BALAJI INSTITUTE OF I.T AND MANAGEMENT KADAPA

Information Technology for Managers (17E00107)

ICET CODE: BIMK

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Units covered:1st , 2nd & half of 3rd Units

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(17E00107) INFORMATION TECHNOLOGY FOR MANAGERS

The main objective of this course is to make the student familiarize in information technology and their applications to business processes.

1. **Fundamentals of IT:- Components of a system - Meaning and nature – Role of IT in various sectors - Information technology management - Strategies for gaining IT advantage.**
2. **Database Management Systems:** Introduction to DBMS - Applications to data base -concepts, data access methods – Types of data processing-data base languages
3. **Understanding Ms-Office:**- MS-Word - MS-Excel - Formulae, Graphs, Basis Statistical Formulae, MS-Access, MS-PowerPoint - Creating Effectiveness presentations.
4. **Data Communication and Networks:** Concepts of Data Communication, Types of Data-Communication Networks, Communications Media, Concepts of Computer Networks, the Internet, Intranet and Extranets: Operation of the Internet, Services provided by Internet, World Wide Web.
5. **Emerging Trends in IT:** Introduction to SAP, IP addresses, IP protocol, various ERP packages, Implementation of ERP - Introduction to big data - cloud computing

Textbooks:

- Fundamentals of Information Technology, Alexis Leon, & Mathews Leon - Vikas.

References:

- Basics of Computer Sciencs, Behrouz Forouzan, Firoz Mosharraf, Cengage.
- Information Technology for Management, Ramesh Behi, Mc Graw Hill.
- Introduction to Computers and Communications, Peter Norton-Sixth Edition-Tata McGraw Hill.
- V.Rajaraman, Introduction to Information Technology, Prentice Hall India.
- Information Technology and theory Aksoy, Cengage Learnings.
- Foundations of IT,Dhiraj Sharma, Excel Books.
- MS Office 2000 for every one, Sanjay Saxena – Vikas

UNIT-1
FUNDAMENTALS OF IT

1.1: COMPONENTS OF A SYSTEM:

1.1.1: INFORMATION TECHNOLOGY:

WHAT IS INFORMATION?

This is processed data with a meaning or an organized, meaningful and useful interpretation of data.

WHAT IS TECHNOLOGY?

Technology refers to tools and machines that may be used to solve real-world problems.

INFORMATION TECHNOLOGY?

Information technology is considered to be a subset of information and communication technology (ICT). It is the use of computer to store, retrieve, transmit and manipulate data or information often in the context of business or other enterprise.

Information technology deals with aspects of managing and processing information, especially in large organizations. It can be considered as a sub-discipline of computing.

The devices of information technology include;

- Computers
- Storage devices (Hard Drive Disk, Floppy Disk, Tape, Compact Disc (CD)).
- Networking devices (routers-A **router** is a networking device that forwards data packets between computer networks, **network bridges**, **modems, wireless access points, networking cables, switches, hubs** - Hubs are devices commonly used to connect segments of a LAN, and repeaters) and physical devices.
- Infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.

WHY IT IS IMPORTANT IN ORGANISATIONS?

Information technology is important in the organizations to keep up with the supply and demand as consumers grow more anxious to have their items instantly.

Information technology has become a major driving force in many organizations. These organizations are seeking to get IT applications which can help them sell their products or services effectively. For example, by use of Internet, organizations

or businesses are moving information faster and they also coordinate multiple activities to achieve efficiency.

1.1.2. DEFINITION:

"IT was defined as technology resources used for business information management. These resources include software, hardware and telecommunication networks".

- **- CHAFFEY AND WOOD**

"Information technology is the study, design, development, implementation, support or management of computer based information systems, particularly software applications and computer hardware".

-According to INFORMATION TECHNOLOGY ASSOCIATION OF AMERICA (ITAA)

1.1.3: FUNCTIONS OF INFORMATION TECHNOLOGY:

The functions performed by information technology are given as follows,

Functions of IT

- **Data capture**
- **Data processing**
- **generation of information**
- **Storage**
- **Retrieval of information**

a. DATA CAPTURE:

- Data capturing is the process of gathering data from automatic device, control system or sensor.
- In IT, data capturing involves compiling of information.
- **For example** – electronic commerce companies like **AMAZON.COM** use internet cookies to capture data about customer's purchases via their website. So in this case, they use this data to suggest items to a user related to their previous orders via their website.

  Also **GOOGLE.com** uses internet cookies to monitor websites and content we search for online, then they use that data to suggest adverts tailored basing on our interests.

b. DATA PROCESSING:

- After capturing data, the system must re-organize that data basing on what the organization wants to use that information for. For example, when an e-commerce website captures data about your previous purchases via their website. Their system can organize that data inform of prices, products of interest, categories of

interest, period of purchase etc, and this data will be used next time when a user goes back to that e-store to suggest relevant products.

- **For example** – AMAZON.COM after getting data about customers purchases, system organize that data into products of interest, period of purchase etc.

c. GENERATION OF INFORMATION:

This involves organizing information into a useful form.

d. STORAGE OF INFORMATION:

- This involves retaining information for future use.
- **For example** – FACEBOOK.COM is a social network connects people, but upon registering with network, the user will provide their interests, profession background etc.
- Then face book use this information to suggest friends to that user.

e. RETRIEVAL OF INFORMATION:

- It is a process by which a computer device is used to find and copy data for further distribution and processing.
- **For example** – search engine like GOOGLE, YAHOO, and BING, these companies have data centers which store information which can be used at a later stage by the end user who will be searching for information online.

1.2. MEANING AND NATURE:

1.2.1. MEANING OF SYSTEM/COMPUTER:

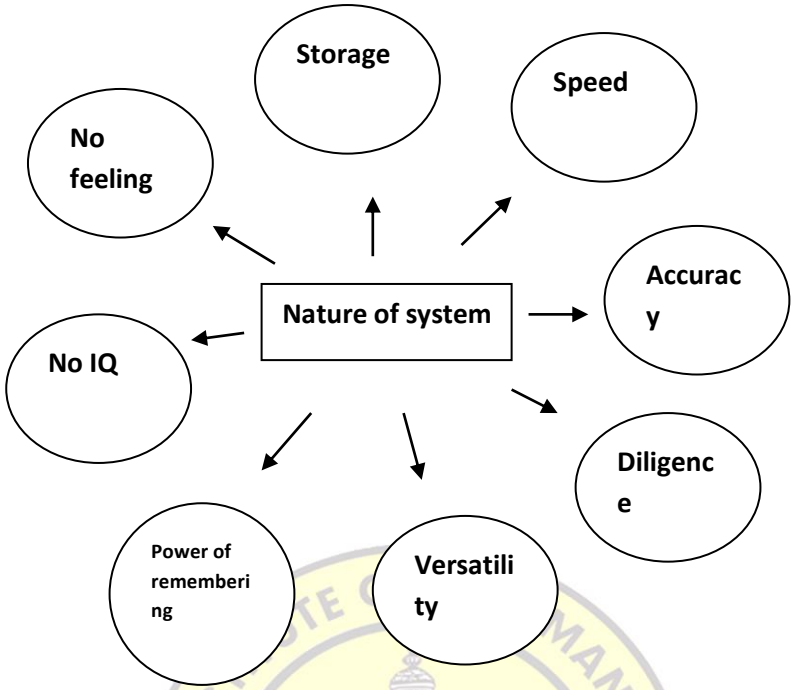
- Computer is an electronic device.
- It is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a pre-determined set of procedural instructions to produce a result in the form of information.
- Computer is an electronic machine which helps in solving problems quickly and easily.
- It is a digital machine (that uses binary digits i.e 1,0….) used in all fields.

1.2.2. DEFINITION:

The computer is a machine used for calculations or computations precisely the computer is an electronic device for performing arithmetic and logical operations.

1.2.3: NATURE OF COMPUTER SYSTEM:

The nature or features of a system are explained here under,



a. SPEED:

- Computers can work very fast.
- It takes only few seconds for calculations that we take hours to complete.
- A computer can perform millions (1,000,000) of instructions per second.

b. ACCURACY:

- The degree of accuracy of computer is very high.
- And every calculation is performed with same accuracy.
- The errors in computer occur due to human and inaccurate data.

c. DILIGENCE:

- A computer is free from tiredness, lack of concentration, fatigue etc.
- It can work for hours without creating an error.
- Due to this capacity, it overpowers human being in routine type of work.

d. VERSATILITY:

- Versatility means capacity to perform different types of work.
- A computer can perform preparing payroll slips; inventory management prepares eclectic bills etc.
- Hence it is a versatile machine.

e. POWER OF REMEMBERING:

- Computers have the power to store any amount of information or data.
- Any information can be stored for any number of years and recalled as long as you require it.

f. NO IQ (intelligence quotient):

- IQ means intelligence quotient.
- Computer is a dumb machine and it cannot able to do work without instructions from the user.

g. NO FEELING:

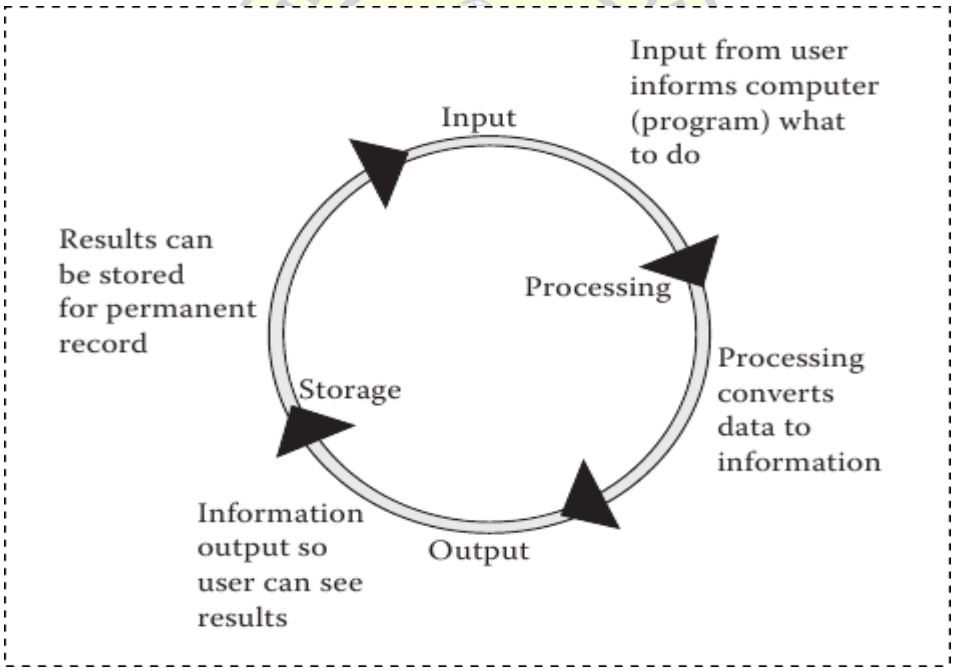
- Computer doesn't have feelings or emotions, knowledge and experience.
- Thus it doesn't get tired even after long hours of work.

h. STORAGE:

- The computer has in-built memory where it can store large amount of data.
- Data can also be stored in secondary storage devices like floppies.

1.2.4: IPOS CYCLE:

The operations performed by computer are termed **as IPOS cycle**.



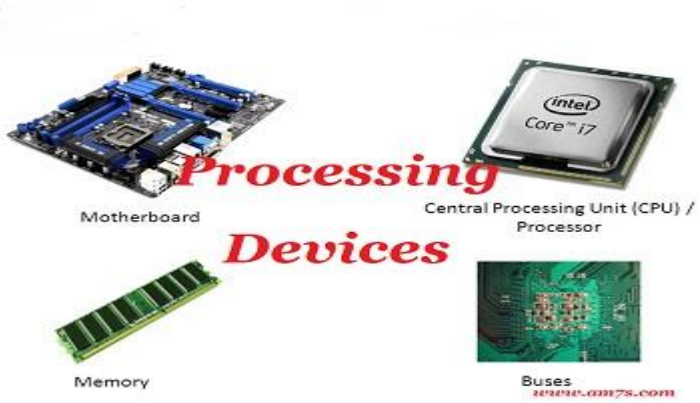
IPOS includes input, processing, output and storage. These are explained as follows,

1. INPUT:

Input involves inserting or feeding data into the computer by means of input devices like keyboard, mouse etc.

2. PROCESSING:

Processing involves transforming data in some way i.e. to information. It is called 'processing'.



3. OUTPUT:

- The computer produces an output on device such as a printer or a monitor that shows the result of processing operations.
- Output in the form of soft copy displayed on monitor, hard copy (by paper) through printer.

Output Devices of Computer

4. STORAGE:

The computer stores the result of processing operations for future use in some storage devices such as hard disk or a floppy disk.

A variety of storage media

1.2.5: COMPONENTS OF SYSTEM:

The basic components of a computer based information systems are,

1. Hardware
2. Software
3. Databases
4. Networks
5. Procedures
6. People

1. HARDWARE:

- The term '**hardware**' refers to the physical parts of the computer or includes anything in the computer that we can touch.
- It consists of interconnected electronic device that control everything in the computer.

Hardware components include the following,

a. PROCESSOR:

Processor acts like brain of the computer. It helps in the processing in which the data is transformed into information. It includes CPU and microprocessors.

b. MEMORY:

Memory is used for storage of data and software or programs. This may be **RAM or ROM**. **Random access memory** is a volatile memory and everything disappears if power goes off. **Read only memory** holds permanent data or instruction that can only be read and nothing can be written on it.

c. INPUT AND OUTPUT DEVICES:

- **Input devices** accept the instructions from the user, and enter such instructions into the computer.

Example – keyboard, mouse, joystick (to play videogames), track ball (like mouse), light pen (to directly draw the figures on monitor) etc.

- **Output devices** provide processed data back to the user in the form of visual display or paper.
- **Example** – printers, screen or VDU (visual display unit) etc.

d. STORAGE DEVICES:

Storage devices are used to store data permanently or semi-permanently.

Example:

- CD-ROM (compact disk read only memory)
- HARD DISK DRIVE (non-removable)
- FLOPPY DISK DRIVE (removable)

2. SOFTWARE:

- Software brings life into the computer.
- It is nothing but instructions (or a program) required to run the computer.
- It guides the hardware on how to do its job.
- Software may be a system software or application software.
- **System software** is the operating system that is required by the computer to functions.

- **Application software** is software which turns the computer into a tool for doing some specific tasks.

- Mostly software is written in high-level language and sometimes in low-level assembly language.

Example;

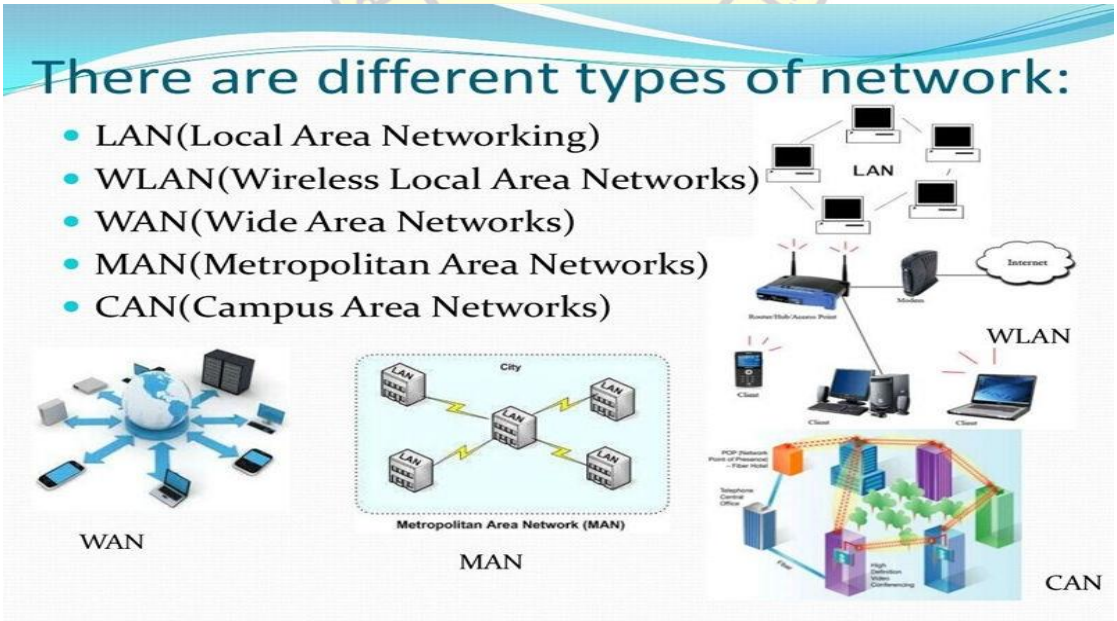
Software	Example	Program
Game	Madden NFL football	Yes
Internet browser	Google, Firefox, internet explorer	Yes
Movie player	VLC, windows media player	yes

3. DATABASE:

- A database is an organized collection of data, stored and accessed electronically.
- This is mainly useful for storage of data.
- **Example** – ms-excel;, Microsoft access, quick base, oracle RDBMS.

4. NETWORKS:

- A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files or other electronic communications.
- The minimum number of systems required to make a network is two.



5. PROCEDURES:

- Procedures are basically the steps that a user follows to make the computer work, and these also include the steps the computer follows to accomplish the instructions given by the user.

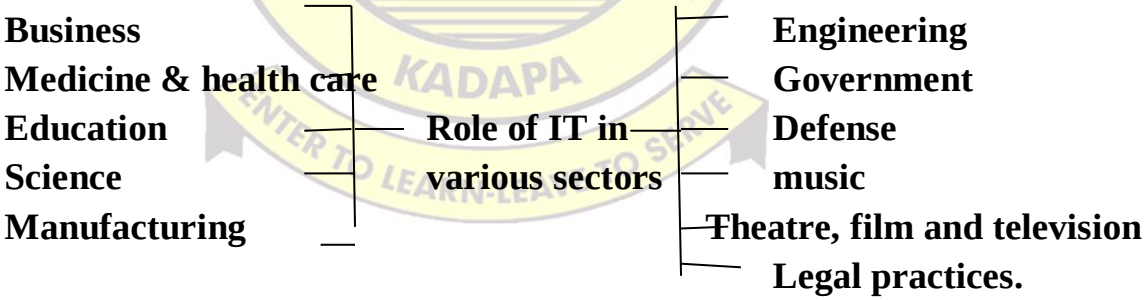
- A procedure is a set of coded instructions that tell a computer how to run a program or calculation.
- Many different types of programming languages can be used to build a procedure.
  Example – mailing a letter, using an ATM card.

