CHAPTER 1

FUNCTIONALITIES OF A COMPUTER .

- Takes data as input.
- Stores the data/instructions in its memory and use them when required.
- Processes the data and
- converts it into useful information.
- Generates the output.
- Controls all the above four steps.

INPUT-PROCESS-OUTPUT MODEL

- Computer input is called data and the output obtained after processing it, based on user's instructions is called information.
- Raw facts and figures which can be processed using arithmetic and logical operations to obtain information are called data.

HARDWARE

- refers to the physical parts or components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects that can be touched.

INPUT DEVICE

- Input device is any peripheral (piece of computer hardware equipment to provide data and control signals to an information processing system such as a computer or other information appliance. Five widely used input devices are the keyboard, mouse, microphone, scanner, and Web cam.

KEYBOARD

- A computer keyboard contains keys you press to enter data into the computer. For security purposes, some keyboards include a fingerprint reader, which allows you to work with the computer only if your fingerprint is recognized.

MOUSE

- A mouse is a small handheld device. With the mouse, you control movement of a small symbol on the screen, called the pointer, and you make selections from the screen.

MICROPHONE

- A microphone allows you to speak into the computer. A scanner converts printed material (such as text and pictures) into a form the computer can use.

OUTPUT DEVICE

- An output device is any hardware component that conveys information to one or more people. Three commonly used output devices are a printer, a monitor, and speakers
- A **printer** produces text and graphics on a physical medium such as paper.
- A **monitor** displays text, graphics, and videos on a screen. **Speakers** allow you to hear music, voice, and other audio (sounds).

SYSTEM UNIT

- The system unit is a case that contains the electronic components of the computer that are used to process data.
- The circuitry of the **system unit** usually is part of or is connected to a circuit board called the motherboard.

Primary Memory

RAM: RANDOM ACCESS MEMORY (RAM)

is a memory scheme within the computer system responsible for storing data on a temporary basis, so that it can be promptly accessed by the processor as and when needed.

It is volatile in nature, which means that data will be erased once supply to the storage device is turned off.

RAM stores data randomly and the processor accesses these data randomly from the RAM storage. RAM is considered "random access" because you can access any memory cell directly if you know the row and column that intersect at that cell.

ROM (READ ONLY MEMORY):

ROM is a permanent form of storage. **ROM** stays active regardless of whether power supply to it is turned on or off. ROM devices do not allow data stored on them to be modified.

Secondary Memory

STORES DATA AND PROGRAMS PERMANENTLY: ITS RETAINED AFTER THE POWER IS TURNED OFF.

Hard drive (HD): A hard disk is part of a unit, often called a **"disk drive," "hard drive,"** or "hard disk **drive,"** that store and provides relatively quick access to large amounts of data on an electromagnetically charged surface or set of surfaces.

Optical Disk: an optical disc drive (ODD) is a disk drive that uses laser light as part of the process of reading or writing data to or from optical discs.

Flash Disk: A storage module made of flash memory chips. A Flash disks have no mechanical platters or access arms, but the term "disk" is used because the data are accessed as if they were on a hard drive. The disk storage structure is emulated.

COMPARISON BETWEEN MAIN MEMORY (RAM) AND SECONDARY MEMORY (HARD DISK):

RAM Memory

Smaller amount (typically 500 MB-6 GB)

Temporary storage of files and programs

A little like your real desktop has only your current work on it (which could be ruined by a spill of Coke or coffee!)

Contents disappear when you turn off power to the computer and when the computer crashes

Consists of chips (microprocessors)

When you want to use a program. a temporary copy is put into RAM and that's the copy you use

HARD DISK (HARD DRIVE) Storage

Much larger amount (typically 80GB to 1000 GB)

Permanent storage of files and programs

Like a file cabinet has long-term storage of work (it's safe from spills!)

