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Chapter 2 Computer Software

* Software

- A set of instructions, data or programmes used to operate computers and execute specific task.
- It is the generic term used to refer scripts and programmes that runs on a device.

There are two types of software :

1) System software

- System software are designed to run computers hardware
- System software co-ordinates the activities and function of the hardware
- It controls the operation of the computer hardware. and provides an environment for other software work in.

Types of system software are :-

i) Operating system

- An operating system is an integrated set of program that is used to manage various resources and overall operations of computer system.
- It provides the user with an interface that is easy to use than bare hardware.

Compiler - whole at a time
Interpreter - one statement at a time

iii) Translator

It is a computer program that converts the program written in other language into an equivalent machine language. Types of language translator : i) Assembler, ii) compiler, iii) Interpreter

iii) Utility Software

It provides additional capabilities to a computer system in addition to OS. for e.g defr defragmentation, Anti virus system.

Differences between System Software and Application Software

	System software	Application software
i)	System software is a This acts as an interface between the system and the applications.	This is designed directly from the user perspective.
ii)	Generally users do not interact with system software.	Generally users interact with application software.
iii)	System software runs independently.	Application can't run without the present of the system software.
iv)	It perform several task.	It perform specific task.
v)	It has is of three types: Operating system, Language processor, Utility software.	It is of two types: Tailored software, packaged software.
vi)	E.g: Windows XP, Linux	E.g: Adobe, Hcrosoft, Microsoft.

2) Application Software

The software that is is written to solve for specific problem is known as application software. Application softwares are written by a programmers. For example: word-processing or, database application, accounting packages etc.

* Types of Software

i) Customized or Tailored Software

- The software which is designed to meet specific requirement of an organization or individual is called customized software.
- The tailor tailored software is made only for one customer.
- The software doesnot work for another organization.
- These types of software are generally made by local programmers.
- C, Java, C# (C shark), Python, types of programming language are used to make these software.
- For example: MIS of school and colleges, Library Management System, travel management system and so on.

ii) Packaged software

→ The software which is generalized set of programs which is designed and developed for general purpose.
→ These are the software which are produced by development organization and sold.
→ It is also called universal software.
→ For examples: Word processing package, Database system, Speardsheet package, etc.

Computer Virus

→ A set of programs that is designed to cause damage, steal personal information, modify data is called computer virus.
→ It requires human action to propagate (transform).

Types of Computer Virus

i) Trojan horse

→ A 'Trojan horse' acts as regular software/gentle performs that actually performs some destructive task.
→ Major task of 'Trojan horse' include deleting, blocking, modifying, dropping data, etc.
→ One of the most dangerous types of trojoin horse is a program that claims to free a computer from virus but instead introduces (सदृश)

viruses onto your computers.

ii) Worms

→ It is a computer program that copies itself.
→ It replicate itself, it doesnot need human intervention to replicate.

iii) Spyware

→ It is a computer software that performs certain activities generally without appropriately obtaining users approval. Keylogger, is a spyware.
→ Keylogger records key stroke made on a computer and secretly send it to the other host (person).

iv) Page hijacking

→ It refers to the method by which a computer in router to a particular page without their consent.

v) Boot Sector

→ This type of virus ~~the~~ infects the master boot records (as Bios).

vi) Overwrite virus

Chapter 3 Operating System

* What do you understand by memory management?

ans Memory management is one of the functions of operating system which refers to the allocation of required memory space between computer hardware and memory.

In another word, Memory management is the process of controlling and coordinating a computer's main memory. It ensure that blocks of memory space are properly managed and allocated so the operating system (OS), applications and other running processes have the memory they need to carry out their operations.

Operating System

- An operating system is a system which is used to control the resources of the computer system.
- It controls the overall operation of a computer system and provides the facility where the user can execute the program in a convenient and efficient manner.
- It controls the resources of the computer system.
- It hides the details of the hardware from the user or programmer.
- For e.g : Dos, Windows xp, Vista, UNIX, etc.

Users

Application software (e.g: ms word, ms excel, Power point etc.

System software (e.g: Operating system)

Computer hardware e.g: (I/O device, CPU, RAM etc)

An Operating system acts an interface between user and computer system

Users → Operating System → Computer hardware

Objectives of Operating System

i) To make the computer system convenient and easy to use.
ii) To use the computer hardware in an efficient way.

Types of OS

i) Single user OS
ii) Multi user OS
iii) Multitasking OS
iv) Multiprocessing OS
v) Real time OS
vi) Embedded OS

Function of Operating System (Board question)

i) Memory Management

- The process of allocating the main memory space to the software is called memory management.
- In a computer system multiple process execute at the same time.
- Each process needs certain amount of memory to execute. So, operating system is responsible to manage these memory.
- The execution time of the software depends on the availability of the data in the main memory. Therefore OS must performed the memory management in the effective way. Otherwise this will create negative impression on throughput of computer system.

Memory management must ensure following :-

i) Correct relocation of data.
ii) Utilization of small free spaces
iii) Facilitating to share information
iv) Protection of data from illegal change.

ii) Device Management :

- Various phenipheral devices like hard disk, printer are connected to the computer. operating system provide appropriate functionality to manage and control these attached device which is called device management.
- Device management is responsible for managing all the hardware device of the computer system. It also include the management of the storage devices as well as management of the input/output devices.
- The task also include to track the status of the devices.
- Device driver software is used to communicate OS and the devices.
- Device driver are the software program that are used by OS to control the functioning of various devices in a uniform manner.

Note :-

i) Buffer
It is a temporary memory area in which data is stored while it is being processed or transferred.

ii) SPOOL

- Spool (Simultaneous Peripheral Operation On-line) is a buffer in memory area or disk, Spooling stores the jobs in a spool where the devices can access it when it is ready. Spooling is commonly used for printer.
- User may give several print commands, and continue working with other operations. However, the printer can print only one task at a time.

Therefore remaining task / job are stored in the spool in a ~~question~~ queue. This task will be continue until the last job is finished.

iii) File Management

- The file management function involves handling the file system which consits of two parts
  i) a set of file
  ii) Directory structure
- A file is the collection of related information, which has a name in it. This (file) is the smallest unit which can be written in the secondary memory.
- A data cannot be return if the appropriate file is not created.
- Directory structure provides information about the file stored on the secondary storage device such as: harddisk. It contains information about all the file ~~with-in it.~~ within it.
- A directory further may have a subdirectory define within it.
- The operations that can be perform on a directory are search a file, create, delet and rename, etc.

iv) User Interface

- The primary goal of OS is to make the computer convenient for use by its user.
- The user can interact with the computer by using the interface. There are mainly two types of interfaces:

i) Command Line Interface (CLI)

- CLI requires user to interact with OS in the form of text keyed in from the keyboard.
- The disadvantage of CLI is the user has to remember and learn different commands which is required for copying, deleting and opening a file or folder.

ii) Graphical User Interface (GUI)

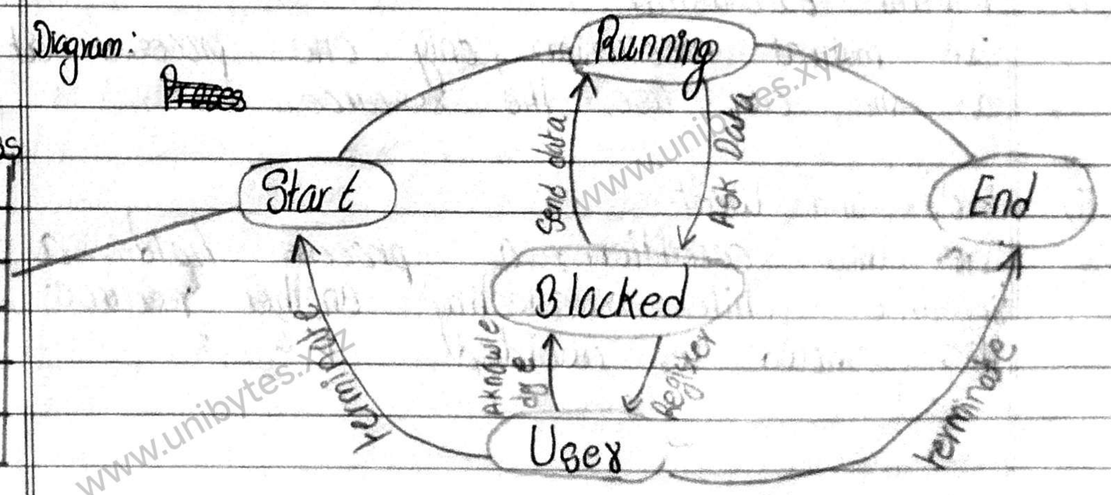
- GUI uses graphics to display various command
- It consists of icons, menus, windows and pointers.
- The advantage is the user need not learn the commands but the user has to use the mouse or keyboard to give instruction to create, delet or rename.

v) Process Management

Diagram:

Process

P1
P2
P3
P4
P5
P6



- A process is the program in a state of execution.
- A program may have one or more than 1000 processes running.
- The process management of an operating system involves the execution of various task such as creation of processes, scheduling of processes and management of deadlock and termination of processes.
- If the management of processes not done properly there may occur deadlock situation. Therefore the OS has to synchronize with various process to over come deadlock.

Deadlock

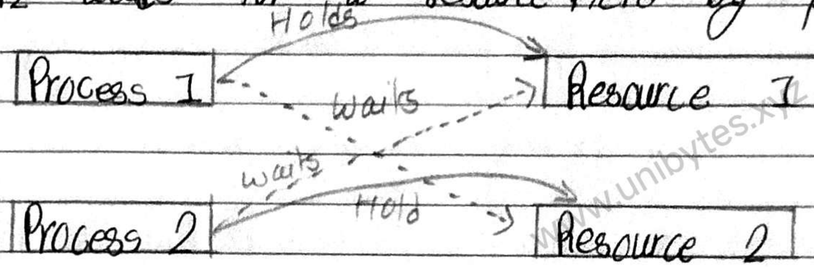
A deadlock is a situation where a set of processes are blocked because each process is holding a resource and waiting for another resource. The reasons for deadlock are:

i) Mutual Exclusion
In mutual exclusion, only one process at a time can use the resource.

ii) Hold and Wait
In this condition, a process hold a resource while requesting another resource. this should be avoided.

iii) No pre-emption
In this condition, a process is not allowed to force some other process to release a resource.

iv) Circular Wait
In this situation P_1 waits for a resource held by another process P_2 and the process P_2 waits for a resource held by process P_1.



Virtual Memory

- Virtual memory is the concept of managing memory virtually.
- For some applications large memory is required to run the application in CPU, and the whole program can't be loaded into the memory but with the concept of virtual memory. The application will run effectively and efficiently by swapping the pages between main memory and secondary memory. The overall process is called page demand.
- Operating system may use algorithms like FIFO, LIFO, LRU to swap the pages.

Chapter 4 Database Management System

Database Language

The language which is used by a database programming language to execute the query and return specific answered data is called database language. It is a high level language.

Types of database language are:

i) Data Definition Language (DDL)

DDL defines the database schema this language used to create a table, add extra column in table. DDL is used to create database structure.

Syntax: Create Database "Database name".

example: Create Database student

Syntax: Create Table "Table name"
int id; // datatype id
varchar name; // datatype name

- Example: Create Table Library
{
bid int
sid int
date date
}

- Create Table details
{ id int
name varchar(30)
}

=> Alter Table Tablename

Syntax: Alter Table Details
Add column phone Varchar(11)
[:. This syntax add the phone number column in detail table.]

* Syntax: Drop table Library (To delet the database)

ii) Database Manipulation language (DML)

DML is a query language which is used for accessing and manipulating the data stored in database. It is use to insert the data, select the data, delet the data, update the data, etc. For e.g "Insert into command is used to insert data in the database." syntax:

Insert into Detail (id, name, phone)
Values (1, "John", 98 99785439)
Values(2, "Don", 99554433)

* Database Security

- Database Security secures the digital privacy of a customer. It helps to prevent unauthorized access to computer and database.
- Protecting files and folders by adopting set of rules and techniques is data security.

