



# **Kunthavai Naacchiyaar**

**Government Arts College for Women (Autonomous)  
Thanjavur - 613 007, Tamilnadu, India**

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## **DEPARTMENT OF COMPUTER SCIENCE INTRODUCTION TO IT –NME Subject code:18K3CSELO1**

**STAFF INCHARGE  
1.Mrs. R. Valarmathy  
2.Mrs. K. Sharmila**

## **Unit I**

Introduction to Computers:- What is Computer- what is so Special about Computers- Speed- Accuracy- Consistency – Storage Capacity – Flexibility – History of Computers : The First Generation – Next Generation.

## **Unit II**

Basic Anatomy of Computers: The Basic Components- Functioning of Components: Memory-RAM- ROM-Software Components- The application Software- the Systems Software- The Utility Software- Input/output devices: Input Devices- Output Devices- External Storage Devices: Example of Storage Devices: Floppy Disk-Hard Disk-Compact Disk(CD)- Digital Versatile Disk(DVD)- Types of Computer: Personal Computer- Personal Computer Types- Work Station- Main Frames- Super Computer.

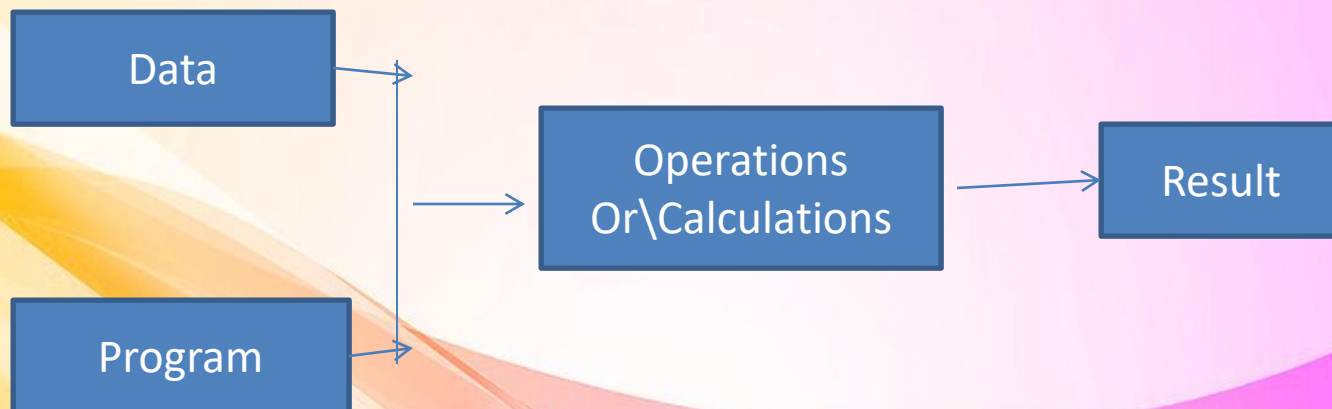
# Introduction to Computer

- ❖ Most of our day-to-day activities are begin influenced by use its Areas Like science and technology depend heavily on computer for their research.
- ❖ It has also become necessary for each and every one of us to have a basic knowledge of computers.

# WHAT IS A COMPUTER

- ❖ A computer is an electronic device, which processes information based on the instructions provided, and generates the desired output.
- ❖ computer system also requires an input, which is processed to get the desired output.
- ❖ Two kinds of inputs are required. One, the basic or raw data, Two, a set of instructions containing the methodology to process this data.

- ❖ This set of instructions is called a program or software in computer jargon .



- ❖ A slide rule consists of two graduated scales, one of which slides over the other.
- ❖ The scales are devised in such a manner that suitable alignment of one scale against the other makes it possible to compute products, additions, etc.,
- ❖ just by inspection. In 1642, Blaise Pascal, a French mathematician, invented the first mechanical calculating machine.
- ❖ In this machine, numbers were entered by dialing a series of numbered wheels.
- ❖ Another series of toothed wheels transferred the movements to a dial, which showed the results.
- ❖ Gottfried von Leibnitz, a German mathematician, in 1671 invented a calculating machine,
- ❖ which was able to perform multiplications and division. Between 1802, Joseph Marie Jacquard, a French textile manufacturer, invented a mechanical system for use in the textile industry
- ❖ This machine was used to automatically control weaving looms to facilitate the production of woven cloth with complex patterns.