6. PEOPLE:

- People involved in the computing process can broadly be classified into **users, power users and computer professionals**.
- People who operate the computers are called users or and users.
- Whereas power users are the people who worked on specified tasks.
- Lastly computer professionals have an in-depth knowledge about computers.

1.3. ROLE OF IT IN VARIOUS SECTORS:

- Information technology can be termed as **a backbone to all the industries** because of wide-scale use of computers, internet and telecommunication systems.
- The role of information technology in various sectors is explained here under.



i. BUSINESS:

- Information technology has become such an important part of business.
- From typing a letter to taking out the balance sheets of a company, the computer presents everywhere.
- Accounting department of every organization use computers for taking out budgets, keeping track of profits and losses of the company.

ii. MEDICINE AND HEALTH CARE:

- In health care sector also, computers are very useful.
- They are used for diagnosing the illness of a patient, performing surgeries.
- Artificial internal organs are commonly used to replace defective organs inside the body.

Example – laser surgery is performed without even a cut on body.

iii. EDUCATION:

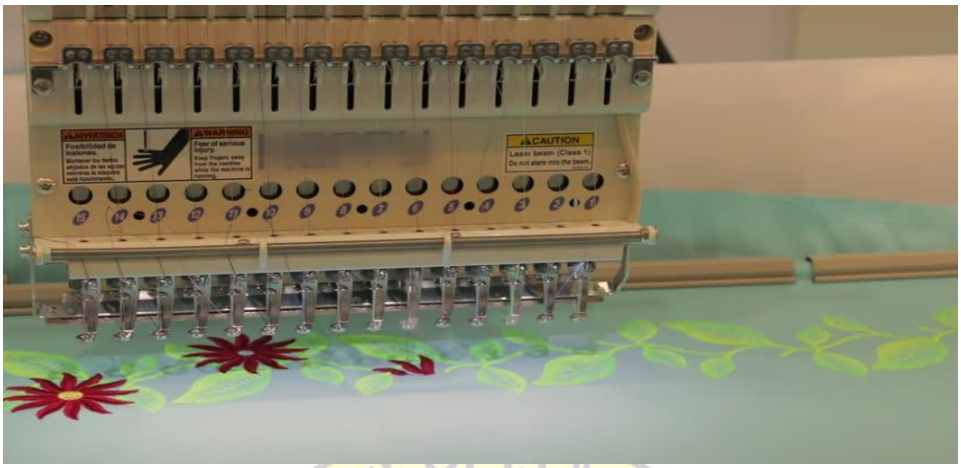
- Computers have brought about a revolution in the education sector too.
- They are present in classrooms, libraries, laboratories and museums. The concept of paper less libraries is spreading very fast.

iv. SCIENCE:

- It would have been impossible to explore this world, without the help of computers.
- Scientists collect, test, transmit, analyze and exchange information electronically.
- **Example** – a man stepped on the moon and the whole world watched his activities on their TV sets through satellites.

v. **MANUFACTURING:**

- Computers extended into the manufacturing sector as well.
- These are used in manufacturing automobiles or even doing some embroidery work on a piece of cloth.
- Also used in automated fabrication in the garment industry.



vi. **ENGINEERING:**

- In engineering sector, information technology have role in designing the aircrafts, missiles and even small airplanes.
- An architect can create the best design by matching the options available to him.

vii. **LEGAL PRACTICES:**

- Information technology have vital role in legal sector also.
- Today all those law books are already fed into the computer for quick references.
- Lawyers also started carrying lap taps to the court room for the details of the case, thus contributing to building a paperless office.

viii. **GOVERNMENT:**

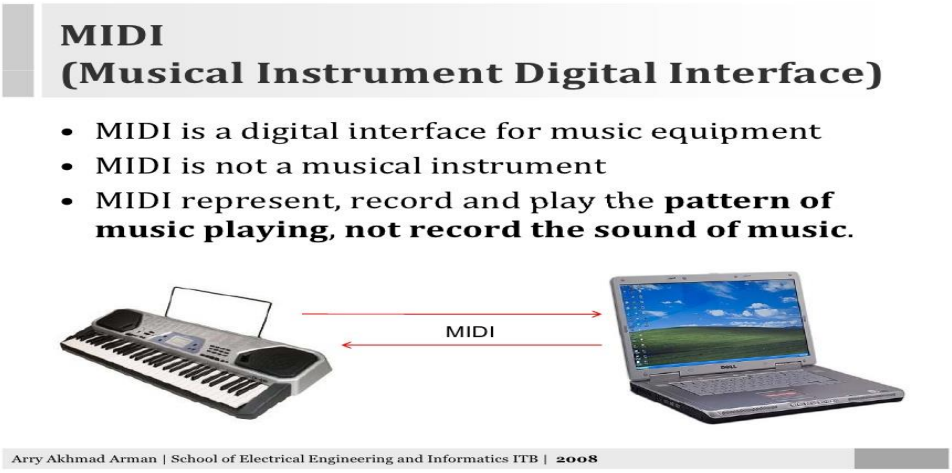
- The government sector also makes extensive use of computers in its work.
- It has started making a database regarding childbirths, deaths, income taxes, any other taxes etc.
- Government passport services are also online, filling income tax forms, computerization of each citizen of the county etc.

ix. **DEFENCE:**

- Army uses information technology in its human resources department, considered the biggest organization in the world.
- Now computers are used in airplanes, fighter planes, on the battle fields in weapons and satellites.

x. **MUSIC:**

- Computers are a help to the musicians as well.
- Musicians not only compose their tunes and music on the computer but can also use them to find out the best setting automatically.
- **Example** – MIDI (musical instrument digital interface) is very commonly used for synchronizing hardware and software, to produce electronic notes.



xi. **ENTERTAINMENT:**

- In entertainment sector also information technology have important role.
- In theatres, the lighting system is totally computerized.
- In movies, the characters are animated as needed.
- **For example** – the dinosaurs of **JURASSIC PARK**.

3D LED MOVIE SCREEN

1.4. INFORMATION TECHNOLOGY MANAGEMENT:

Information technology management is the discipline whereby all the IT (information technology) resources of a firm are managed in accordance with its needs and priorities. These resources may include tangible investments like hardware, software, data, networks as well as staff that are hired to maintain them.

The main aim of information technology management is to generate value through use of technology. To achieve this, the technology and business strategies must be aligned.

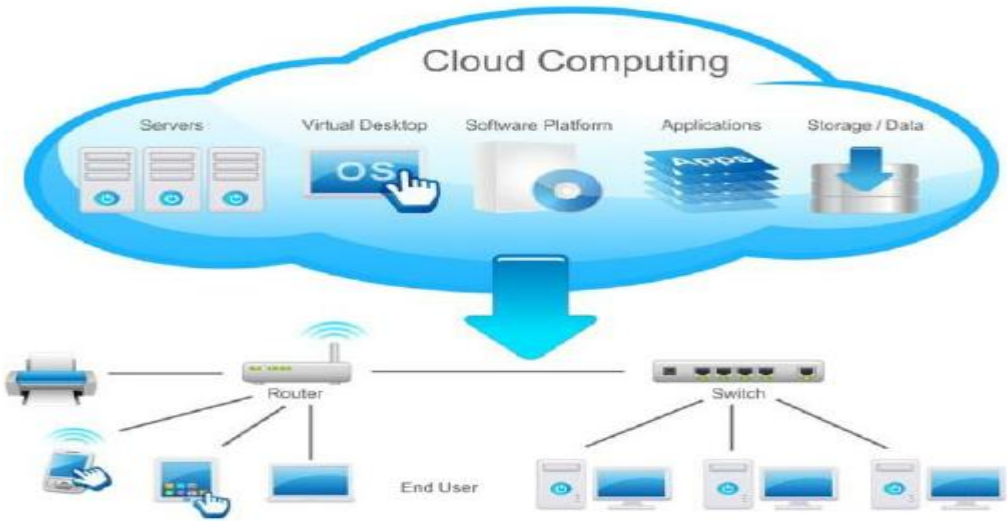
Information technology management includes many of the basic functions of management, such as staffing, organizing, budgeting and control, but it also has functions that are unique to IT, such as software development, change management, network planning and tech support.

1.4.1: CHALLENGES OF INFORMATION TECHNOLOGY MANAGEMENT:

Challenges of ITM

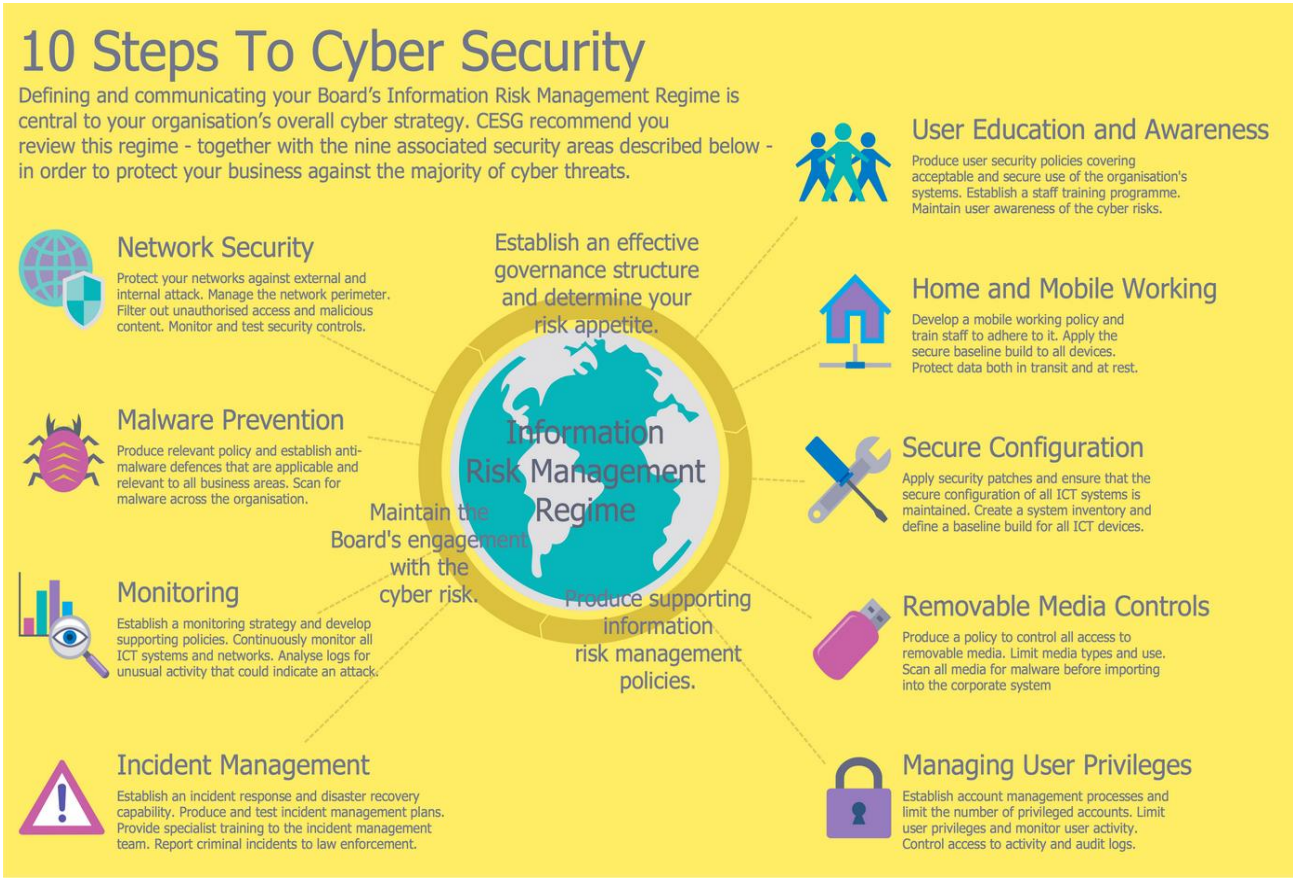
- **Cyber security**
- **Cloud computing**
- **Remote management**
- **Talent retention**

1. **CLOUD COMPUTING:**
   - The ability to connect large number of computers on single networks in called as '**cloud computing**', raises many challenges for IT professionals.
   - One of the issues is who owns the data and how the provider is supposed to keep it.



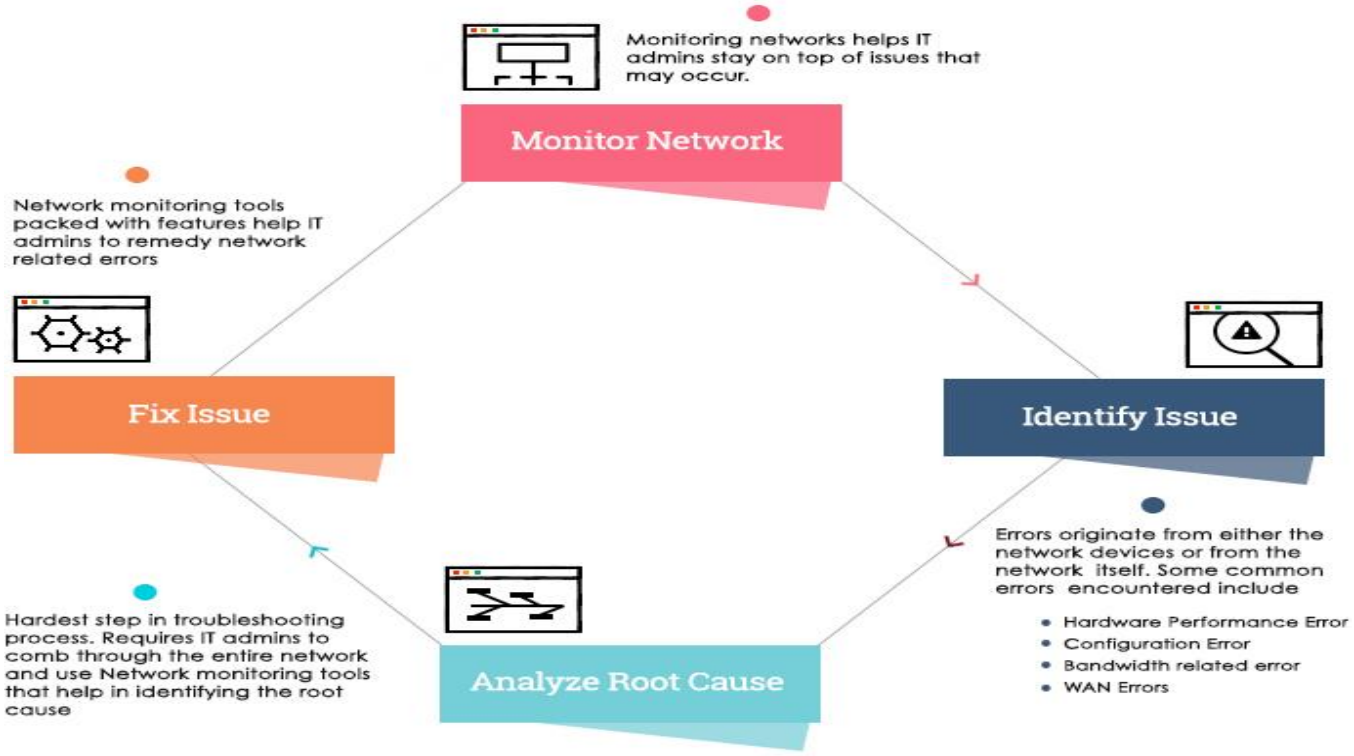
2. CYBERSECURITY:

- Developing new strategies against cybercrime remains an ongoing challenge for IT professionals.
- Cyber security is the state of being protected against the criminal or unauthorized use of data.
- **For example** – against hacking, spam, spying (espionage –getting confidential information without permission of holder).



3. REMOTE MANAGEMENT:

- Remote management involves management of networks.
- Conventional offices (with stable state of growth) seem less relevant when digital technologies, such as email, instant messaging and video conferencing enable employees to work remotely.
- As a result, IT professionals will likely face greater pressure to keep networks running at top capacity.



4. <u>TALENT RETENTION</u>:

The bureau of labor statistics estimates that demand for IT jobs will grow approximately 15% between 2012-2022 faster than 11% estimated average for all other occupations. This trend leaves smaller firms struggling to recruit talent.

4.2: <u>ADVANTAGES AND DISADVANTAGES OF IT</u>:

<u>ADVANTAGES/PROS OF IT</u>:

I. <u>INCREASES PRODUCTION AND SAVES TIME</u>:

- Business today more than ever uses technology to automate tasks.
- A good example is a bakery which uses electronic temperature sensors to detect a drop or increase in room or oven temperature in a bakery.
- These sensors send information directly to the operator, reporting any temperature change.
- This temperature system saves the bakery time, and it also results in consistent higher quality products.

II.<u>IMPROVES COMMUNICATION</u>:

- With the help of communication technology tools like phones, video conferencing electronic mail or instant messenger just to mention a few, movement of information within an organization or business has become instantaneous.

- Tools like electronic mail, e-fax, mobile phones and text messaging enhance the movement of information data among employees, customers and business partners or suppliers.
- This allows for greater interconnectivity throughout internal and external structures.

III.IMPROVES DATA STORAGE FILES MANAGEMENT AND DATA REPORTING / ANALYSIS:

- Business use cloud hosting services to store and backup business data. Also it saves on paperwork and makes transfer and access to data possible remotely.
- With services like DROPBOX.COM, business owners can access their data anytime, anywhere.
- Additionally, databases today allow for greater correlation of information, analysis of this data relationship can encourage better and more informed decision making, resulting in potential growth.

IV.IMPROVES FINANCIAL MANAGEMENT:

- Accounting software like Quick books, Bookkeeper, Sage50, and Account edge perform various accounting tasks in a business.
- Business owners can easily balance their books with less experience in accounting because this software is well equipped with every tool needed in accounting.
- It allows for faster processing and calculation of financial information and the recording or storing of financial data that may need to be referenced in the future.

