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IWT notes

INTERNET

1 - Inter - Interconnection

2 - Net - Network

(Internet) - Interconnection of network

yashveen singh

* Internet *

① [Internet is equal to interconnection of network]

[World Wide Web]

[Internet is a network which consists of inter-connected networks.]

* Application of Internet *

- ① Research
- ② hospitals
- ③ ip transition
- ④ E-Commerce
- ⑤ Communication
- ⑥ web browsing

* Network *

[A network is a collection of computers that are connected to each other with the help of cables or satellites to share information around the world.]

Services of Internet

1. W.W.W
2. web services
- 3.

[W.W.W]

पश्चिम भारत

W.W.W - [World wide web]

- ① world wide web is a Service of Internet
- ② W.W.W is invented by Tim Bernerly in 1989

[ARPANET] 1969

Advanced Research projects Agency Network (ARPANET)

ARPANET is designed by USA Military Centre for Connecting to each other

It is design for military and for Research Centre

Browser

web Browser is an application software which is used to view or visit websites.

web browser is an interface between a user and the world wide web.

A web browser can have a graphical user interface like Microsoft edge, google chrome, opera etc.

[Yashveer Singh]

Browser	dev.in	popular in.	dev. by
Google Chrome	2008	v. popular, window	google
Internet Explorer	1994	reliable, safer	Microsoft
Mozilla Firefox	2004		Mozilla Firefox
opera	1996	in mobiles	opera soft.
Apple Safari	beta 2003, window 2007	apple devices	Apple Inc.

* Software *

Software is a set of instruction, data or program used to operate Computers, and execute specific tasks.

* Software type

① Application Software

② System Software

* System Software *

System Software are the type of Software which are designed to provide a platform for the other softwares.

A system software is a specific type of software that manage the computer system. The System Software Comprises the operating System, utility programmes, and Device Driver.

Example:- ① operating System [Windows, Linux, Mac-OS, Ubuntu, Android]

Windows	Mac OS	Linux	Ubuntu
Android	Windows 10	Ubuntu	Mac OS X
Ubuntu	Windows 7	Ubuntu	Windows 8
Windows 10	Windows 8	Ubuntu	Windows 10
Windows 7	Windows 7	Ubuntu	Windows 7

* Application Software *

Application Softwares are the programs and group of programs designed for the Computer to perform specific and advanced tasks.

Example:- ① MS Word, wordpad and Notepad
 ② multimedia Software - video player, media player
 ③ Presentation Software - Microsoft powerpoint, key notes
 ④ Games - IGI, Call of Duty, Counterstrike, halo

Search Engine

Search Engine is an application that helps a user in finding information or document from the internet.

The Search Engine uses a Software called Spider or Web crawler which Continuously crawls on the web to comb out any newly published web documents and find their web address.

* Some Search Engines *

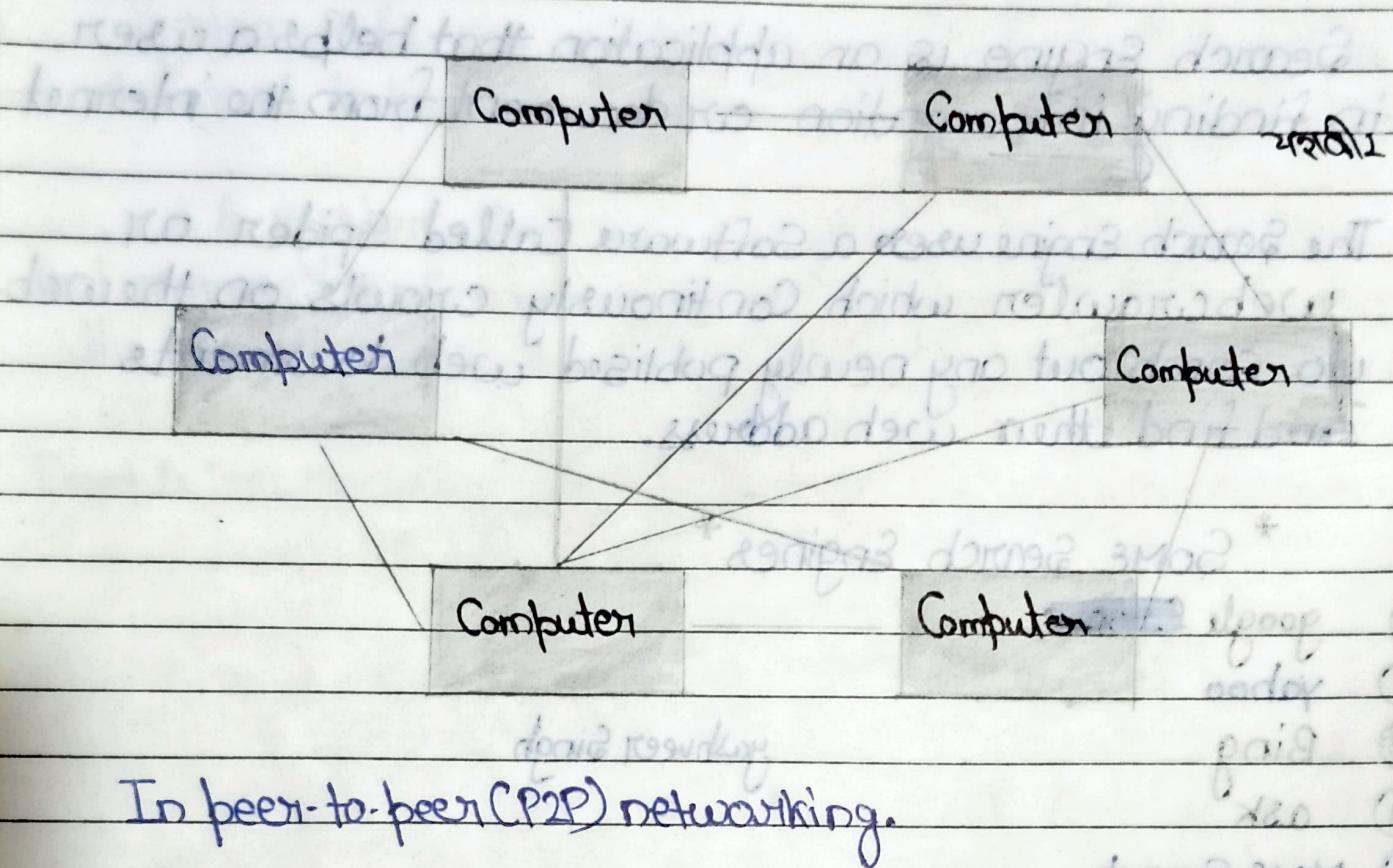
- ① google
- ② yahoo
- ③ Bing
- ④ ask
- ⑤ MNS Search