## WHAT IS SO SPECIAL ABOUT COMPUTERS

- ❖ The five major characteristics of computers, which have made them so powerful and useful are:
- ❖ Speed
- ❖ Accuracy
- ❖ Consistency
- ❖ Storage capacity
- ❖ Flexibility

# SPEED

- ❖ Computer work at an incredible speed.
- ❖ This can be gauged from the fact that the speed of the computer is measured in terms of milliseconds, microseconds, nanoseconds
- ❖ i.e., one-thousandth, one-millionth and one-trillionth of a second, respectively.
- ❖ chances are that the computer you are presently working on, would be processing information at the speed of a couple of million instructions per second, also called MIPS in computer jargon.



# ACCURANCY

- ❖ In addition to being fast, computer are also accurate.
- ❖ they either give the correct answer or do not answer at all.
- ❖ it must be remembered that the computer is capable of doing only what it is instructed to do. if faulty instructions are provided for processing the data, obviously faulty answers will be given.
- ❖ This feature is called GIGO i.e., Garbage out.
- ❖ The only possibility of an error occurring is due to inaccurate instructions or faulty data.

# Consistency

- ❖ Unlike human beings, computers being machines are highly consistent.
- ❖ They never get bored too, I am yet to meet a computers complaining of a monotonous job.
- ❖ They are ideal machines for carrying out repetitive and voluminous work.

## STORAGE CAPACITY

- ❖ Computer can store huge amounts of data.
- ❖ Once recorded, a piece of information is never forgotten (unless some problem takes place) and any information can be retrieved almost instantaneously.
- ❖ Give you an idea of storage capacity,
- ❖ a single CD ROM can contain the entire Encyclopedia Britannica, and more!

## FLEXBILLITY

- ❖ A computer is a versatile machine and its use is limited only by your imagination.
- ❖ In today's fast developing technology-world it would be very difficult, in some cases in conceivable, to find an area where computer are not being used to a great advantage.
- ❖ computer have one major limitation; they are not originally creative and perhaps will never be.
- ❖ they may never be able to write An old man and the sea, and may never be able to paint a Mona Lisa (although they can faultlessly duplicate it), and again may never be able to compose Beethoven's Sonata.

## EVOLUTION

- ❖ In order to understand today's computer; it might be worth while to take a quick look at the evolution of computer.
- ❖ Historians trace back the history of calculation with the Abacus(a wooden frame with balls or beads strung on parallel wires)and to its origin to around 5000 B.C.
- ❖ it was used for performing simple calculations. In the seventeenth century, john Napier, a Scottish mathematician, did considerable work on the aids for calculation. the most notable one was the invention of logarithms in 1614.
- ❖ In 1620,just six years after the invention of logarithms,
- ❖ William oughtred,an English mathematician, invented the slide rule. this is a calculating device based on the principles of logarithms.

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# THE FIRST COMPUTER

- ❖ In 1822, Charles Babbage, a professor of mathematics at Cambridge University, devised a machine called "Difference Engine" for the Royal Society.
- ❖ This difference engine was used to perform simple computations needed for setting up trigonometric and logarithmic tables. In short,
- ❖ Babbage had developed a prototype computer
- ❖ Which was 100 years ahead of its time
- ❖ He is widely considered as the father of modern day computers.

- ❖ After world war II, there was anteed for advanced calculations
- ❖ By that time, many mechanical dock calculators with a high degree of reliability had been developed
- ❖ Howard H Aiken of Harvard University, while working on his doctorate in physics in the year 1937 .
- ❖ Designed a machine that could automatically performs a sequence of arithmetic operations.
- ❖ Completed in 1944 it was named Mark 1
- ❖ The time taken for average multiplication and division was about four and eleven seconds, respectively
- ❖ The results ware printed at the rate of one result per five seconds.



- A Comparison of generations is made in

Ist Generation  
Computer  
Use of Vacuum  
tubes  
Limited storage  
capacity  
Slow speed  
Symbolic  
language  
programming  
Huge size  
  
Problems of over  
heating

2<sup>nd</sup> Generation  
Computer  
  
Use of transistors  
and diodes  
  
Faster speed  
  
Reduction in size  
and heat generation  
  
High level  
programming  
language  
(COBOL, FORTRAN)

3<sup>rd</sup> Generation  
Computers  
Use of integrated  
circuits  
  
More flexibility  
with input/output  
Smaller size and  
better  
performance  
Extensive use of  
high level  
programming  
language  
Remote  
processing and  
time sharing

Use of large  
scale and very  
scale  
integrated  
circuits  
Increased  
storage  
Considerably  
faster and  
smaller  
Modular  
design,  
Versatility and  
compatibility  
Sophisticated  
programs and  
languages for  
special  
applications  
Increased use  
of  
microcomputers  
(PCs)

