Registration No:-
12114762

Assignment : First CAP275

1:-

Ans:1:- Data Communication:-

When we communicate, we are sharing information. This sharing can be local or remote. Between individuals, local communication usually occurs face to face, while remote communication takes place over distance.

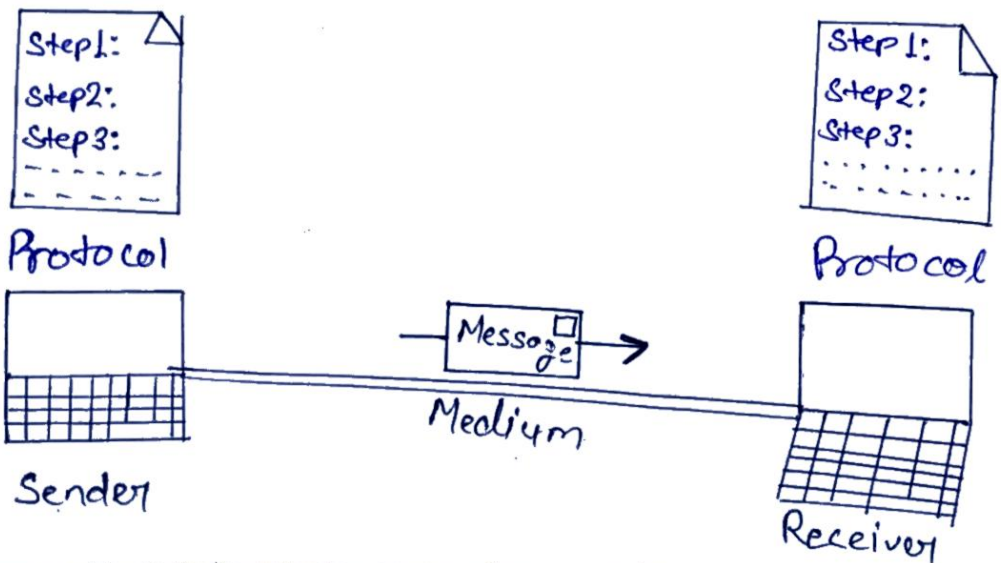
Both analog and digital data can be transferred through mainly these two process.

Analog data is continuous in nature while digital data discrete in nature.

Computer Network:-

A computer Network is a group of computer systems and other computing hardware devices that are linked through the communication channels. A computer Network enables file sharing across the network. It helps the web information to traverse more easily and conveniently. It allows the sharing of software and operating systems on remote system.

Example:-



It's a very broad way to refer to all of this networked technology on any platform or in any digital environment.

Some common type of data communication technologies include telecommunication, computer networking and radio/satellite communication. Data communication usually requires the existence of a transportation or communication medium between the nodes wanting to communicate with each other, such a copper wire, fiber optic cables, or wireless signals.

Computer networks are the basis of communicatio in IT. They are used in a huge variety of ways and can include many different type of network A computer network is a set of computers that are connected together so that they can share information.

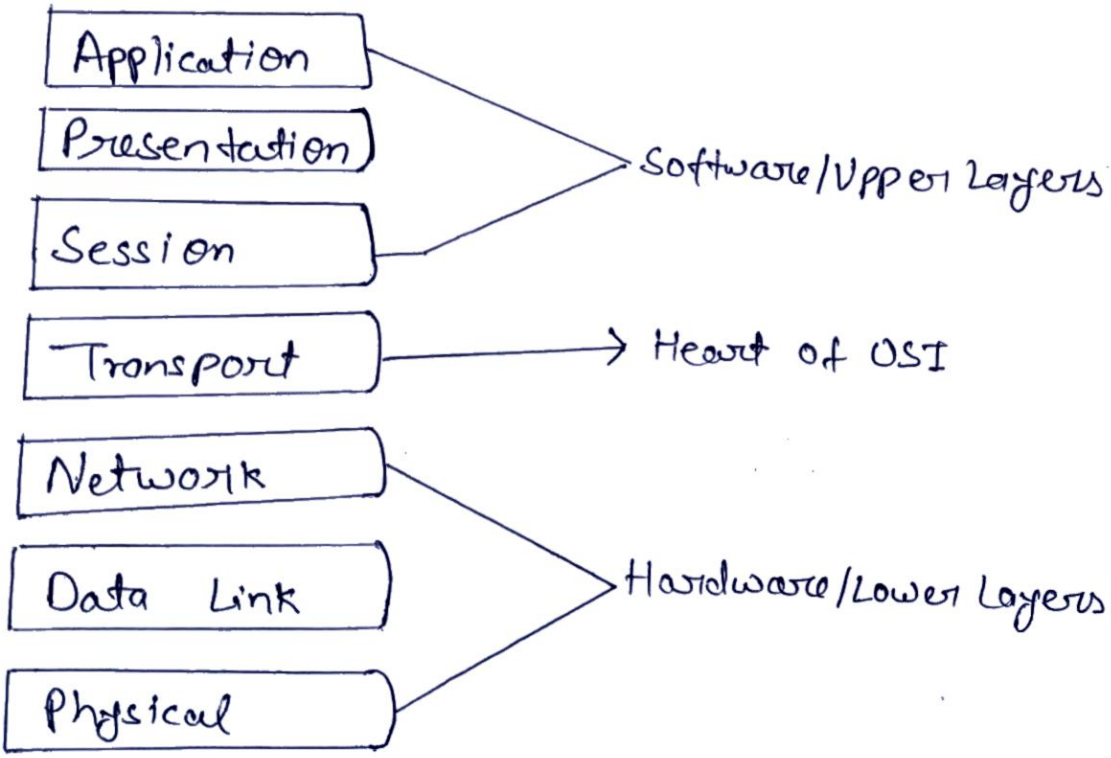
For Example:- A common example of data communication is a computer connected to the Internet via a Wifi connection, which use a wireless medium to send and receive data from one or more remote servers.