Client: Clients are PCs or workstations on which user run application. It carries out the user's/client's request to the Server and displays the result send by the Server.

Server: Servers are the powerful Computer, which provide data or information resources available on the internet to the client.

A Server is a host that runs one or more Server programs to share its resources with a client.

Peer to peer (P2P)



In peer-to-peer (P2P) networking.

A Group of Computers are linked together with equal permission and responsibilities for processing data
+ Unlike traditional Client-Server Networking +

DNS / URL

Domain Name System (DNS)

[Domain Name is a unique name given to each website.]

[Domain names are easier to remember than IP address.]

The domain name consists of two parts:

Domain Name

One is the name of domain

other is the web Extension

domain(.) Extension

The name of domain comes before the dot(.) symbol

and then Extension

comes after (.)

comes after (.)

domain

Extension

domain are the name which is given by the user to the websites

Commercial .com

Governmental .gov

Network .net

Example: www.wic

(.)

Organization .org

Educational .edu

Information .info

@www

Global address "www" often written following a top level domain like .com or .org which blocks other off.

+ URL (Uniform Resource Locator) +

The Uniform Resource locator (URL) denotes the global address of the web documents and the web resource.

A uniform resource locator is same as Uniform Resource identifier (URI).

+ Components of URL +

① The Scheme

② The Host

③ The Extension

④ The path

* The Scheme *

This is the first part of a web address, also known as
(Or identifier)

http:// → It tells the internet browser what protocol needs to be followed to pull up the address.

Used schemes are - ① ftp:// (file transfer protocol)

② mailto:// (e-mail protocol)

(yashveer)

* The HOST *

The second part of the web address identifies the host

The Host is normally started with "www", which indicates the world wide web.

This tells the browser that the site is located on the internet

Example:- google's domain name is "google.com"

* The Extension *

All the domain name extension are monitored and regulate by the Internet Corporation for assigned Name and Number (ICANN)

Example : The ".gov." extension is used with the official government website.

- ② the ".com" is used by commercial organizations,
- ③ ".org" extension is used by organization

* The path *

This is the last part of URL.

The path tell the browser that what file is to be used from the domain directory

Example: " /quote.html "

Website

Date.....

Consist of:-

- ① HTML
- ② web pages
- ③ website
- ④ web portal
- ⑤ web addressing system
- ⑥ IP address
- ⑦ Domain name

* HTML*

HTML (Hyper text Markup Language)

This language is used to Create webpage

HTML elements are the basic building blocks of a webpage

* Web page*

A web page is written using HTML and is stored on a web server. It is a digital page which may contain text, hyperlink, audios, videos, images, tables etc.

Each web page is identified by a unique web address
Called uniform Resource locator (URL)

* Website*

A website is a Collection of interlinkable web pages Containing images, videos or other digital media and set under the same domain name, which is the address of the website written in HTML

* HOME PAGE *

The first page of a website is called HOME PAGE

* Web portal *

A web portal is a webpage which contains links to the other website

* Web addressing system *

The IETF [Internet Engineering Task force] has designed a system to provide a unique address to each computer in the form of Number or characters.