- ❖ As you go through the history of evolution of computers, you would find that the earliest computer were very big and therefore consumed a lot of power.
- ❖ This resulted in their heating very quickly and they had to be frequently shut down and cooled .This made them very expensive to build and maintain.
- ❖ As the technology improved, computers became smaller in size, the season for the much faster and more powerful.
- ❖ But most importantly, from users' point of view, they became more affordable and user-friendly.
- ❖ This is success of computers and why they have been able to transform from 'huge monoliths 'to 'personal assistants'.
- ❖ It right be just a matter of time before they enter the next phase of their evolution and become 'domestic appliance'.
- ❖ As simple to operate as a refrigerator, as useful as a microwave oven and as common as a TV.

# THE BASIC COMPONENTS

- ✓ Computer system essentially has three important parts, namely, input device, central processing device and output device.
- ✓ The central processing unit (CPU) itself has three parts, namely, Memory Unit, Control Unit and Arithmetic Logic Unit (ALU).
- ✓ These three units along with the input and output devices form the five important components of any computer system.
- ✓ computers also employ secondary storage devices (also called auxiliary storage or backing storage), which are used for storing data or instructions on a long-term basis.

## FUNCTIONING OF THE COMPONENTS

- ✓ The input devices are used to transfer the information into the memory unit of a computer.
- ✓ Information from the memory can be transferred to the ALU where comparisons or calculation are done and the result are sent back to the memory unit.
- ✓ Memory unit is used to store the set of instructions. The memory unit is also called the main memory or the immediate access store (IAS).
- ✓ The coordination and control of the operations of a computer system is the sole responsibility of the control unit.
- ✓ It accepts instructions held in store, interprets these instruction and processes them for execution by appropriate parts of the system in the correct sequence.

# MEMORY

- ✓ Memory consists of a large number of storage space known as cells or locations, which are organized into units of bytes, each comprising eight bits.
- ✓ Memory bytes are used to record program instruction codes, numeric or alphabetic data.
- ✓ RAM: Random access memory or RAM, the main feature of RAM is that it can be read from or written onto any location and can be accessed randomly.
- ✓ Reading and writing onto to any location takes the same amount of time.
- ✓ It loses its contents the moment the power is turned off. Hence it is called volatile memory

## **ROM:**

- ✓ It holds permanent data or instructions that can only be read from, but not written onto, i.e., information is permanently recorded so that it cannot be changed by the programmers.
- ✓ It is non-volatile on nature. The contents of ROM are not lost when the computer is switched off.

# SOFTWARE COMPONENTS

- ✓ Set of instructions are called software. The software acts as an interface between the user and the computer.
- ✓ A software or a program is defined as a complete set of instructions written by the programmer.
- ✓ Software can be classified into applications software, systems software, utility software.
- ✓ Applications software: These are programs employed by the user to perform specific functions. It can be used for accounting control in business or a program used for engineering design.

## **The System software:**

- ✓ It consists of all programs, languages and documentation supplied by the manufacturer along with the computer.
- ✓ System software programs are held permanently on a machine, which relieve the programmer from mundane tasks and improve resource utilization.

## **Utility Software:**

- ✓ These may be considered as a border line case between applications software and systems software. Such software's are either used as specific tools while developing a program or package, or to perform a limited specific task, such as scanning the hard disk for viruses.
- ✓ Viruses are also a different kind of software, created by perverts whose principal purpose is to be a nuisance to the users of computers. representation of the



## **INPUT/OUTPUT DEVICES:**

- ✓ These devices is required for users to communicate with the computer. Input devices allow you to input data input into the computer.
- ✓ Output devices on the other hand display the results of your computer calculations.

### **Example of Input/output Devices:**

✓	<b>Input Devices</b>	<b>Output Devices</b>
✓	Keyboard	Monitor
✓	Mouse	Liquid Crystal Display (LCD)
✓	Scanner	Printer
✓	Touch Screen	Speaker
✓	Light Pen	Plotter

# INPUT DEVICES

Keyboard A text based input device that is used to type in letters, numbers and other characters.