V.CUTS COSTS OF OPERATION AND INCREASES IN RIO (Return on investment):

- In business factors like cost of operation play a significant role in the development and growth of a business.
- When companies use information technology to cut down on costs of operation, then their ROI will increase which will result in business growth.

VI.IMPROVES BUSINESS TO CONSUMER RELATIONSHIP:

- Information technology can be used to improve customer service in so many ways.
- For example, business can use their website or email to inform their customers about great deal and discounts.

- Making the customer aware of these offers can drive their desire to buy. Good customer service can be used as an excellent tool for any small business to gain the competitive advantages.

VII.IMPROVE BUSINESS COMPETITIVE ADVANTAGE:

- Companies have used technology to gain the competitive advantage over their competitors.
- Business that innovate and adopt technology to remain efficient and improve processes, typically have high customer loyalty rates. As they can consistently meet and exceed expectations of their customers.

DIS-ADVANTAGES/CONS OF IT:

I.IMPLEMENTATION EXPENSES:

Small business sometimes struggle to afford and maintain expensive core technology, so they end up losing their clients to a company which has the capital and resources necessary to compete in the industry.

II.JOB ELIMINATION:

- Technology has replaced many positions humans used to occupy.
- Software is now doing complete accounting so trained accountants has fewer opportunities robots can cut the lawn or clean the pools no need for a handyman.

III.SECURITY BREACHES:

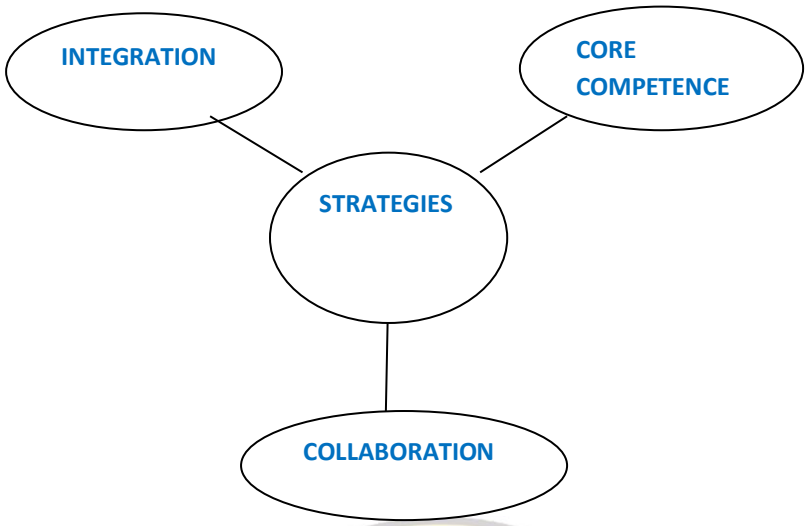
Since business store their data on remote cloud servers which can be accessed online with a username and password they risk potentially losing that data to hackers or viruses.

IV.ADDICTION:

By addicting to the information technology and long run exposure of this leads to some health issues and increased stress.

1.5. STRATEGIES FOR GAINING IT ADVANTAGES:

Following are the strategies for gaining IT advantages,



1. CORE COMPETENCE:

- Core competence is a harmonized combination of multiple resource and skills that distinguish a firm in the market place.
- Organizations design and build products with a focus on speed-to-market. They are experts of technologies for managing the supply chain (the sequence of processes involved in production of a commodity) and communicating with their suppliers.
- Organizations rely on sales partners to take the finished product to market.

2. COLLABORATION:

- E-procurement networks and e-market places are being replaced with private exchanges.
- Private exchanges connect manufactures with their distribution, reseller and dealer networks and their customers, to ensure collaborative selling success across all related parties.
- The same technology adopts to give end-users the choice of researching a purchase online and take delivery from only entity.

3. INTEGRATION:

- Technologies that offer value chain efficiency and channel expansion must synchronize or integrate with inventory control, product forecasting, customer service, materials management, resources scheduling and other such technologies.
- The technologies need not require any changes to existing business process or operations, but instead **expedite** (make a process be accomplished more

quickly) their automation for **stream lined efficiency** (make an organization more effective by employing simpler working methods).

UNIT-1

ITM IMPORANT QUESTIONS

1. Explain the components of a system?
2. What are the roles of IT in various sectors?
3. Explain the strategies for gaining IT advantages?

CASE STUDY

BBB PUBLISHERS

Mr. Rattan is a trainee editor with BBB Publisher. He is currently working on a book related to computer hardware. Read the following paragraph carefully and help Mr.Rattan in his jobby answering the questions that follow:

The term computer hardware refers to the physical components of a computer, namely keyboard, monitor, mouse and printer including the digital circuitry. Computer hardware is an integral part embedded in all modern day automobiles, microwave ovens, electrocardiograph machines, compact disc players, and other devices.

The hardware of a computer is not charged frequently in contrast with software and data. The present computers are much advanced in terms of processing speed and have an efficient memory structure. The present lesson aims at providing an insight into the various hardware concepts of a computer system.

QUESTIONS

a) All the occurrences of the word "hw" need to be substituted by the word "hardware". Name the feature to be used for achieving the same.

One possible solution

Find and replace future should be used for achieving the same. Find and replace feature in word allows to automatically search for and replace all instances of a word or phrase in a document. Find and replace feature find all occurrences of "hw" and substituted it by word "hardware".

b) The editor needs to create a list of errors at the end of the paragraph, name the feature to be used for achieving the same.

One possible solution

Numbered list option can be used. Simple procedure to find out wrong spelling mistakes and fixing them. Then number the musing numbered list.

c) To simplify editing selected words, suggest the mouse shortcut for selecting a complete word.

One possible solution

The mouse shortcut for selecting a complete word id to double-click within the word.

d) The word formatting of the words "computer h/w" in the first line needs to be copied on certain other words in the paragraph. Name the feature to be used for achieving the same.

One possible solution

The format painter feature can be used for this purpose.

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- MS Office 2000 for every one, Sanjay Saxena – Vikas

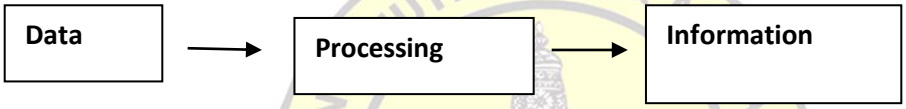
UNIT-2
DATABASE MANAGEMENT SYSTEM (DBMS)

2.1. INTRODUCTION TO DBMS:

2.1.1 DATA:

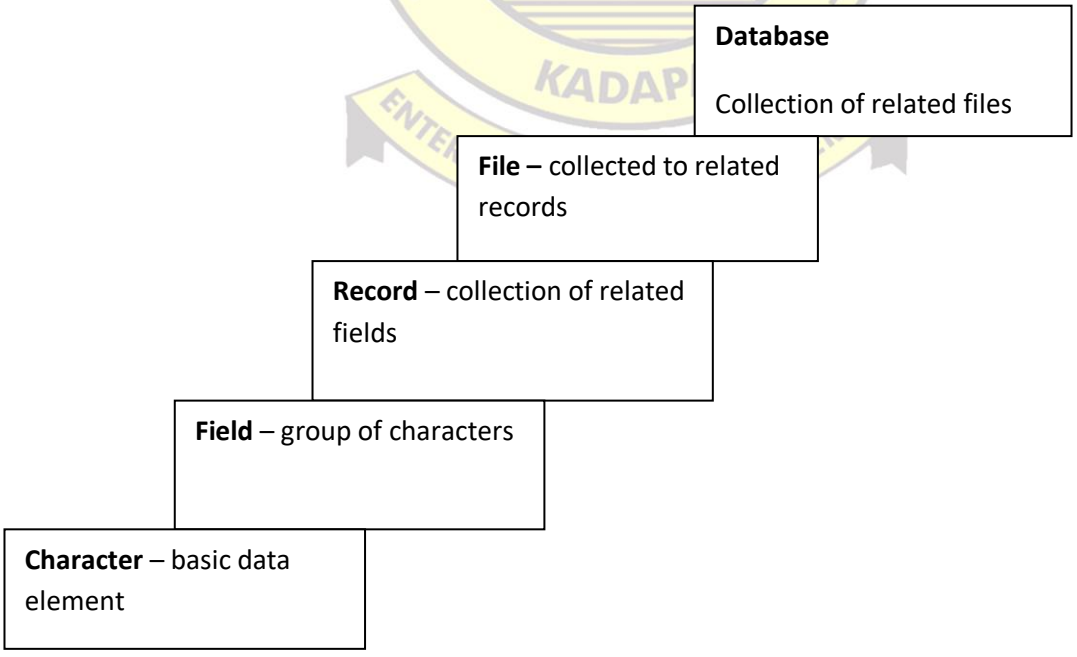
The term '**data** 'was derived from Latin word '**DATUM**' means **'something given'**. Data is plural form of datum data is the collection of facts, symbols, numbers, words, measurements etc.

- Data after processing becomes' information'.
- 'Processing' is the process of conversion of data into meaningful information.



2.1.2 : DATA HIERARCHY:

Data hierarchy refers to systematic organist ion of data in a hierarchical form.

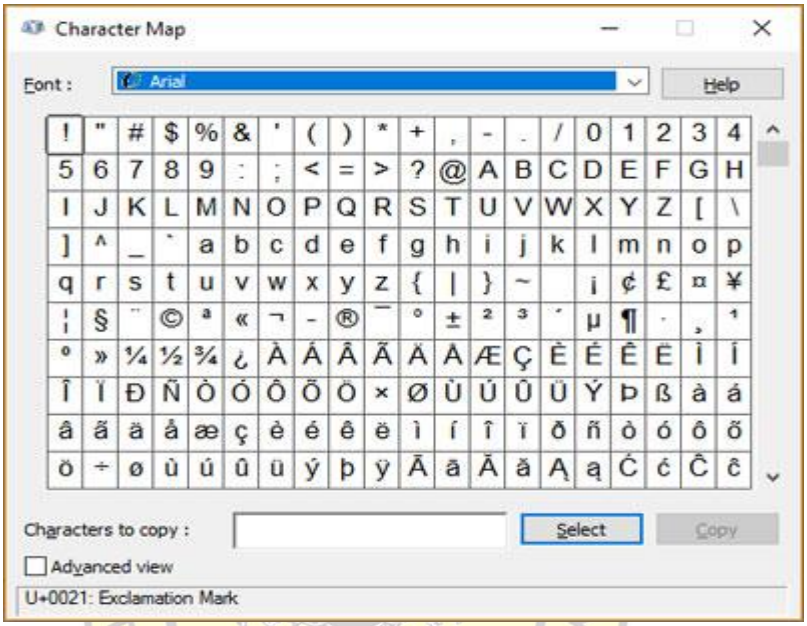


DATA HIERARCHY

A. CHARACTER:

Character is the basic data element. It includes a single alphabetic, numeric or other symbol.

For example – (alphabet A, B……, numbers 1, 2…….)



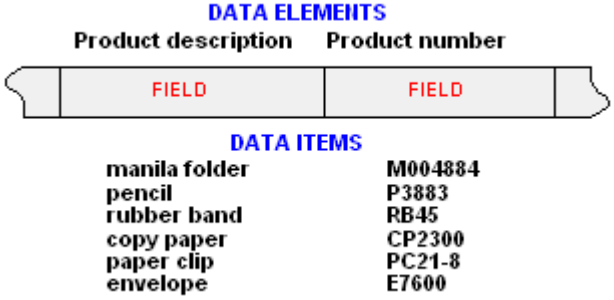
B. FIELD:

Field holds a single factor attribute of an entity or single piece of information.

Example – In a student's database there are six types of information.

1. Roll number
2. Name
3. Date of birth
4. Sex/gender
5. Address
6. Subjects

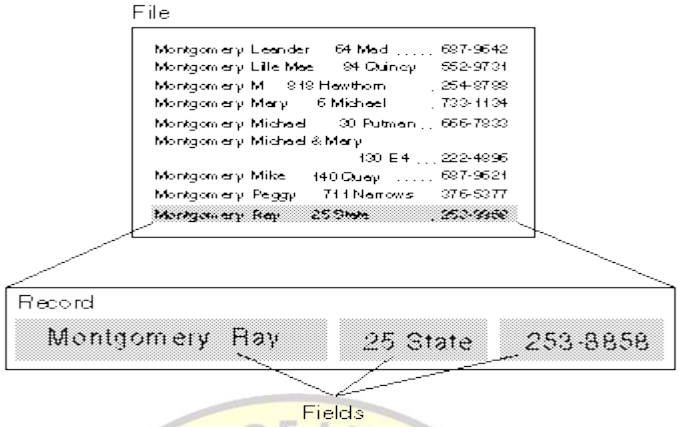
(Each type of information is a field)



C. RECORD:

Record is a collection of related fields.

Example – all the above mentioned six types of fields in a student's database is collectively called as record.

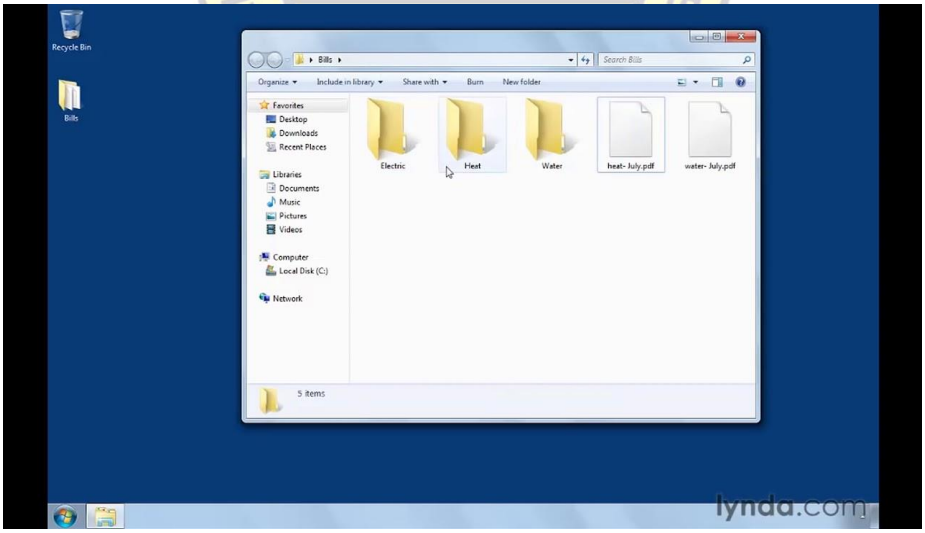


D. FILE:

A file is a collection of related records.

Example – telephone dictionary containing records of various telephone holders

1. Students file
2. Employees file in an organization.

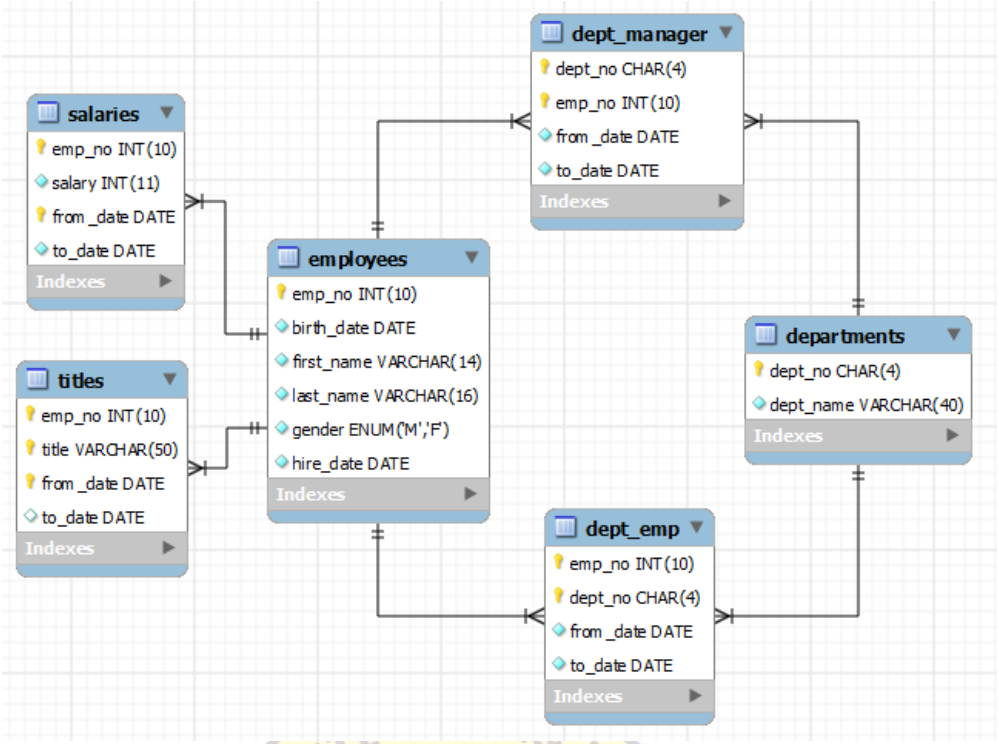


E. DATABASE:

All the related files are integrated into a database.

Example – Student's database

Employee's database



2.1.3: DATA BASE:

- A database is an organized collection of data, stored and accessed electronically. It is an electronic filing system.
- A database is an assortment of data that is organized to be easily accessed, managed and updated.
- For example – record of all employees on their payroll in an organization.

EXAMPLES OF DATABASE:

- Oracle
- Microsoft access
- File maker pro
- SAP (system applications products) in data processing.

2.1.4: DATABASE MANAGEMENT SYSTEM (DBMS):

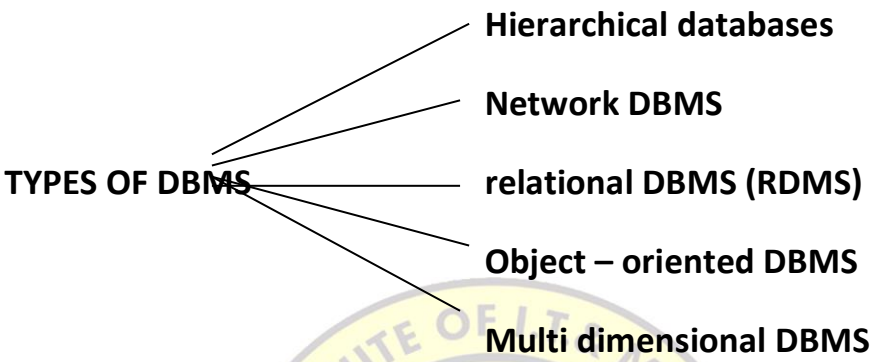
A database management system is system software for creating and managing databases. The database management system provides users and programmers with a systematic way to create, retrieve, update and manage data.