* IP address *

(YASHVEEN)

An IP address consists of a unique set of numbers which is provided to each computer by IETF.

An IP Address is a 32 bit ~~numerical~~ address containing a set of four numbers which is vary from 0 to 255.

Domain NAME

Domain NAME is a unique name given to each ~~other~~ website

Domain name are easier to remember than IP address

* Type of website *

There are 3 type of website...

- ① Static
- ② Dynamic
- ③ Responsive

* Static website *

Static websites are once that are fixed and display the same content for every user, usually it is written in HTML.

It is a type of website, which is used to giving/providing information OR knowledge to the users ONLY.

Example - wikipedia

(yashveer Singh)

* Dynamic website *

dynamic website is one that can display different content and provide user interface.

* Responsive website *

These are the type of website which may change after request changing some which is called responsive.

Ex.

Component of DATA Communication

- ① terms
- ② protocol

- ① Delivery - [Sender sending DATA and Received to right address]
- ② Accuracy - The data Communication system must deliver data to the receiver without being altered or damaged. The receiver should receive the exact same data which was send by sender.
- ③ Timeliness - The System must maintain timeliness. It must deliver Data in a timely manner. Delayed delivery can make the data useless to the receiver. Data must be delivered as they are produced, in the order they were produced and without any significant delay.
- ④ Jitter - jitter refers to the variation of packet arrival time. Data is sent as packet, that is, a chunk of the whole data is send in each turn. These packet get re-joined back in the target device to represent the complete data it is.

DATA Transfer

Data is transfer in the form of signal

There are two type of DATA Transfer

1. Analog Data transfer
2. Digital DATA transfer

Analog Data transfer

Analog transmission is the transfer of a Continuously varying analog signal over an analog channel

Digital DATA Transmission

Digital Communication is the transfer of discrete message over a digital or an analog channel

.... Data transmitted may be digital message originating from a data source,

Example:- a Computer or a keyboard.

Type of Signals...

1. Periodic Signal
2. Non-Periodic

Periodic Signal

Completes a pattern within measurable time frame and Repeats the pattern over subsequent identical periods.

Non-periodic Signal

change with Exhibiting a pattern that repeats over time.

Note... Imp...

In DATA Communication we Commonly use periodic analog Signal and Non periodic Signal

bit period is the time interval between consecutive bits

Signal and Transmission

Data moves in the form of electromagnetic signal across a transmission medium both data and the signal that represent them can be either analog or digital in form.

Analog Data $\not\rightarrow$ Digital Data

An Analog signal has infinitely many levels of intensity over a period of time

An digital Signal on the other hand Can have only a limited number of defined values.

Example - An analog clock, that is hour, minute and second hand gives information in a continuous form the movement of hands are continuous on the other hand.

A digital Clock that reports the hour and minute will change sudden from 6:00 to 6:10

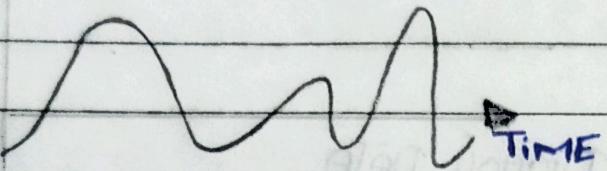
Digital Data take on \$ discrete values. for example: data are stored in computer memory in the form of 0's and 1's They can be converted to a digital signal or modulated into an analog for transmission across a medium.

GRAPHICAL REPRESENTATION

Date.....

VALUE

VALUE



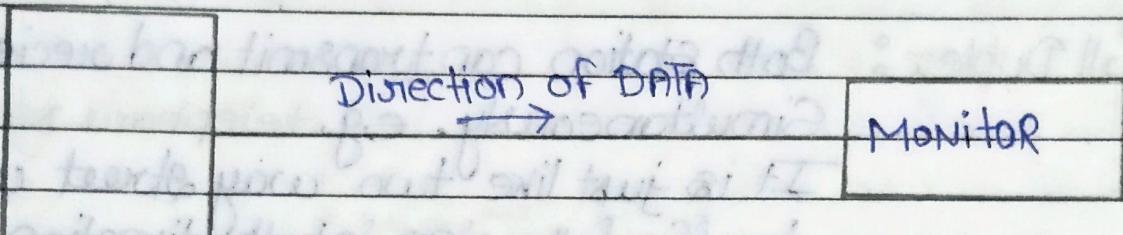
Analog Signals

Digital Signals

Direction of DATA flow (Simplex, half Duplex, full Duplex)

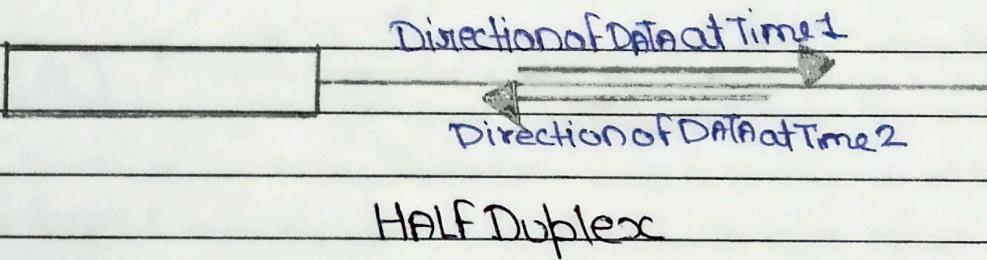
* Communication between two devices can be

1.



