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Set-1

a) what is digital signals and Analog signals?

b) Explain Switching.

c) what is multiplexing?

Answer

a) digital signals:

Digital signals are discrete in nature and represent sequences of voltage pulses. Digital signals are used within the circuitry of computer system.

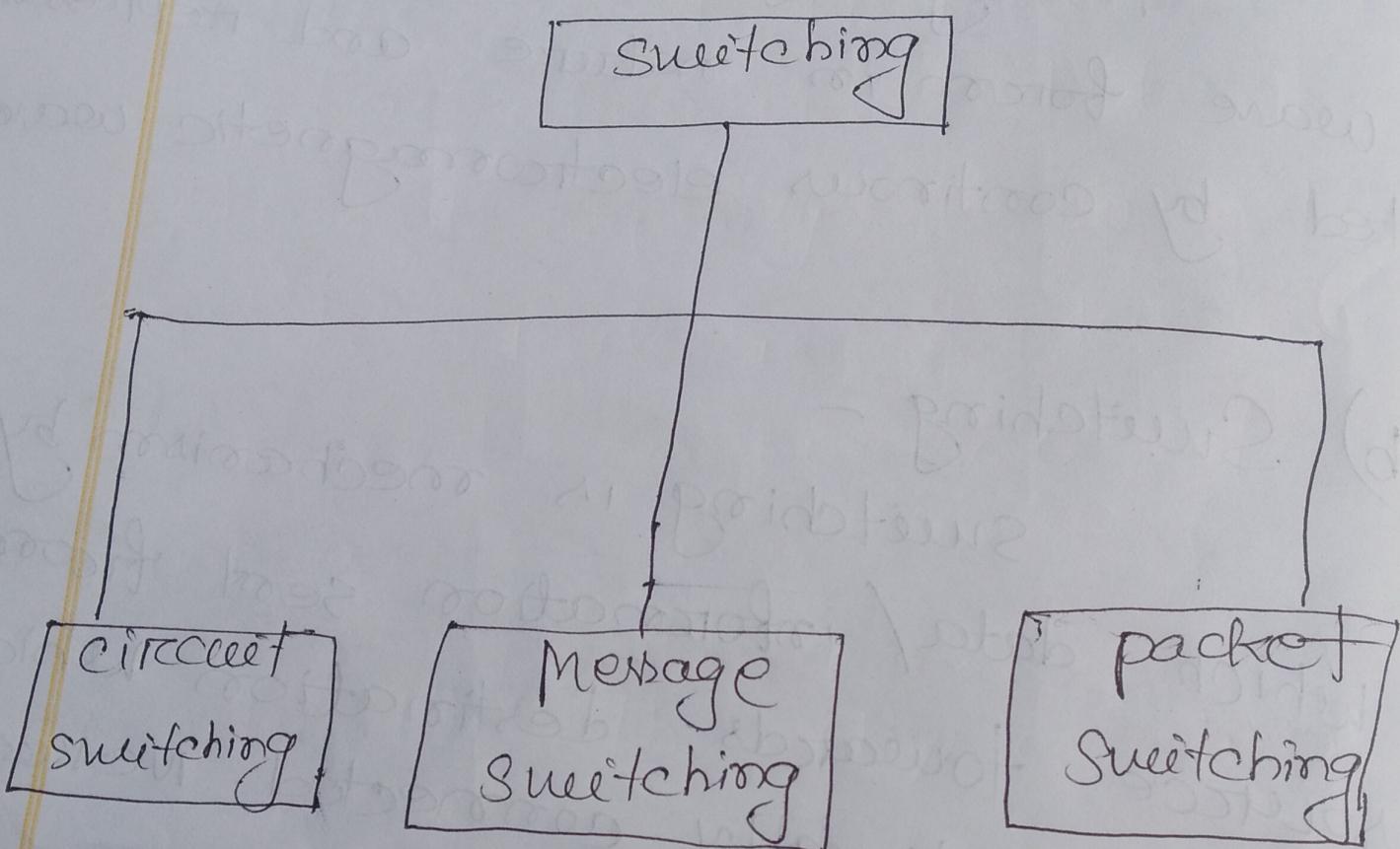
Analog signals:

Analog signals are in continuous wave form in nature and represented by continuous electromagnetic waves.

b) Switching -

Switching is mechanism by which data/information sent from source towards destination which are not directly connected. Networks have interconnecting devices, which receives data from directly connected sources, stores data, analyze it and then forwards to the next interconnecting devices, which closest to the destination.