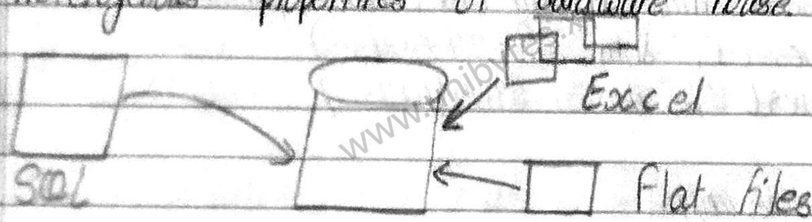
* Data Warehouse

Datawere warehouse is the collection of a data in reservoir where the data are abstracted

for analytical purpose. It is also called OLAP servex (Online analytical process) extract, transport and loading is used to transfer the data from data source to data warehouse. The characteristic of data warehouse are:-

i) Subject Oriented: Dataware house is oriented towards the major subject areas of organization which have been defined in data model. For e.g: Customer, Sales, location, time are subjects.

ii) Integrated: The data in the data warehouse are extracted from multiple sources. For example SQL files, Excel sheet, flat files and other documents are integrated in the single data warehouse. It is also called heterogenous properities of dataware house.



iii) Non-Volatile: The data in the data~~ware~~ warehouse are only loaded but not change.

iv) Time-Variant: There is the connection between date, data and time recorded when it is enter into the data warehouse. The more old data are recorded the more perfect data analysis is obtained.

* Advantage of data Warehouse

i) Decission Making
ii) Enhanced Customer Service
iii) Enterprise Intelligence
iv) Business reengineering

* Disadvantages of Data Warehouse

i) Underestimation of data loading resources
ii) Inflexibility and Homogenization of Data
iii) Demands for large amount of resources
iv) Hidden issues consume Time
v) It is difficult to maintain.

2001: 2 Exam

* Database Models

Database Model describes the structure of database it consists of components for describing the data and relationship among them.

It is an abstract model that describes how the data is represented and used.

Types of database Models:

i) Hierarchical Database Model

- It was developed by IBM. This model

helps to establish a logical relationship among various dataelements and these elements in a hierarchy. In this model each record on one level can be related to multiple records on the next lower level. The upper layer is also called parent level and lower is called child. The parent child relationship is one to many relationship between two entities. That is one parent can have multiple children.

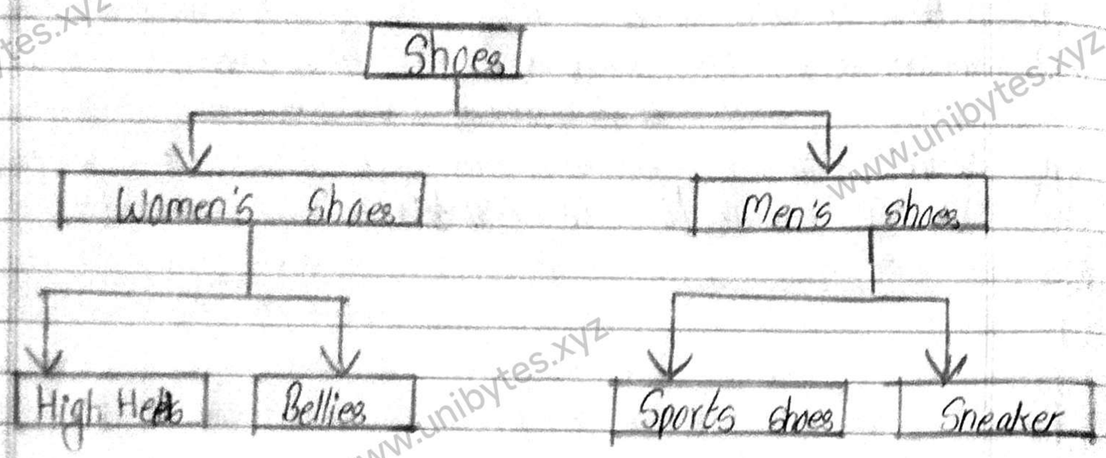
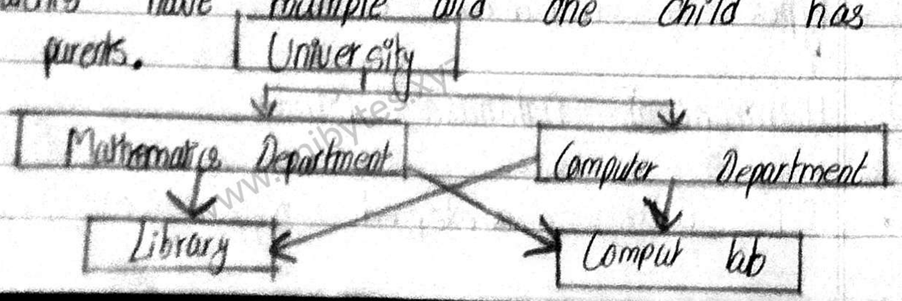


Figure : Hierarchical Model

ii) Network Model

This is the modified version of hierarchical model. In this model each record in the database can have multiple parents. In this model one parents have multiple and one child has multiple parents.



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iii) Relational Database Model (RDMS)

RDMS was composed in 1970 by E.F Codd. RDMS are made of columns and Rows. It also consists of tables (relation), records (tuple), fields, keys and data values. In the relational table each row has to be unique, each column has a unique name, values are atomic. For example : A database of an Library Management System

Student Detail

Id	Name	Phone
1	Ram	999999
2	Hari	9959959

Fee

Id	Amount
1	10000
2	20,000

RDMS Model certain constant are used.
For e.g : i) Null
ii) Primary key
iii) UNIQUE
iv) Foreign key
v) Check, etc.

These constants are the rules that are applied during the creation of table.

iv) Entity - Relationship (E-R) Model

ER model represents the entities contained in the database. The entities are further described in the database using attributes. The relation

between the entities is shown using the relationship and relationship is represent by diamond sign (◇). The E-R model is represented diagrammatically using an E-R diagram. The ER model mainly ~~contain~~ contain Entity, Attribute and Relationship

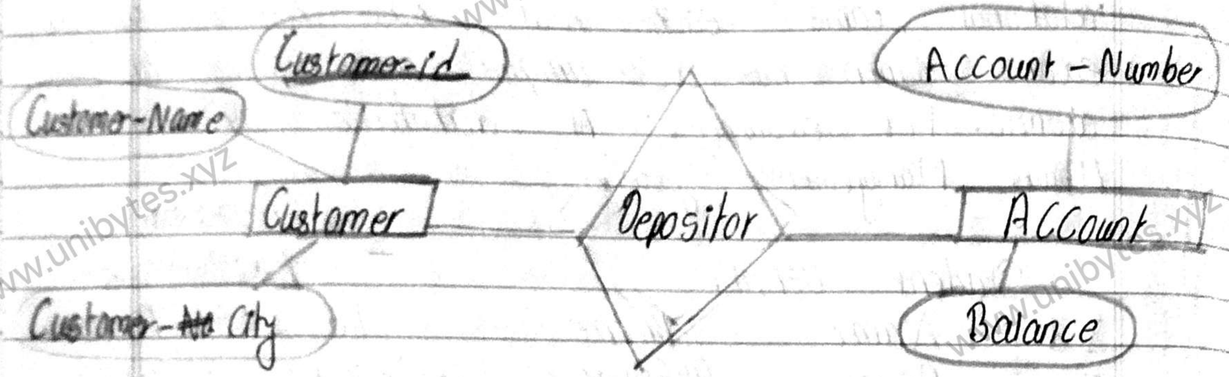


Figure: E-R Database Model

* What is data mining. What is KDD?

Ans The process of extracting new knowledge from the data source is called data mining. Data mining techniques and tools help enterprise to predict future trends and make more informed business decisions. It is concerned with the analysis of data. ~~It~~ and use of software techniques for finding hidden patterns. Data mining software searches through large amount of data for meaningful pattern of information. Data mining is more useful today due to the growth of big data and data warehousing. Data mining support fraud detection, risk management, cybersecurity planning and ~~more~~ many other critical business use cases. The analysis can help managers and CEO in decission making process.

For example, many companies use data mining to:

- Perform market-basket analysis to identify new product bundles.
- Find root cause of quality or manufacturing problems.
- Prevent customer attrition and acquire new customers.
- Cross-sell to existing customers
- Profile customers with more accuracy.

KDD means knowledge Discovering in Database.

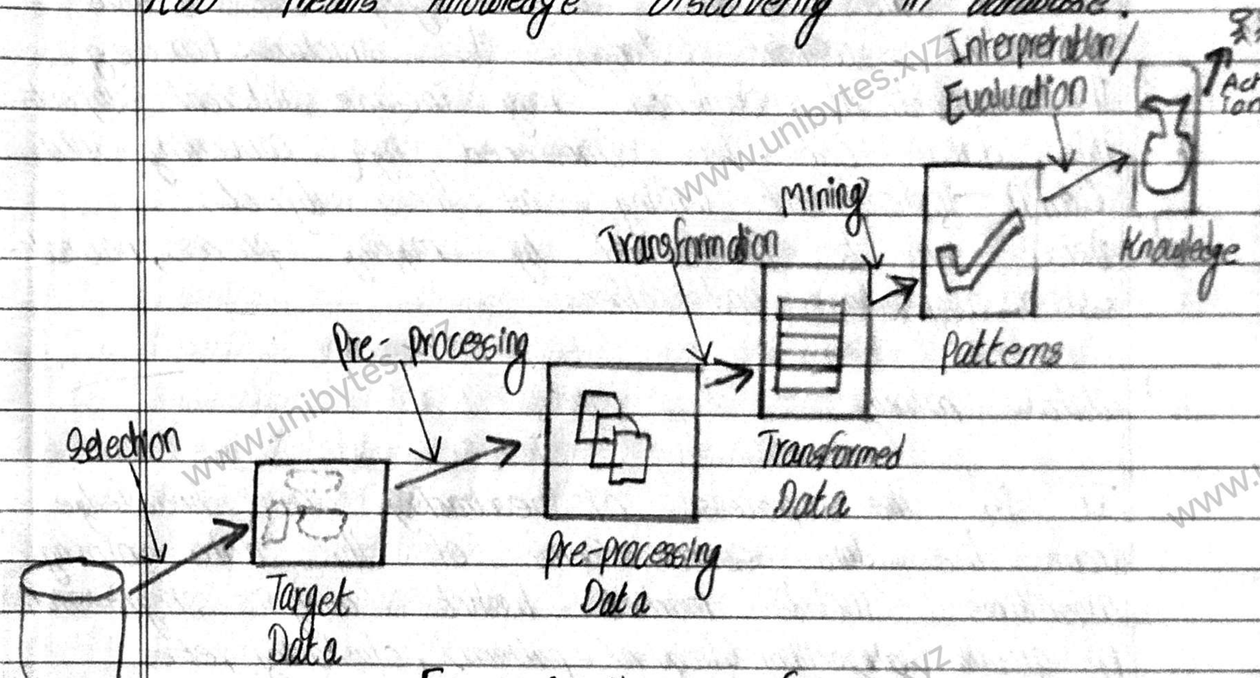


Figure: Stages of Data Mining

i) Selection:

In this stage data are selected according to some criteria. This the first process of KDD so all the data are collected and then selected.

i) Preprocessing

This stage is also called cleaning stage. The data which is selected needs to be clean before it is transfered to transformation. In-consistent data are change to consistent.

ii) Transformation

It is the process of changing the format of data without changing its structure. For eg
i) The record of students may include different subjects this data can be transfered by converting into CGPA instead of writing all the subjects
ii) Data can be transformed by mapping process, normalisation, aggregation and others.

iv) Data mining

It is the process of extracting new knowledge from the data source. Some of the data mining algorithms include market basket analysis, regression, FP growth algorithm (frequent pattern), clustering, etc.

v) ~~Knowledge~~ Interpretation and evaluation

It is obtain from the algorithm conducted by data mining process. This knowledge is normally new and undiscovered. The knowledge is normally used by knowledge worker, CEO and managers.

Imp

i Who is responsible for maintaing database. Explain in detail

ans DBA is responsible for maintaing database. Database Administrator (DBA) is responsible for maintaining, securing, and operating database and also ensures that data is correctly stored and retrieved. ~~In~~ In other word, DBA is a professional who oversees the management, upkeep, and security of a company's database system. Modern organizations depend on databases to store and organize a tremendous quantity of data, including customer information, financial information, and inventory information.