In Simplex Mode, the Communication is unidirectional as on a one way street, only one of the two devices on a link can transmit other can only Receive for eg. working of keyboards & Monitor

②



In half duplex Mode, each station can both transmit and receive but not at the same time when one is sending the other can only receive and vice versa This mode is used, where there is no need for communication in both direction at the same time.

Date.....

3.

Direction of Data (all time) *
Full Duplex

Station



Station

In full Duplex : Both station can transmit and receive simultaneously. e.g. telephone Network.
It is just like two way street with traffic following in both direction at the same time

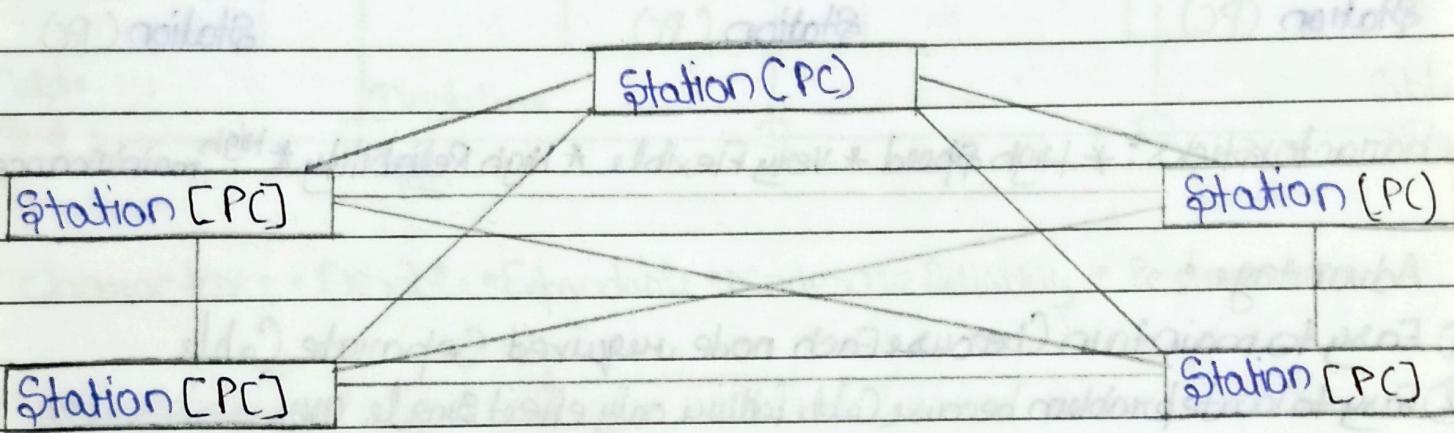
Network Topologies

Date.....

1. Mesh
2. Star
3. Bus
4. Ring

* MESH Topology *

Every device has a dedicated point-to-point link to every other device



Advantages:

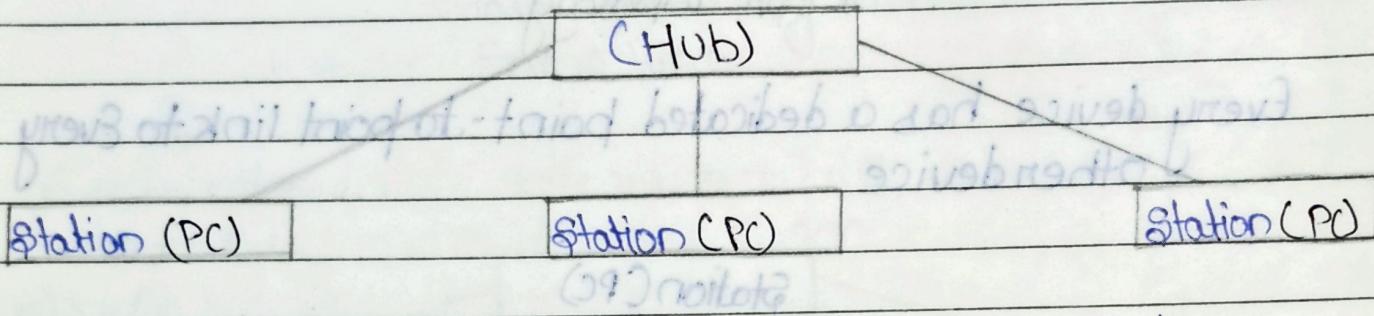
- ① There is no traffic problem involved in connecting computer each other.
- ② It has multiple links, which helps when 1 route is blocked then they use another.
- ③ It provides high privacy and security.
- ④ Fault find easily.