Contents remain when you turn off the power to the computer (they don't disappear unless you purposely delete them), and when the computer crashes

Consists of hard disks (platters)

Holds the original copy of the program permanently

SOFTWARE

Software is a generic term for organized collections of computer data and instructions, often broken into two major categories: **system software** that provides the basic nontask-specific functions of the computer, and **application software** which is used by users to accomplish specific tasks**.**

System Software

- is responsible for controlling, integrating, and managing the individual hardware components ofacomputer system so that other software and the users of the system see it as a functional unit without having to be concerned with the low-level details such as transferring data from memory to disk, or rendering text onto a display.
- Generally, **system software** consists of an operating system and some fundamental utilities such as disk formatters, file managers, display managers, text editors, user authentication (login) and management tools, and networking and device control software.

Application Software

- is used to accomplish specific tasks other than just running the computer system.
- **Application software** may consist of a single program, such as an image viewer; a small collection of programs (often called a software package) that work closely together to accomplish a task, such as a spreadsheet or text processing system; a larger collection (often called a software suite) of related but independent programs and packages that have a common user interface or shared data format, such as Microsoft Office, which consists of closely integrated word processor, spreadsheet, database, etc.; or a software system, such as a database management system, which is a collection of fundamental programs that may provide some service to a variety of other independent applications.

UNIT OF MEASUREMENTS

The basic unit used in computer data storage is called a bit (binary digit). Computers use these li ttle bits, which are composed of ones and zeros, to do things and talk to other computers. All your files, for instance, are kept in the computer as binary files and translated into words and pictures by the software (which is also ones and zeros). This two number system, is called a "binary number system" since it has only two numbers in it. The decimal number system in contrast has ten unique digits, zero through nine.

Speed measurement: The speed of Central Processing Unit (CPU) is measured by Hertz (Hz), which represent a CPU cycle. The speed of CPU is known as Computer Speed.

COMPUTERS CLASSIFICATION

Personal Computer:

A small, single-user computer based on a microprocessor. In addition to the microprocessor, a personal computer has a keyboard for entering data, a monitor for displaying information, and a storage device for saving data.

Workstation:

A powerful, single-user computer. A workstation is like a personal computer, but it has a more powerful microprocessor and a higher-quality monitor.

Minicomputer:

A multi-user computer capable of supporting from 10 to hundreds of users simultaneously.

Supercomputer:

An extremely fast computer that can perform hundreds of millions of instructions per second.

Laptop:

is a battery or AC-powered personal computer that can be easily carried and used in a variety of locations. Many laptops are designed to have all of the functionality of a desktop computer, which means they can generally run the same software and open the same types of files. However, some laptops, such as **netbooks**, sacrifice some functionality in order to be even more portable

Netbook:

A netbook is a type of laptop that is designed to be even more portable. Netbooks are often cheaper than laptops or desktops. They are generally less powerful than other types of computers, but they provide enough power for email and internet access, which is where the name "netbook" comes from.

Mobile Device:

A mobile device is basically any handheld computer. It is designed to be extremely portable, often fitting in the palm of your hand or in your pocket. Some mobile devices are more powerful, and they allow you to do many of the same things you can do with a desktop or laptop computer. These include tablet computers, e-readers, and smartphones

Tablet Computers:

Like laptops, tablet computers are designed to be portable. However, they provide a very different computing experience. The most obvious difference is that tablet computers don't have keyboards or touchpads. Instead, the entire screen is touch-sensitive, allowing you to type on a virtual keyboard and use your finger as a mouse pointer. Tablet computers are mostly designed for consuming media, and they are optimized for tasks like web browsing, watching videos, reading e-books, and playing games. For many people, a "regular" computer like a desktop or laptop is still needed in order to use some programs. However, the convenience of a tablet computer means that it may be ideal as a second computer.

Smartphones:

A smartphone is a powerful mobile phone that is designed to run a variety of applications in addition to phone service. They are basically small tablet computers, and they can be used for web browsing, watching videos, reading e-books, playing games and more.

DATA – INFORMATION – KNOWLEDGE

Data: Facts and figures which relay something specific, but which are not organized in any way and which provide no further information regarding patterns, context, etc. So data means "unstructured facts and figures that have the least impact on the typical manager."

Information: For data to become information, it must be contextualized, categorized, calculated and condensed. Information thus paints a bigger picture; it is data with relevance and purpose. It may convey a trend in the environment, or perhaps indicate a pattern of sales for a given period of time. Essentially information is found "in answers to questions that begin with such words as who, what, where, when, and how many".