## *Keyboard keys*

- Enter** To execute a command or a program. Similar to the “return” key of a typewriter
- Backspace** To remove the character directly to the left of your Cursor.
- Delete** To remove the character directly to the right of your Cursor.
- Ctrl (Control key)** Called as a helper key because it is always used in combination with other keys to perform specific actions.
- Alt (Alternate key)** Called as a helper key because it is always used in combination other keys to perform specific actions.
- Shift** Used to type capital letters when pressed with an alphabetic key. Also used to type the symbols located on the upper side of number keys [0-9]

**Tab:** Used to insert indentation into a document. Jumps from box to box when entering data in a form

**Arrow keys:** Used to move the cursor in top/bottom/left/right directions.

**Caps Lock:** Used to make the alphabetic characters to the upper case.

**Esc (Escape key):** Used to cancel and abort programs.

**Home:** Home key is used to move the cursor to the beginning of a line.

**End:** End key is used to bring the cursor to the end of a line.

**Page Up:** Used to move the cursor up one screen length. It will *not* move the cursor to the 1<sup>st</sup> page if you are in the 2nd page.

**Page Down:** Used to *move* the cursor down one screen length. It will *not* move the cursor to the 2nd page if you are in the 1st page.

**F keys:** Called Function keys, which are located at the top of the keyboard. Their function depends upon the type of the program being used.

**Num Lock:** The numeric keypad is located at extreme right of the key board is activated when the Num Lock is turned on.

## **Mouse:**

This is used to move the cursor on your computer screen to give instructions to your computer and to run programs and applications.

It can be used to select the menu commands, move icons, size windows, start programs, close windows etc.

## **Mouse Actions:**

**Click:** used to select an item`

**Right click:** Used to display a set of commands. Right click means press and Release the right mouse button.

**Double-click:** used to open a document or a program. to press the left mouse button twice.

**Drag and Drop:** Place the cursor over an item on the screen and then press and hold down the left mouse button. Holding down the button move the cursor to where you want to place the item and then release the button.

**Scanner:**

It is used to input picture and image into your computer. It converts images to digital form so that it can be fed into the computer.

**Touch screen:**

It allow the user to operate a computer by simply touching the display screen

Ex: ATM at a Bank.

**Light Pen:**

It uses a light sensor device to select objects on a display screen.

# OUTPUT DEVICES

## Monitor:

It is used to display information, programs and applications in a computer. It is also called Screen. Like televisions, monitors come in different sizes.

## LCD:

It is smaller and lighter as compared to a monitor. It is mostly used with portable computers (Laptops).

**Printer:** It is used to create a hard copy of the files stored in a computer. There are two basic qualities associated with printers: resolution and print speed. Print resolution is measured as the number of dots per inch (dpi). Print speed is typically measured in pages per minute (ppm). Four types of printers, Impact Line Printers, Dot Matrix Printers, Ink Jet Printers and Laser Printers.

**Speaker:** Used to produce music or speech from programs. A speaker port (a port is a connector in your computer wherein you can connect an external device) allows you to connect the speaker to the computer. Speakers can be built into the computer or can be attached separately.

**Plotter:** A plotter interprets commands from the computer to make line drawings on a paper using multicolored automated pens. Plotters can be very useful in drawing graphs, bar charts, line drawing and maps on rolls of paper.

## External Storage Device:

External storage is any storage other than main memory (RAM). External storage devices are peripheral devices connected to and controlled by the computer to enable permanent storage of user data and programs.

Computer uses binary system to work with data. All the data in the computer is internally stored in the form of 0's and 1's (bits). A bit can be defined as an electronic signal, which is either ON (1) or OFF (0). It is the smallest unit of information the computer uses. The capacities of storage devices or the main memory is always measured in terms of bytes. Each letter typed consumes one byte. For example, if I have typed I Love India it means I have typed 12 bytes [ 10 letters and 2 spaces].

1 Byte	= 8bits
1 KB (Kilo Byte)	= 1024 Bytes
1 MB [Mega Byte]	= 1024 Kilo Bytes
1 GB [Giga Byte]	= 1024 Mega Bytes
1 TB [Tera Byte]	= 1024 Giga Bytes

## **Examples of storage devices:**

- ✓ Magnetic Storage                      Floppy disk, hard disk
- ✓ Optical Storage                        CD, DVD

## **Floppy Disk:**

- ✓ Portable storage device. It is commonly used to move files from different computers, load new programs onto the computer, or store backup of data.
- ✓ Hold 1.44 MB of data.
- ✓ It can be easily damaged.

