OPTIMUM
INTERNATIONAL SCHOOL

CLASS –VIII

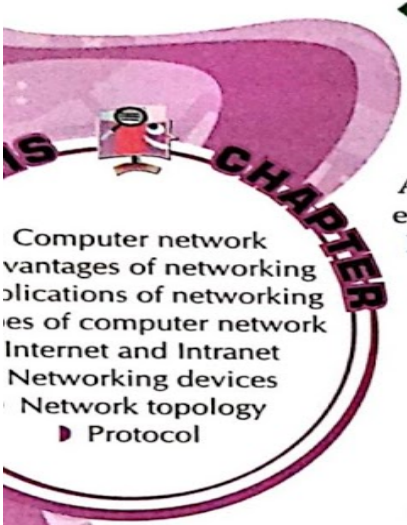
Computer Date:-27/04/2020

➔ Read the chapter Computer Networking (image attached) and do the Q.No. A, B, C and D

Please see next page.

1 Computer Networking

A network is a group of things connected with one another. Railways connected to each other, the cable TV and the telephone networks are examples of networks.



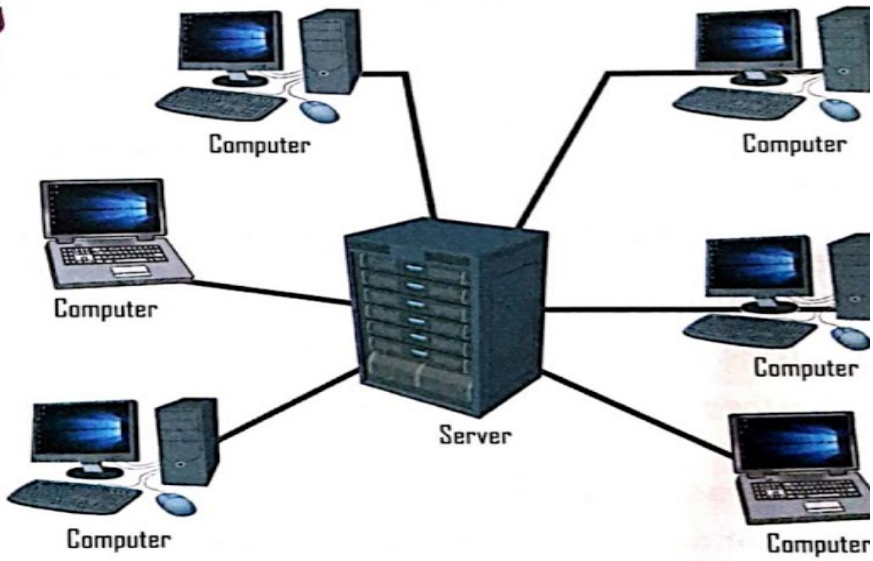
CHAPTER

Computer network
vantages of networking
olications of networking
es of computer network
Internet and Intranet
Networking devices
Network topology
Protocol

◆ COMPUTER NETWORK

A computer network is a collection of computers connected to share resources with each other. The computers are connected using a communication medium such as cable, telephone line or a satellite.

A computer network enables computers to share printers exchange files, etc. The biggest computer network is the Internet.



Know More When we connect our computer to a network, we becom a network user and our computer is called a workstation. The central computer we access is called the server.

◆ ADVANTAGES OF NETWORKING

There are various advantages of networking.

- **Data Sharing:** Multiple users can easily share the information and resources at the same time over the network.
- **Security:** Network allows security by ensuring that only the authorised users may have access to the files and applications.
- **Efficiency:** Any modification, upgradation and deletion of data or software can be done at a single point only using network.
- **Less Hardware Cost:** The hardware devices, like printers, scanners, modems, etc. can be easily shared in a network. This reduces the cost of hardware equipment.