Knowledge: Knowledge is closely linked to doing and implies know-how and understanding. The knowledge possessed by each individual is a product of his experience, and encompasses the norms by which he evaluates new inputs from his surroundings.

CHARACTERISTICS OF COMPUTER

SPEED, ACCURACY, DILIGENCE, STORAGE CAPABILITY AND VERSATILITY

COMPUTER VIRUSES

A virus is a small piece of software that piggybacks on real programs. For example, a virus might attach itself to a program such as a spreadsheet program. Each time the spreadsheet program runs, the virus runs, too, and it has the chance to reproduce (by attaching to other programs) or wreak havoc.

- **E- mail viruses:** An e- mail virus travels as an attachment to e- mail messages, and usually replicates i tself by automatically mailing i tself to dozens of people in the victim's e-mail address book. Some e- mail viruses don't even require a double- click -- they launch when you view the infected message in the preview pane of your e-mail software [source: Johnson].
- **Trojan horses:** A Trojan horse is simply a computer program. The program claims to do one thing (it may claim to be a game) but instead does damage when you run it (it may erase your hard disk). Trojan horses have no way to replicate automatically.
- **Worms:** A worm is a small piece of software that uses computer networks and security holes to replicate itself. A copy of the worm scans the network for another machine that has a specific security hole. It copies itself to the new machine using the security hole, and then starts replicating from there, as well.

WHAT ARE SOME TIPS TO AVOID VIRUSES AND LESSEN THEIR IMPACT?

- Install anti-virus software from a reputable vendor. Update it and use it regularly.
- In addition to scanning for viruses on a regular basis, install an "on access" scanner (included in most anti-virus software packages) and configure it to start each time you start up your computer. This will protect your system by checking for viruses each time you run an executable file.
- Use a virus scan before you open any new programs or files that may contain executable code. This includes packaged software that you buy from the store as well as any program you might download from the Internet.
- If you are a member of an online community or chat room, be very careful about accepting files or clicking links that you find or that people send you within the community.
- Make sure you back up your data (documents, bookmark files, important email messages, etc.) on disc so that in the event of a virus infection, you do not lose valuable work.

CHAPTER 2

INTRODUCTION TO PROFESSION

ROLE OF IT PROFESSIONALS

- It empowers businesses
- It enables organizations to make dramatic leaps in productivity and governments to deliver greatly enhanced service levels that their citizens now expect.
- Without a smooth flow of information through a company's IT systems, operations would not be efficient or even possible in some cases.

TOP 10 IT JOBS

SOFTWARE DEVELOPER

Are responsible for designing computer or mobile applications. This involves understanding user needs, developing software solutions, monitoring performance and modifying programs as needed.

NETWORK ENGINEER

(also called network architects) who plan, construct and manage networks to ensure they're optimized and functioning as intended. Responsible for the foundation of an organization's IT system (and by default, the entire organization).

SYSTEMS ENGINEER

who manage, monitor, test, and maintain all installed operating systems, application software, system management tools and other infrastructures. Ensuring the highest levels of systems and infrastructure availability.

SENIOR SOFTWARE DEVELOPER

will develop information systems by studying operations; designing, developing and installing software solutions; support and develop software team.

JAVA DEVELOPER

is responsible for the design, development, and management of Java-based applications.

SOFTWARE QA ENGINEER

is someone who monitors every phase of the software development process so as to ensure design quality, making sure that the software adheres to the standards set by the development company.

IT PROJECT MANAGER

are responsible for planning, organizing, allocating resources for, budgeting and successfully executing organizations' specific IT goals.

APPLICATION DEVELOPER

is responsible for developing and modifying source code for software applications.

COMPUTER SUPPORT SPECIALIST

is a person who analyzes an organization or business domain (real or hypothetical) and documents its business, processes, or systems, assessing the business model or its integration with technology.

Information Communication Technology Application in Society

APPLICATION OF ICT

ICT also includes the various services and applications associated with them, such as videoconferencing and distance learning, that plays a vital role in the creation of new media modes of interaction between people.

EDUCATION

ICTs are playing the remarkable role in the education sector.

