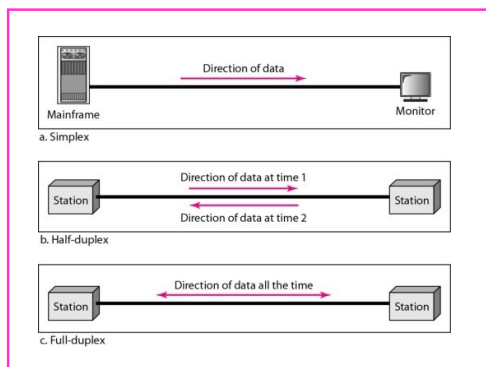


## DATA COMMUNICATIONS AND NETWORKING

- **BASIC ELEMENTS OF COMMUNICATION SYSTEM**
  - Transmitter – converts the information in a suitable form before transmission.
  - The Channel – The physical medium or the communication channel used to send the information from the transmitter to the receiver.
  - The Receiver – It receives the information transmitted by the transmitter.



- **TYPES OF TRANSMISSION MODES**
  - Simplex: In this type of transmission, data can be sent only in one direction i.e., it's a uni-directional mode. The receiver only receives the data, but cannot communicate back to the sender.
  - Half Duplex: In half duplex system, we can send data in both directions but sender can either receive the data or send the data at a particular time. So, when the sender is sending the data, it cannot receive the data and vice versa.
  - Full Duplex: In this mode, we can send data in both directions as it is

bidirectional mode. We can send and receive data at the same time.

- **ANALOG AND DIGITAL TRANSMISSION**

**Analog Transmission:** In this transmission, information changes continuously and can take on many different values. It uses a continuous signal to transmit voice, data, image or other information between two systems.

**Digital Transmission:** In this transmission, information is characterized by discrete states. The transmission signal is not continuous but discrete.

- **E-M SPECTRUM**

The electromagnetic spectrum is the range of all possible frequencies of electromagnetic radiation. The E-M spectrum extends from the low frequencies used for modem radio communication to gamma radiation at the short wavelength (high frequency) end, covering wavelengths from thousands of kilometres down to a fraction of the size of an atom.

- **BANDWIDTH**

It is the range of frequencies that make up a signal. There are three major classes of bandwidth that we refer to in telecommunications networks: narrowband, wideband, and broadband.

- **TRANSFER RATE**

It is the amount of digital data that is moved from one place to another in a given time.

- **GUIDED AND UNGUIDED MEDIA**

The transmission media that are used to convey information can be classified as guided or unguided. Guided media provides a physical path between transmitter and receiver. Guided media include Twisted Pair, Coaxial cable, Optical Fiber. Unguided media employs an antenna for transmitting through air, vacuum, or water. Unguided media includes Microwave Transmission, radio Waves, Infrared waves, Communication Satellites, Bluetooth and Wifi.

- **COMPUTER NETWORK**

A computer network is a group of computers which are interconnected to exchange and share information. People can transfer or receive information at minimum cost and time, using computer networks.

- **NETWORKING DEVICES**

1. Modem: A modem is a communication device that is used to provide the connectivity with the internet. Modem works in two ways i.e., modulation and demodulation.
2. RJ45 Connector: RJ45 is a type of connector commonly used for Ethernet networking.
3. Ethernet card: An Ethernet card is one kind of network adapter. These adapters support the Ethernet standard for high-speed network connections via cables.

4. Routers: Routers are networking devices used to extend or segment networks by forwarding packets from one logical network to another.

5. Hub: A hub is the most basic networking device that connects multiple computers or other network devices together.

6. Switches: Switches are a special type of hub that offer an additional layer of intelligence to basic physical layer repeater hubs

7. Gateways: A network gateway is an internetworking system capable of joining together two networks that use different base protocols.

8. Bridges: A bridge is a device that separates two or more network segments within one logical network (e.g., a single IP-subnet)

- **TYPES OF NETWORKS**

1. Local Area Network (LAN): Local Area Network is confined to small geographical area, like in a building or group of buildings.

2. Metropolitan Area Network (MAN): Metropolitan Area Network or MAN is basically spread throughout a city, college campus or a small region.

3. Wide Area Network (WAN): Wide Area Network covers comparatively large geographic area than LAN and MAN, for example an entire country.

- **NETWORK TOPOLOGY**

Network topology is the schematic description of a network arrangement, connecting various nodes (sender and

receiver) through lines of connection. Some of the major topologies include Bus Topology, Star topology, Token Ring, Mesh Topology, Tree Topology.

- **NETWORK PROTOCOLS:**

A network protocol defines rules and conventions for communication between network devices. Network protocols include mechanisms for devices to identify and make connection with each other. Few major protocols are FTP, PPP, TCP/IP, HTTP, HTTPS, SLIP.

- **MALWARES**

Malware is short for malicious software and used as a single term to refer to virus, spyware, worms etc. Some examples of malware risks are Virus, Spam and Hacking.

- **SECURITY CONCEPT**

Network devices such as routers, firewalls, gateways, switches hubs and so on, create the infrastructure of local area networks and the Internet. Securing such devices is fundamental to protecting the environment and outgoing/incoming communications. Some security methods are Firewall and Antivirus.

### CHECK YOURSELF

1. Which of the following is **NOT** a network device:  
A. Ethernet Card B. MODEM  
C. Printer D. Router
2. Which of the following is **NOT** a guided media:  
A. Twisted Pair Cable

- B. Fiber Optic Cable
- C. Microwave
- D. Coaxial Cable

3. Which of the following is a network topology:  
A. Star B. Ring  
C. Bus D. All of above
4. Keyboard is an example of:  
A. Simplex  
B. Half Duplex  
C. Full Duplex  
D. None

### STRETCH YOURSELF

1. What are the various transmission modes? Explain with examples.
2. What are the basic elements of a communication system?
3. What do you understand by topology?

### ANSWERS

Answers to Check yourself:

1. C
2. C
3. D
4. A