The Function of DBA include

i) Defining of schema
ii) Defining of storage structure and access method
iii) Deciding storage devices to be used
iv) Gathering user authority to access the database.
v) ~~For~~ Maintaining security in database
vi) Modifying database data
vii) Deciding software to be used
viii) Deciding backup procedure.
ix) Deciding the recovery procedure

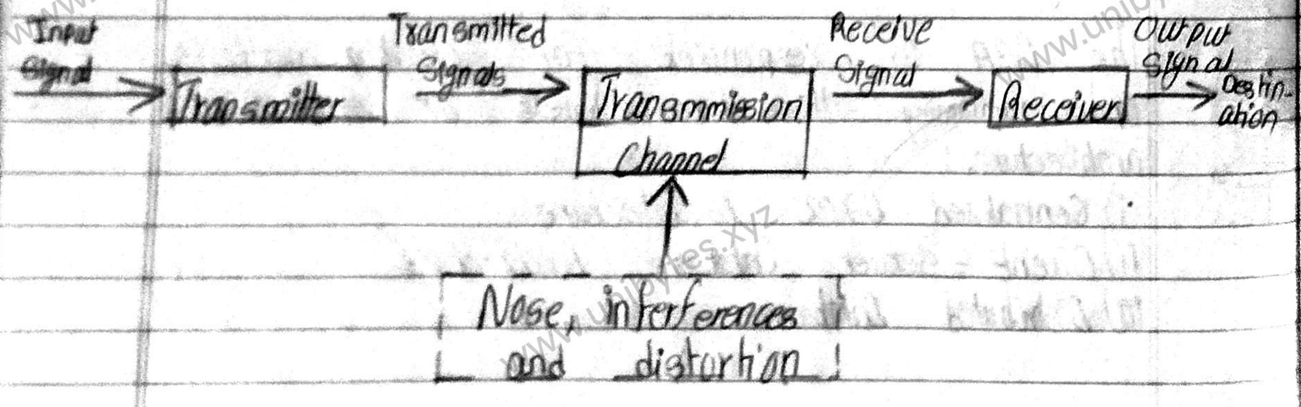
The DBA is responsible for creating, modifying and maintaining the three levels of ~~DBMS~~ DBMS architecture.:
i) Centralized DBMS Architecture
ii) Client - server Database Architecture
iii) Distributed Database.

Lesson 5 Data Communication and Computer Network

* Computer Network

- Collection of computers and devices interconnected by communication channel that facilitate communication among users and allows users to share resource and information is called Computer Network.
- Computer refers networking refers to interconnected computing devices that can exchange data and share resources with each other.
- It is a set of devices connected through links. A node can be computer, printer, or any other device capable of sending or receiving the data.
- The links connecting the nodes are known as communication channels.
- Computer Network uses distributed processing in which task is divided among several computer. Instead, a single computer handles an entire task, each separate computer handles a subset.

* Basic Elements



* Types of Computer Network

1) Local Area Network (LAN)

- LAN is a collection of devices connected together in one physical location, such as a building, office, or home.
- A LAN can be small or large, ranging from a home network with one user.
- A LAN comprises cables, access points, switches, routers, and other components that enables devices to connect to internal severeds, web severes, and other LANs via wide area networks.

Advantages of LAN

i) Hardware and software can be shared.
ii) Private ownership
iii) It is easy to control and it is easy to manage the entire LAN.
iv) Data transfer rate is higher
v) Software and resources can be centrally managed
vi) The error rate is very less.
vii) LAN user do not require own HD (hard disk) and CD-ROM drivers.
viii) All the user work can be stored in a central place hub.

Disadvantage of LAN

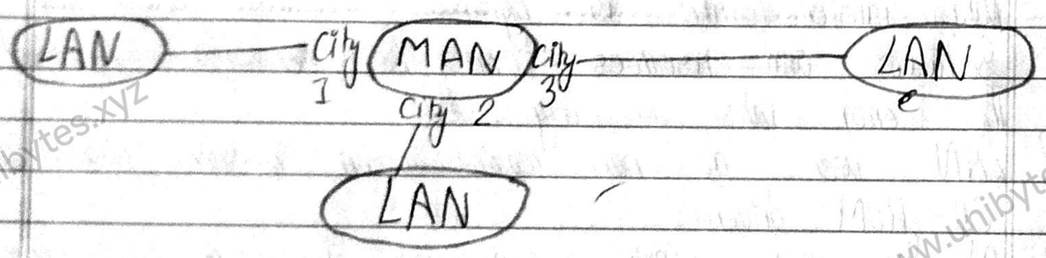
i) It covers a small geographical area
ii) A virus can be spread more easily.

iii) High degree of maintence
iv) A data is stored there is a greater need for security-based

2) Mehropolitan Area Network (MAN)

- A MAN is a computer network that connects computers within a metropolitan area, which could be a single large city, multiple cities and towns, or any given large are with multiple buildings.
- A MAN is larger than a LAN but smaller than a WAN.
- The term "metropolitan" implies the size of the network, not the demographics of the area that it serves.

* Difference between LAN AND MAN



3) Wide Area Network (WAN)

- WAN is a large computer networks that connects groups of computers over large distances.
- WANs are often used by large businesses to connect their office networks; each office typically has its own local area network, and these LAN's connect via a WAN.
- The definition of what constitutes a WAN is fairly broad. Technically any large network that spreads out over a wide geographic area is a WAN. Example: Internet

* Compare and Contrast between LAN, MAN and WAN.

Basis	LAN	MAN	WAN
i) Full-Form	LAN stands for local Area Network.	Stands for Metropolitan Area Network.	Stands for Wide Area Network.
ii) Geographic Area	Operates in small areas such as the same building or Campus	Operates in large areas such as a city	Operates in larger areas such as country or continent.
iii) Owner-ship	LAN's ownership is private	MAN's ownership can be private or public.	WAN's are not owned by any organization
iv) Transm-ission speed	It has high transmission speed	It has average transmi-ssion speed.	It has low transm-ission speed.
v) Propag-ation delay	It has short propagation delay.	There is a moderate propagation delay in a MAN.	There is a long ~~for~~ propagation delay in a WAN
vi) Congestion	It has less Congestion	It has more conges-tion.	It has more congestion
vii) Design and mainten-ance	It is easy	It is difficult than LAN	It is difficult than LAN as well MAN
viii) Expen-sive	It is less expensive	It is mare expen-sive than LAN	It is too much expensive

Network Interface Card

- NIC is a hardware component without which a computer cannot be connected over a network. The NIC is the physical piece of hardware that connect your computer to the network.
- It is a circuit board installed in a computer that provides a dedicated network connected to the computer.
- It is also called network interface controller, network adapter or LAN adapter.
- A network interface controller is a computer hardware component that connects a computer to a computer network.

* Types of NIC

i) Internal Network Cards.

In internal network cards, motherboard has a slot for the network card where it can be inserted. It requires network cables to provide network access

ii) External Network Cards

- In desktops and laptops that do not have an internal NIC, external NICs are used
- External network cards are of two types.
  - Wireless and
  - USB based. Wireless network card needs to be inserted into the motherboard, however no network cable is required to connect to the network.
- They are useful while traveling or accessing a wireless signal.

Purpose

- NIC allows both wired and wireless communications.
- NIC allows communications between computers connected via local area network (LAN) as well as communications over large-scale network through Internet Protocol (IP)
- NIC translating and converting data into digital signals that your device can understand
- Transmitting signal using physical layer of the card, which deals with connecting two distinct station ~~por~~ points.
- Transferring data packets using a network layer from source, such as a website, to target point, such as a personal computer.

Topology

- A network topology is the arrangement of computers, cable and other components on a network.
- It is the concept of explaining how computers are connected to each other and shows physically how they are linked.

Types of topology

1) Bus Topology

It is a network setup where each computers and network device is connected to a single cable or backbone. Depending on the type of computer network cable, an RJ-45 network cable is used to connect them together

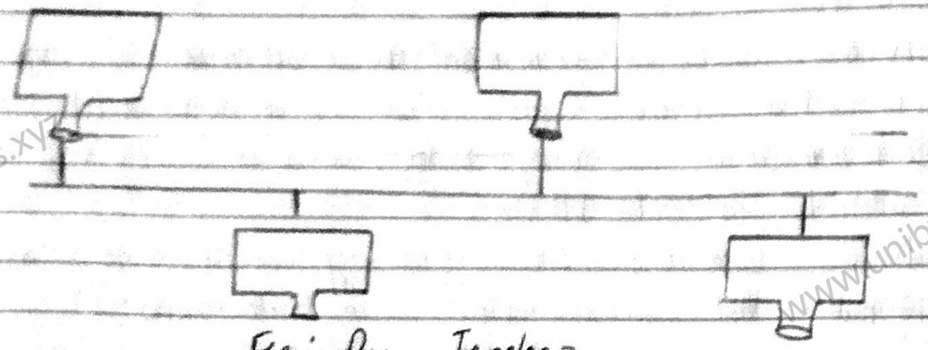


Fig: Bus Topology

Advantages

- Works well when you have a small network.
- Requires less cable length than a star topology.
- Easiest network topology for connecting computers or peripherals in a linear fashion.

Disadvantages

- It can be difficult to identify the problems if the whole network goes down.
- It can be hard to troubleshoot individual device issues.
- Bus topology is not great for large network.
- Terminators are required for both ends of the main cable.
- Additional devices slow the network down.
- If a main cable is damaged, the network fails or splits into two.

2) Star Topology

The star was first popularized by ARCNET, and later adopted by Ethernet. Each node is connected directly to a central device such as hub or a switch

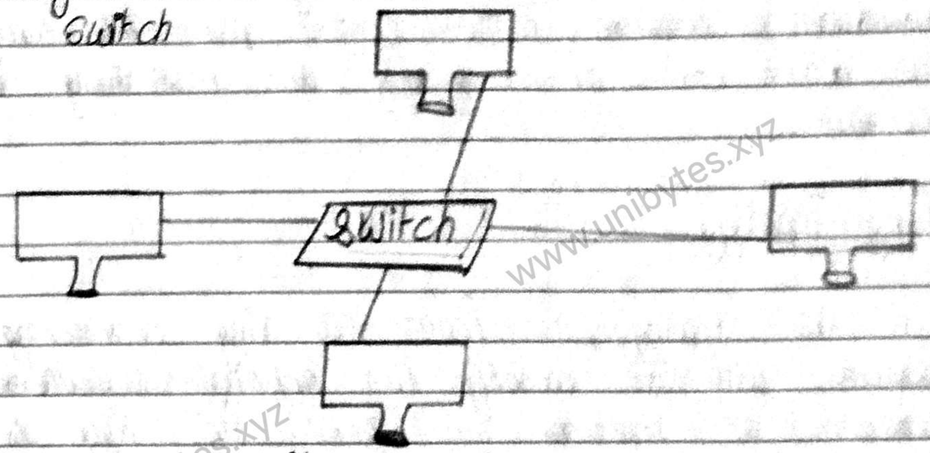


Fig: Star Topology

In a star topology, computers aren't connected to one another but are all connected to a central hub or switch. When a computer sends data to other computers on the network, it is sent along the cable to a central hub or switch, which then determines which part it needs to send the data through for it to reach the proper destination.

Characteristics of star topology

- All cables run to a central connection point.

- If one cable breaks or fails, only the computer that is connected to that cable is unable to use the network.
- A star topology is scalable.
- As the network grows of changes, computers are simply added or removed from the central connection point, which is usually a hub or a switch.
- Because there is too much cabling used to connect individuals computers to a central point, this may increase the ~~cost~~ cost of expanding and maintaining the network.