Switching can be categorized as



c) Multiplexing -

Multiplexing is a technique to mix and send multiple data streams over a single medium.

This technique requires system hardware called multiplexer (mux) for multiplexing the streams and sending them on a medium, and de-multiplexer which takes information from the medium and distribute to different destinations.

set - 2

- a) what is channel capacity?
- b) what do you mean by transmission media and its forms?
- c) Explain digital to digital conversion.

Answer

a) The speed of transmission of information is said to be the channel capacity. We count it as data rate in digital world. It depends on numerous factors such as

Bandwidth: The physical limitation of underlying media.

Error-rate: Incorrect reception of information because of noise.

Encoding: The number of levels used for signalling.

b) The media over which the information between two computer systems is sent, called transmission media. Transmission media comes in two forms.

Guided media -

All communication wires/cables are used such as UTP / coaxial cables and fiber optics.

Unguided media -

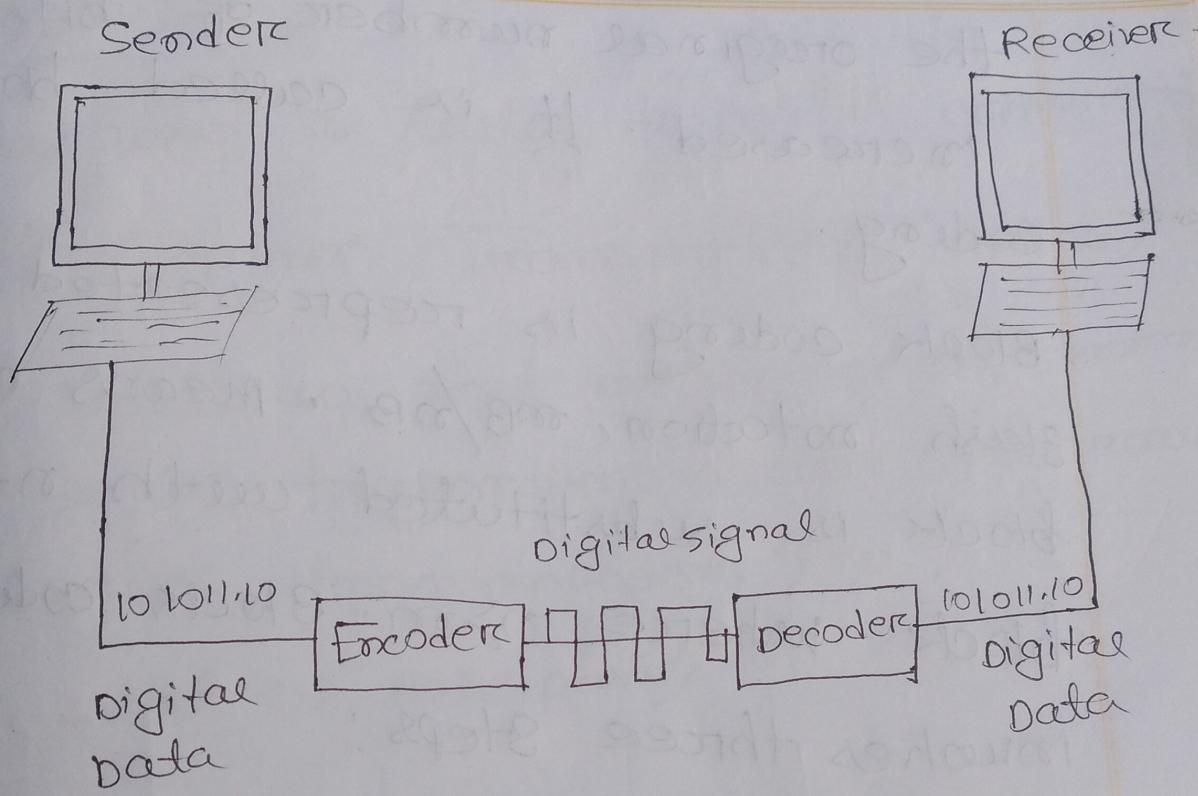
Wireless or open air space is said to be unguided media because there is no connectivity between the sender and receiver.