The DBMS serves as an interface between the database and end users.

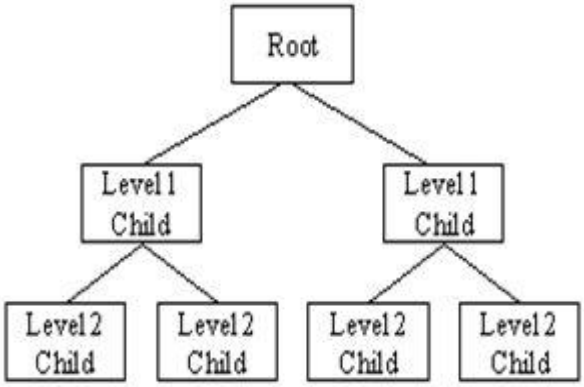
THREE THINGS IN DBMS

- **Data**
- **Database engine – that allows data to be accessed locked & modified**
- **Data base schema – defines database logical structure**.

ATYPES OF DBMS:



1. **HIERARCHIAL DBMS:**
   - In a hierarchical database management systems (hierarchical DBMSs) model, ***data is stored in parent-children relationship nodes.***
   - In a hierarchical database, besides actual data, records also contain information about their groups of parent/child relationships.
   - In a hierarchical database model, ***data is organized into a tree like structure***. The data is stored in form of collection of fields where each field contains only one value.
   - The records are linked to each other via links into a parent-children relationship. In a hierarchical database model, each child record has only one parent. A parent can have multiple children.
   - To retrieve a field's data, we need to traversed (travel across) through each tree until the record is found.
   - The hierarchical database system structure was ***developed by IBM in early 1960s.*** While hierarchical structure is simple, it is inflexible due to the parent-child one-to-many relationship.
   - Hierarchical databases are widely used to build high performance and availability applications usually in banking and telecommunications industries.
   - The IBM Information Management System (IMS) and Windows Registry are two popular examples of hierarchical databases.



Hierarchical Database Model

- **Advantages**
  - **Conceptual simplicity**
  - **Database security and integrity**
  - **Data independence**
  - **Efficiency**
- **Disadvantages**
  - **Complex implementation**
  - **Difficult to manage and lack of standards**
  - **Lacks structural independence**
  - **Applications programming and use complexity**
  - **Implementation limitations**

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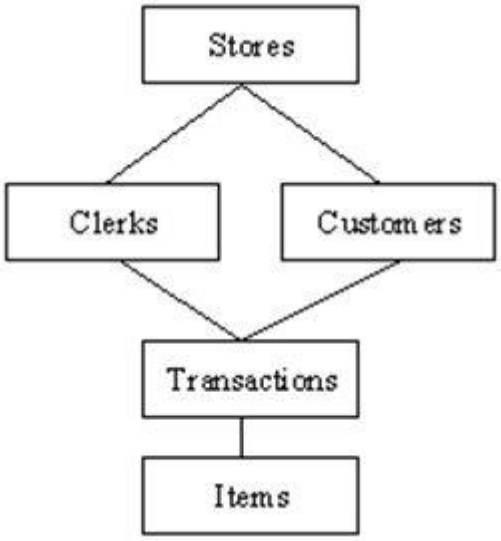
2. NETWORK DBMS:

- Network database management systems (Network DBMSs) use a network structure to create relationship between entities.
- Network databases are mainly used on large digital computers.
- Network databases are hierarchical databases but, unlike hierarchical databases where one node can have one parent only, a network node can have relationship with multiple entities.
- A network database looks more like a cobweb or interconnected network of records.
- In network databases, ***children are called members and parents are called occupier.***
- The network database structure was ***invented by Charles Bachman.***
- Some of the popular network databases are Integrated Data Store (IDS), IDMS (Integrated Database Management System), Raima Database Manager, Turbo IMAGE, and Univac DMS-1100.



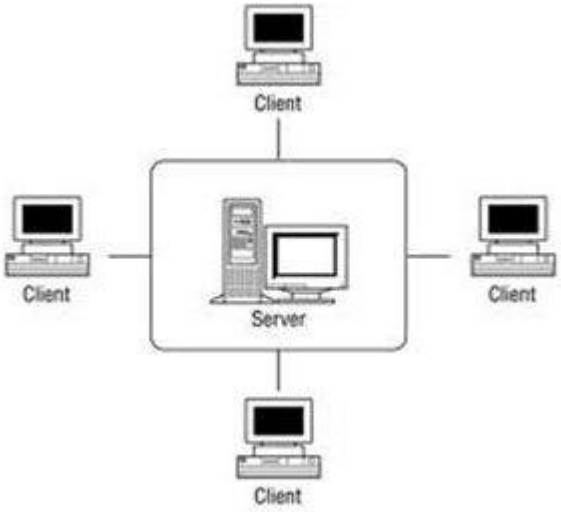
Network Model

Advantages	Disadvantages
▪ Conceptual simplicity ▪ Handles more relationship types ▪ Data access is flexible ▪ Data owner/member relationship promotes data integrity ▪ Conformance to standards ▪ Includes data definition language (DDL) and data manipulation language (DML)	▪ System complexity limits efficiency ▪ Navigational system yields complex implementation, application development, and management ▪ Structural changes require changes in all application programs

3. RELATIONAL DBMS (RDMS):

- In relational database management systems (RDBMS), the relationship between data is relational and data is stored in tabular form of columns and rows.
- Each column in a table represents an attribute and each row in a table represents a record. Each field in a table represents a data value.

- Structured Query Language (SQL) is the language used to query a RDBMS including inserting, updating, deleting, and searching records.
- Relational databases work on each table has a key field that uniquely indicates each row, and that these key fields can be used to connect one table of data to another.



- Relational databases are the most popular and widely used databases.
- Some of the popular DDBMS are Oracle, SQL Server, MySQL, SQLite, and IBM DB2.

Relational Database Model

Advantages

- Structural independence
- Improved conceptual simplicity
- Easier database design, implementation, management, and use
- Ad hoc query capability (SQL)
- Powerful database management system

Disadvantages

- Substantial hardware and system software overhead
- Possibility of poor design and implementation
- Potential "islands of information" problems

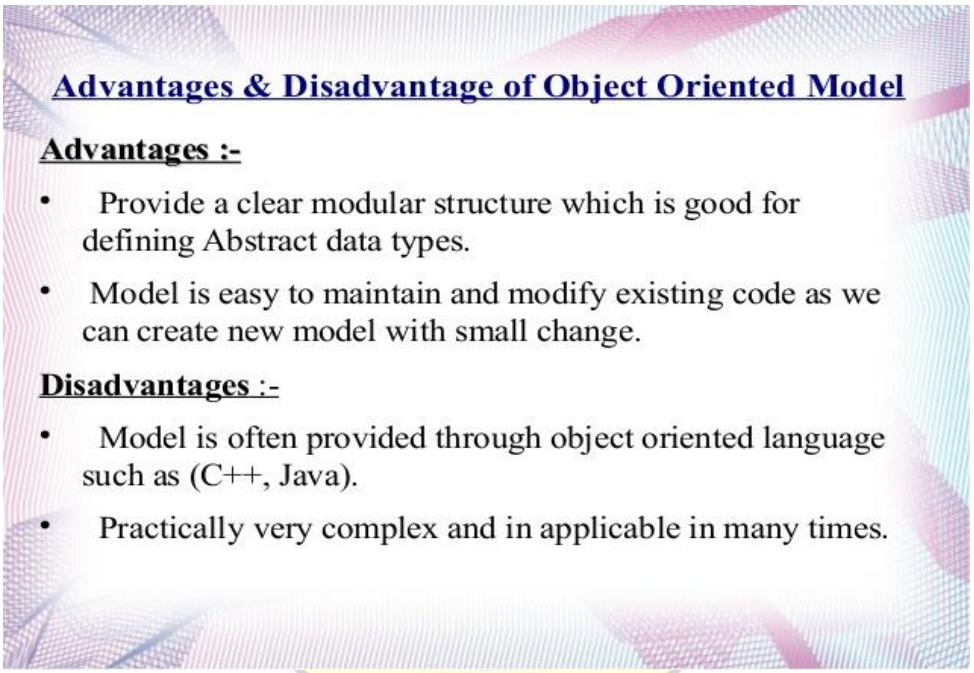
4. OBJECT-ORIENTED DBMS:

- Object-oriented databases use small, recyclable separated software called objects. The objects themselves are stored in the object-oriented database.
- Each object contains of two elements:

1. Piece of data (e.g., sound, video, text, or graphics).

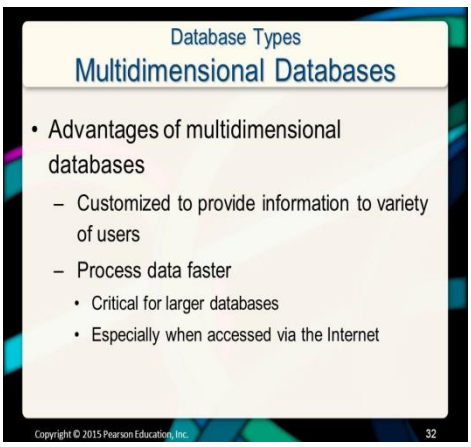
2. Instructions or software programs called methods, for what to do with the data.

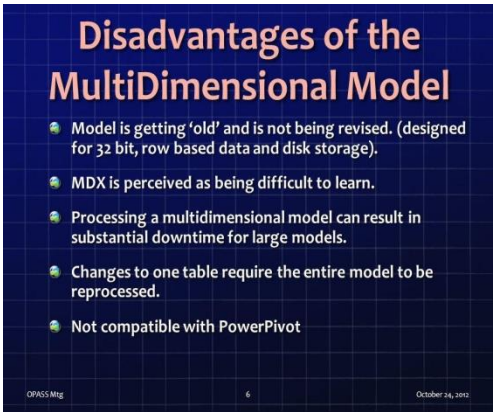
- Object-oriented database management systems (OODBMs) were created in early 1980s.
- Some OODBMs were designed to work with OOP languages such as Delphi, Ruby, C++, Java, and Python. Some popular OODBMs are TORNADO, Gemstone, ObjectStore, GBase, VBase, InterSystems Cache, Versant Object Database, ODABA, ZODB, Poet. JADE, and Informix.



5. MULTI DIMENSIONAL DBMS:

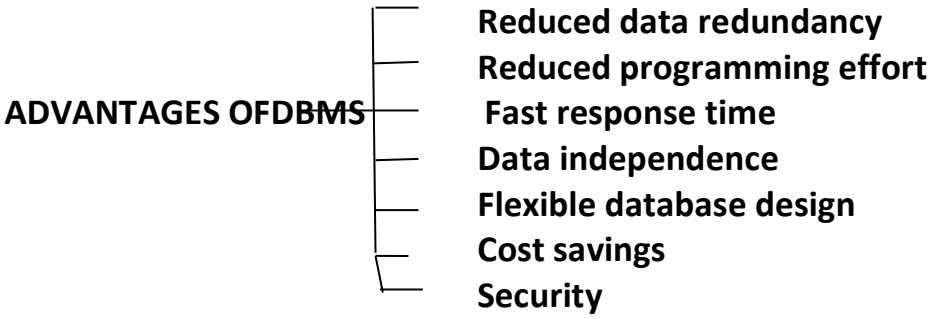
- A Multidimensional database management system (MDBMS) is a database management system that uses a data as an idea to represent multiple dimensions of data available to the users.
- Multidimensional database are frequently created using input from existing relational databases.
- MDBMS is a type of database that is optimized for data warehousing and online analytical processing (OSLAP).





2.1.5: PROS AND CONS OF DBMS / ADVANTAGES AND DISADVANTAGES OF DBMS:

ADVANTAGES/PROS OF DBMS



a. REDUCED DATA REDUNDANCY:

- Data redundancy is the existence of additional data to the actual data.
- Centralized control of data by DBMS avoids unnecessary duplication of data and reduces the total amount of data storage required.
- By this, problems of excessive memory requirements and data inconsistencies are solved.

b. REDUCED PROGRAMMING EFFORT:

With DBMS programming effort is also reduced considerably because of the built-in capabilities of DBMS.

c. FAST RESPONSE TIME:

In database management system, response time is much faster since the end-user can directly interact with the DBMS.

d. DATA INDEPENDENCE:

Data independence is achieved as the responsibility of knowing the physical details of data storage lies with DBMS. The users concentrate on the logical contents of the data.

e. FLEXIBLE DATABASE DESIGN:

Most databases give the users the freedom to make database design changes very easily. In contrast, in a non DBMS environment these changes would require considered programming effort.

f. COST SAVINGS:

Due to reduced programming effort, reduced data redundancies, fast response time etc, cost savings are achieved through the use of a DBMS.

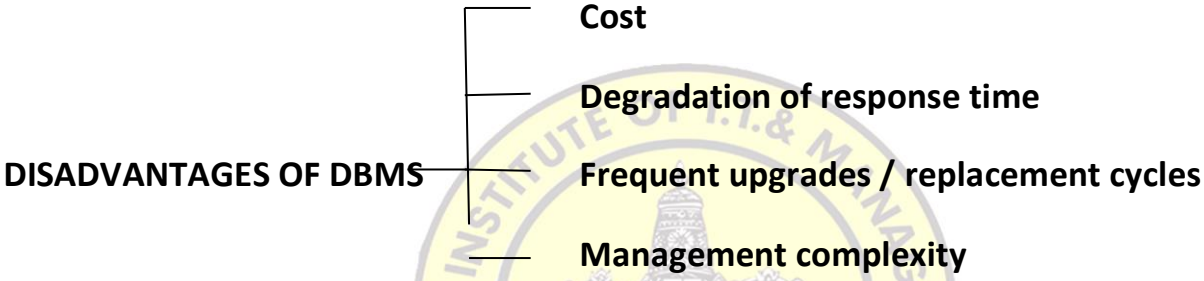
g. SECURITY:

DBMS offers a wide variety of security and privacy features which are essential for the success of a system.

Example:

- Proper access procedures.
- Proper authentication schemes for access to DBMS.

DISADVANTAGES / CONS OF DBMS:



i. COST:

Database management systems require sophisticated hardware and software and highly skilled personnel. So, it is costly for implementing a DBMS.

ii. DEGRADATION OF RESPONSE TIME:

The processing overhead introduced by the DBMS to implement security, integrity and sharing of the data result in degradation of response and throughput times.

iii. FREQUENT UPGRADES/REPLACEMENT CYCLE:

DBMS vendors frequently upgrade their products by adding new functionality. Such new features come bundled in new upgrade versions of software. These upgrades require money, but also costs money to train database users to use and manage new features.

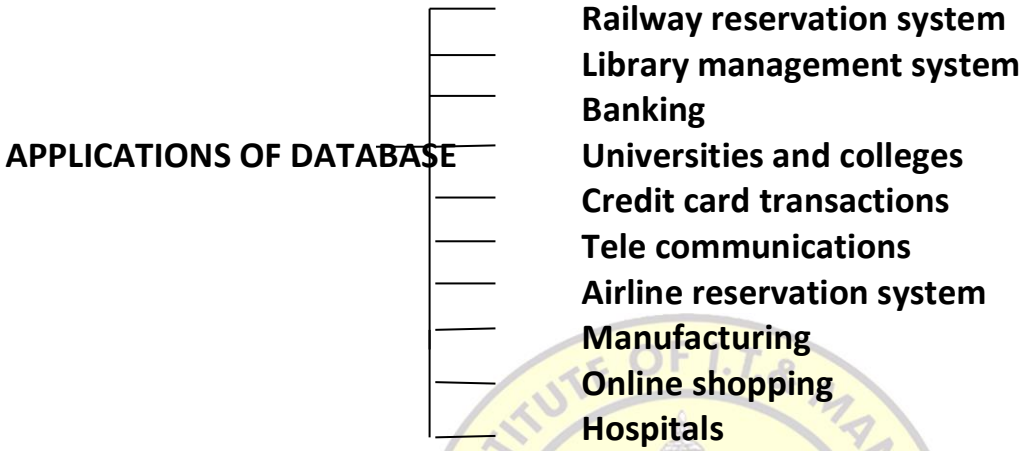
iv. MANAGEMENT COMPLEXITY:

- DBMS interface with many different technologies and have a significant impact on company's resources and culture.
- The changes introduced by the adoption of DBMS must be properly managed to ensure that they help advance the company's objectives.

2.2. APPLICATIONS TO DATABASE:

A data base application is a computer program whose purpose is to enter and retrieve information from a computerized database.

Applications of databases are as follows;



I. RAILWAY RESERVATION SYSTEM:

In railway reservation system, database is required to keep record of ticket booking, train's departure and arrival status. Also if trains get late then people get to know it through database update.

II. LIBRARY MANAGEMENT SYSTEM:

There are thousands of books in the library, so it is very difficult to keep record of all the books in a copy or register. So, database used to maintain all the information relate to book issue dates, name of the book, author and availability of book.

III. BANKING:

There are thousands of transactions takes place through banks daily; and all these are made without going to bank. By sitting at home we can send or get money through banks. That is possible just because of DBMS that manages all the bank transactions.

III. UNIVERSITIES AND COLLEGES:

Examinations are done online today and universities and colleges maintain all these records through DBMS. Students registration details, results, courses and grades all the information are stored in database.

IV. CREDIT CARD TRANSACTIONS:

For purchase of credit cards and all the other transactions are made by DBMS. A credit card holder knows the importance of their information that all secured through DBMS.

V. TELECOMMUNICATIONS:

Any telecommunication company cannot even think about their business without DBMS. It is must for these companies to store the call details and monthly post paid bills.

VI. AIRLINE RESERVATION SYSTEM:

Same as railway reservation system, airline also needs database to keep records of flights arrival, departure and delay status.

VII. HOSPITALS:

Database in hospitals used for storage of data on patient demographics, procedures, admission source, charges, etc.

VIII. MANUFACTURING:

Manufacturing companies make products and sale them on the daily basis. To keep records of all details about the products like quantity, bills, purchase, supply chain management database is used.