3) Ring Topology

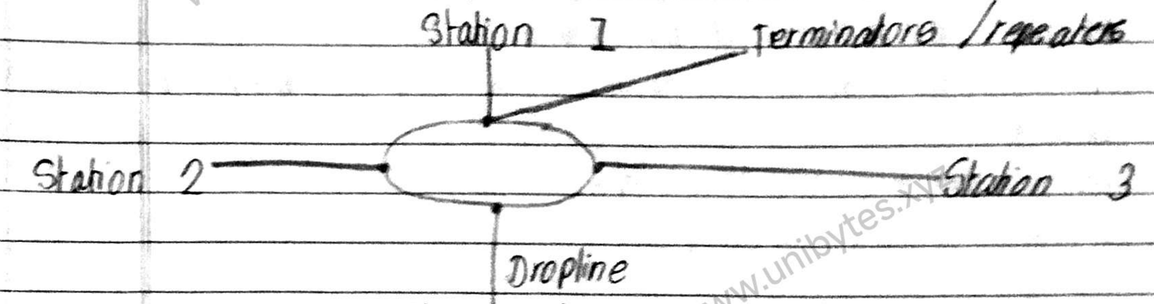
In this topology, it forms a ring connecting devices with its exactly two neighboring devices. A number of repeaters are used for ring topology with a large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node. Hence to prevent data loss repeaters are used in this network. The transmission is unidirectional

Advantage

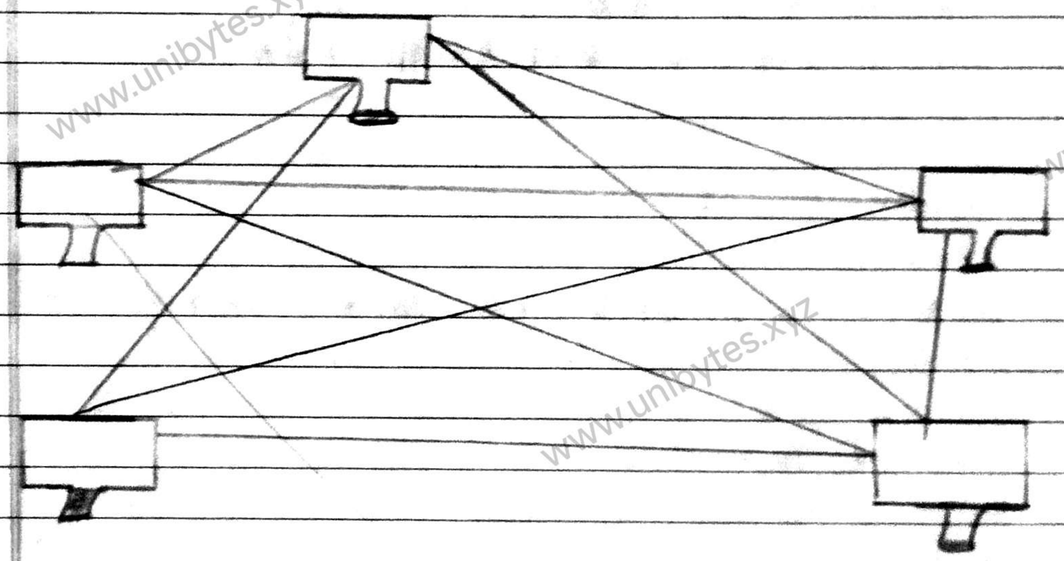
i) The possibility of collision is minimum
ii) Cheap to install and expand
iii) Higher data rate
iv) Adding workstation does not impact on the performance of network

Disadvantages

i) Troubleshooting is difficult
ii) ~~The~~ Difficult to add new stations
iii) Less secure
iv) Failed of any one station can ~~not~~ affect the whole topology
v) More cables are needed than bus network



4) Mesh Topology / Hybrid



Every device is connected via dedicated channels. These channels are known as link.

Advantage

i) It is robust
ii) The fault is diagnosed easily. Data is reliable because data is transferred among the devices through dedicated channels or link.
iii) Provide security and privacy.
iv) Capable of handling heavy traffic
v) A single device's failure has no impact on the network.
vi) Data transmission is reliable.
vii) Provides security and privacy

Disadvantage

i) Installation and configuration are difficult
ii) The cost of maintenance is high.
iii) Time-consuming to construct and maitain.
iv) High Price

Router

It is devices which provide connectivity to other device.

Types of Router

i) Wird Wireless Router

A wireless router uses an Ethernet cable to connect to a modem. It distributes data by converting packets from binary code into radio signals, then wirelessly broadcasts them using antennae.

ii) Wired Router

It also uses an ethernet cable to connect to a modem. It then uses separate cables to connect to one or more devices within the network, create a LAN, and link the devices within that network.

* MODEM

Converts the digital signals from a computer at one end into analog frequencies, and at another point analog frequency is converted into digital signals (which are then passed in telephone line). This is called modulation and demodulation.

Types of computer Modems

i) Onboard Modem: Modem build onto the computer motherboard. These modems cannot be removed, by can be disabled through a jumper or BIOS setup.

ii) Internal Modem: Modem that connects to a PCI slot inside a newer desktop computer or ISP slot on an older computer.

iii) External Modem: Modem in a box that connects to the computer externally, using a serial port or USB port.

Repeater

Device used to regenerate or replicate signals is called repeater. This device used is transmission system to amplify both analog and digital signals. Analog repeater can only amplify the signal but digital repeater reconstruct a new signal that is near to its original quality.

* What is switch? Explain in detail.
* Different between Switch and hub.

#	Hub	Switch
i)	Hub works on physical layer of OSI model.	Switch works on Data link layer of OSI model
ii)	HUB is Broadcast Device	Switch is Multicast Device
iii)	Hub is used to connect device in the same network.	Switch is use to connect devices in the same network.
iv)	Hub sends data in the form of binary bits.	Switch sends data in the form of frames
v)	Hub only works in half duplex.	Switch works in full duplex
vi)	Only one device can send data at a time.	Multiple devices can send data at the same time.
vii)	Hub does not store any mac address of IP address.	Switch store MAC Address.

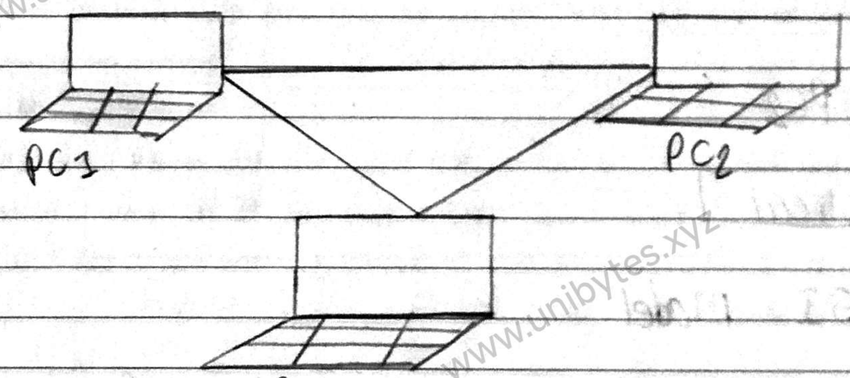
Imp

Network Architecture

Network Architure defines the fundamental principle in building the structure of the computer network. It includes hardware, funcational layer, interface / software and protocols. These helps to establish communication and ensure the reliable transfer of information. Types:

i) Peer-to-Peer

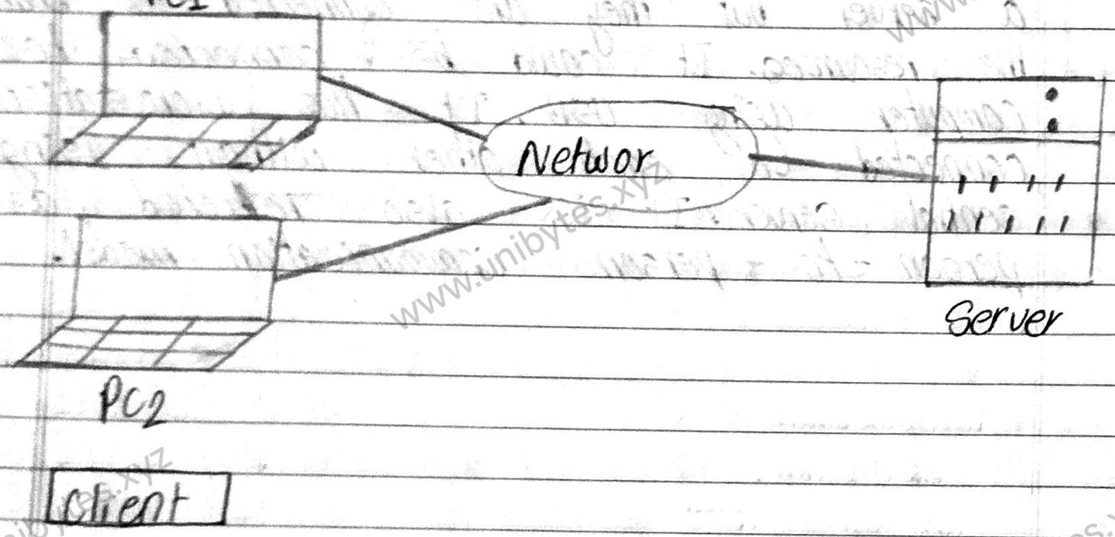
A Peer-to-peer network is created without a server but they are connected to share the resources. It could be connected to computer using USB. It has workstation connected to each other without using central server. It is also reffered as person-to-person communication model.



ii) ~~The~~ Client Server Architecture

The client server Architecture

works on the basis of producer - consumer technology. The server act as a producer and the client act as a consumer. The task of the server is to provide services to the client on demand. This service can be anything like access of information, file sharing, printer access, etc. The task of the client is to request service to the server and the server is responsible to control, manage and provide services to all the clients.



OSI Model

OSI model is the short form of Open System Interconnection model. It is a standard discription of "how" message should be transmitted between any two point in the tele-communication model. The purpose of OSI model is to guide product manufacture so that their product will work with other product. The OSI model consist of 7 layer each layer has the particular network function or task.

Layer of OSI model

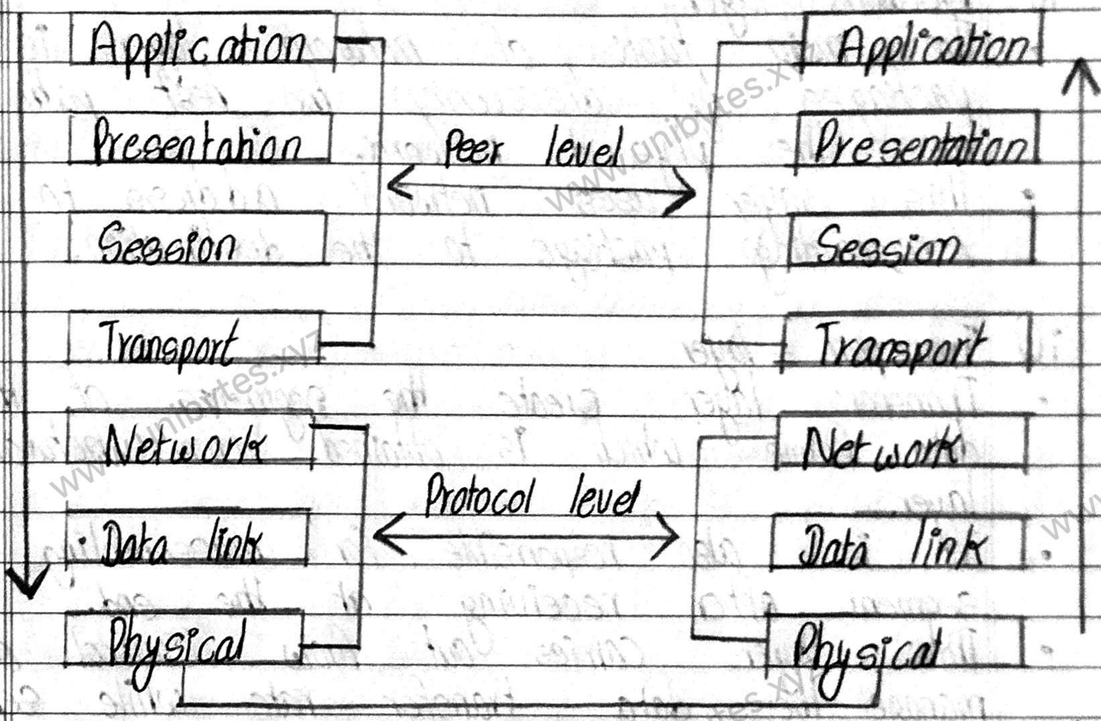


Figure : The Seven Layer of OSI model

i) Physical layer
It is concerned with transmiting bits over a communication channel. It provides the hardware which is used for sending and receiving data over the internet.

ii) Datalink layer
- Datalink layer establishes connection between two nodes on the network. It also helps to terminate the connection between devices. Datalink layer breaks up package into frames and then sends to the destination.
- It also checks error and MAC (Media Access Control) address to connect the devices.

iii) Network layer
- The main task of network layer is routing packages by discovering the best path across the physical network.
- This layer uses network address to route / forwarding package to the destination.