Teachers use ICTs to research for teaching materials, participate in the online conference as well to aid their teaching.

Students use ICTs as reference tool. They use Internet to search for their study materials. In an online system of study, students can access class notes, submit assignments and also join a discussion group with the help of ICTs.

Researchers use ICTs to collect and process data. School administrators use ICTs for administrative purposes.

BANKING

ICTS control the entire banking system that also includes "Electronic Banking Services".

It is also known as the nerve center of the banking system around the world. Customers use ICTs to make transactions at 24 hours service centers.

Business persons use ICTs to save their time by using online services.

Bank administrators use ICTs to control the entire banking system.

E-COMMERCE

Buying and selling goods by the use of an internet are known as e-commerce.

E-commerce helps in boosting the economy. It makes buying and selling activities easier and faster.

In an e-commerce sector, customers, suppliers and employees get benefits from the usage of ICT.

Customers use ICTs to connected online with suppliers to purchase products.

Suppliers use ICts to keep track of their transactions.

Employees use ICTs to communicate with their customers for any inquiries.

HEALTH

ICT applications have been valuable resources in the medical field. They support the efficient exchange of information between health professionals, they enable transfer of patient records and can improve the quality of care provided by health professionals. Ct Scan, Ultra Sound, ECG are done by the help of ICTs to diagnosis different diseases.

COMMUNICATION

ICT is Used for communication. Nowadays people are in touch with the help of ICT. Through chatting, E-mail, voice mail and social networking people communicate with each other. It is the cheapest means of communication.

CODE OF ETHICS FOR ICT PROFESSIONALS

The Finnish Information Processing Association's ethics workgroup has created this code to help professionals resolve ethical problems that occur in their work. The aim of the code is to encourage ethical ways behavior and to help IT professionals to handle moral problems arising from their work.

The purpose of this code is to reinforce the ethical aspect of information technology professionalism and promote it by raising discussion amongst IT professionals. The code is not final; it will continue to evolve through feedback. Because it is not possible to anticipate all ethical problems, this code should not be taken as an absolute truth, but rather as a guide towards better choices. In the end, everyone is responsible for the choices they make.

Acting ethically is not about following an ethical code to the letter, but rather it evolves as a result of the choices between right and wrong, good and bad that we make. Choices affect our ethics.

AUTHORITY AND RESPONSIBILITY

IT professionals must not misuse their power. They must face up to their responsibility, which can be measured as actions and deeds. Knowledge is power, and using knowledge requires wisdom, as does all use of power.

KNOWLEDGE AND EXPERIENCE

Professionals must understand their limits: they should know the strengths and weaknesses of their skills. In a rapidly developing field, professionals must develop their skills.

They must know, for example, any laws regarding personal privacy. Professionals do not hide their knowledge, but instead pursue to enhance their own and others' skills and share their knowledge with the professional community. However, professionals also understand that information which is confidential (and must remain so) and respect the trust of their clients.

ATTITUDE

Professionals do not work just for themselves, but also for others. They will take into consideration the opinions of the subjects of their actions. They should not let greed or lack of consideration affect their decisions. They understand, that their work has meaning only through others

COMMUNICATIONS

Professionals understand the importance of communication. They communicate with their clients, document what they do and inform all relevant parties of their actions. Professionals must aim to communicate as clearly as possible and when necessary explain the terms they use. The aim of communication is to create common understanding with other parties to achieve cooperation.

CONSEQUENCES OF PROFESSIONALS' WORK

The results of information technology work receive their meaning through application. IT professionals must understand the consequences of their work, as part of a long chain, at the end of which is the user. Professionals must take into regard the needs and wants of the consumer, the client and their employer.

In their actions professionals should always aim to understand the meaning of their work to the whole community for which the work is done and not limit themselves only to the opinions of the people with whom they have the transaction.

OTHER PEOPLE

IT professionals respect the work of other people, and in so doing take other peoples' rights to their creations into account.

IT professionals respect the work of other people, and in so doing take other peoples' rights to their creations into account.

PROMOTION OF ETHICS

Professionals must promote ethically sustainable ways of acting within the field of information technology.