Disadvantage:

- ① Mesh topology required; high No. of cable / and I/O ports for comm.
- ② Installation is very hard.
- ③ Costly.

★ STAR Topology *

In star topology, each device has a dedicated point to point link only at a central controller usually called a Hub. The controller act as an Exchanger. It is less expensive than mesh topology.



~~weakness of star network - failed hub or hub port causes broadcast storm~~

characteristics : * High Speed * Very Flexible * High Reliability * High maintenance

Advantage :

- ① Easy to maintain (because each node required separate cable)
- ② Easy to locate problem because cable failure only effect single user.
- ③ Easy to extend network
- ④ It provide very high speed DATA of DATA transfer

Disadvantages :

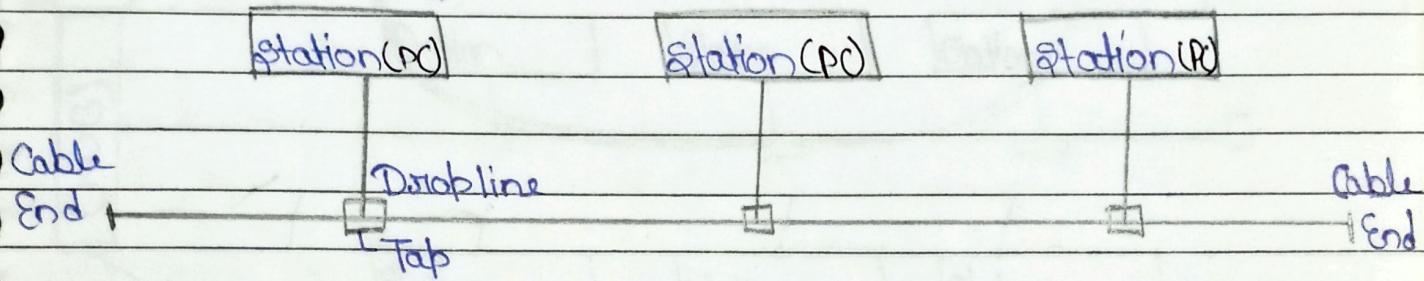
- ① All the connection or data transfer depends on single device hub.
- ② If the Hub device goes down, the entire network is dead.
- ③ It need more wire compared to the Ring and bus topology.



* Bus Topology *

Nodes are Connected to the Cable by drop lines and taps. A drop line is a connection running between the devices and the main cable.

Advantage of a bus topology include ease of installation, less cabling than mesh or star topology.



Character: • Flexible • Expandable • Moderate Reliability • Performance

ADVANTAGES:

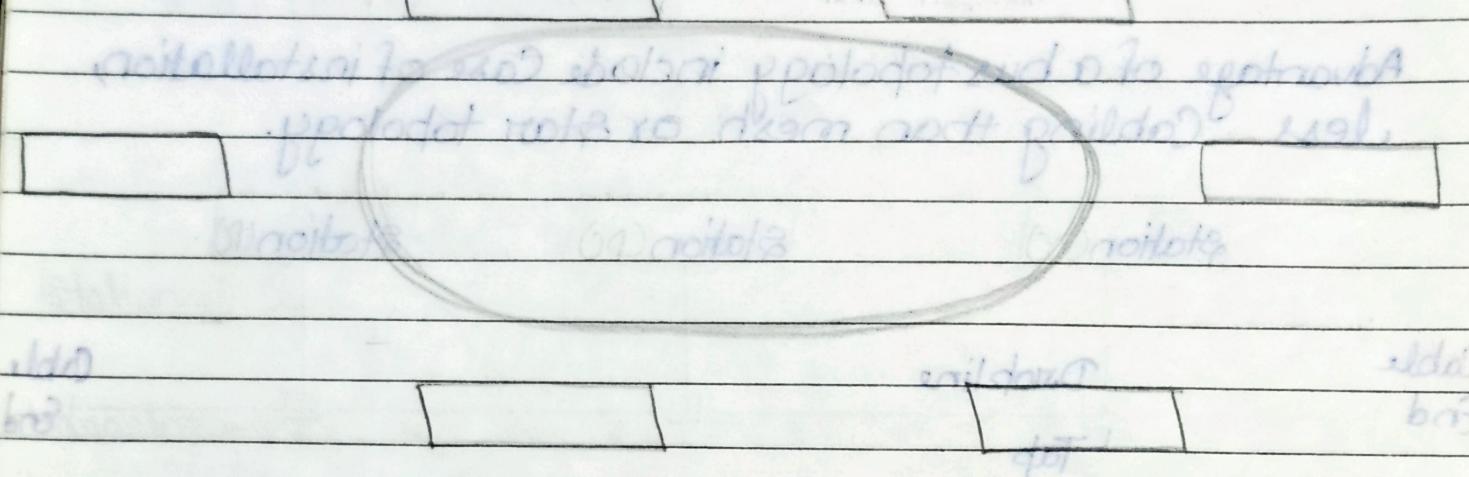
- ① Easy to Connect or Remove device
- ② In case of Computer failure, there will be no effect on other network
- ③ Cost is lesser
- ④ Easy to understand
- ⑤ Easy to Extend

Disadvantage:

- ① difficult to find the fault in case of device failure
- ② If the backbone cable is damage then network stops
- ③ Length of cable is limited
- ④ Slower

Ring Topology

Each device has a dedicated point to point connection with only the two devices on either side of it. A signal is passed along the ring in one direction from device to device, until it reaches its destination.