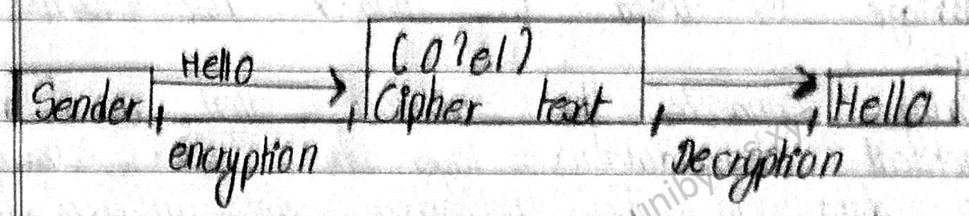
iv) Transport layer
- Transport layer create the segments of the data frame which is obtained from network layer.
- It is also responsible for reassembling the segment after receiving at the end.
- This layer carries out flow control and manage the data transfer rate while sending and receiving.

v) Session layer
- The session layer creates communication channels called session between devices.
- This layer is responsible for opening sessions, remain open until data transfer and closing session when the communication end.
- If the session is interrupted in the middle of transfer device will resume data transfer from the beginning or log point.
- Session layer also manages the conversation and create notification if some error occurs.

vi) Presentation layer
- This layer is responsible to present the data on the receiver side.
- It may need to encrypt and decrypt the data if needed.

Note: Encryption: The process of changing normal text into unrecanginized (cipher text) is called encryption.

Decryption: The process of converting unrecanginized text into normal text is called decryption.



vii) Application layer
- The application layer is used by end user software such as web browser and email clients. For e.g application layer protocols are HTTP, FTP, POP and SMTP, DNS.

* Network Devices

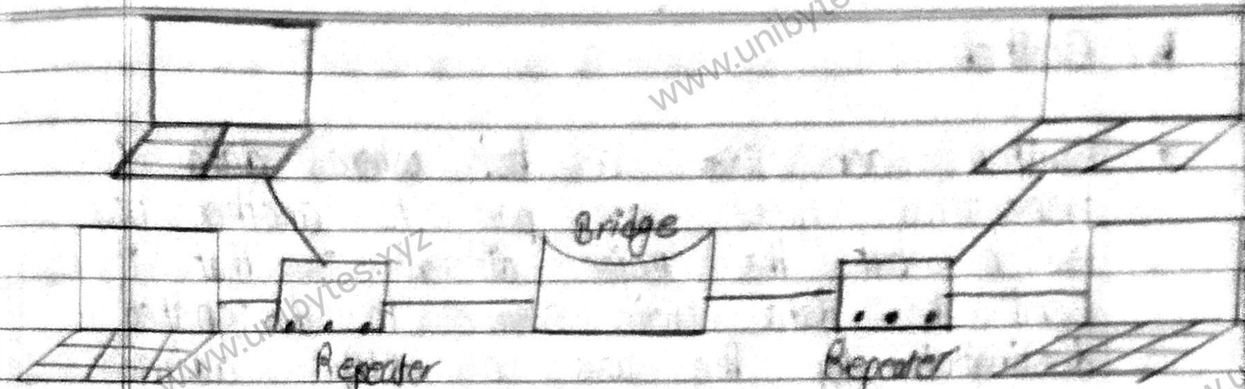
i) Network Interface Card

ii) Repeater

- Repeater are used to extend network.
- They are useful where computer in the network are located far away from each other.
- The main task of repeater is to amplify the signal so that the signal will be strong enough.

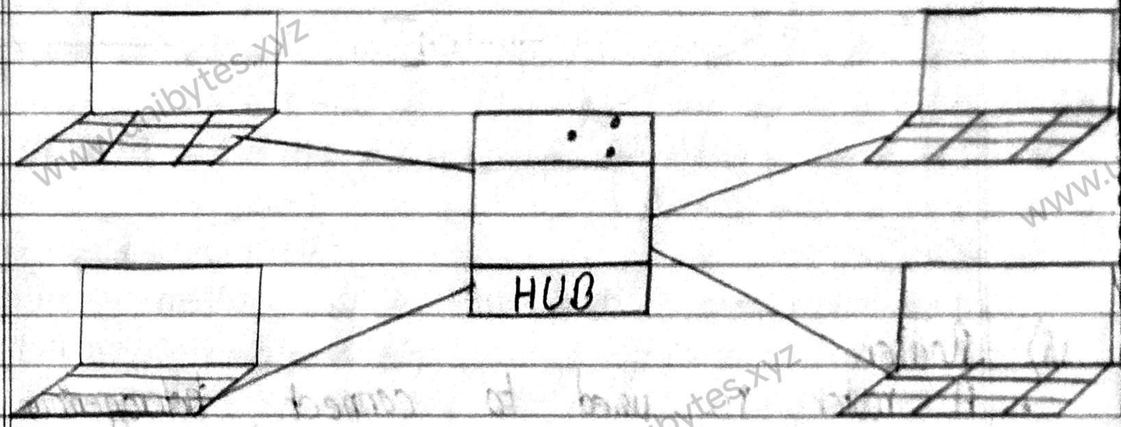
iii) Bridge

- Bridge is used to connect two LAN segments.
- Bridge connects the network that uses different protocol at datalink layer. The frame format of data in the networks are different. The bridge convert the frame format before transmitting data from one network to another.
- Bridge forwards the copy of frame to the other network only if necessary.
- It is also used to divide a network into separate broadcast domain to reduce traffic.



iv) HUB

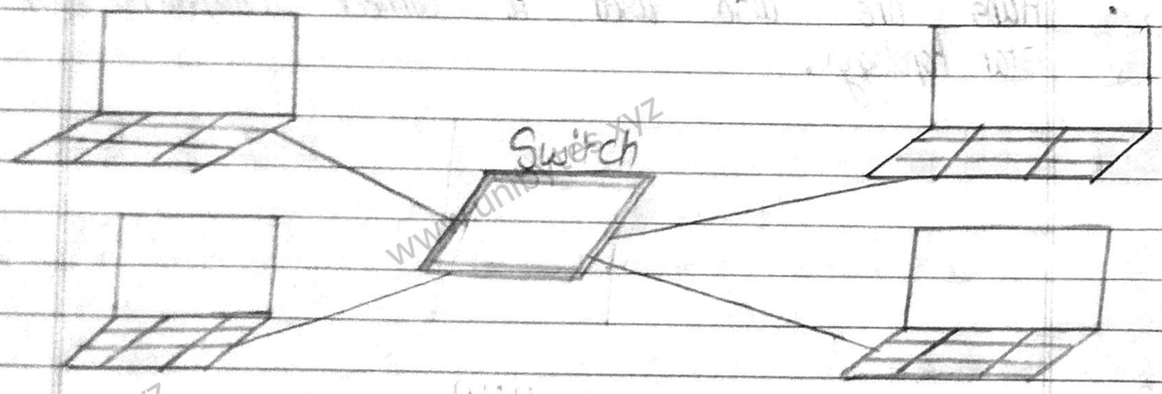
- It is like a repeater but it doesnot amplify the signal.
- Hub operates at the physical layer of OSI reference model.
- Hubs are also used to connect computers in star topology.



- It has main one disadvantage hub increase the network traffic because it broad cast data to all the devices connected all the ports of the hub.

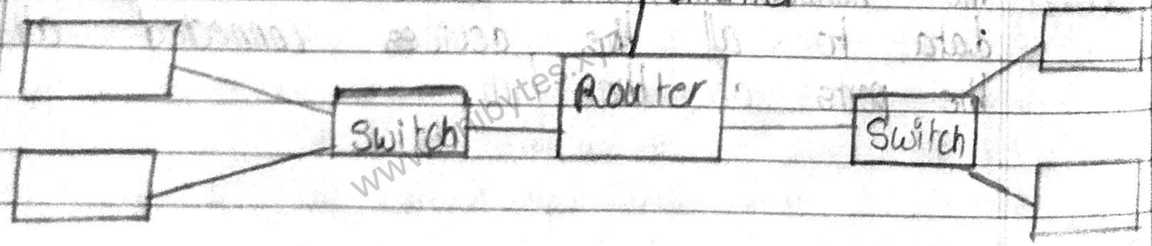
iv) Switch

- Switch act likes a hub where data is transmitted frome one port to another via switch but the major different is that it send the data from source to designated destination by the use of MAC address.
- Switch doesnot broadcoast data but instead it intelligently send data to the particular destination.
- A switch receives a single from the source computer checks the MAC address of the frame and forward the frame to the destination computer having the same MAC address.



v) Router

- A router is used to connect heterogeneous network.
- A router has a process, memory and I/O interface.
- Router operates in network in layer (3) in OSI model.



* Data Transmission Media

A transmission media can be defined as anything that carry information from source to destination. Data can be transmite through cable and wireless technologies. Computer and other telecommunication devices use signals to represent data. Types:

i) Guided media
ii) Unguided media

i) Guided media

- Guided media transmite signals by sending electricity or light by using a physical wired.
- It uses a cabling system that guides the signals
- Copper wires and optical fibers are mostly used guided media. For e.g: Twisted pair, cable coaxial cable, fiber optics cable.

ii) Unguided media

- The media which transport electromagnetic waves without using a physical conductor is called unguided media.
- The data signals are not bound to the cabling media instead data is transmitted through open air.

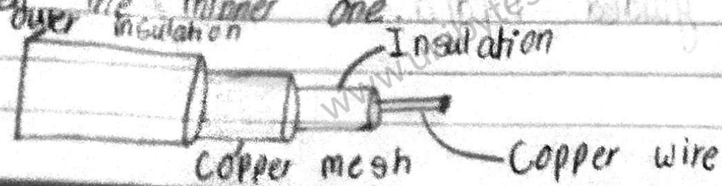
* Types of guided media

i) Twisted Pair Cable

- A twisted pair cable consits of two conductor, each with own plastic insulation, twisted together.
- One of the wire is use to carry signal and the other is used as the ground reference.
- Twisted pair cable is used for short and medium length connections.
- In the twisted pair the twisting to reduce electromagnetic interference from external source.

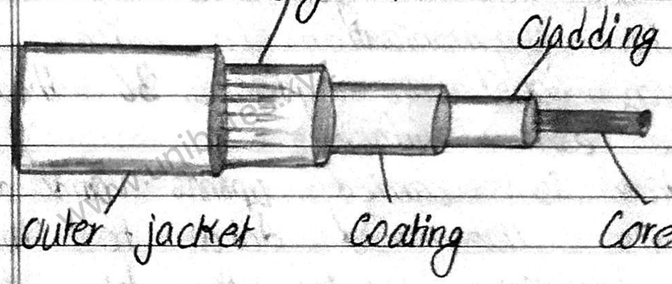
ii) Coaxial Cable

- Coaxial cable is made of conductor that share common axis.
- The center of the cable is relatively stiff solid copper wire encased in insulating plastic foam.
- The foam is surrounded by the second conductor, a wire mesh to which serves as a shield from electromagnetic interference (EMI).
- The thicker coaxial cable can transmit more data than the thinner one.



ii) Optical fiber

- Optical fiber uses reflection to guide light through the channel. It transmits signal in the form of lights.
- It consist of two main parts.
a) Core : Core is denser in comparision to cladding which is made up of plastics or some time glass.
b) Cladding : Cladding act as a protecting cover to core.
- Optical fiber transmit signals in the form of light.
- In comparision to other cables, optical fiber are used for transmission of information over large distance in less cost.