To act ethically is to make choices; each person can choose to be, or not to be, ethical. To apply ethics is often not to choose between the "right" and the "wrong" choice, but rather to develop an ethical character by constantly having regard for one's environment and the people in it. These instructions strive to give IT professionals a framework for action that will promote their own and other peoples' ethical growth.

CHAPTER 3

FUNCTIONALITIES OF A COMPUTER

Step 1 - Takes data as input.

Step 2 - Stores the data/instructions in its memory and uses them as required.

Step 3 - Processes the data and converts it into useful information.

Step 4 - Generates the output. Step 5 - Controls all the above four steps.

ADVANTAGES OF COMPUTERS

HIGH SPEED

- Computer is a very fast device. It is capable of performing calculation of very large amount of data.
- The computer has units of speed in microsecond, nanosecond, and even the picosecond.
- It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.

ACCURACY

- In addition to being very fast, computers are very accurate.
- The calculations are 100% error free.
- Computers perform all jobs with 100% accuracy provided that the input is correct.

STORAGE CAPABILITY

- Memory is a very important characteristic of computers.
- A computer has much more storage capacity than human beings.
- It can store large amount of data.
- It can store any type of data such as images, videos, text, audio, etc.

DILIGENCE

- Unlike human beings, a computer is free from monotony, tiredness, and lack of concentration.
- It can work continuously without any error and boredom.
- It can perform repeated tasks with the same speed and accuracy.

VERSATILITY

- A computer is a very versatile machine.
- A computer is very flexible in performing the jobs to be done.
- This machine can be used to solve the problems related to various fields.
- At one instance, it may be solving a complex scientific problem and the very next moment it may be playing a card game.

RELIABILITY

- A computer is a reliable machine.
- Modern electronic components have long lives.
- Computers are designed to make maintenance easy.

AUTOMATION

- Computer is an automatic machine.
- Automation is the ability to perform a given task automatically. Once the computer receives a program i.e., the program is stored in the computer memory, then the program and instruction can control the program execution without human interaction.

REDUCTION IN PAPER WORK AND COST

- The use of computers for data processing in an organization leads to reduction in paper work and results in speeding up the process. As data in electronic files can be retrieved
- As data in electronic files can be retrieved as and when required, the problem of maintenance of large number of paper files gets reduced.
- Though the initial investment for installing a computer is high, it substantially reduces the cost of each of its transaction.

DISADVANTAGES OF COMPUTERS

NO I.Q.

- A computer is a machine that has no intelligence to perform any task.
- Each instruction has to be given to the computer.
- A computer cannot take any decision on its own.

DEPENDENCY

- It functions as per the user's instruction, thus it is fully dependent on humans.

ENVIRONMENT

- The operating environment of the computer should be dust free and suitable.

NO FEELING

- Computers have no feelings or emotions.
- It cannot make judgment based on feeling, taste, experience, and knowledge unlike humans.

COMPUTER – APPLICATIONS

HEALTH BANKING EDUCATION BUSINESS

COMMUNICATION

COMPUTER – GENERATIONS

FIRST GENERATION

- The period of first generation: 1946- 1959. Vacuum tube based.

SECOND GENERATION

- The period of second generation: 1959-1965. Transistor based.

THIRD GENERATION

- The period of third generation: 1965- 1971. Integrated Circuit based.

FOURTH GENERATION

- The period of fourth generation: 1971-1980. VLSI microprocessor based.

FIFTH GENERATION

- The period of fifth generation: 1980-onwards. ULSI microprocessor based.

COMPUTER - TYPES

PC (PERSONAL COMPUTER), WORKSTATION , MINI COMPUTER, MAIN FRAME, SUPERCOMPUTER

PC (PERSONAL COMPUTER)

A PC can be defined as a small, relatively inexpensive computer designed for an individual user. PCs are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications. At home, the most popular use for personal computers is playing games and surfing the Internet.

WORKSTATION

Workstation is a computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other such types of applications which require a moderate amount of computing power and relatively high quality graphics capabilities.

Workstations generally come with a large, highresolution graphics screen, large amount of RAM, inbuilt network support, and a graphical user interface. Most workstations also have mass storage device such as a disk drive, but a special type of workstation, called diskless workstation, comes without a disk drive.