IX. ONLINE SHOPPING:

Online shopping has become a big trend of these days. Everyone wants to shop from home, no one wants to go to shops and waste their time. So all these products are added and sold with the help of DBMS. Purchase information, invoice bills and payment, all of these done with database.

2.3. DATABASE CONCEPTS:

2.3.1: DATABASE:

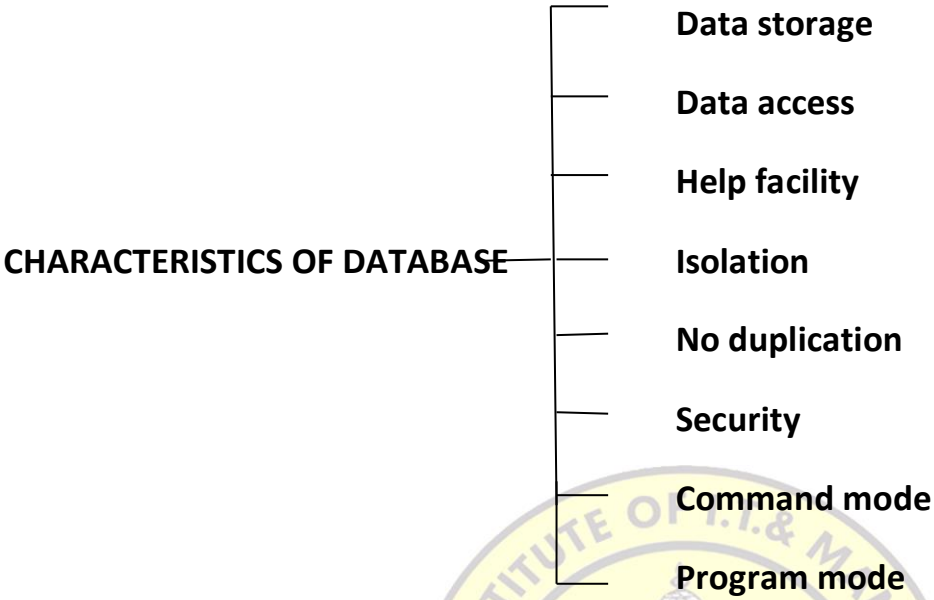
- A database is an organized collection of data stored and accessed electronically. It is an electronic filing system.
- A database is an assortment of data that is organized to be easily accessed, managed and update.

  For example – record of all employees on their payroll in an organization.

  Example
  - Oracle
  - Microsoft access

- File maker pro
- SAP

2.3.2: CHARACTERISTICS OF DATABASE:



1. **DATA STORAGE:**
   - A database should be able to store all kinds of data.
   - Since, individuals need to work with all kinds of data and requirements; database should be strong enough to store all kinds of data.
2. **DATA ACCESS:**
   - Databases systems demands that data should be accessed easily. This includes modifying data, adding data, searching the database, generating reports.
   - Multiple users should be able to access the same database without affecting each other.

3. **HELP FACILITY:**

Database provides help facility that allows user to obtain online help while interacting with DBMS.

4. **ISOLATION:**

Data and application should be isolate, because database is a system which gives the platforms to store the data. Here, there should be clear differentiation between them.

5. **NO DUPLICATION:**
   - There should not be any duplication of data in the database.

- Data should be stored in such a way that is should not be repeated in multiple tables. If repeats, it would be unnecessary waste of database space.

6. SECURITY:

Database should also provide security i.e. when there are multiple users are accessing the database, each user will have own levels of rights to see the database.

7. COMMAND MODE:

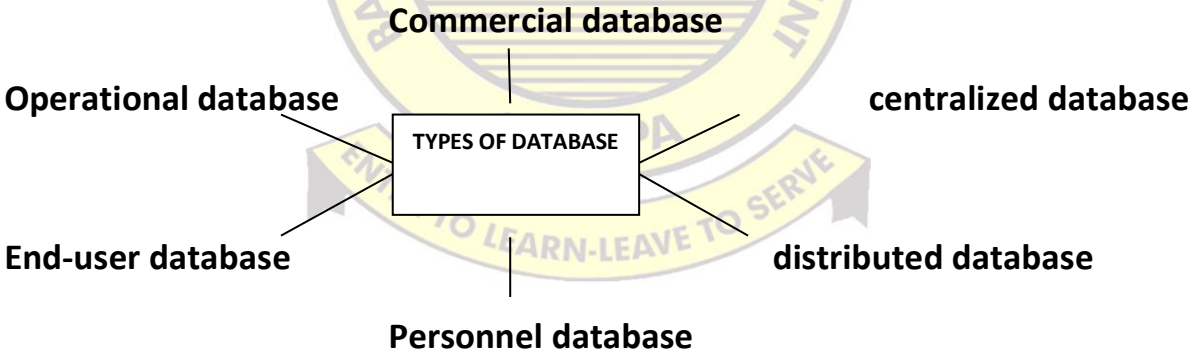
In command mode, the user gives commands to the DBMS. Due to this feature some technical experience is necessary.

8. PROGRAM MODE:

- In program mode, in case the user's needs are very complex, then manipulation of database has to be done through one or many application programs.
- In such a case where large amount of data processing is involved program mode is best suited.

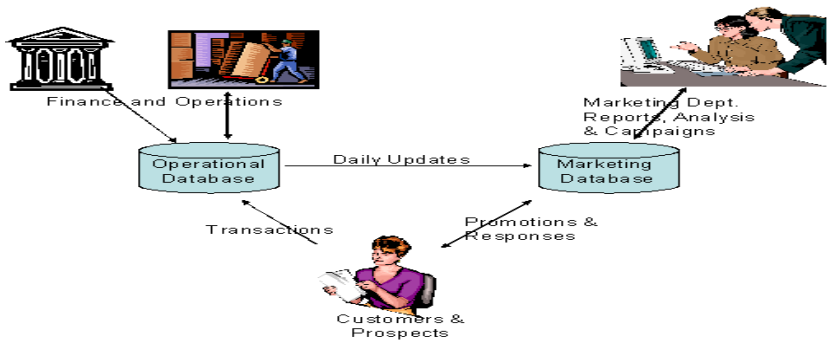
2.3.3: TYPES OF DATABASE:

Types of databases given here as follows,



1. OPERATIONAL DATABASES:

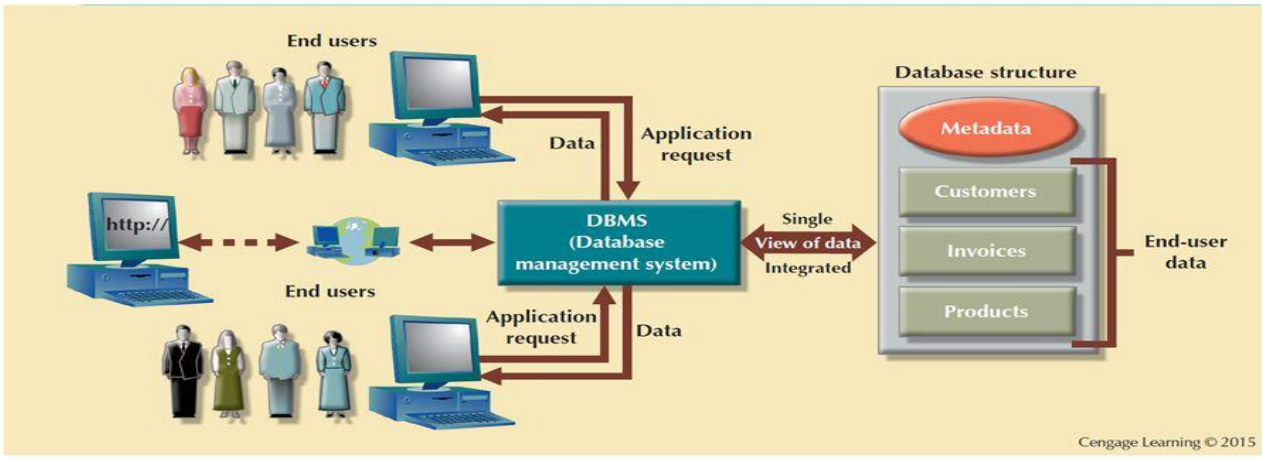
- Operational databases store data relating to the operations of an organization.
- Generally such databases are organized on functional lines/areas such as finance, marketing, production etc.



2. END-USER DATABASES:

- End-user databases are shared by users and contain information meant for use by end users like managers of different levels.
- These managers may not be concerned about individual transactions found in operational databases.

Interaction between the End User and the Database



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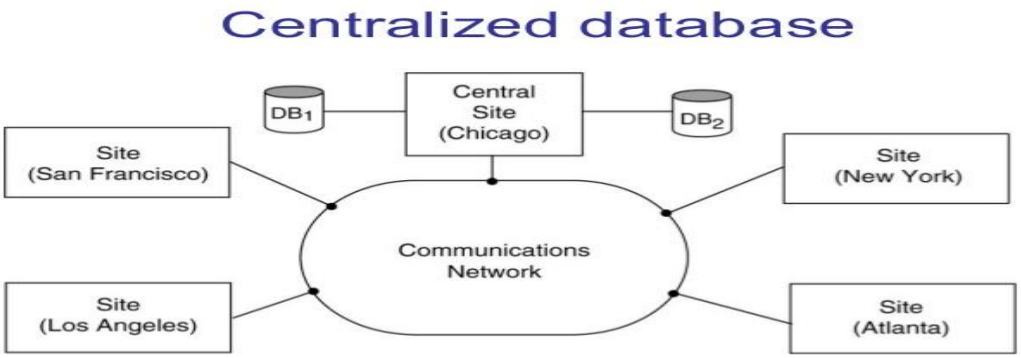
3. CENTRALIZED DATABASES:

- Centralized databases store the entire information and application programs at a central computing facility.
- The users at different locations access the central databases to make processing.
- The communication controller sends the transactions to the relevant application programmes.

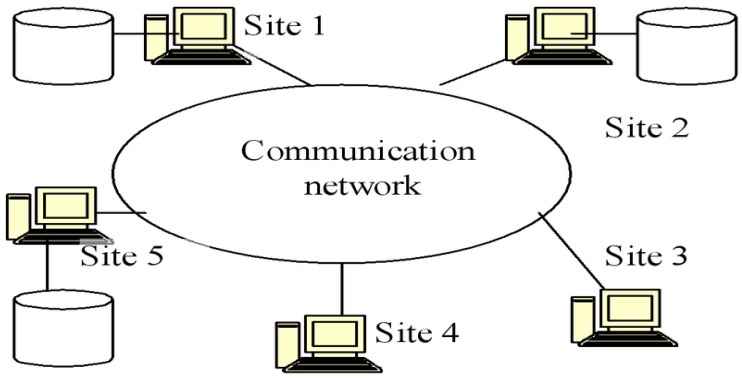
Example – MTNL (Mahanagar telephone Nigam ltd) has a centralized database for registration of applications for new telephone connections.



4. DISTRIBUTED DATABASES:

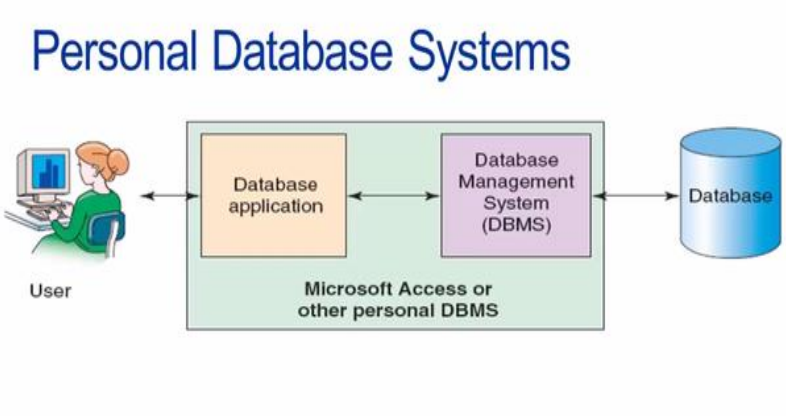
- A distributed database is a database in which not all storage devices are attached to a common processor.
- It may be stored in multiple computers located in the same physical location or may be dispersed over a network.

Example – independent computers on internet.



5. PERSONAL DATABASES:

Personal databases are maintained on personal computers. They contain information that is meant for use among a limited number of users.



6. COMMERCIAL DATABASES:

Commercial databases offers statistics regarding commodity, foreign exchange and stock markets, companies and their performance ,importers and their buying patterns etc.

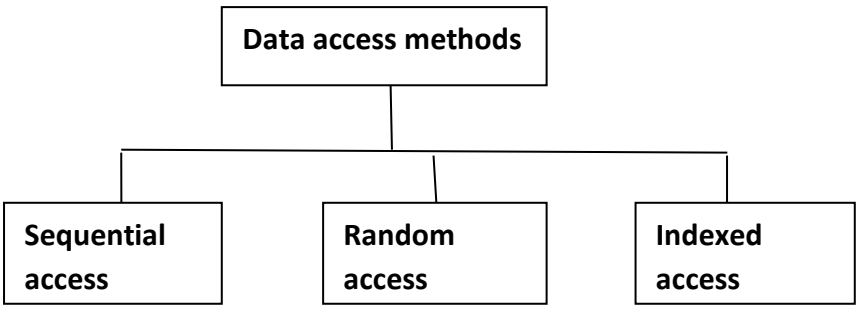
2.4: DATA ACCESS METHODS:

Data access typically refers to software and activities related to storing, retrieving or acting on data housed (present) in database.

- Data access methods are used to process queries and access data.
- An access method is also an application program interface (API) that a programmer uses to create or access data sets or to read from or write to a display terminal or other output device.

There are 3 types of data access methods like,

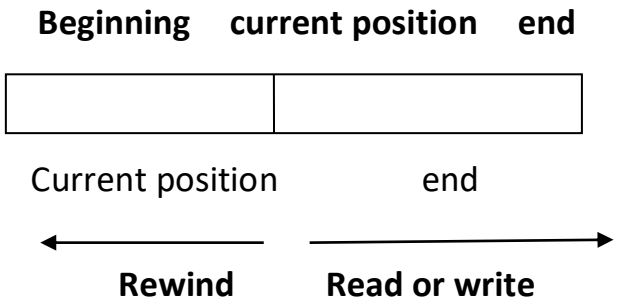
- Sequential access
- Random access
- Indexed access



1. SEQUENTIAL ACCESS METHOD:

- Sequential access means that a group of elements (such as data in a memory array or a disk file or on magnetic tape) is accessed in a predetermined, ordered sequence.

- Sequential access is the only way of accessing the data if data is on a tape. Most common form of file structure is the sequential file. In sequential access method, the records are read sequentially (one record, then another and so on) in an order.
  Example – magnetic tape rather than magnetic disk.



Sequential access method

ADVANTAGES:

- Sequential access is fast and efficient when dealing with large volumes of data.
- Allows sequential access of the data in an order.
- Amount of storage space on the disk can be saved.
- Simple to implement.

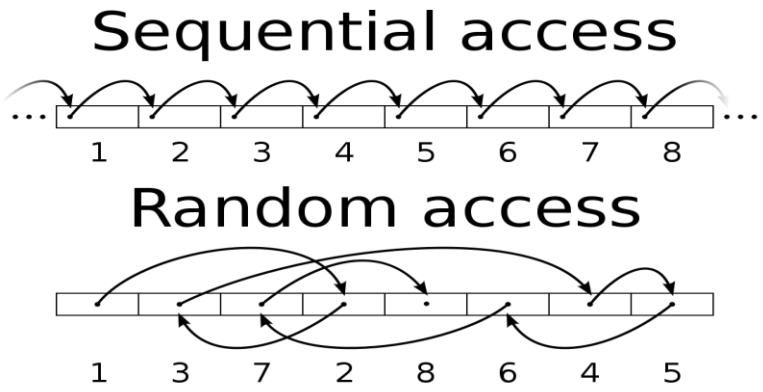
DISADVANTAGES:

- This method is too slow to handle applications requiring immediate updating or responses.
- All new transactions sorted into the proper sequences for sequential processing.

2. **RANDOM ACCESS METHOD:**
   - Random access method also referred as ***direct access method.***
   - Random access is the ability to access any data from a population of addressable elements roughly as easily and efficiently.
   - This method doesn't consider how many elements may be in the set.
   - Random access is contrasted to sequential access method.
   - Files whose records can be read in any order are called direct access or random access files.
   - Random access files are basically a collection of records stored on a disk.

Example

In a banking application, a customer may want to look up his current balance. This can be easily done by locating this customer's record using his account number as a key rather than sequentially reading the records for other customers.



ADVANTAGES:

- No need to sort records in order during addition.
- Gives efficient use of memory.
- Gives fastest retrieval of records.

DISADVANTAGES:

- Less efficient in use of storage spaces.
- Needs expensive hardware and software.

3. INDEXED ACCESS METHOD:

- Indexed access method is a slight modification of the direct access method.
- It is a combination of both the sequential access as well as direct access method.
- The main concept of indexed access method ***is to access a file direct first and then sequentially from that point onwards.***

ADVANTAGES:

- Indexed access method, both direct and sequential access of files is possible.
- Records can be inserted or updated in the middle of the file.

DISADVANTAGES:

- It requires unique keys.
- Requires expensive hardware and software resources.
- Processing is occasionally slow.
- Requires periodic re-organization of file.