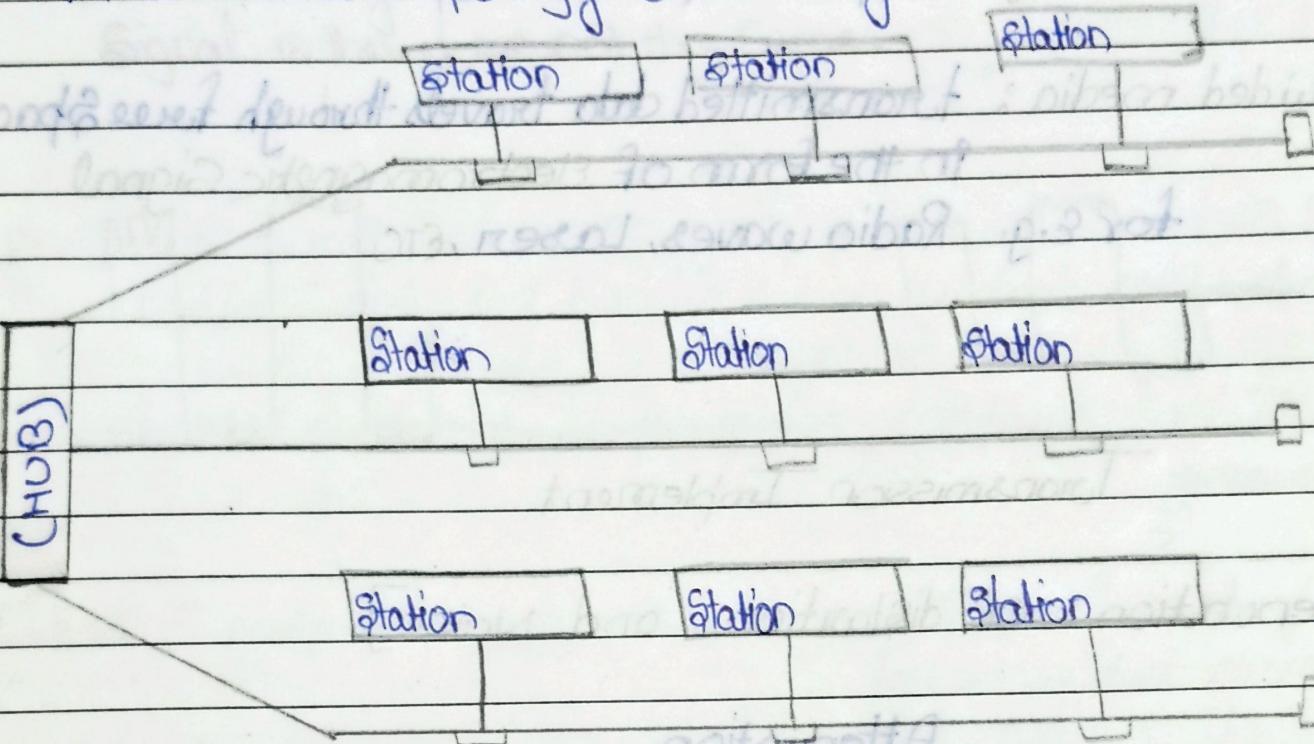


A Ring is relatively easy to install and each device is linked to only its immediate neighbours.

Hybrid Topology.

Date.....

A network can be hybrid. Suppose we have a main star topology with each branch connecting several stations in a bus topology as in diagram.



Guided - UnGuided

Date.....

transmission Media

In Guided media: transmitted data travels through
Cabling System that has a fixed path.
for e.g. copper wire, fibre optics wire, etc.