MINICOMPUTER

It is a midsize multi-processing system capable of supporting up to 250 users simultaneously

MAINFRAME

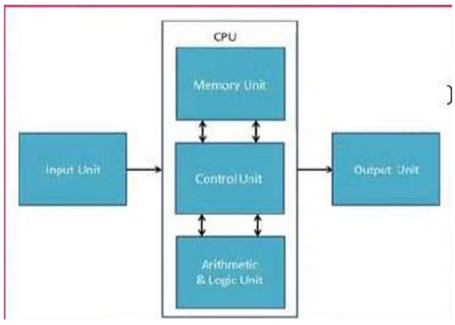
Mainframe is very large in size and is an expensive computer capable of supporting hundreds or even thousands of users simultaneously. Mainframe executes many programs concurrently and supports many simultaneous execution of programs.

SUPERCOMPUTER

Supercomputers are one of the fastest computers currently available. Supercomputers are very expensive and are employed for specialized applications that require immense amount of mathematical calculations (number crunching).

For example, weather forecasting, scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting).

COMPUTER – COMPONENTS



Take Input: The process of entering data and instructions into the computer system.

Store Data: Saving data and instructions so that they are available for processing as and when required.

Processing Data: Performing arithmetic, and logical operations on data in order to convert them into useful information.

Output Information: The process of producing useful information or results for the user, such asa printed report or visual display.

Control the workflow: Directs the manner and sequence in which all of the above operations are performed.

INPUT UNIT

This unit contains devices with the help of which we enter data into the computer. This unit creates a link between the user and the computer. The input devices translate the information into a form understandable by the computer.

CPU (CENTRAL PROCESSING UNIT)

CPU is considered as the brain of the computer. CPU performs all types of data processing operations. It stores data, intermediate results, and instructions (program). It controls the operation of all parts of the computer. CPU itself has the following three components

- ALU(Arithmetic Logic Unit)
- Memory
- Unit Control Unit

OUTPUT UNIT

The output unit consists of devices with the help of which we get the information from the computer. This unit is a link between the computer and the users. Output devices translate the computer's output into a form understandable by the users

CENTRAL PROCESSING UNIT

This unit contains devices with the help of which we enter dataInto the computer. This unit creates a link between the user and the computer. The input devices translate the information Into a form understandable by the computer.

- CPU is considered as the brain of the computer.
- CPU performs all types of data processing operations.
- It stores data, Intermediate results, and instructions (program).
- It controls the operation of all parts of the computer.

MEMORY OR STORAGE UNIT

This unit can store instructions, data, and intermediate results. This unit supplies information to other units of the computer when needed. It is also known as internal storage unit or the main memory or the primary storage or Random Access Memory (RAM).

CONTROL UNIT

This unit controls the operations of all parts of the computer but does not carry out any actual data processing operations.

- It is responsible for controlling the transfer of data and instructions among other units of a computer.
- It manages and coordinates all the units of the computer.
- It obtains the instructions from the memory, interprets them, and directs the operation of the computer.
- It communicates with Input/Output devices for transfer of data or results from storage.
- It does not process or store data.

ALU (ARITHMETIC LOGIC UNIT)

This unit consists of two subsections namely:

- **Arithmetic Section**
- **Logic Section**

Arithmetic Section

Function of arithmetic section is to perform arithmetic operations like addition, subtraction, multiplication, and division. All complex operations are done by making repetitive use of the above operations.

Logic Section

Function of logic section is to perform logic operations such as comparing, selecting, matching, and merging of data.

CHAPTER 4

COMPUTER INPUT DEVICES

KEYBOARD

- Keyboard is the most common and very popular input device which helps to input data to the computer. The layout of the keyboard is like that of traditional typewriter, although there are some additional keys provided for performing additional functions.
- **TYPING KEYS:** These keys include the letter keys (A-Z) and digit keys (09) which generally give the same layout as that of typewriters.
- **NUMERIC KEYPAD:** It is used to enter the numeric data or cursor movement. Generally, it consists of a set of 17 keys that are laid out in the same configuration used by most adding machines and calculators.
- **FUNCTION KEYS:** The twelve function keys are present on the keyboard which are arranged in a row at the top of the keyboard. Each function key has a unique meaning and is used for some specific purpose.
- **CONTROL KEYS:** These keys provide cursor and screen control. It includes four directional arrow keys. Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control(Ctrl), Alternate(Alt), Escape(Esc).
- **SPECIAL PURPOSE KEYS:** Keyboard also contains some special purpose keys such as Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen.