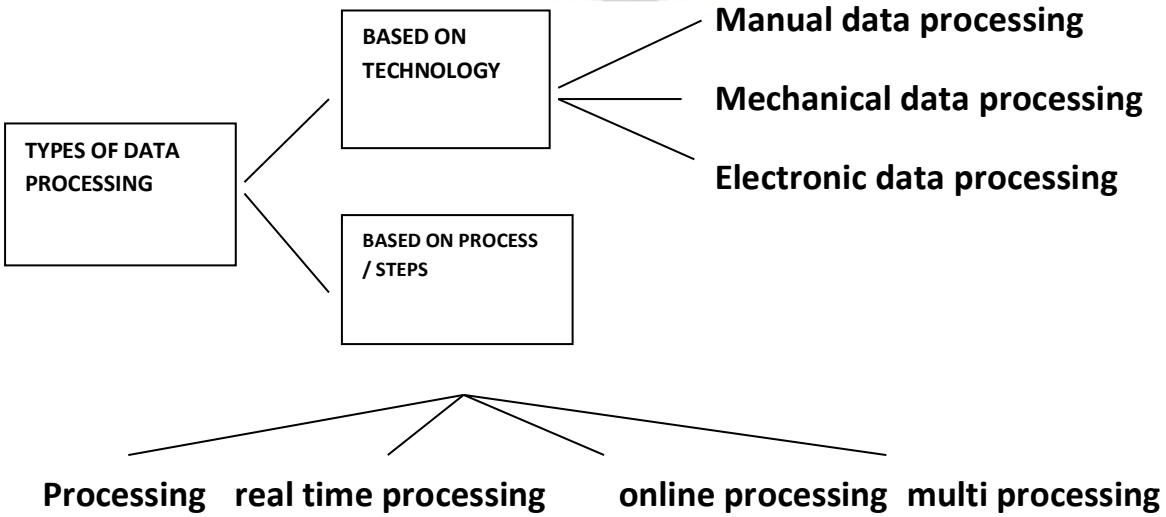
FEATURES	SEQUENTIAL	RANDOM ACCESS	INDEXED
Type of Access	Batch	Online	Batch or Online
Data organizations	Sequentially	No particular order	Sequentially or Indexed
Flexibility in handling inquiries	Low	High	Very High
Availability of up-to-date data	No	Yes	Yes
Speed of Retrieval	Slow	Very Fast	Fast
Activity	High	Low	High
Volatility	Low	High	High
Examples	Payroll processing and Billing operations	Airline reservations and Banking transactions	Customer ordering and Billing

2.5: DATA PROCESSING TYPES:

2.5.1: DATA PROCESSING:

The conversion of raw data into meaningful information through a process and the conversion is called '**data processing**'.

There are number of methods and techniques which can be adopted for processing of data depending on the time, availability, requirements, software and hardware, capability of technology.



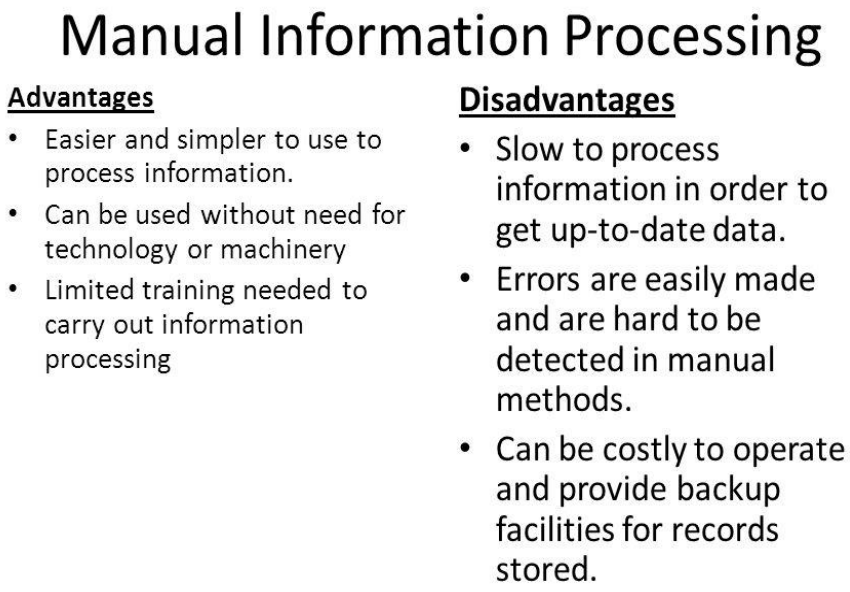
1. DATA PROCESSING ON THE BASIS OF TECHNOLOGY:

Types of data processing based on technology are as follows,

a. MANUAL DATA PROCESSING:

- In manual data processing, data is processed manually without use of machine or electronic device.
- This method is slow and less reliable chances of error is high.
- This method also makes processing expensive and requires large man power depending on the data required to be processed.

  Example – selling of commodity on shop.



b. MECHANICAL DATA PROCESSING:

- Mechanical data processing involves data processing done by use of mechanical devices like calculator and type writers.
- The advantages of this method include,
  - More reliability
  - Time saving

c. ELECTRONIC DATA PROCESSING:

- This method uses computers for data processing.
- This is the fastest and best available method with highest reliability and accuracy.
- Requirement of manpower is minimum.
- Process large volumes of similar information.
- Processing can be done through various programs and predefined set of rules.

Examples:

Stock updates, Applying to an inventory, banking transactions applied to an account and customer files, booking and ticketing transactions to an airline reservation systems.

Advantages:

1) It is faster than humans.
2) Small as well as huge data can be processed in a short period of time.
3) It is more efficient, accurate and cost effective.

Disadvantages:

It may require large and complex computing infrastructure. Continuous support and maintenance is required.

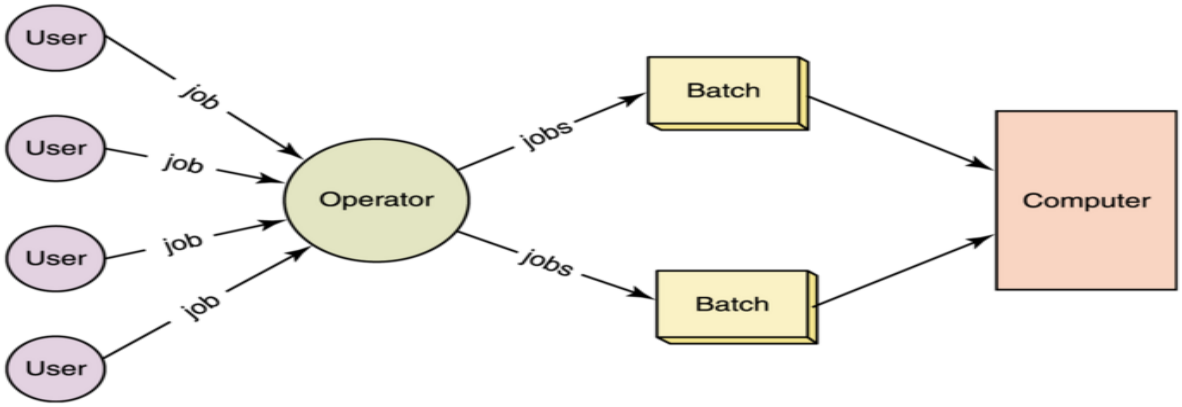
2. DATA PROCESSING BASED ON PROCESS/STEPS PERFORMED:

The types of data processing based on the process performed are explained here under,

a. BATCH PROCESSING:

- Batch processing also referred as serial or sequential processing.
- The fundamental of this type of processing is that different jobs of different users are processed in the order received.
- This processing of a large volume of data helps in reducing the processing cost.

Example,- examination payroll and billing system.



Advantages of batch processing systems

Here are some advantages of batch systems:-

- Repeated jobs are done fast in batch systems without user interaction.
- You don't need special hardware and system support to input data in batch systems.
- Best for large organizations but small organizations can also benefit from it.
- Batch systems can work offline so it makes less stress on processor.

Disadvantages of batch processing systems

- Computer operators must be trained for using batch systems.
- It is difficult to debug batch systems.
- Batch systems are sometime costly.
- If some job takes too much time i.e. if error occurs in job then other jobs will wait for unknown time.

b. REAL TIME PROCESSING:

- Real time processing is required where results are displayed immediately or in lowest time possible.
- The data fed to the software is used almost instantaneously for processing purpose.
- This processing requires use of internet connection and data is stored / used online.
- This method is costly than batch processing.

  Example – banking system, tickets booking for flights trains etc.

ADVANTAGES AND DISADVANTAGES (REAL-TIME PROCESSING):

Advantages:

1. Real-time processing provides immediate updating of databases and immediate responses to user inquiries.

2. Real-time processing is particularly important for applications where a high frequency of changes must be made to a file during a short time to keep it updated.

3. Only the specific records affected by transactions or inquiries need to be processed, and several databases can be processed or updated concurrently.

Disadvantages of real-time processing:

1. Because of the online, direct-access nature of real-time processing networks, special precautions must be taken to protect the contents of databases (control logs or backup files).

2. More controls have to be built into the software and network procedures to protect data from unauthorized access or the accidental destruction of data.

3. Organizations with critical OLAP applications have to pay a high cost premium for the security of fault tolerant computer systems.

c. ONLINE PROCESSING:

- Online processing at times known as direct or random access processing.
- Under online processing method, the job received by the system is processed at same time of receiving.
- This processing method is a part of automatic processing method.
- This can be considered and often mixed with real-time processing.

Advantages of online processing systems:-

- Easy to use to do shopping online
- These systems have quick response time
- It is easy to use just form filling and your job get processed automatically by web and database servers
- Online banks nowadays use online processing systems for money transactions

Disadvantages of online processing systems:-

- There occur millions of requests to banks at a time which is difficult to handle.
- During purchases if servers hang out for few seconds then transactions get interrupted, so not good for big websites and organization and high traffic sites.
- There should be making some relation with banks so if any transaction problem occurs then banks handle it correctly.
- Transferring products to people physically is also another problem.
- Some issues also get involved during creation of new accounts by visitors.

d. MULTI PROCESSING:

- Multi processing is the most widely used types of data processing.
- Multi processing makes use of CPUs (more than one CPU)
- The task or set of operations are divided between CPUs simultaneously thus increasing efficiency and throughput.
- The benefits of multi processing include,
  - Reduction in time
  - Increased output

Example – processing of data and instructions in computers, lap tops mobile phones etc.

- Here CPUs work independently; failure of one CPU doesn't result in halting the complete process.

Advantages:

1.increase throughput
2.Economy of scale
3. Increased reliability

Disadvantages:

1) If one processor fails then it will affect in the speed
2) multiprocessor systems are expensive
3) Complex OS is required; 4) Large main memory required.

1.6: DATABASE LANGUAGES:

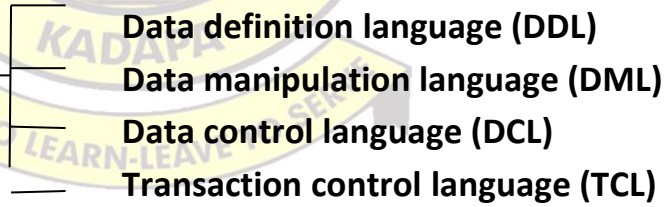
A DBMS has appropriate languages and interfaces to express database queries and updates. Database languages are used to read, update and store data in database. There are several such languages that can be used for reading, updating and storing data in database. Database languages are used to create and maintain database on computer.

Examples,

- SQL – structured query language
- DDL – data definition language

1.6.1 TYPES OF LANGUAGES:

Types of databases are given here under,



1. DATA DEFINITION LANGUAGE (DDL):

- **DDL** stands for **D**ata **D**efinition **L**anguage. It is used to define database structure or pattern.
- Data definition language is a language that allows users to define data and their relationship to other types of data.
- It is mainly used to create files, databases, data dictionary and tables within databases. It is used to create schema, tables, indexes, constraints, etc. in the database.
- Using the DDL statements, you can create the skeleton of the database.

- Data definition language also used to specify the structure of each table, set of associated values with each attribute, security and authorization information for each table and physical storage structure of each table.

- Data definition language is used to store the information of metadata like the number of tables and schemas, their names, indexes, columns in each table, constraints, etc.

Here are some tasks that come under DDL:

- **Create:** It is used to create objects in the database.
- **Alter:** It is used to alter the structure of the database.
- **Drop:** It is used to delete objects from the database.
- **Truncate:** It is used to remove all records from a table.
- **Rename:** It is used to rename an object.
- **Comment:** It is used to comment on the data dictionary.

These commands are used to update the database schema that's why they come under Data definition language.

The following table gives an overview about usage of DDL statements in SQL;

S.NO	NEED AND USAGE	THE SQL DDL STATEMENT
1	Create schema objects	CREATE
2	Alter schema objects	ALTER
3	Delete schema objects	DROP
4	Rename schema objects	RENAME
5	Remove all records from a table	TRUNCATE
6	Comment on the data dictionary	COMMENT

2. DATA MANIPULATION LANGUAGE (DML):

- Data manipulation language is a language that provides a set of operations to support the basic data manipulation operations on the data held in databases.
- Data manipulation language allows users to insert, update, delete and retrieve data from the database.
- The part of data manipulation language that involves retrieval of data is called ‘query language’.

Here are some tasks that come under DML:

- **Select:** It is used to retrieve data from a database.
- **Insert:** It is used to insert data into a table.
- **Update:** It is used to update existing data within a table.
- **Delete:** It is used to delete all records from a table.
- **Merge:** It performs UPSERT operation, i.e., insert or update operations.
- **Call:** It is used to call a structured query language or a Java subprogram.

- **Explain Plan:** It has the parameter of explaining data.
- **Lock Table:** It controls concurrency.

The following table gives an overview about usage of DML statements in SQL;

S.NO	NEED AND USAGE	THE SQL DML STATEMENTS
1	Remove rows from tables or views	DELETE
2	Add new rows of data into table or view	INSERT
3	Retrieve data from one or more tables	SELECT
4	Change values in existing rows of table or view	UPDATE
5	Insert or update operations	MERGE
6	Call a structured query language	CALL
7	Explain data.	EXPLAIN PLAN
8	Controls concurrency	LOCK TABLE

3. DATA CONTROL LANGUAGE (DCL):

- Data control language statements control access to data and the database using statements such as GRANT and REVOKE (taken back)
- A privilege (a special right/advantage) can either be granted to a user with the help of GRANT statement.
- In addition to granting of privileges user can also revoke It using REVOKE command.
- The privileges assigned can be SELECT, ALTER, DELETE, EXCUTE, INSERT etc.

The following table gives an overview about the usage of DCL in SQL.

S.NO	NEED AND USAGE	AGE
1	Grant and take away privileges	GRANT
2	Add a comment to the data dictionary	REVOKE comment

4. TRANSACTION CONTROL LANGUAGE (TCL):

- Transaction control language is a language that is used to manage transactions in the database.
- This language is used to manage the changes made to the data in a table by DML statements.
- It also allows statements to be grouped together into logical transactions.

Commands in TCL

- **COMMIT (for permanently saving data)**
- **SAVE POINT(for temporarily saving data)**
- **ROLL BACK transaction(for moving backward to the starting stage)**

UNIT-2

IMPORTANT QUESTIONS:

1. What do you mean by data? Explain the concepts and models of DBMS?
2. Define DBMS? Explain the various data models with examples?
3. Explain applications of database with examples?
4. Discuss about database languages in detail?
5. What are the data access methods?
6. Discuss about types of data processing?

CASE STUDY

APPLECOMPUTERS

An Apple computer is an American multinational corporation with a focus on designing and manufacturing consumer electronics and even develops software products. It was confounded by Steve wozniak and Steve jobs. Steve wozniak met stove jobs while he was working at Hewlett-Packard. Steve jobs worked part time where he would finish up games that they designed in grass valley.

In1975, the first personal computer kit, the Alistair 8800 was announced. Since Steve wozniak could not afford an Alistair 8800 he decided to build his own personal computer by using cheaper chips. As circuit board alone, it could do more than Alistair. He and Steve jobs called it apple I. Jobs handled on marketing it while woznaik continued to improve it. By 1977, wozniak had built Apple II, then he and jobs decided to form Apple computer Inc. when it went public on 1980, its stock value was $117 million, three years later it was $985 million.

Steve wozniak is determined that he will develop a computer even if he was still a child. According to wozniak, if we try to start our own company, we must have the highest ethics and be open and truthful about things, not hide them.

We must not lead people. Know in your heart that you are a good person with goals because t will carry-over to our own self-confidence make our own product better that the average person would.

Apple computers ere pioneers when it comes to the GUI which was later picked-up by Microsoft. The first DTP work was also done in apple computers.

During the beginning of this century, Microsoft and Intel based products dominated the market share. However the introduction of iPod put the Apple back into the business. The world was crazy when the iPod were introduced by Apple.

QUESTIONS:

a) What is the basic philosophy of Apple computers?

One possible solution

Basic philosophy of Apple computers

Apple has long had a philosophy of focusing on the user experience. Their hardware designs are sleek and sophisticated, and are frequently offered in custom colors and designs. Their user interfaces are also well researched and tested to ensure that users will

not have difficulty in learning to operate them. In this way, they stay competitive with the other digital devices in the market.

Most especially, they point to their integrated technology as an advantage of being both hardware and a software company, as opposed to the rest of the desktop personal computer market where the hardware is assembled piecemeal from numerous vendors and the software comes from many companies which may only have a passing familiarity with the intended hardware platform.

Apple has had the majority of its customer base in the high-end user market, most especially with artists ad creators in many industries. Apple's marketing frequently plays to this culture, with ads featuring famous off-beat heroes of history, cultural references, and an undercurrent of reputation as a rebel smashing down the barriers of a crushing monotony.

b) Who are the competitors of apple computers and what is the product range?

One possible solution

Hewlett-Packard, Intel and Microsoft are the competitors of apple computers. The product ranges are computers and iPod.

c) What are the characteristics to apple computers?

One possible solution

Characteristics of apple computers

Apple computers have many distinct features that set them apart from the rest of the computer industry. The main characteristics of Apple computers are illustrated below:

1) Apple Macintosh offers the simplest OS functionality out of all the other leading brands. The experts at Apple have specifically designed Macintosh and allots versions to make things easier for the user.

2) Special hardware is designed for Apple computers that provide far superior performance than others brands that can be used another hardware. Macintosh OS when used on apple hardware performs with incredible speed.

3) Special attention is paid to the appearance of all models released by Apple. The simplistic nature of all Apple products has found many admirers all over the world.

4) One of the distinctive features of Apple computers is a piece of software called "The Dock". The Dock is sort of an always there menu with big icons that spawn your most frequently used programs. Docks also can run small programs or dock

lets that can do things like display a clocker show you the weather. Docks also can be configured to display running programs that have been minimized in a mini widow.

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(17E00107) INFORMATION TECHNOLOGY FOR MANAGERS

The main objective of this course is to make the student familiarize in information technology and their applications to business processes.