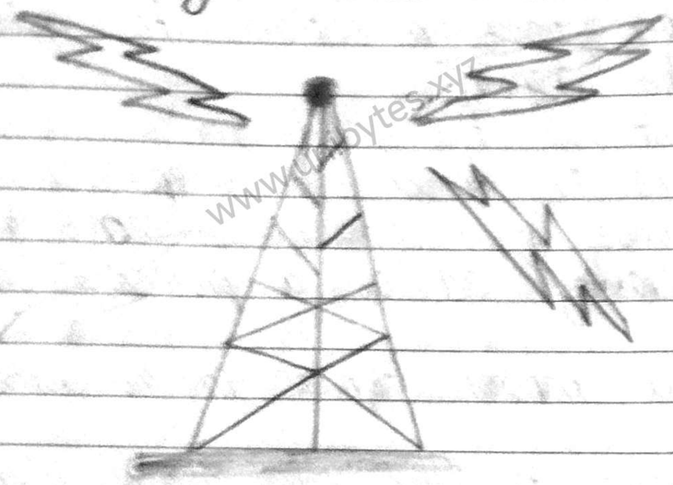


* Types of Unguided media

a) Radio transmission

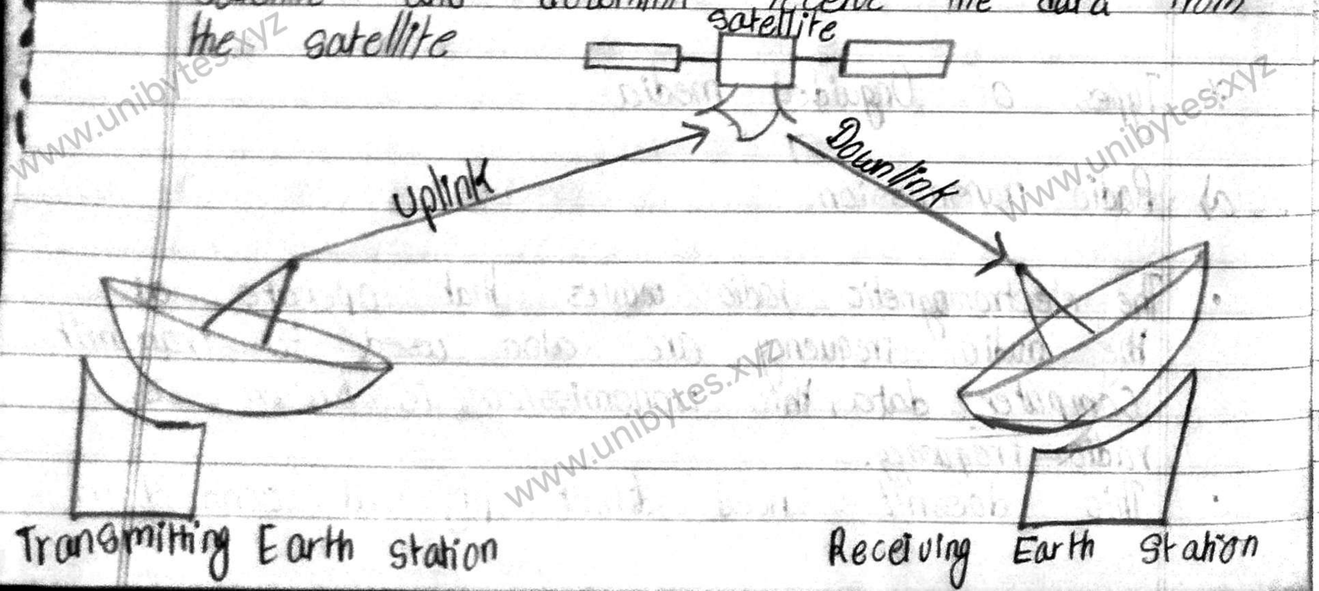
- The electromagnetic radio waves that operate at the audio frequency are also used to transmit computer data, this transmission is known as radio frequency.
- This doesn't need direct physical connection

like wires or cable. Instead of wires or cables the system uses antenna



b) Satellite Transmission

- Satellite are set in a geo-stationery orbit which routed in synchronization to earth.
- These geo-stationery orbit are place 36 thousand K.M above the earth surface
- The communication is carried uplinks and downlinks. The uplinks transmitted data to the satellite and downlink receive the data from the satellite



Chapter 6 Internet and World Wide Web

The Internet is a vast network that connects computers all over the world. It is a network of network that consists of million of private, public, academic and goverment networks which is ~~like~~ linked by a board array of electronic, wirless and optical network. Through the internet, people can share information and communicate from anywhere with an internet connection.

* When was first message sent using Internet?
  ans In october 1969, using ARPANET.

Internet is a global system of interconnected computers network that use standard Internet protocols (TCP/IP) to serve users world wide.

History of Internet

- The Internet came in the year 1960 with the creation of the first working model ARPANET (Advanced Research Project Agency).
- ~~In october I~~

The internet is setup with the help of physical optical fiber data transmission cables or copper wires and various other

networking medium like LAN, WAN, MAN, etc.

Usage of internet (Book)

* Application of internet

i) Communication
The internet allows to communicate by providing free and low cost ways for people to connect. Ex email, video call, voice call.

ii) Information Access
The internet allows accessing information through web browsers like chrome, firefox and safari. The internet provides access amounts of information that can be accessed immediately from almost anywhere with an internet connection.

iii) Online Shopping

- It also allows consumers to buy products, easily compare prices between multiple retailers through sites like amazon, google shoping.
- The benefits of online shopping include convenience, competitive pricing, broader selection, ability to purchase goods from other countries and the ability to send gifts more easily.

iv) Real-Time Updates

- The internet has enabled people to access real-time updates and breaking news stories as they occur. News sites are able to update stories throught the day, keeping the public constantly informed. Instant messaging is also ~~etc~~ an example of real-time updates.

* Advantages of Internet

i) Accessibility
Internet applications can be accessed from any internet-connected device anywhere, enabling remote usage.

ii) Real-time updates
Data and content can be updated continously, allowing internet applications to provide the ~~latest~~ latest updates.

iii) Scalability
Internet application infrastructure can scale to support large userbases more easily than traditional applications.

Img →
* Client-Server technology

Client-server technology is a model where devices, known as clients, requests services or resources from another set of devices, known as servers. The server provides these services or resources in response to client request. It works on the principle of producer and consumer where

server are producer and client are consumers.
For e.g, when you visit a website, your web browser (the client) sends a request to the server hosting the websites. The server then delivers the web page back to your browser, allowing you to view and interact with the content.

Advantages of client-server technology.

i) Simplify user account
ii) Single password for user devices
iii) More powerfull
iv) When a set up of rule is applied to server it will automatically apply to the clients.
v) High performance

Disadvantages

i) Expensive to setup
ii) Require skilled manpower
iii) Security risk
iv) Single point failure
v) Complex to arrange

Disadvantage of Internet

i) Loosing data confendiality
ii) Cyber security
iii) Addicted to Internet
iv) Misinformation and fake news
v) Online Harassment and Bulling
vi) Dependency on Technology

* Internet Protocol

Internet Protocols are a set of rules that governs the communication and exchange of data over internet. Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination. Data traversing the internet is divided into smaller pieces, called packets. Each computer on the internet has at least one IP address that uniquely identifies it from all other computers on the Internet.

* What is an IP address?

An IP address is a unique identifier assigned to a device or domain that connects to the internet. Each IP address is a series of characters, such as '192.168.1.1'. via DNS resolves, which translate human readable domain names into IP address, users are able to access website without memorizing their complex series of characters.
IPv4 = 32 bit (2^{32}) bit, IPv6 = 128 bits

* Different Internet Protocols → Numbers and alphabet
→ Numbers only

* What is TCP/IP?

• The Transmission Control Protocol (TCP) is a transport protocol, meaning it dedicates the way data is sent and received. Before transmitting data, TCP opens a connection with the recipient.

TCP breaks data up into packet.
IP protocol deals only with the packet.

TCP ensures that all packets arrive in order once transmission begins. Via TCP, the recipient will acknowledge receiving each packet that arrives. Missing packets will be sent again if receipt is not acknowledge.

- TCP is designed for reliability, not speed, Because TCP has to make sure all packets arrive inorder, loading data via ~~(TCP), IP~~ TCP/IP can take longer if some packets are missing.
- TCP and IP were originally designed to be used together, and these are often refered to as the TCP/IP suite. However, other transport protocols can be used with IP.

* What is Simple Mail Transfer Protocol?

- These protocols are important for sending and distributing outgoing emails. SMTP is used most commonly by emails clients, including Gmail, Outlook and Yahoo mail. SMTP is text based protocol.
- This protocol uses the header of the mail to get the email id of the receiver and enters the the mails into the queue of outgoing mail. And as soon as it delivers the mail to the receiving email id, it removes the email from the outgoing list.
- The message or the ~~electron~~ electronic ~~mail~~ mail may consider the text, video, image, etc. It helps in setting up some communication server.

* FTP

File transfer Protocol (FTP) is an application layer protocol that moves files between local and remote file system. FTP is a standard network protocol used for the transfer of files from one host to another over a TCP-based network, such as the internet.

It runs on top of TCP like HTTP. To transfer a file, 2 TCP connection are used by FTP in parallel control connection and data connection. It works on client-server printer.

* POP

The Post office Protocol (POP) is mostly commonly used message request protocol in the internet world for transferring message from an email server to an email client. It is an open protocol, defined by internet RFCs.

It allows access to new mail from a spread of client platform types. POP can handle email access only while the emails are sent by SMTP.

* TELNET (Terminal Network)

TELNET is a text-based network protocol that facilitates remote computer access. TELNET stand for teletype Network. It is a type of protocol that enables one computer to connect to the local computer. It is used as a standard TCP/IP protocol for virtual terminal services which is provided by ISO. The computer which starts the connection is known as the local computer.

The computer which is being connected to i.e which accepts the connection known as the remote-computer.

During telnet operation, whatever is being performed on the remote computer will be displayed by the local computer. Telnet operates on a client/server principle. The local computer uses a telnet client program and the remote computers used a telnet server program.

* HTTP

The protocol used to transfer hypertext between two computer is known as HyperText Transfer Protocol. HTTP provides a standard between a web browser and a web server to establish communication. It is a set of rules for transferring data from one computer to another. Data such as text, image, and other multimedia files are shared on the World Wide Web.

Whenever a web ~~browser~~ user opens their web browser, the user indirectly uses HTTP. It is an application protocol that is used for distributed, collaborative, hypermedia information system.

Chapter I Imp questions.

i) What are the difference characteristics of computer

ii) Explain computer architecture. Describe vonnum and Horvard architecture.

iii) Discuss the classification of computer according to size: i) super computer
ii) Mainframe
iii) Mini
iv) Micro

iv) What is mobile computing? Explain its advantages and disadvantages.

v) Explain a memory hierarchy memory and

vi) What is ROM? Explain different type of ROM?

vii) Explain the architecture of Hard disk drive?

Chapter 6 Important Questions

1) What is Internet? Explain its advantage and disadvantages.

2) Explain client server technology with proper diagram

3) Write short notes on:
   i) IP, iii) FTP, iv) SMTP
   ii) TCP/IP, v) Push and POP

4) What is internet, intranet and extranet?

5) What is web browser? Explain any three.

Chapter 7: Important Questions

1) Explain e-commerce? What are the different types of e-commerce?
   Types are: C to C, B to C, G to B, G to G
   C = Consumer, B = Business and G = Government.

2) What is e-governance? What are its advantages.

3) Explain AI, Robotics, Ambient technology, Augumented technology, GIS, Hypermedia? Include advantages and disadvantages.

* IBM
- International Business Machine establishing 1924 in USA.
- PC are reliable, durable but they are expensive than IBM compatible computer.

* IBM compatibles

If any computer is produce by any other company then IBM company is known as IBM compatibles.

* Apple/Macintosh Computer
- USA in 1970
- Own software and hardware
- Software for this can't run in IBM and vice-versa.

* logic structred of a computer is developed by von Neumann

* memory unit that directly communicate with CPU is called main memory. They are volatile. RAM is an example of this.

* Secondary storage is also known as auxiliary storage that supplement the main memory. Non-volatile. Example: magnetic Disk, Optical Disk.

Magnetic tap = Sequential Access

Magnetic disk = Direct Access.