Ans:-2:- Network Models:- A network model is a data base model that is designed as a flexible approach to representing objects and their relationships.

A unique features of the network model is its schema which is viewed as a graph where relationship types are arcs and object types are nodes.

The network model's schema is not confined to be a lattice or hierarchy; the hierarchical tree is replaced by a graph, which allows for more basic connections with the nodes.

Architecture of OSI model:-



Network Layers Diagram:-

1:- Physical Layer :- Its function is to transmit individual bits from one node to another over a physical medium.

2:- Data Link layer :- It is responsible for the reliable transfer of data frames from one node to another connected by the physical layer.

3:- Network Layer :- It manages the delivery of individual data packets from source to destination through appropriate addressing and routing.

4:- Transport Layer :- It is responsible for delivery of the entire message from the source host to destination host.

5:- Session Layer :- It establishes session between users and offers services like dialog control and synchronization.

6:- Presentation Layer :- It monitors syntax and semantics of transmitted information through translation, compression, and encryption.

7:- Application Layer :- It provides high-level APIs (Application Program Interface) to the users.

Ans:-3:- Data Communication:- Only when communicating devices are part of a hardware and software-based communication system do data communication occur.

Data communication allows electronic or digital data to be sent between two or more devices regardless of their geographical location, transmission medium, or data substance.

Characteristics of Data Communication:-
Data communication has four critical characteristics that are as follows:-

→ Delivery
→ Accuracy
→ Timeliness
→ Jitter

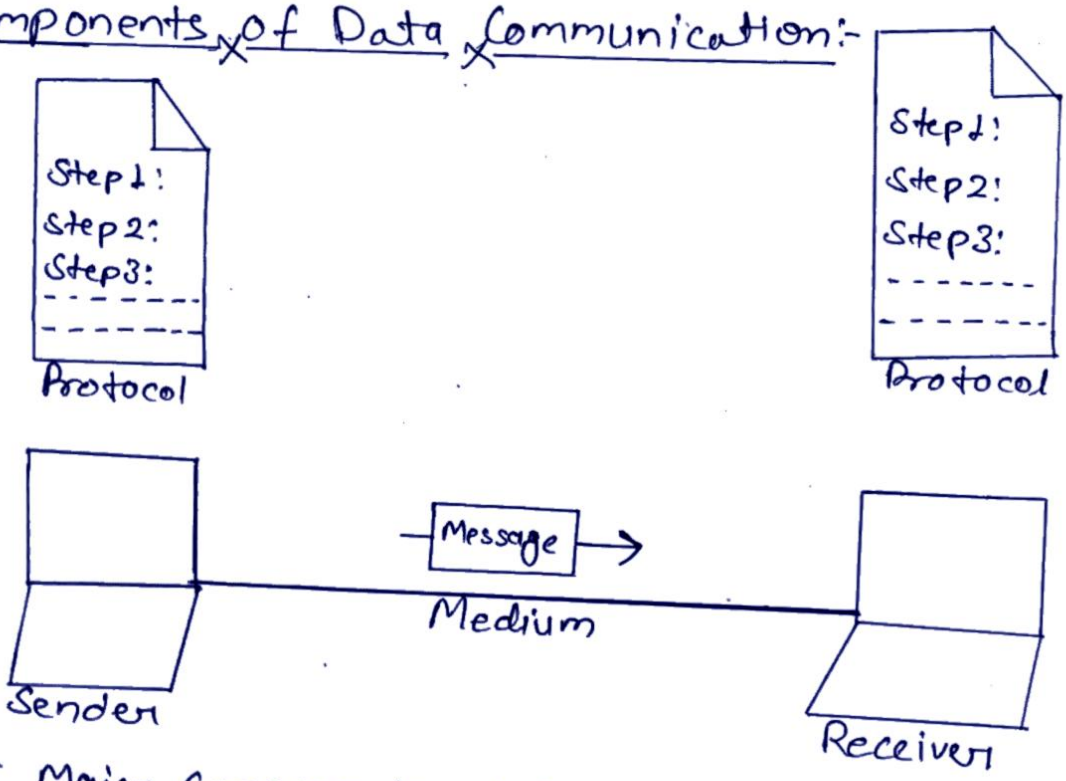
Delivery:- Data must be sent in the correct order from the source device to the correct destination.