◆ APPLICATIONS OF NETWORKING

Networking has become an important part of business, industries, education and entertainment. Internet is the largest computer network. Some of the applications of this largest network are:

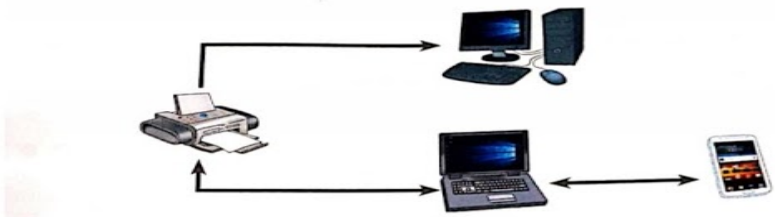
- **Electronic Messaging:** We can send and receive e-mail to any one in any part of the world by using the Internet.
- **Electronic Data Interchange (EDI):** EDI is a method of transferring data over the Internet.
- **Teleconferencing:** Teleconferencing allows the people to exchange and share their ideas with each other without being present there. It is of two types – Videoconferencing and Voiceconferencing.
  - In videoconferencing, users can see as well as talk to one another.
  - In voiceconferencing, users can communicate over the phone.
- **Electronic Fund Transfer (EFT):** EFT allows the users to transfer money without going to a bank. ATM (Automated Teller Machine) is a kind of Electronic Fund Transfer used to withdraw amount.

◆ TYPES OF COMPUTER NETWORK

Based on the geographical area, across which the computer network is spread, it can be classified as follows:

PAN (Personal Area Network)

This type of network is used to provide connectivity to the devices like printer, scanner, cellphone, tablet, etc. belonging to an individual. The coverage area of this network is very small and is in the range of just 5 to 10 metres only.



PAN

LAN (Local Area Network)

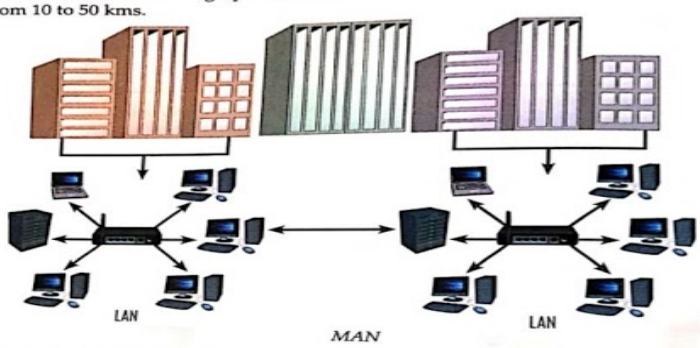
This type of network is spread within a small geographical area like, a room, office, building or a campus.

All the computers in the LAN are connected through cables or wireless links for communication. The number of computers in a LAN can vary from two to several hundred computers. Due to the small geographical area covered by LAN the communication speed is faster. Generally, it spreads in the area of 0 to 10 kms. The cost involved in setting up the LAN is low as compared to the larger network.

LAN

MAN (Metropolitan Area Network)

This is a larger network as compared to LAN. It covers a city. The communication medium used to connect the computers in MAN is similar to that in LAN. As it covers larger geographical area, the cost involved in setting up a MAN is much higher than LAN. The size of a MAN can range from 10 to 50 kms.



MAN

WAN (Wide Area Network)

This type of network covers a very large geographical area, across the country or continent. WAN is generally established by a large organisation, having offices spread across the country or in different countries. WAN is connected through telephone lines, satellites and wireless mediums.

◆ INTERNET AND INTRANET

Internet is accessible to every user all over the world. Every computer in Internet is identified by a unique IP address, a unique set of numbers (such as 110.22.33.114) which identifies a computer's location.

Intranet is a private network that is contained within an organisation. Computers in Intranet are not available to the world outside the Intranet. Usually each organisation has their own Intranet network and employees of that company can access the computers in their Intranet. Each computer in Intranet is also identified by an IP Address which is unique among the computers in that Intranet.

◆ NETWORKING DEVICES

Various devices needed to connect the computers in a network are:

Network Interface Card (NIC)

This is also known as a LAN Card or Ethernet Card and is the most important component of the network. It allows a computer to participate in the network. Information is transmitted or received through NIC connected to the computer.

Hub

Hub is a central hardware device that manages flow of data across the network.

Switch

Just like hub, a switch is also a central hardware device that manages the flow of information among the computers and devices connected to it. A switch is considered advanced than a hub.

Router

This network device is used to route the data across the different parts of the network when the computers are connected in Wide Area Network (WAN).