Floppy disk
- magnetized binary I and demagnetized binary 0.
- 1.44 MB ~~on~~ storage and rotates speed 360rpm.

* Hard disk
- provide relative quick access to large amount of data.
- Containg magnetic disk or platters routing
- made up metallic disk coat with metallic oxide on both side.
- Platters rotates speed 3600 rpm to 15000rpm

* Optical Disk

It is an electronic data storage medium which r/w data by the help of low light laser beam.

- It is cost effective, durable, High storage, light weighted

Data access speed is slow.
required complicated disk mechanism

- CD-Rom
* we can write only one time. Non-rewritable
* data are stored by manufacture company.
650 mB to 700 mB - storage
12cm x 1cm size
18 gram weight.

~~DVD~~ CD - Recordable
Rewrite once. Data can be store by user

CD - Rewritable

We can rewrite many time

DVD - Rom
- Same as CD-Rom. Space or storage area 4.7 8Gm

DVD - R / Dual Layer.
Same as CD-R. It has two side data storage capacity. Storage 8.5. Later update up to 17 GB.
~~DVD R/W or R~~

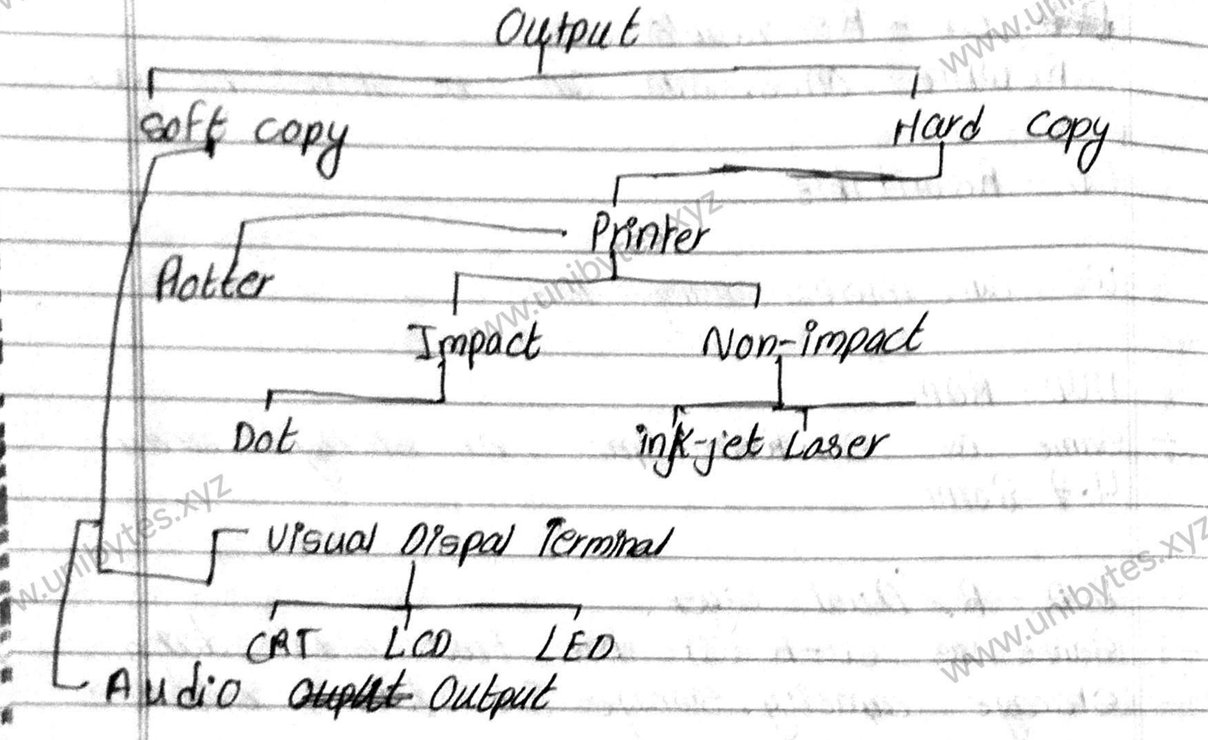
* Flash storage Device
Such as pendrive, SD cards.

OCR = Optical Character Recongnition
- Use ~~for academic purpose~~

MICR → for reading check.

OMR - optical mark ~~recognize~~ recongnition
- Use for academic.

~~Aug~~ Augmented Reality = Virtual world + Real world.



(Computer ko ~~minimum~~ require ments for multimedia)

Desirable features of Multiple media system

i) High processing power
ii) Storage and Memory
iii) Operating System
iv) Software Tool
v) Efficient Input/Output
vi) Network support
vii) Sound and Display cards

* Step make ~~Passwor~~ passport size photo in photoshop.

1) Open the photoshop
2) ~~So~~ Open the file then again click in open after that select a photo.
3) Select the crop tool from the toolbox and make the size ~~of~~ height of 2.3 and width of 3 with resolution 250.
4) Crop the photo and click at the fit to screen ~~at~~ which will be above to the photo.
5) To put the boarder at the photo click on the edit menu and the stroke.
6) After that choose the boarder according to your need and puth width 2 and the click ok.
7) The open new file and ~~paste~~ move the photo to new file simply by drag and drope.
8) The makes the copy of doyour wish.

* Words inserts

i) Pages — Break page, Cover page, Blank
ii) Tables
iii) Illustrations
iv) Add-ins
v) Media
vi) Link
vii) Comments
viii) header & footer
ix) Text
x) symbols

1) What is Antivirus. What are the function of anti virus?

Ans Antivirus is a type of software that protects your computer from malware, which is malicious software that can harm your data, performance, and privacy. Anti-virus software is a software utility that detects, prevents, and remove viruses, worms, and other malware from a computer.

The function of antivirus are :-

i) Scans specific files or directories for any malware or known malicious patterns.
ii) Allows to schedule scans to automatically run for you.
iii) Updating itself regularly to detect and prevent from new malware variants.
iv) Users can also scan the system anytime they want.
v) It makes sure that the system is always safe for work.
vi) Shows the health of your computer

2) Different between Viruses and Worms

	Viruses	Worms
i)	It is a set of program that is designed to cause damage, steal personal information, modify data.	It is an independent malicious program, which when enters a system can start causing harm / damage to the device.
ii)	Time taken by a virus to spread in the system is lesser in comparsion to a worm.	A worm can quickly spread through a device.

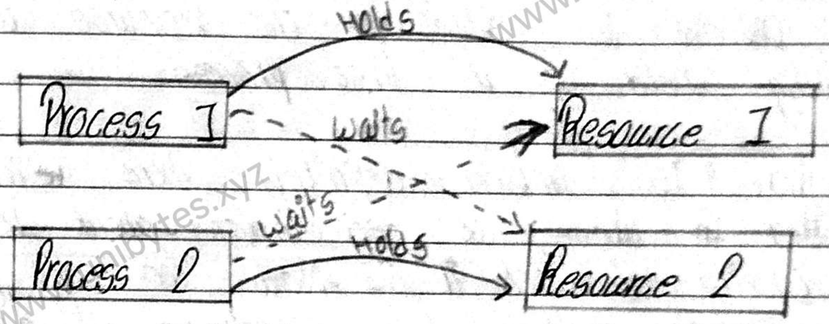
iii)	A virus corrupts the files or delete them automatically.	A worm also affects the bandwidth and network connections of the device.
iv)	The viruses need hosts to spread from one system or device to another.	Worms however does not need any host.
v)	The main purpose of the virus is to transform or modify the information	The main aim of worms is to eat the system resources.
vi)	Antivirus software is employed for protection against viruses.	Worms can be identified and eliminated by the antivirus and firewall.
vii)	Viruses are executed through executable files/data.	Worms are executed through weakness in the system.
viii)	Full form of Virus is Vital Information Resources Under Siege.	Worms stand for Write-only, Read-Many.
ix)	The examples of viruses are:- i) Trojan horse ii) Spyware iii) Shimmer.	The examples of Worms are:- i) Morris worm ii) Storm worm

Un-3

Q) What is deadlock. Explain it in brief.

Ans A deadlock is a situation when a process waits endlessly for a resource and the requested resources is being used by another process that is waiting for some other resource.

In a database, a deadlock is a situation in which two or more transactions are waiting for one another to give up locks. In another word, a deadlock is a situation where each of the computer process waits for a resource which is being assigned to some another process.



Reasons due to which a deadlock situation may rise are :-

i) Mutual exclusion

If there are two process and any one of them use the resources then another one should wait until the resources released.

ii) Hold and wait

A process waits for some resources while

holding another resource at the same time

c) No pre-emption

When ~~th~~ any process start it should be complet and it doesn't release the resources to another process. ~~Ther~~ ~~Pr~~ process release the resources by itself.

d) Circular Wait

All the processes must be waiting for the resource in a cyclic manner so that the last process is waiting for the resource which is being held by the first process.

If there is problem definitely there ~~is~~ is solution So ~~ther~~ In above we ~~dei~~ discuss about reason of causing deadlock in OS. Now we are going to prevent method from occurence of deadlock they are given below :-

i) Mutual Exclusion
- Shared resources such as read-only files do not lead to deadlocks
- Unfortunately some resources, such as printers and tape drives, require exclusive access by a single process.

ii) Hold and Wait
- To prevent this condition processes must be prevented from holding one or more resources while simultaneously waiting for one or more others.

iii) ~~No Pre-emption~~ Circular Wait
One way to avoid circular waits ~~is~~ to number all resources, and to require that process request resources only in strictly increasing (or decreasing) order.

iv) Recovery From Deadlock
There are three basic approaches to recovery from deadlock :

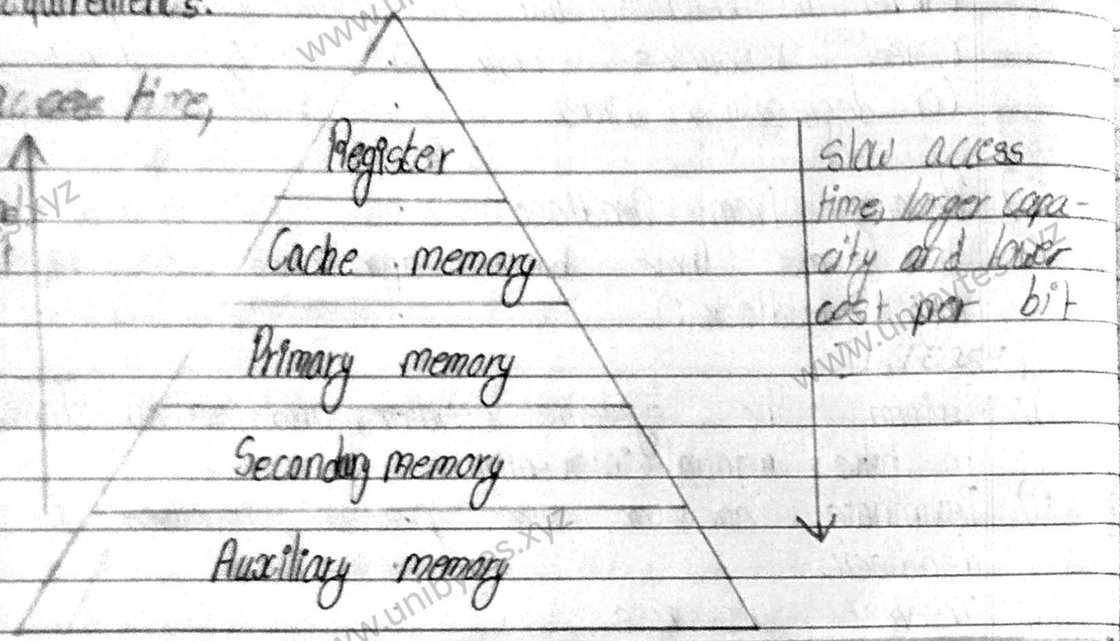
i) Inform the system operator, and allow him/her to take manual intervention.
ii) Terminate one or more process involved in the deadlock.
iii) Preempt resources

v) Deadlock Avoidance
In this method, a process requesting a resource is allocated the resources only if there is no possibility of deadlock occurence.

Q4 What is memory hierarchy explain in details.