1. **Fundamentals of IT:-** Components of a system - Meaning and nature – Role of IT in various sectors - Information technology management - Strategies for gaining IT advantage.
2. **Database Management Systems:** Introduction to DBMS - Applications to data base -concepts, data access methods – Types of data processing-data base languages
3. **Understanding Ms-Office:- MS-Word - MS-Excel - Formulae, Graphs, Basis Statistical Formulae, MS-Access, MS-PowerPoint - Creating Effectiveness presentations.**
4. **Data Communication and Networks:** Concepts of Data Communication, Types of Data-Communication Networks, Communications Media, Concepts of Computer Networks, the Internet, Intranet and Extranets: Operation of the Internet, Services provided by Internet, World Wide Web.
5. **Emerging Trends in IT:** Introduction to SAP, IP addresses, IP protocol, various ERP packages, Implementation of ERP - Introduction to big data - cloud computing

Textbooks:

- Fundamentals of Information Technology, Alexis Leon, & Mathews Leon - Vikas.

References:

- Basics of Computer Sciencs, Behrouz Forouzan, Firoz Mosharraf, Cengage.
- Information Technology for Management, Ramesh Behi, Mc Graw Hill.
- Introduction to Computers and Communications, Peter Norton-Sixth Edition-Tata McGraw Hill.
- V.Rajaraman, Introduction to Information Technology, Prentice Hall India.
- Information Technology and theory Aksoy, Cengage Learnings.
- Foundations of IT,Dhiraj Sharma, Excel Books.
- MS Office 2000 for every one, Sanjay Saxena – Vikas

UNIT-3
MICROSOFT OFFICE

3.1: MICROSOFT WORD:

3.1.1: MICROSOFT OFFICE:

Microsoft office is a set of interrelated desktop applications, servers and services, collectively referred to as an office suite, for the Microsoft windows and Mac OS operating systems.

In Microsoft office, suite of products (set of products) developed by Microsoft corporation that includes,

- Microsoft word
- Microsoft excel
- Microsoft access
- Microsoft power point

Each program in Microsoft office serves a different purpose and compatible with other programs included in the package. Microsoft office is the most common form of software used in the western world.

In Microsoft office,

- **MICROSFT WORD** is used for word processing such as creating and editing documents.
- **MICROSOFT EXCEL** is used for data analysis and numeric manipulation.
- **MICROSOFT ACCESS** helps to analyze large amounts of information
- **MICROSOFT POWER POINT** is used to create and deliver presentations.

NOTE – Microsoft office was first announced by Bill gates on 1st august 1988.

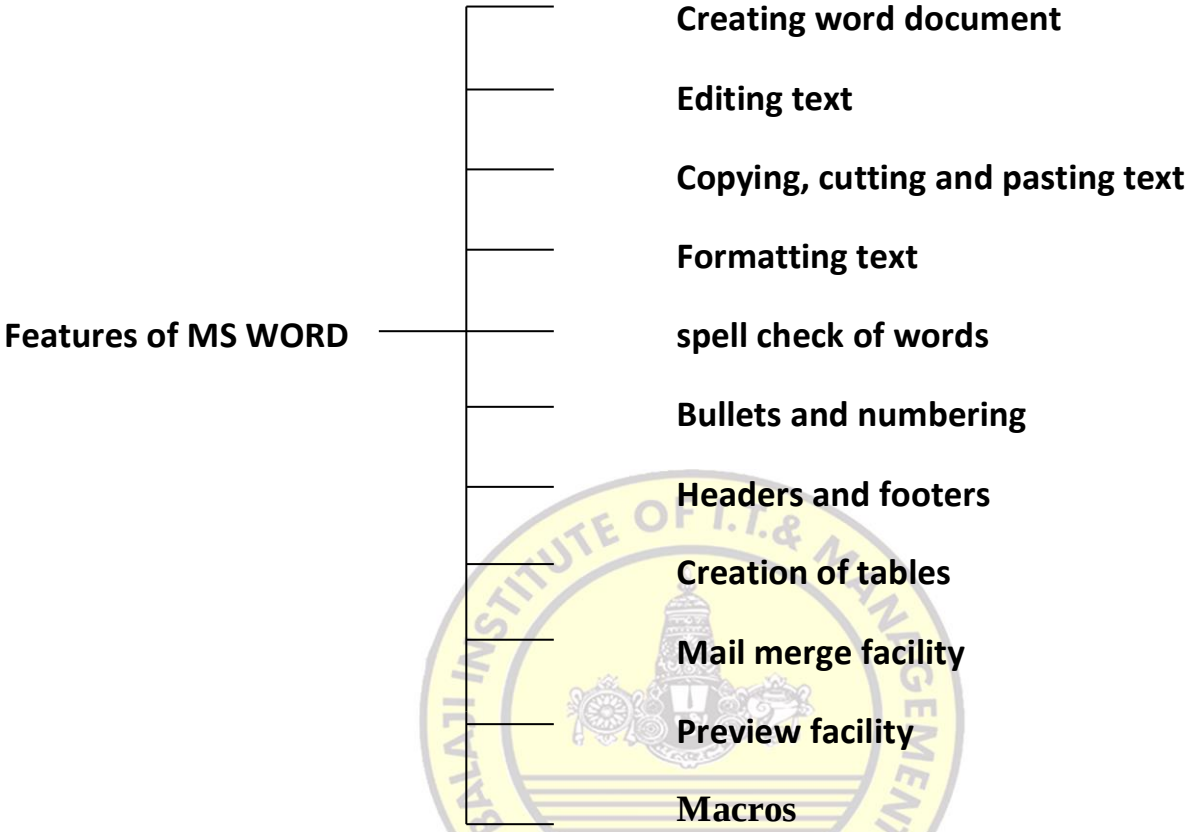
3.1.2: MS WORD:

Microsoft word is a component of Microsoft office. The first version of MS WORD was developed by Charles simony and Richard brodie.

MS WORD is Microsoft's solution to meet the word processing needs everyone. Like any other word processor, this package also contains necessary typing, editing features. In addition to these features, MS WORD also provides great tools for specialized word processing applications.

3.1.3: FEATURES OF MS WORD:

The important features of MS WORD covered here as follows;



1. **CREATING WORD DOCUMENT:**
   - In Microsoft word, word processing is done through the word documents.
   - A word document is created by using;
   - Either file ⟶ new command option
   - Or by choosing new document in programs menu.
   - After creating a document, it will present on screen stating document 1 and is ready to be written into.

2. **EDITING TEXT:**
   - Text editing is one of the advanced features of MS WORD.
   - The screen below shows the edit menu which has several features to edit the text. For this, the text to edit should be selected first.
   - Selection is indicated by the text being highlighted by a black background.
   - For editing text an edit menu has following options,
     - Undo paste
     - Repeat paste

- Cut
- Copy
- Paste
- Clear
- Select all
- Find, replace, go to…

3. COPYING, CUTTING AND PASTING TEXT:

- In the course of document production, it becomes necessary to move portions of text from one location in the document to another.
- To move the text to one place to another, first the text to be moved is selected and then copied by using edit ⟶ cut command.
- To bring cut portion to the desired location, the cursor is first brought to that location and then use edit ⟶ paste command to paste the cut text.
- The edit⟶copy command differs from edit ⟶ cut command in the sense that, in cut operation the text is removed, in the copy operation the text is copied to other location but it remains where it was in the document.

4. FORMATTING TEXT:

- It is important for a document to be presented to the reader in an attractive way.
- MS-WORD includes format menu to format the document in effective way.
- Format menu includes,
  - Font
  - Paragraph
  - Bullets and numbering
  - Boarders and shading
  - Auto format
  - Style
  - Background and so on

5. SPELL CHECK OF WORDS:

- MS-WORD features a built in dictionary for spell-checking.
- The misspelled words area marked with a red squiggly underline.
- The spelling of the words in the document can be rectified automatically we can also find alternative words to our typed words.

6. BULLETS AND NUMBERING:

- In MS-WORD bullets and numbering option appears in format menu.
- Bullets are special symbols which can be put for different points, paragraphs and documents where as numbers are ascending figure while 1, 2, 3……

7. HEADERS AND FOOTERS:

- The header and footer options available in INSERT MENU of ms word.
- A header is the text appearing above the documents.
- The footer is the text appearing below the documents.

8. CREATION OF TABLES:

- Another innovative feature of MS WORD is its ability to create tables with user specified rows and columns.
- Creation of table is achieved through the table menu.
- The table menu includes,
  - Draw table
  - Insert
  - Delete
  - Select
  - Merge cells
  - Split cells
  - Split table
  - Table auto format and soon.

9. MAILMERGE FACILITY:

- Mail merge is another important feature of MS WORD.
- In mail merge, the original letters are sent to the different people through the production of a single common document and the merging of this document with a data file containing data relevant to each recipient of the letter.

10. MACROS:

- Macros are another important feature of MS WORD.
- With the help of macros, we can avoid certain types of repetitive works. This saves out time and efforts.

11. PREVIEW FACILITY:

- In MS -WORD, before getting a print out of our document we can get a preview of document if mistakes are there we can change the document.
- This print preview option appears in file menu of ms-word.

3.1.4: HOW TO USE MAILMERGE IN MS-WORD:

Main merge is one of the very powerful features of MS-WORD in its ability to send original letters to different people through the single common document. Mail merge is most often used to print or email letters to multiple recipients. Using mail merge, individuals can easily customize (modify something) letters for individual recipients.

The steps in mail merging a letter are given as follows,

1. In a blank document i.e., Microsoft word document;
   - Click on **mailing tab**
   - Click **start mail merge group**
   - Click **start mail merge**
2. Click **step-by-step mail merge wizard.**
3. Select your document type. For example,
   - letters or e-mail messages,
   - Envelopes,
   - Labels
   - Directory
4. Click next **starting document.**

5. Select the starting document. For example,

- Use the current document
- Start from a template
- Start from existing document

6. Click next: select recipients,

7. After selecting next: select recipients, select recipients list, for example:

- use an existing list
- select from outlook contacts
- Type a new list.

8. Click **create.**

9. After selecting type a new list, create a list by adding data in the new address list dialog box and click ok.

10. Save the list.

11. Now the list has been created, the mail merge wizard reverts to use an existing list and you have the option to edit the recipient list.

12. Select edit recipient list, open up the mail merge recipients dialog box, where one can edit the list click ok to accept the list.

13. Click next: write your letter.

14. Then write the letter and add custom fields, it includes,

- Address block
- Greeting line
- Electronic postage
- More items

15. Click address block to add recipient's addresses. Then press ENTER on keyboard and click greeting line to enter a greeting click ok.

16. Click next: preview your letters

17. Preview letter and click next: complete the merge.

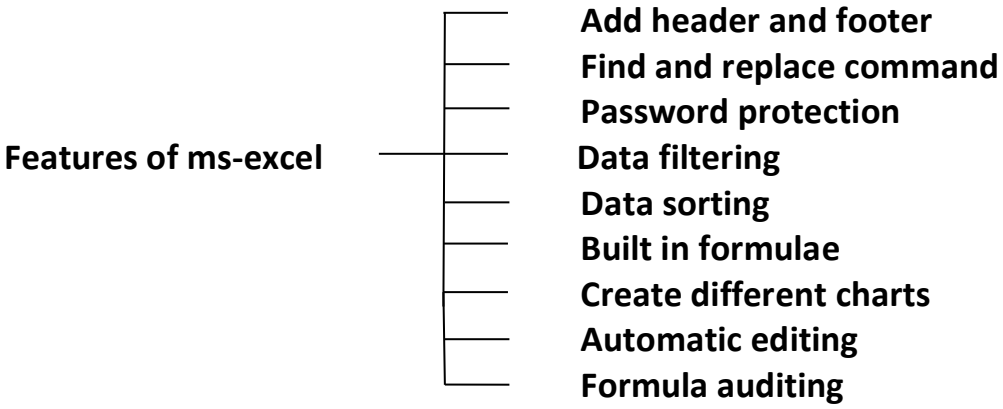
2. MS EXCEL:

Microsoft excel is a Microsoft applications. MS EXCEL is a spreadsheet program developed by Microsoft. Excel is mainly used for large data and calculations, and mathematical works, as it it's a program designed to work with numbers.

Microsoft excel is a spreadsheet application in which worksheets are organized by workbook. Each workbook contains three worksheets by default; additional worksheets are added up to a maximum of 255. Each worksheet contains several cells. A cell is a combination of rows and columns. Each worksheet contains 65536 rows and 256 columns. Rows numbered from 1 to 65536 and columns from A to Z (first 26 columns), next 26 from AA to AZ and so on.

2.1.1: FEATURES OF MS-EXCEL:

The features of MS-EXCEL are given here as follows;



a. ADD HEADER AND FOOTER:

MS-EXCEL allows user to keep header and footer in our spreadsheet document.

b. FIND AND REPLACE COMMAND:

MS-EXCEL allows user to find the needed data (text and numbers) in the workbook and also replace the existing data with a new one.

c. PASSWORD PROTECTION:

MS-EXCEL allows user to protect their worksheet by using password from unauthorized access to their information.

d. DATA FILTERING:

Filtering is a quick and easy way to find and work with a subject of data in a range. MS-EXCEL provides two commands for filtering ranges.

A. Auto filter – which includes filter by selection for simple criteria.

B. Advanced filter – for more complex criteria.

e. DATA SORTING:

- Data sorting is another feature of MS-EXCEL. It is the process of arranging data in some logical order.
- Ms-excel allow us to sort data either in ascending or descending order.

f. BUILT IN FORMULAE:

Ms-excel has many built in formulae for sum, average, minimum etc, one can use these formulae as per their needs.

g. CREATE DIFFERENT CHARTS (pivot table report):

- MS-EXCEL allows us to create different charts such as bar graph, pie-charts, line graphs etc.

- Creation of charts helps us to analyze and compare data very easily.

h. AUTOMATICALLY EDITING:

Ms-excel automatically edit the result if any changes are made in any of the cell.

i. FORMULA AUDITING:

- By using formula auditing, we can graphically display or trace the relationship between the cells and formulas with blue arrows.
- With formula auditing, the precedents (the cells that provide data to a specific cell) or the dependents (the cells that depend on the value in a specific cell).

3. FORMULAE IN MS-EXCEL:

Formulas and functions are extremely easy to use. In excel, a formula is an expression that operates on values in a range of cells or a cell. It can be anything from simple addition to complex additions.

For example;

= A1+A2+A3, which finds the sum of range of values from cell A1 to cell A3.

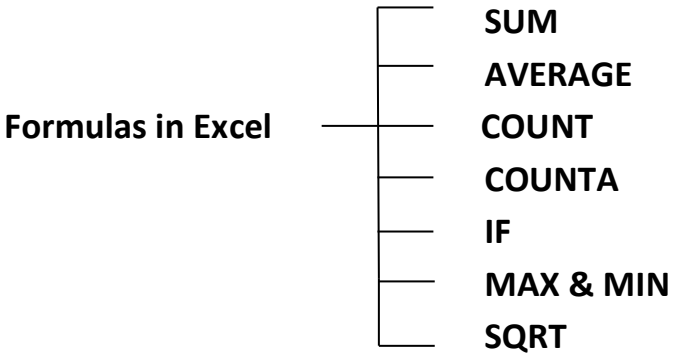
Function is a predefined formula built into excel. Functions eliminate laborious manual entry of formulas.

For example;

= sum (A1: A3), the function sums all the values from A1 to A3.

3.1: FORMULAS IN EXCEL:

Different formulas in excel are given here under,



1. SUM ( ):

The sum function is the first must know formula in excel. This sum function usually aggregates values from a selection of columns or rows from a selected range.

Formula;

= SUM (number 1, (number 2))

For example;

= SUM (A2:A8) it involves sum of values from A2toA8 columns

2. AVERAGE ( ):

The AVERGE function calculates the average of the series of specified number.

Syntax: = AVARAGE (number 1, number 2, number 3……)

Example – if there is a cell having range from A6 to F6, then average function is,

= AVERAGE (A6:F6)

3. COUNT ( ):

Count is another type of statistical function which counts the total number of cells which contains the numbers.

Syntax: = COUNT (value 1, value 2……)

4. COUNTA ( ):

This function counts the number of cells that are not empty within the list of range arguments. This function counts all cells regardless of numbers.

Syntax: =COUNTA (value 1, value 2….

5. IF ( ):

The' IF function' is used when you want to sort data according to given logic. The best part of 'IF formula' is that you can embed formulas and function in it.

Syntax: = IF (logical test, (value if true), (value if false))

Example, = IF (C2<D3) TRUE, FALSE.) if the logic is true, let the cell value be TRUE else, FALSE.

6. MAX ( ) & MIN ( ):

- MAX ( ) function calculates the maximum number given is a series.
- **Syntax**: = MAX (number 1, number 2, number 3…..)
- MIN ( ) function calculates the minimum number given in a series.
- **Syntax:** =MIN (number 1, number 2, number 3….)

7. SQRT ( ):

SQRT function is used to calculate the square root of a number.

Example;

- SQRT (5)
- SQRT (30)

The result is,

- 25
- 900.

4. GRAPHS:

In MS-EXCEL, a chart is often called a 'graph'. A chart is a powerful tool that allows individuals to visually display data in a variety of chart formats. The data which is entered as tables can be viewed in the graphical form as charts which makes the figures of the data effective, interesting ,easy to understand and easy to analyze and compare.

Charts are of two types,

- Embedded chart
- Chart sheet

EMBEDDED CHART:

These charts are included in the worksheet and can be moved, copied and resized as any other graphical object.

CHART SHEET:

Separate chart sheets are inserted when a chart is created. It contains only one chart to create chart sheets.

To create a chart sheet;

Choose insert → chart → as new sheet.

4.1. COMPONENTS OF A CHART:

- Charts may be two dimensional or three dimensional
- Two dimensional charts have two dimensions i.e. X-axis and Y axis.
- Three dimensional charts include X-axis, Y-axis and also Z-axis.

A typical chart has following components;

(i) **Chart title** – a title given to the whole chart.

(ii) **X-axis title** – a title given to the X-axis range.

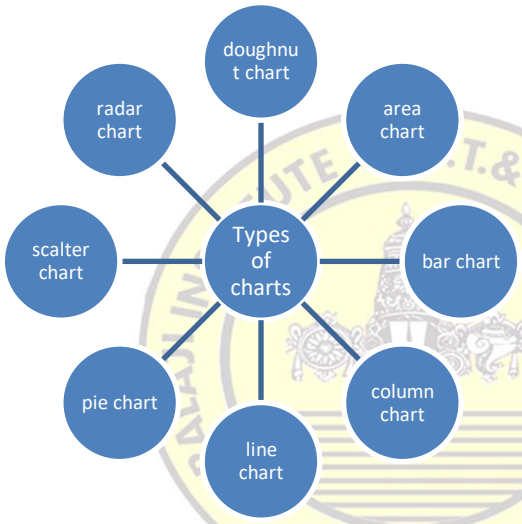
(iii) **Y-axis title** – a title given to the Y-axis range.