Connector

A connector is used to join two computers or networks through a wired medium. RJ-45 is an eight wire connector used to connect LANs.

Transmission Media

Transmission media is the communication channel through which the information on the network is transferred.

Coaxial Cable

Coaxial has four layers. A solid copper wire runs in the middle of the cable. Coaxial cable is hardly used these days.

Twisted Pair Cable

Twisted pair cable consists of four pairs of insulated copper wires twisted together. Because of the twist between the two wires it reduces the electromagnetic interference.

Optical Fibre Cable

These cables are made up of plastic or glass fibre. The signals in these cables are carried in the form of light.

Bluetooth

It is a short range wireless communication technology which uses radio waves to exchange data signals between the devices. This is mainly used to connect mobile devices like cell phones, laptops, tablets, etc. to help them exchange their data with each other in a Personal Area Network (PAN).

Bluetooth

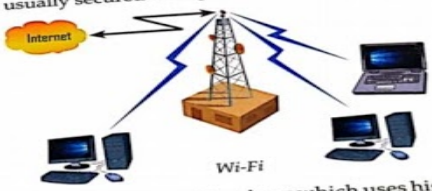
Infrared

This is a short range wireless communication technology in which infrared light is used to send the data from one device to another. We see the use of this technology in the remote control units of TV/DVD and other electronic gadgets. It is also used in automatic door systems and wireless speakers, etc. A major disadvantage of this technology is that infrared signals cannot pass through the obstacles. The devices aligned with each other can only communicate using this technology.

Infrared

Wi-Fi

Wi-Fi is a way of connecting to a computer network using radio waves instead of wires. Wi-Fi is a form of low-power wireless communication used by many electronic devices such as laptops, smart phones, etc. In a Wi-Fi setup, a wireless router serves as the communication hub. Wi-Fi networks are usually secured with passwords for security purposes.



Wi-Fi

A long distance wireless communication technology which uses high frequency microwaves to establish network connection, in order to provide broadband access is called WiMax.

Quick Quiz

Tick (✓) the correct option.

1. What is the full form of NIC?
   a. Network Interface Card ☐ b. Network Internet Connection ☐
2. What are the wires that connect computers and resources on the network called?
   a. connectors ☐ b. cables ☐
3. Which transmission media uses radio waves to exchange data?
   a. Bluetooth ☐ b. Infrared ☐

Star Topology

In a star topology, all the nodes are connected to a central system called switch, which forwards data towards its destination.

Star Topology

Advantages of Star Topology

- It is cost effective.
- If any of the local computer fails, the network is unaffected.

Disadvantage of Star Topology

- The system crucially depends on the central switch. It it fails, the entire network goes down.

Ring Topology

In a ring topology, all the nodes are connected in a closed loop. Each device is connected to the other two on either side. Data travels only in one direction in a ring. Each computer passes the data to the next one.

Ring Topology

Advantage of Ring Topology

- It is more reliable.

Disadvantages of Ring topology

- The ring network requires more complicated control software.
- Failure of one node results in the failure of the entire network.

Bus Topology

In a bus topology, all the nodes are connected to a central cable called bus. Transmission from any node travels the length of the bus in both directions and can be received by all other nodes. The bus has terminators at either ends which prevent bouncing of signals.

Bus Topology

Advantages of Bus Topology

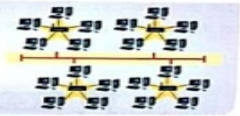
- It easy to set up.
- Failure of one node does not affect the network.

Disadvantage of Bus Topology

- A signal on the bus must be strong enough to reach the receiver.

Know More

A combination of star and bus topology is called a tree topology.



Note for Teacher: Take the children to the lab and show them some network hardware components like, NIC, cables, switch or hub, etc. used to connect the computers in a network. Explain them the topology used in the lab and how the other computers or connected devices are accessed on the LAN.

◆ PROTOCOL

Protocol defines rules for communication between network devices. TCP/IP is a protocol used as a standard for transmitting data over the Internet. TCP stands for Transmission Control Protocol and IP stands for Internet Protocol. These two protocols send data from one computer to another on the Internet. When we send or receive data, the message gets divided in the form of packets. These packets contain both the sender's address and the receiver's address. The TCP/IP picks and delivers these packets.