Ans Memory hierarchy is about arranging different kinds of storage devices in a computer based on their size, cost and access speed, and the roles they play in application processing.

The main purpose is to achieve efficient operations by organizing the memory to reduce access time while speeding up operations. A processor can easily move from any one level to some other on the basis of its requirements.



i) Registers

They are small, high-speed memory units located in the CPU. They are used to store the most frequently used data and instructions.

ii) Cache Memory

Cache memory is designed to minimize the time it takes to access data by providing the CPU with quick access to frequently used data.

iii) Primary Memory

It is also known as main memory, is the part of the computer that stores current data, programmes, and instructions. Examples: RAM, ROM

iv) Secondary memory

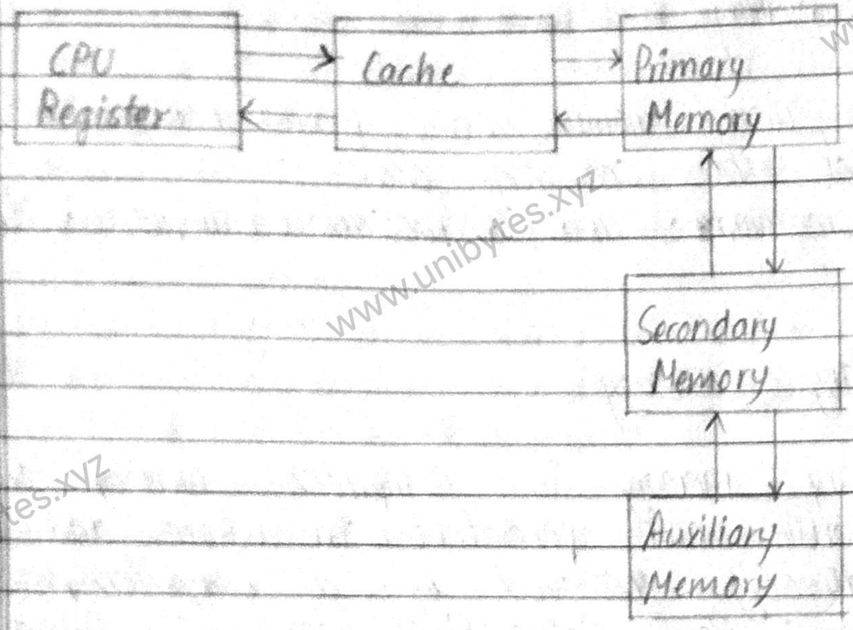
Secondary memory is computer memory that is non-volatile and persistent in nature and is not directly accessed by a computer/processor. Examples: Hard Drive, SSD, Flash, USD Drive, etc

v) Auxiliary memory

An Auxiliary memory is known as the lowest-cost, highest-capacity and slowest-access storage in a computer system. Examples: magnetic tapes and magnetic disks

Advantage of Memory Hierarchy

i) It helps in removing some destruction, and managing the memory in a better way.
ii) It helps in spreading the data all over the computer system.
iii) It saves the consumer's price and time.



2) What is memory hierachy?

Ans Generally speaking, hierachy refers to an organizational structure in which items are ranked in a specific manner, usually according to levels of importance. In computing, there are various types of hierachical systems. For example, in most file systems, files are placed in specific places based on a hierarchical tree model.

Similarly, computer memory hierarchy ranks memory components in terms of access and response time. Memory hierarchy is about arranging different kinds of storage devices in a computer based on their size, cost and access speed, and the roles they play in application processing. The main purpose is to achieve efficient operation by organizing the memory to reduce access time while

Imp question - another copy
Remaining in this copy

speeding up operations. The computer memory hierachy looks like a pyramid structure which is used to describes the differences among memory ~~hierarchy looks~~ types. It separates the computer storage based on hierarchy.

1) What is antivirus. Explain with example. Explain the way how virus spreads

Ans Anti-virus software is a software utility that detects, prevents, and remove viruses, worms and other malware from a computer. Antivirus software was orginally developed to detect and remove computer viruses, hence the name. Most antivirus software include an auto-update feature to download the updated virus profile and check for new threats. An antivirus normally scans a computer's hard drive and external media for any potential viruses or worms. Some of the example of antiviruses are Norton, PC optimizer free, zone alarm antiviruses, AVG Antivirus and Pand free Antivirus and other types are Windows Antivirus software, Macos antivirus software and Android ~~anit~~ antivirus software.

Here are the some ways how virus spreads are: (Remaing points in book)

i) Click on online Advertisment

If you click on Ads, then it can infect your computer with virus because the

the Ads may contain malicious code. It is highly recommended that never click on suspicious online ads.

ii) Copying Data from Infected Computer.

It is very common way that Viruses can spread on your system. Sometimes you need to copy data from another computer or external devices (i.e, USB devices). In that case, if the external devices are infected by a virus, then your computer will also be infected by a virus.

iii) Use External Devices.

A virus can enter your computer system by inserting external devices such as USB devices, Mobile, external hard disks. For example, when you connect your mobile devices to your computer and if the mobile has a virus, then your computer could be infected with malware or virus.

2) What is device driver. Write it's purpose

Device driver is a group of files that enable one or more hardware devices to communicate with the computer's operating system. In another word, A device ~~drive~~/computer/hardware is a unique type of computer software developed to allow interaction between the operating systems and hardware devices. Device Driver depend upon the operating system's instruction to access the device and perform any particular Action. For example, a printer driver tells the printer in which format to print after getting instruction from OS.

The purposes of device driver are:-

i) Helps pherpheral devices established communication with a computer.
ii) Helps comprise, edit, print, and electronically publish documents.
iii) To help you monitor and configure settings for your computer
iv) Helps you organize, update and report information stored in a database
v) To manipulates the physical properties of hardware devices.

3) Difference between Compiler and Interpreter.

	Compiler	Interpreter
i)	A compiler translates the source program in a single line.	An interpreter translates the source program line by line.
ii)	It is faster	It is slower
iii)	It consumes less time	It consumes more time then compiler
iv)	It is more efficient	It is less efficient
v)	They are larger in size	They are smaller than compiler
vi)	C, C++, C# uses compiler	PHP, Ruby, & Perl, Python uses an Interpreter

4) What is Paging? Explain with examples.

Ans Paging is a function of memory management where a computer will stored and retrieve data from a device's secondary storage to the primary storage. Paging is a storage mechanism used in OS to retrieve process from secondary storage to the main memory as pages. The primary concept behind paging is to break each process into individual pages. Thus the primary memory would also be separated into frames. Process pages are usually only brought into the main memory when they are needed; else, they are stored in the secondary storage. The size of the process is measured in the number of pages.

5) What is fragementation? Explain internal and external fragementation.

Ans The process of dividing a computer file, such as a data file or an executable program file, into fragments that are stored in different parts of a computer's storage medium, such as it hard disc or RAM is known as fragementation. An unwanted problem with operating systems is fragmentation, which occurs when processes load and unload from memory and divide available memory.

i) Internal fragmentation

It is defined as the difference between memory allocated and the memory space required by a process. Internal fragmentation occurs when the size of a process is larger than the memory required. Also, the problem of internal fragmentation occurs when the memory is divided into fixsized partitions.

ii) External fragmentation

It is the unused space that is left between the fragments of non-contiguous memory. These unused spaces are too small to help a new process. External fragmentation occurs when the total memory is divided into memory partitions of variable size.

6) What is operating source OS ? Explain with example.

Define - Book (102, 103, 104)

7) Differentiate between traditional database approach and RDMS

Traditional Database	RDMS
i) A traditional database is maintained and operated within the company's premises except for infrastructure setup	RDMS is a program used to create, update and manage relational database.
ii) It is not cost effective	It is cost effective.
iii) It is difficult to modify and update data.	It is easier to modify and update data
iv) It is less secure than RDMS.	It is highly secure.
v) In now days it is almost not in practices.	It is highly practices.
vi) It is difficult to arrange data.	It is easier to arrange data

* Characteristics of DBMS

i) Represents complex relationship between data
ii) Controls data redundancy
iii) Enforces user defines rules
iv) Ensure data sharing
v) It has automatic and intelligent backup and recovery procedures.
vi) It has central dictionary to store information.
vii) It has different interfaces via which user can manipulate the data.
viii) Enforces data access authorization

8) What is SQL. Write its features and also the objectives.

Ans Structured Query Language (SQL) is a programming language for storing and processing information in a relational database. A relational database stores information in tabular form, with rows and columns representing different data attributes and the various relationships between the data values.

Features of SQL

i) Provides create, modify tables, insert and manipulates data
ii) It is simple, flexible and powerful
iii) It has higher data security
iv) SQL is an English-like language
v) SQL is an a non-procedural language
vi) SQL processes sets of records rather than a single record at time

9.a) Consider following Excel sheet and write down the correct formula based on conditions.

Conditions:

1) Service tax will be 6% for employee who he get salary more than 1,50,000, otherwise 1%. [I27]

2) Income tax will be 0% for employees who has get yearly salary less than 2,20,000 otherwise 15%. [E]

3) Total is calculated as sum of service and income tax. [I]

* OR function le AND ko opposite task garna. Book maa xa herna.

For grade:
IF(K4="Pass",IF(I4>=90,"A+",IF(I4>=80,"A",IF(I4>=70,"B+",IF(I4>=60,"B",IF(I4>=50,"C+",IF(I4>=40,"C",IF(I4>=30,"D","*")))))))

Another Question

	C	D	E	F	G	H	I	J	K
3.	S.N	Name	CF	DL	Math	Total	Percentage	Rank	
4	1	A	80	90	95				
5	2	B	40	80	65				
6	3	C	10	80	22				

i) Find the total of each student
=SUM(E4+F4+G4)
Drag the column from E4 to G4.

2) Find the percentage
=(H4/300)*100

Grade
IF(K4="Pass",IF(I4>=90,"A",IF(I4>=80,"A",IF(I4>=70,"B+",IF(I4>=60,"B",IF(I4>=50,"C+",IF(I4>=40,"C",IF(I4>=30,"D","*")))))))
↳ Remaining for task

3) Rank
=RANK(I4,$I$4:$I$8,0)

Note: Rank maa (I4 to I8) samma jana ani sabai ko agadi $ rakhni:, 0 rakhe ascending, 1 rakhe decending.

4) Division
=IF(I4>90,"Distinction",IF(I4>60,"First",IF(I4>45,"Second",IF(I4>32,"Pass","Fail"))))

→ 5 marks.

Dos Command

i) To find time
c:\user\time

ii) To find date
c:\user\date

* Cd

- This command is used to find the current directory. If cd.. is used we go to back and cd name of directory goes into the next directory.

- Cd.. [back]
- Cd bca [goes into bca]

* Cls

- Clear the screen
- C:\user\cls

* dir
List out the directories in the particular location.

* MD (mkdir)

- Make a directory
- C:\user\mkdir bca1st
- this command creates new directory

* COPY con

- New files is created within the folder
- C:\\ copy con std.txt
  e.g. Hello, my name is Bikram
- Press F6/ctrl Z after writing.

* type

- To see the content of the file
- C:\\ type filename

* ren

- To change the name of file
- C:\ren old-file new-filename
- C:\ren stud.txt bca.txt

* copy file

* This commands helps to copy of one folder
- C:\ file-name Path_name
- C:\ bca.txt C:\abc

* X copy

- All files are copies from one directory to another directory
- C:\ copy *.* c:\first directory\secondary directory.

* Print
This print command allows you to obtain a print-out of a text file.

PRINT A:\Hello.BAK Message.BAT

↳ Book page 263.

* Make Msg.Bat Read only,

ATTRIB +R Msg.Bat — Read only
ATTRIB -R Msg.Bat — remove from read only
ATTRIB +H [redacted].Bat — Hide
ATTRIB -H [redacted].Bat — remove from hide

+ is use for applying.
- is use for deleting.

* RD or RDMIR Command

- Syntax : rd [drive:][path] directoryname(s)
- Eg : C:\rd D:\backup
Eg: D:\rd backup.
This Command is used to Remove (delete) a directory

* EDIT

Syntax : Edit [drive] [path] filename
~~Eg : D:\Ed edit~~
Eg : D:\Backup\edit ~~text~~ test.txt
(change the content of the file test.txt)