MOUSE

- Mouse is the most popular pointing device. It is a very famous cursor-control device having a small palm size box with a round ball at its base, which senses the movement of the mouse and sends corresponding signals to the CPU when the mouse buttons are pressed.
- Generally, it has two buttons called the left and the right button and a wheel is present between the buttons. A mouse can be used to control the position of the cursor on the screen, but it cannot be used to enter text into the computer.

JOYSTICK

- Joystick is also a pointing device, which is used to move the cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. The joystick can be moved in all four directions.
- The function of the joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.

LIGHT PEN

- Light pen is a pointing device similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube.
- When the tip of a light pen is moved over the monitor screen and the pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

TRACK BALL

- Track ball is an input device that is mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on the ball, the pointer can be moved**.**
- Since the whole device is not moved, a track ball requires less space than a mouse. A track ball comes in various shapes like a ball, a button, or a square.

DIGITIZER

- **Digitizer** is an input device which converts analog information into digital form. Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer. They can be used by the computer to create a picture of whatever the camera had been pointed at.
- **Digitizer** is also known as Tablet or Graphics Tablet as it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for fine works of drawing and image manipulation applications.

MICROPHONE

- Microphone is an input device to input sound that is then stored in a digital form.
- The microphone is used for various applications such as adding sound to a multimedia presentation or for mixing music.

MAGNETIC INK CARD READER (MICR)

- MICR input device is generally used in banks as there are large number of cheques to be processed every day. The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine-readable.
- This reading process is called Magnetic Ink Character Recognition (MICR). The main advantages of MICR is that it is fast and less error prone.

OPTICAL CHARACTER READER (OCR)

- OCR is an input device used to read a printed text. OCR scans the text optically, character by character, converts them into a machine readable code, and stores the text on the system memory.

BAR CODE READERS

- **Bar Code Reader** is a device used for reading bar coded data (data in the form of light and dark lines). Bar coded data is generally used in labelling goods, numbering the books, etc. It may be a handheld scanner or may be embedded in a stationary scanner.
- **Bar Code Reader** scans a bar code image, converts it into an alphanumeric value, which is then fed to the computer that the bar code reader is connected to.

OPTICAL MARK READER (OMR)

- OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked.
- It is specially used for checking the answer sheets of examinations having multiple choice questions.

COMPUTER OUTPUT DEVICES

MONITORS

- Monitors, commonly called as Visual Display Unit (VDU), are the main output device of a computer. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.
- There are two kinds of viewing screen used for monitors

- Cathode-Ray Tube (CRT)
- Flat-Panel Display

CATHODE-RAY TUBE (CRT) MONITOR

- The CRT display is made up of small picture elements called pixels. The smaller the pixels, the better the image clarity or resolution. It takes more than one illuminated pixel to form a whole character, such as the letter ‘e’ in the word help.
- A finite number of characters can be displayed on a screen at once. The screen can be divided into a series of character boxes - fixed location on the screen where a standard character can be placed. Most screens are capable of displaying 80 characters of data horizontally and 25 lines vertically.
- There are some disadvantages of CRT
    - Large in Size
    - High power consumption

FLAT-PANEL DISPLAY MONITOR

- The flat-panel display refers to a class of video devices that have reduced volume, weight and power requirement in comparison to the CRT. You can hang them on walls or wear them on your wrists. Current uses of flat-panel displays include calculators, video games, monitors, laptop computer, and graphics display.
- The flat-panel display is divided into two categories:
    - **Emissive Displays** - are devices that convert electrical energy into light. For example: plasma panel and LED (Light-Emitting Diodes).
    - **Non-Emissive Displays** – Non-emissive displays use optical effects to convert sunlight or light from some other source into graphics patterns.