c) Digital to digital conversion—

This section explains how to convert digital data into digital signals. It can be done in two ways, line coding and block coding, for all communications coding, whereas line coding is necessary whereas block coding is optional.

Line coding—

The process for converting digital data into digital signal is said to line coding. Digital data is found in binary format. It is represented internally as series of 1s and 0s.



Block coding -

To ensure accuracy of the received data frame, redundant bits are used. For example, in even-parity, one parity bit is added to make the count of 1s in the frame even. This way

the original number of bits is increased. It is called block coding.

Block coding is represented by slash notation, mB/nB , means m -bit block is substituted with n -bit block where $n > m$. Block coding involves three steps:

- (i) Division
- (ii) Substitution
- (iii) Combination

set-3

- a) what is Analog to digital conversion.
- b) Explain Transmission modes
- c) what do you mean by Asynchronous serial transmission and synchronous serial transmission?
- d) what is Band pass?

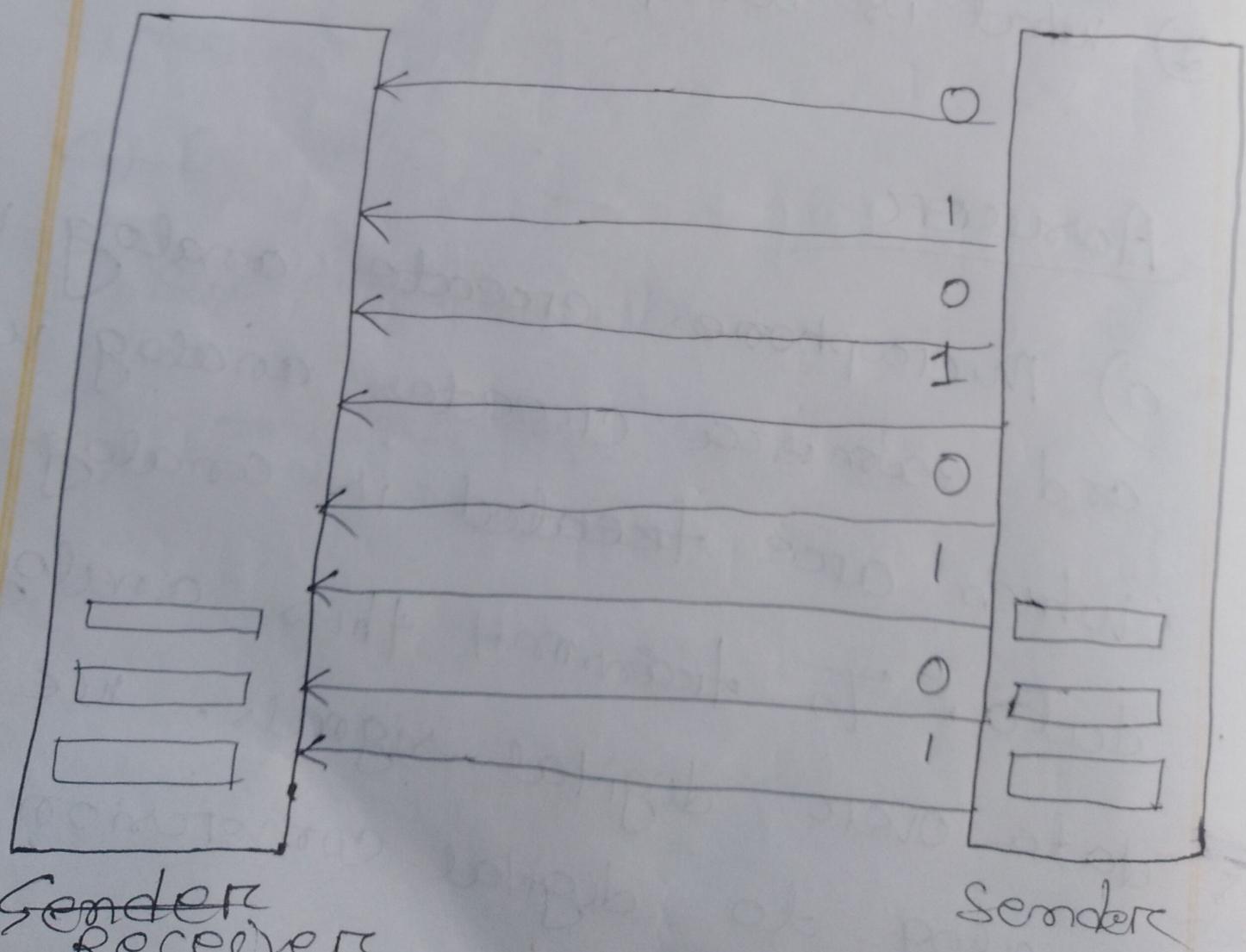
Answer

a) Microphones create analog voice and camera creates analog video, which are treated as analog data. To transmit this analog data over digital signals, we need analog to digital conversion.

b)

Transmission modes -

The transmission mode decides how data is transmitted between two computers. The binary data in the form of 1s and 0s can be sent in two different modes: parallel and serial.



c) Asynchronous Serial Transmission

It is named so because there is no importance of timing. Data-bits have specific patterns and they help receiver recognize the start and end data bits. For example, a 0 is prefixed on every data byte and one or more 1s are added at the end.

Two continuous data-frames (bytes) may have a gap between them.

Synchronous Serial Transmission —

Timing in synchronous transmission has importance as

there is no mechanism followed to recognize start and end data bits. There is no pattern or prefix/suffix method.

Data bits are sent in burst mode without maintaining gap between bytes (8-bits).

