wired media (UTP, Coaxial Cables, etc.) or wireless media (Infrared, radiowaves). If a LAN is set up using unguided media, it is known as WLAN

(wireless LAN) The key purpose of a LAN is to share resources. LAN users can share data, programs, printer, disk, modem, etc.

**Data transfer rate speed over a Local Area Network can vary from 10 Mbps to 1 Gbps.**
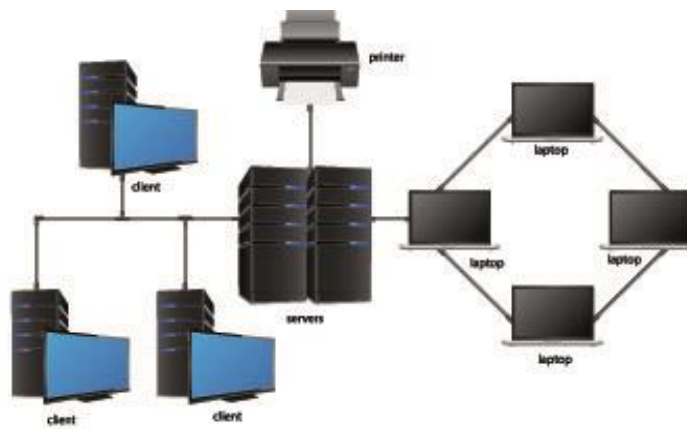


*Fig 5. LAN*

### 2.4.3 Metropolitan Area Network (MAN):

MAN is larger than a LAN and can cover a city and its surrounding areas. A MAN usually interconnects a number of LANs and individual computers. IT also shares the computing resources among users. All types of communication media (guided and unguided) are used to set up a MAN. A good example of MAN is the interconnected offices of a Multinational Corporation (MNC) or cable television networks available in the whole city.
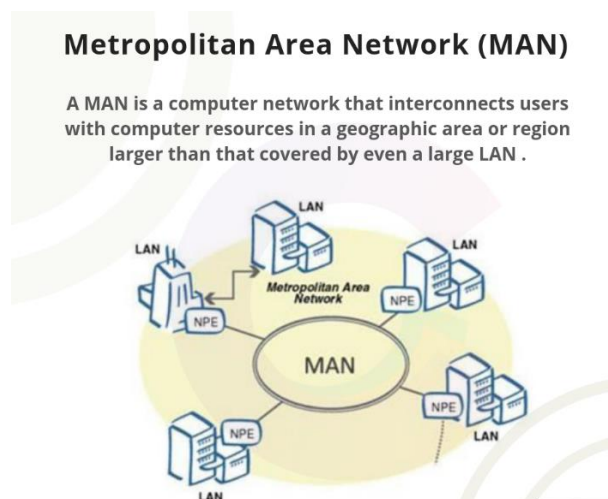


*Fig 6. MAN*

### 2.4.4 Wide Area Network (WAN):

A WAN interconnects all the computer across the world. WAN is a telecommunication network. This type of network spread over a large geographical area across countries and continents. WANs are generally used to interconnect several other types of networks such

as LANs, MANs, etc. They facilitate fast and efficient exchange of information at a high speed and low cost. A WAN uses common carriers like satellite systems, telephone lines, etc.

A network of ATMs, banks, government offices, international organizations' offices, etc., spread over a country, continent, or covering many continents are example of WAN. The best well known example of a WAN is the internet. The **Internet** is the largest WAN spanning the entire planet.
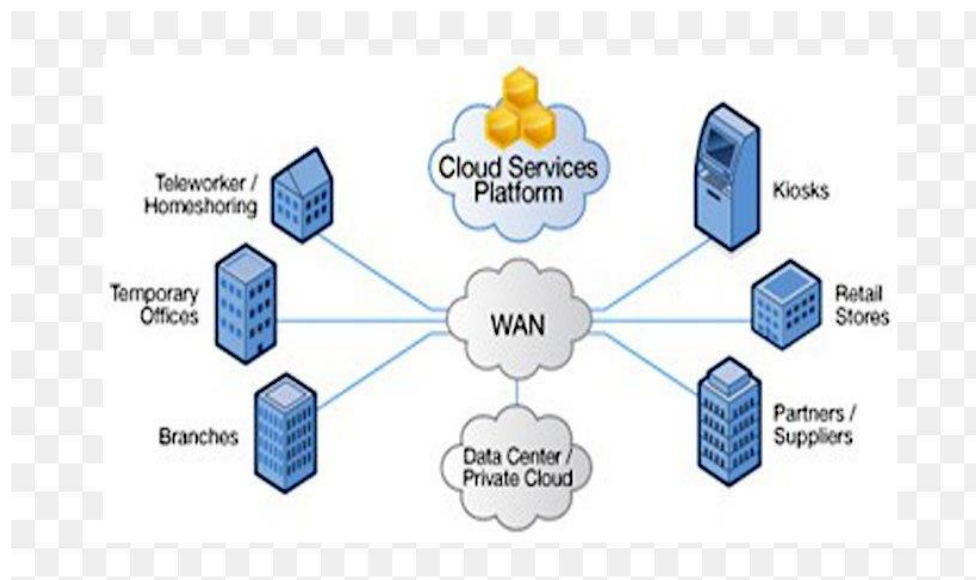


*Fig 7. WAN*

| Parameter | PAN | LAN | MAN | WAN |
|---|---|---|---|---|
| Area Covered | Small Area (Up to 10 M radius | Building or Campus (Up to 10 KM) | City (Up to 100 KM radius) | Entire country, Continent or Globe |
| Networking Cost | Negligible | Inexpensive | Expensive | Very Expensive |
| Transmission Speed | High Speed | High Speed | Moderate Speed | Low Speed |
| Error Rate | Lowest | Lowest | Moderate | Highest |
| Network Device Used | WLAN, USB Dongle | LAN/WLAN, Hub/Switch, Repeater, Modem | Router, Gateway | Router, Gateway |
| Technology/Media Used | Infrared, Bluetooth | Ethernet, Wi-Fi | Optical fibre, Radio-wave, Microwave | Microwave Satellite |

# Worksheet

Attempt all questions & answers in your notebook.

Q1) Bluetooth is an example of _____ network.

Q2) Data communication system spanning states, countries, or the whole world is _____network.

Q3) PAN stands for _____.

Q4) _____ is the largest WAN spanning the entire planet.

Q5) A transmission medium is a physical path through the data flows from _____ to _____.

Q6) What is a network? Why is it needed?

Q7) Write difference between LAN, WAN & MAN.

Q8) What is difference between IP address & MAC address?

Q9) What is protocol?

Q10) Write two examples of wired media & wiles media each.