HTTP (Hypertext Transfer Protocol) is a another protocol defines set of rules for transferring files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web.

Vocabulary

Resources: computer programs, documents and hardware devices
Route: select best path in a network
Node: each element of a network

Recap

- A computer network is a collection of computers connected to share resources with each other.
- Networking has become an important part of business, industries, education and entertainment. Internet is the largest computer network.
- Based on the geographical area, across which the computer network is spread, it can be classified as: PAN, LAN, MAN and WAN.
- Intranet is a private network that is contained within an organisation.
- The way of connecting different computers in a network is known as topology.
- There are three basic topologies: star topology, ring topology and bus topology.
- Protocol defines rules for communication between network devices.

SCRATCH YOUR BRAIN

A. Tick (✓) the correct answer and fill in the blank.

1. _____ network has the smallest geographical area.
   ☐ LAN ☐ PAN ☐ WAN
2. Internet is a good example of _____.
   ☐ WAN ☐ LAN ☐ PAN

3. In _____ topology, if one computer fails, the entire network crashes.
   ☐ Ring ☐ Bus ☐ Star
4. In _____, there are four pairs of insulated copper wire.
   ☐ optical fibre ☐ twisted pair cable ☐ coaxial cable

B. Match the following.

1.  Twisted Pair Cable
2.  RJ-45 Connector
3.  Coaxial Cable
4.  Optical Fibre Cable
5.  Router

C. Fill in the blanks using the given words.

Intranet protocol efficiency network MAN LAN

1. A network increases _____ and speed of working.
2. A computer _____ enables computers to share resources.
3. A _____ is a collection of Local Area Network within a city.
4. The type of network used in your school's computer lab is an example of _____.
5. Computers in _____ are not available to the world outside it.
6. _____ defines rules for communication between network devices.

Write full forms of the following.

1. LAN _____
2. WAN _____
3. MAN _____
4. PAN _____
5. NIC _____
6. TCP/IP _____
7. HTTP _____

E. Name these topologies.

F. Answer in short.

1. Name the types of topologies.
2. Name a few types of transmission mediums used in a network.
3. Define Internet.
4. What is Wi-Fi?
5. Write any two advantages of a network.

G. Answer in detail.

1. What is the difference between LAN and WAN?
2. What are the various hardware requirements to connect the systems in a network?
3. Differentiate between star and ring topology.
4. Which is the most efficient type of topology? Write its advantages.

FUN ACTIVITY

Crossword

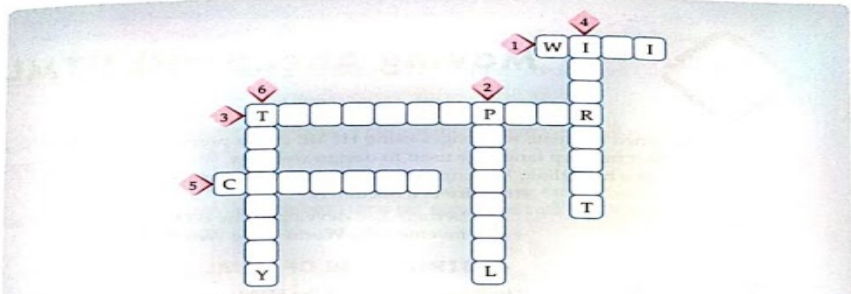
Complete the crossword with the help of clues given .

Down:

2. Set of rules that govern the network.
4. Private network of an organisation.
6. A way in which different computers are connected.

Across:

1. A network that uses radio waves instead of wires.
3. It has four pairs of insulated copper wires twisted together.
5. It has four layers with a copper wire in the middle.



To Do

Discuss on "Advantages and disadvantages of different network topologies".

IN THE LAB

Create a presentation containing slides about the following.

Slide 1: What is network?	**Slide 2:** Types of Networks
Slide 3: LAN	**Slide 4:** MAN
Slide 5: WAN	**Slide 6:** PAN
Slide 7: Topology	**Slide 8:** Types of Topologies

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