A single burst of data bits may contain a number of bytes. Therefore, timing becomes very important.

It is up to the receiver to recognize and separate bits into bytes.

a) The filters are used to filter out unwanted frequencies of interest. A bandpass is a band of frequencies which can pass the filter.

Set-4

- a) What do you mean by magnetic media?
- b) Explain Twisted pair cable.
- c) What is Fiber optics?
- d) What is wireless transmission?

a) Any storage medium that utilizes magnetic patterns to represent information is considered magnetic media. Good examples of a magnetic media and magnetic storage is a tape drive, floppy diskette and hard drive.

b) Twisted pair cable —

A twisted pair cable is made of two plastic insulated copper wires twisted together to form a single media. Out of these two cables, only one carries actual signal and another is

used for ground reference.

There are two types of twisted pair cables:

- ① shielded twisted pair (STP) cable
- ② unshielded twisted pair (UTP)

c) fiber optics—

Fiber optics works on the properties of light. When light ray hits at critical angle it tends to refract 90 degrees.

This property has been used in fiber optic. The core of fiber optic is made of high

quality glass or plastic. From one end of it light is emitted, it travels through it and at the other end light detector detects light stream and converts it to electric data.

Fiber optic provides the highest mode of speed. It comes in two modes one is single mode fiber and second is multimode fiber.

Fiber optic also comes in unidirectional and bidirectional capabilities.

d) wireless Transmission

wireless transmission is a form of unguided media. wireless communication involves no physical link established between two or more devices, communicating wirelessly. wireless signals are spread over the air and are received and interpreted by appropriate antennas.

set-5

- a) what is code division multiple
- b) what do you mean by circuit switching?
- c) Explain frequency division multiplexing.
- d) what is infrared transmission

Answer

- a) multiple data signals can be transmitted over a single frequency by using code division multiplexing. FDM divides the frequency in smaller channels but CDMA