      For example: LCD (Liquid-Crystal Device).

PRINTERS

- Printer is an output device, which is used to print information on paper
- There are two types of printers:
    - **IMPACT PRINTERS**
    - **NON-IMPACT PRINTERS**

IMPACT PRINTERS

- Impact printers print the characters by striking them on the ribbon, which is then pressed on the paper. Characteristics of Impact Printers are the following:
    - Very low consumable costs
    - Very noisy
    - Useful for bulk printing due to low costThere is physical contact with the paper to produce an image.
    - **These printers are of two types**
        - CHARACTER PRINTERS
        - LINE PRINTERS

CHARACTER PRINTERS

- Character printers are the printers which print one character at a time.
- These are further divided into two types:
    - **DOT MATRIX PRINTER(DMP)**
    - **DAISY WHEEL**
- **DOT MATRIX PRINTER**
    - In the market, one of the most popular printers is Dot Matrix Printer. These printers are popular because of their ease of printing and economical price. Each character printed is in the form of pattern of dots and head consists of a Matrix of Pins of size (5*7, 7*9, 9*7 or 9*9) which come out to form a character which is why it is called Dot Matrix Printer.
    - ADVANTAGES
        - Inexpensive
        - Widely Used
        - Other language characters can be printed
    - DISADVANTAGES
        - Slow Speed
        - Poor Quality
- **DAISY WHEEL**
    - Head is lying on a wheel and pins corresponding to characters are like petals of Daisy (flower) which is why it is called Daisy Wheel Printer. These printers are generally used for wordprocessing in offices that require a few letters to be sent here and there with very nice quality.
    - ADVANTAGES
        - More reliable than DMP
        - Better quality
        - Fonts of character can be easily changed
    - DISADVANTAGES
        - Slower than DMP
        - Noisy
        - More expensive than DMP
- **LINE PRINTERS**
- Line printers are the printers which print one line at a time.
    - These are of two types:
        - **DRUM PRINTER**
        - **CHAIN PRINTER**
- **DRUM PRINTER**
    - This printer is like a drum in shape hence it is called drum printer. The surface of the drum is divided into a number of tracks. Total tracks are equal to the size of the paper, i.e. for a paper width of 132 characters, drum will have 132 tracks. A character set is embossed on the track. Different character sets available in the market are 48 character set, 64 and 96 characters set. One rotation of drum prints one line. Drum printers are fast in speed and can print 300 to 2000 lines per minute.
    - ADVANTAGES
        - Very high speed
    - Very high speed
        - Very expensive
        - Characters fonts cannot be changed

- **CHAIN PRINTER**
    - In this printer, a chain of character sets is used, hence it is called Chain Printer. A standard character set may have 48, 64, or 96 characters.
    - ADVANTAGES
        - Character fonts can easily be changed
        - Different languages can be used with the same printer.
    - DISADVANTAGES
    - Noisy

NON-IMPACT PRINTERS

- Non-impact printers print the characters without using the ribbon. These printers print a complete page at a time, thus they are also called as Page Printers.
- These printers are of two types:
    - **Laser Printers**
    - **Inkjet Printers**
- **CHARACTERISTICS OF NON-IMPACT PRINTERS**
    - **Faster than impact printers**
    - **They are not noisy**
    - **High quality**
    - **Supports many fonts and different character size**

LASER PRINTERS

- These are non-impact page printers. They use laser lights to produce the dots needed to form the characters to be printed on a page.
- ADVANTAGES
    - Very high speed
    - Very high quality output
    - Good graphics quality
    - Supports many fonts and different character size
- DISADVANTAGES
    - Expensive
    - Cannot be used to produce multiple copies of a document in a single printing

INKJET PRINTERS

- Inkjet printers are non-impact character printers based on a relatively new technology. They print characters by spraying small drops of ink onto paper. Inkjet printers produce high quality output with presentable features.
- They make less noise because no hammering is done and these have many styles of printing modes available. Color printing is also possible. Some models of Inkjet printers can produce multiple copies of printing also.
- ADVANTAGES
    - High quality printing
    - More reliable
- DISADVANTAGES
    - Expensive as the cost per page is high
    - Slow as compared to laser printer