(iv) **LEGEND** –it specifies the color, symbol or pattern used to mark the data series.

(v) **DATA SERIES** – a data series is one of the sets of data from which the chart is drawn.

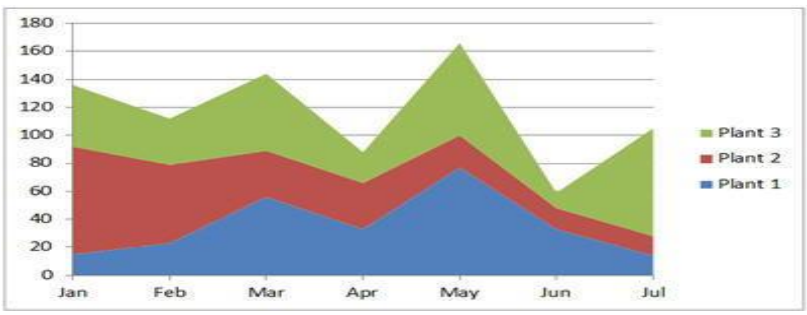
(vi) **CATEGORIES** – the item by which the data series is separated area categories.

4.2: TYPES OF CHARTS / GRAPHS:



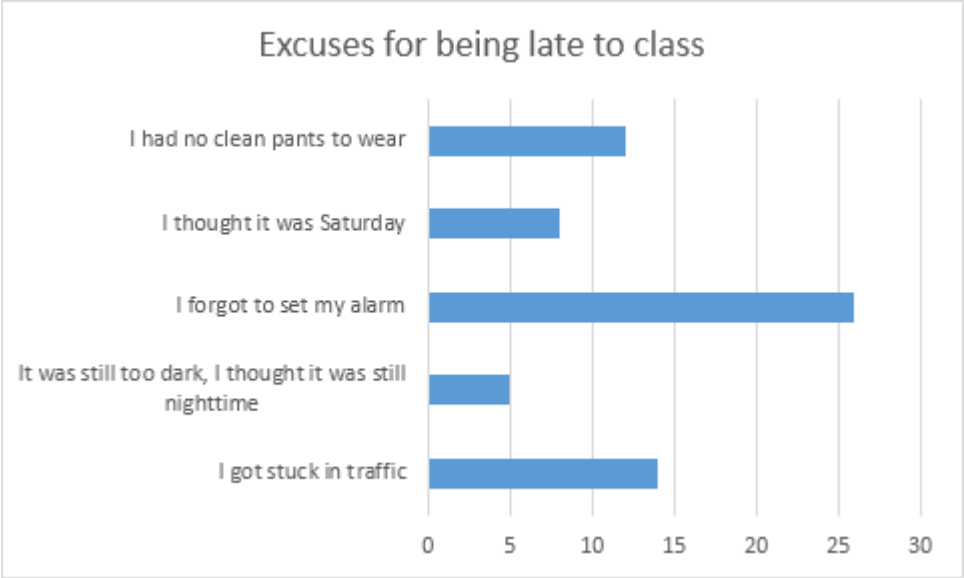
1. AREA CHART:

- Area chart shows the magnitude of change over time.
- It is a stacked line chart, with the area between the lines filled with color and shading.
- Area charts provide a way to compare different locations or groups of people. For example;
- If a line graph represent the height of water in reservoir over time, shading the area under the line make the graph look like actual water rising and falling.



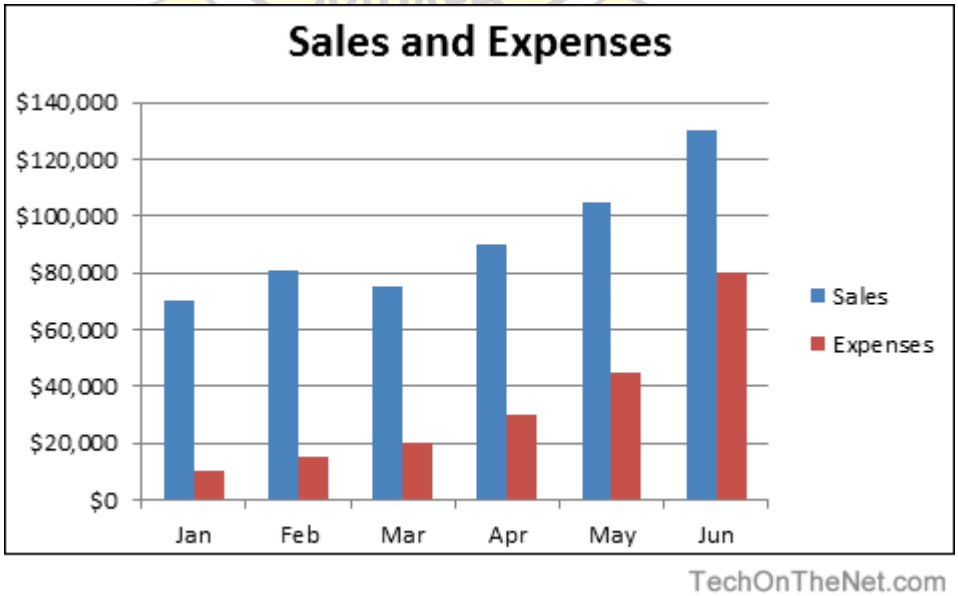
2. BAR CHART:

- Bar chart consists of a series of horizontal bars that allow comparison of the relative size of two or more items.
- A horizontal bar that extends to the left or right of the baseline marks each data point.



3. COLUMN CHART:

- Column chart consists of series of vertical columns that allows comparison of the relative size of two or more items.
- Column charts are typical for showing sales, rainfall etc.

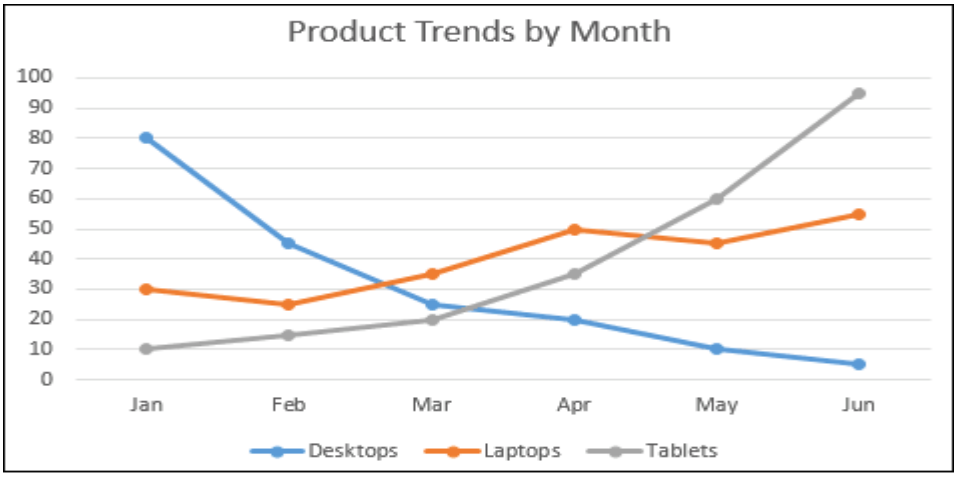


4. LINE CHART:

- In line chart, each of the data series is plotted as lines of different color and shading. A line chart is a graph that shows a series of data points connected by straight lines.
- It is a graphical object used to represent the data in your Excel spreadsheet.
- Line chart shows changes in data series over time like changes in prices.

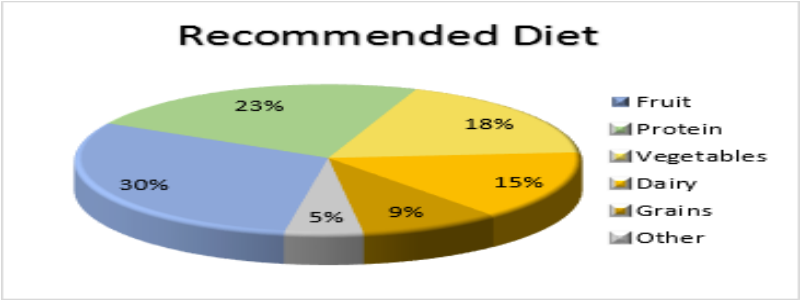
You can use a line chart when:

- You want to show a trend over time (such as days, months or years). In this case, the time values would be your categories.
- The order of your categories (ie: time values) is important.



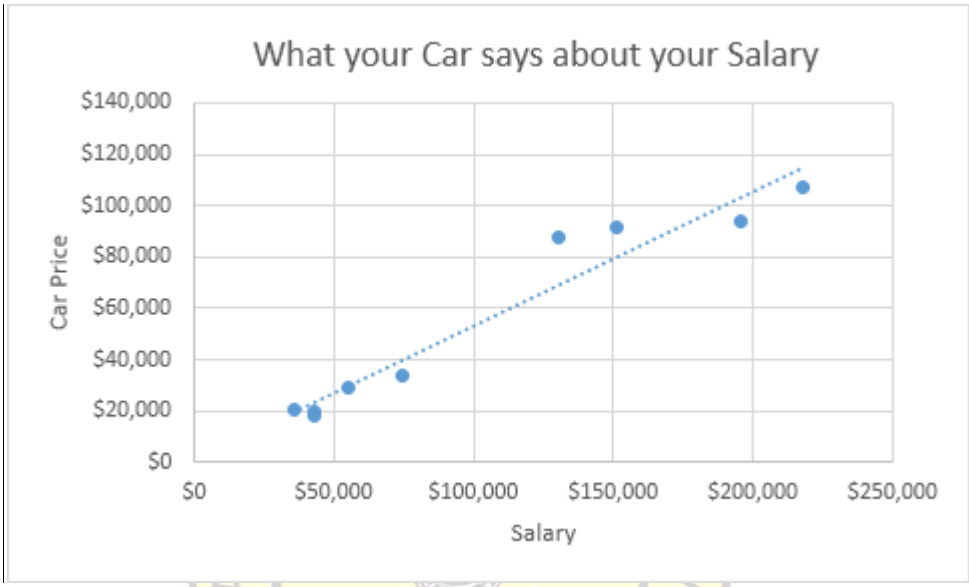
5. PIE-CHART:

- **Pie charts**, or **circular graphs** as they are also known, are a popular way to show how much individual amounts or percentages contribute to the total. In such graphs, the entire pie represents 100% of the whole, while the pie slices represent portions of the whole. In pie-chart, a single data series is divided up into pie-slices showing the relative contribution of the various data points.
- Market survey is reflected well in pie-charts.



6. SCATTER (XY) CHART:

- An XY scatter chart either shows the relationship among the numeric values in several data series or plots, two groups of numbers as one series of XY coordinates.
- This chart shows uneven interests of data and is commonly used for scientific data.



5. BASIC STATISTICAL FORMULAE IN EXCEL:

- Statistical formulas are helpful in performing some statistical analysis. Excel statistical formulas caused to analyze the data in a spread sheet.
- Basic statistical formulas in excel are as follows,

Basic statistical formulas

- **MEAN**
- **MEDIAN**
- **MODE**
- **CORREL**
- **FORECAST**
- **FREQUENCY**
- **PERCENTILE**
- **INTERCEPT**

a) MEAN:

Arithmetic mean, also referred to as average, is probably the measure you are most familiar with. The mean is calculated by adding up a group of numbers and then dividing the sum by the count of those numbers.

For example, to calculate the mean of numbers {1, 2, 2, 3, 4, 6}, you add them up, and then divide the sum by 6, which yields 3: (1+2+2+3+4+6)/6=3.

In Microsoft Excel, the mean can be calculated by using one of the following functions:

- **AVERAGE**- returns an average of numbers.
- **AVERAGEA** - returns an average of cells with any data (numbers, Boolean and text values).
- **AVERAGEIF** - finds an average of numbers based on a single criterion.
- **AVERAGEIFS** - finds an average of numbers based on multiple criteria.

MEAN or AVERAGE is a statistical function that is helpful for calculating average of data.

Syntax: = MEAN (number1, number 2….)

b) MEDIAN:

Median is the middle value in a group of numbers, which are arranged in ascending or descending order, i.e. Half the numbers are greater than the median and half the numbers are less than the median. For example, the median of the data set {1, 2, 2, 3, 4, 6, 9} is 3.

When there are an odd number of values in the group. But what if you have an **even** number of values? In this case, the median is the arithmetic mean (average) of the two middle values. For example, the median of {1, 2, 2, 3, 4, 6} is 2.5. To calculate it, you take the 3rd and 4th values in the data set and average them to get a median of 2.5.

In Microsoft Excel, a median is calculated by using the MEDIAN function. For example, to get the median of all amounts in our sales report, use this formula:

=MEDIAN (C2:C8)

- MEDIAN is another statistical function that helps in finding the number at the midpoint of a given set of numbers.
- Syntax: =MEDIAN (number1, number 2….)

c) MODE:

Mode is the most frequently occurring value in the dataset. While the mean and median require some calculations, a mode value can be found simply by counting the number of times each value occurs.

For example, the mode of the set of values {1, 2, 2, 3, 4, 6} is 2. In Microsoft Excel, you can calculate a mode by using the function of the same name, the MODE function. For our sample data set, the formula goes as follows:

=MODE (C2:C8)

Syntax: = MODE (number 1, number 2…..)

d) CORREL:

CORREL is a statistical function that is helpful in finding correlation between variables. CORREL function returns the correlation co efficient of the array 1 and array 2 cell ranges.

Syntax: =CORREL (array 1, array 2…)

e) FREQUENCY:

In this statistical function, it calculates how often values occur within a range of values, and then returns a virtual array of numbers.

Syntax: =FREQUENCY (data array, bins array)

f) FORECAST:

FORECAST function calculates or predicts a future value of using existing values.

Syntax: =FORECAST (X, known Y's known X's)

g) PERCENTILE:

PERCENTILE function returns the K percentile of values in a range.

Syntax: = PERCENTILE (array, K)

h) INTERCEPT:

INTERCEPT calculates the point at which a line will intersect the Y-axis by using existing X-values and Y-values.

Syntax: =INTERCEPT (known Y's, known X's)

5.1: CREATING A CHART IN MS-EXCEL:

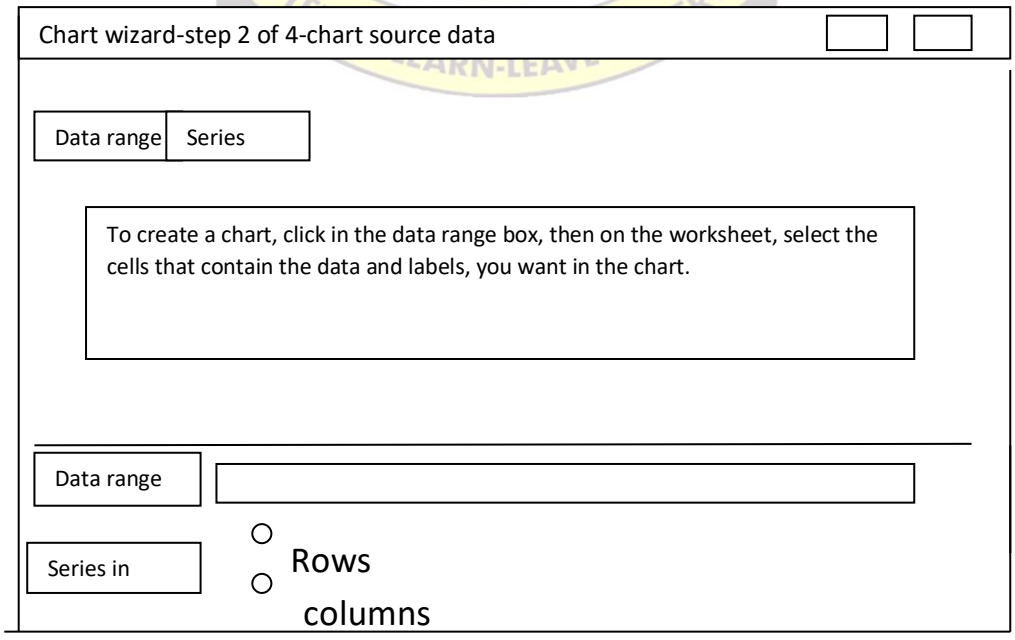
- The easiest way to create a chart is to use **chart wizard**.
- The chart wizard is a series of dialog box that guide the user through the steps required to create a new embedded chart or modify settings for an existing embedded chart.
- Chart wizard displays five or two steps, depending on what is selected. If worksheet data is selected, all five steps are displayed because you're creating new chart. If existing chart is selected to modify it, only two steps are displayed.

FOLLOWING ARE THE STEPS TO CREATE A CHART THROUGH CHART WIZARD:

- To create a new chart, first enter the data.
- Click on chart wizard tool button from standard tool bar

OR

- Choose insert ⟶ chart to start the chart wizard.
- Now chart wizard appears on the screen.
- Choose the chart type in the chart type list box. Excel will display a variety of available subtypes choose a subtype by clicking on it.
- Excel will show a sample chart from the data you selected if you click on press and hold to view sample button.
- Click the **next button** to display the second chart wizard the chart source data.



- On the data range tab, check/enter the data range.
- On the series adjust the data series as necessary.
- Click the next button to display the third chart wizard the chart options and select the options as per type of chart.
- On the **TITLE TAB** enter chart, X-axis, Y-axis title.
- On the **AXES TAB**, suppress the display of data on any axes if necessary.
- On the **GRIDLINE TAB**, choose which gridlines to display.
- On the **LEGEND TAB**, choose a legend and place it as per choice.
- On the **DATA LABELS TAB**, choose whether to show the data or not.
- On the **DATA TABLES TAB**, you can choose to show the data table along with the chart or not.
- Click the **NEXT** button to display the fourth chart wizard the chart location.
- Choose whether to display the chart,
    1. As new sheet or
    2. As an embedded chart.
- Click the **finish** button to have the chart wizard create the chart for you.

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