In Guided media: transmitted data travels through free Space
in the form of electromagnetic Signal
for e.g. Radio waves, Laser, ETC

Transmission Implement

[Attenuation OR distortion and Noise]

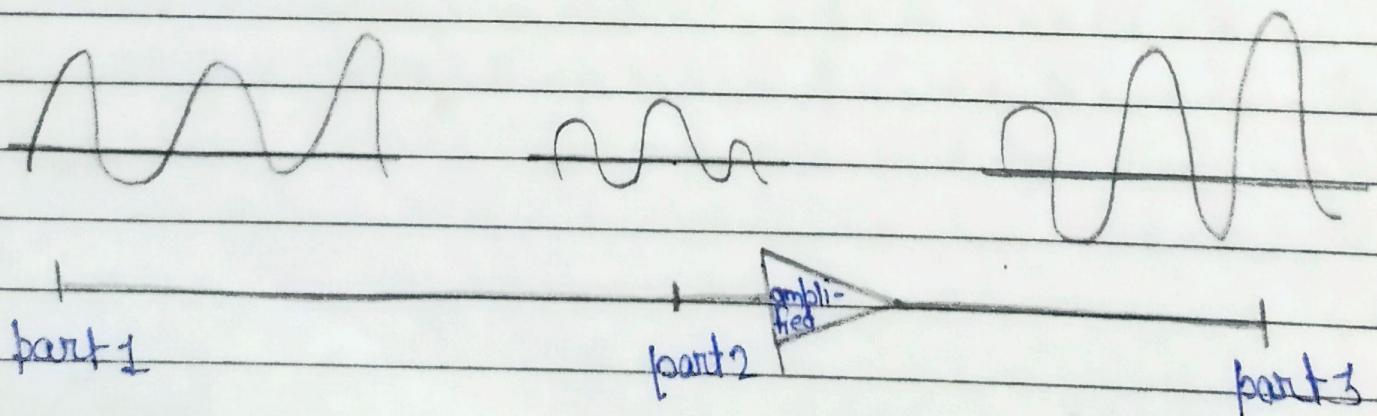
Attenuation

Attenuation means a loss of Energy when a Signal travels through a medium it losses some of its Energy in overcoming the resistance of the medium. That's why a wire carrying electric signal is converted to heat to compensate for this loss, amplifiers are used to amplify the signal

ORIGINAL

Attenuated

Amplified



Distortion

Distortion means that the signal changes its form or shape. Signals Components at the receiver have phases different from what they had at the sender. The shape of the signal is therefore not the same.

SAME Important Processing

Date.....

1 Sampling

2 Sampling rate

3 Quantization

4. Quantization Error

* Sampling *

First step in PCM is Sampling. There are three Sampling Methods - ideal Sampling, natural and flat-top Sampling

In Ideal Sampling, a high speed switch is turned on ~~frequently~~

pulses from the analog signal are sampling it cannot be easily implemented

In natural Sampling, a high speed switch is turned on for only small periods of time when the sampling occurs.

The most common Sampling method. Called sample and hold, however, creates flat-top Sample by using a circuit.

Sampling process is also known as pulse amplitude Modulation (PCM)...

* Sampling Rate *

what are the restrictions on According to Nyquist theorem to reproduce the original signal, one necessary condition is that the Sampling rate be at least twice the highest frequency in the original signal.

* Quantization *

The result of Sampling is a series of pulse with amplitude values between the maximum and minimum amplitudes of the Signal.

following steps are used in quantization

1. Assume that the original signal has instantaneous amplitude between V_{\min} and V_{\max}
2. We divide the range into L zones, each of height (Δ)
(Level) (δ)

$$\Delta = \frac{V_{\max} - V_{\min}}{L}$$

3. we assign quantized value of 0 to $L-1$ to the mid point of Each ~~other~~ zone.
4. we approximate the value of the Sample amplitude to the quantized values

Date.....

* Quantization * ERROR *

Quantization is an approximation process. The input values to the quantization are the real values. The output are the approximated values. The output values are to be the middle value in the zone. If the input value is also at the middle of the

Digital transmission

1. Digital - to Digital Conversion
2. Analog to digital Conversion

① In digital to digital Conversion we represent digital data by usually digital signals. The conversion involves three techniques

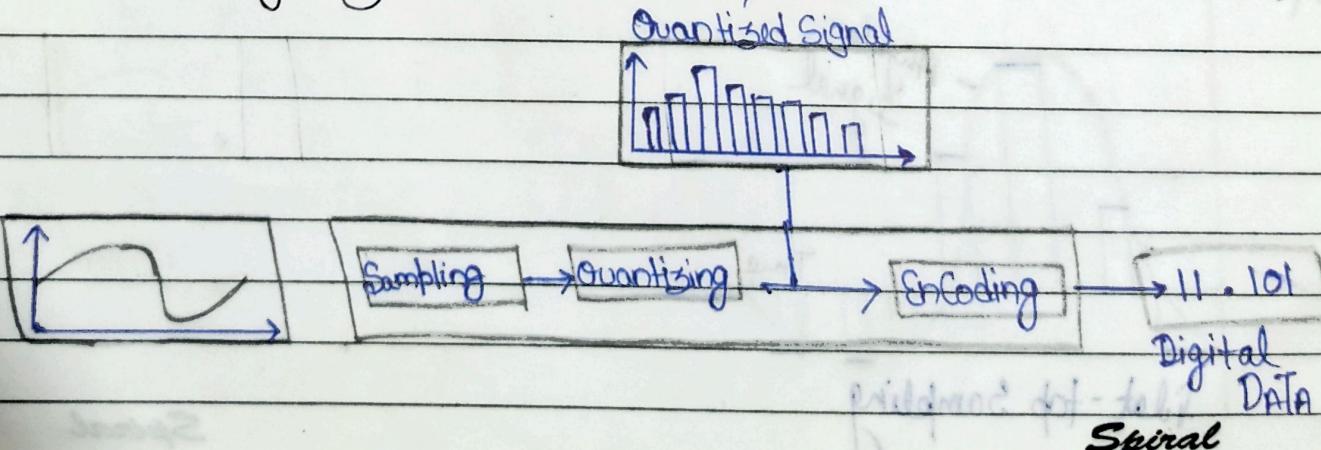
→ Line Coding, block Coding and Scrambling may or may not be needed