Accuracy:- The information must be supplied without errors. The data should be retransmitted if there is any inaccuracy during transmission.

Timeliness:- Data must be given with in the timeframe provided. The data that was given late has become unusable.

Jitter:- Jitter is caused by an uneven or unexpected delay in the packet arrival time.

Components of Data Communication:-



5 Major Components of Data Communication are as follows:-

→ The Message
→ The Sender
→ Recipient
→ Medium of Transmission
→ Etiquette

The Message:- The data or information being sent from the sender to the receiver is preferred to as a message. It could be made up of text, images, music, video, graphics, or photos, among other things.

The Sender:- The sender is a device that generates and send message. Text, numbers, photos, graphics, music, video, and other media may be used to convey the message. A sender is sometimes referred to as a source, transmitter, or node. In most data transmission systems, the computer functions as a transmitter.

Recipient:- The transmitter sends a message to the receiver, which is a device that receives it. It's also known as a sink. The receiver is usually located somewhere other than the sender.

Medium of Transmission:- ~~In the~~ It is the physical road or channel that the communication travels from the sender to the receiver. The communication medium can be wired, such as twisted-pair cable, coaxial cable, or fiber-optic cable or wireless, such as lasers, radio waves, or microwaves.

Etiquette ~~in~~ (Protocol) in Data Communication:- A protocol is a set of instructions for transmitting data between computers. These protocols define how a communication channel is established, how information is delivered, and how errors are recognized and repaired during the data communication process.

Ans:-4:- Unguided Media:-

An unguided communication medium transmits the information through the air in much the same way as radio stations broadcast their programming. They are also called unbound wireless transmission media or unguided transmission media because they do not use any physical wire or a closed circuit for data communication.

An unguided transmission transmits the electro magnetic waves without using any physical medium.

List of Unguided Media:-

→ Microwave
→ Satellite
→ Radio Broadcast
→ Infrared
→ Bluetooth

Microwave System:-

Microwave are unguided communication media that use a high-frequency ~~band~~ (1-300 GHz) band of radio broadcast transmission to transmit the data through space (wireless communication). It uses dish-shaped antennae for sending and receiving the information. Microwaves are called line of sight because the microwave signal cannot bend around the surface of the earth. The microwave system installation cost is very high as compared to other guided communication media. Microwaves are used mostly for point to point communications system to convey all types of information, including voice, data and video in both analog and digital formats.

Satellite :- A satellite is an amplifier or repeater that receives information from one location on the earth, repeats the data, and sends it to one or more receiving locations on the earth.
Satellite communication media are very cost-effective for moving large amounts of information, especially where there are many receiving locations.
Satellite ~~send~~ is used for send television signals directly to homes, but they also are the backbone of cable and network TV.

Radio Broadcast :- It is an unguided communication medium similar to microwaves and Stallite except that the receiving locations need not be in the line of sight or have a dish-shaped antenna to receive information transmission.

Infrared :- It is an unguided communication medium ~~similar to~~ that uses a red light (below the human eye) to transmit information.
The common application is in television and VCRs with remote control. In the area of the network, infrared is used to connect the local area network in the same room and to connect a computer with peripheral devices such as a mouse, keyboard etc.

Bluetooth :- It is a low cost, low power, wireless radio frequency technology that allows various devices to communicate with each other. One of the advantage of bluetooth over infrared is that close proximity between the communication devices is not required and distance of up to 10 meters or 32 feet is allowed.
It is used in Mobile Phone, Bluetooth speakers, etc.

Ans:-5 FDM:- It is an analog method which is used when the bandwidth of a connection (in hertz) is higher than the linked bandwidth of the signals which are to be communicated.
It is stand for Frequency Division Multiplexing.
The signals are created by each transmitting device which modulates the multiple carrier frequencies. These modulated signals are then connected to an individual composite signal that the link can transport.

In FDM, different frequencies are combined into a signal composite signal and transmitted on the channel. At the receiver end, the reverse phase is applied to get the individual frequencies back for working.
The entire bandwidth of the channel is divided into logical channels, and each sending device is given with the possession of a logical channel.
FDM undergoes cross-talk immunity because of Bandpass Filter.

Ex:- FDM are radio and television system

TDM:- It is stand for Time Division Multiplexing. In TDM, the pulse is presented for a short period. No signal is present for most of the time between the two pulses. The pulses from other channels can occupy this free space between the pulses and this is called Time Division Multiplexing (TDM).

It is a digital Multiplexing technique.

In TDM all the signals to be transmitted are not transmitted simultaneously. Instead, they are transmitted one by one.

The TDM system can be used to multiplex analog or digital signals, however it is more suitable for the digital signal multiplexing.

The TDM signal in the form of frames is transmitted on the common communication medium

Types of TDM:-

→ Syn chronous TDM

→ Asynchronous TDM

Ex:- TDM is the television broadcast. In a tevelvision serial, generally 10 minutes serial is followed by 5 minutes advertisement. The time in which the serial is being broadcasted, the total frequency is dedicated to the serial.