② In analog to Digital signal Conversion, we change an analog signal to digital data such as created by a microphone or camera

Two Techniques ARE USED:-

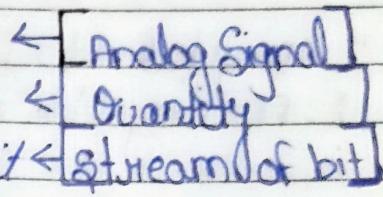
1. PCM (Pulse Code Modulator)
2. Delta Modulation

PCM - It is the most Common Technique to change an analog signal to digital DATA (Digitalization) is called pulse code modulation (PCM)



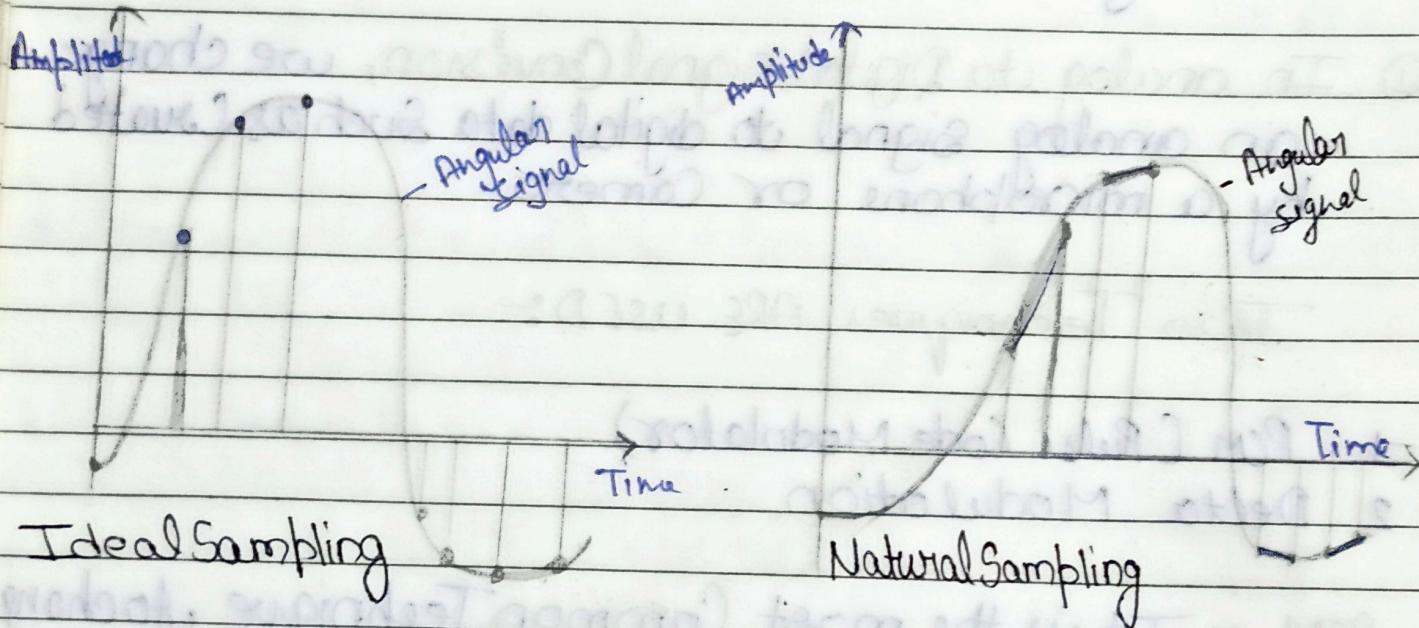
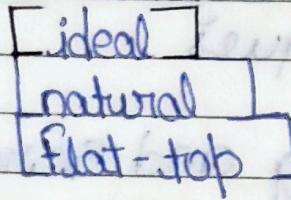
PCM Encoder has three process

1. Analog Signal is sampled
2. Sampled Signal is quantity
3. quantized values are encoded as stream of bit



Sampling - There are 3 methods of sampling [3 METHODS]

1. ideal
2. natural
3. flat-top



Ideal Sampling

Natural Sampling