## **Hard Disk:**

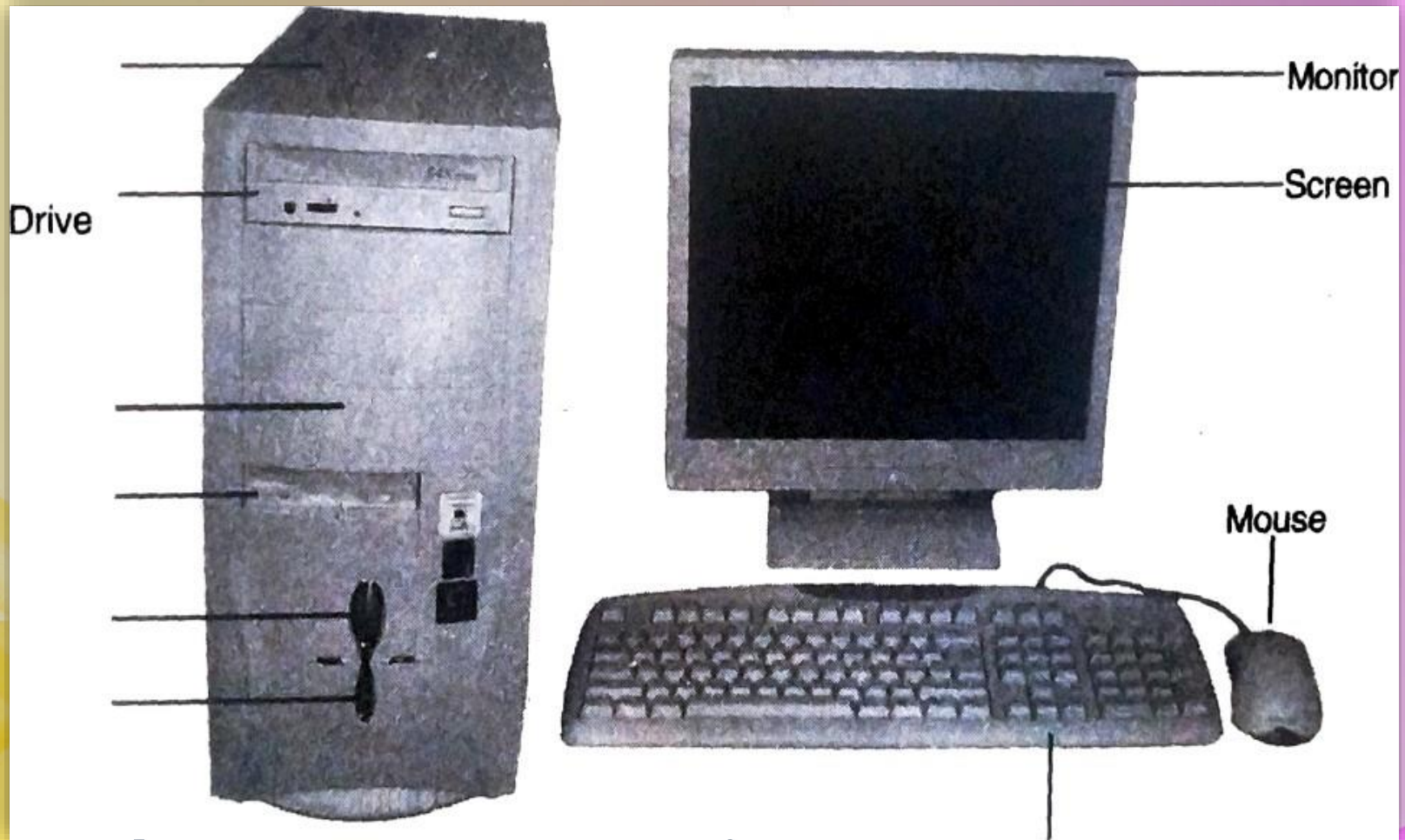
- ✓ It is not a single flexible disk, but a stack of metal disks sealed in a box. The hard disk and hard-disk drive exist together as a unit and are usually a permanent part of the computer where most of your files are saved.
- ✓ The storage capacity of a hard disk can be several gigabytes ranging from 1GB to 100+ GB.
- ✓ Very reliable as compared to Poppies.
- ✓ Rewritable
- ✓ You can access any information in a fraction of a second.



- Compact Disk: Compact Disc (CD) contains digital information, which can be read, but cannot be rewritten. It can hold vast amounts of information such as full-motion videos, animation, music, text, etc.
- CD is fairly a simple piece of plastic, about four one-hundredths ( $\frac{4}{100}$ ) of an inch (1.2 mm) thick.
- It is portable. Its capacity usually ranges from 650-700 MB.
- Most reliable for long-term storage.
- CD drives are different for reading and writing a CD.

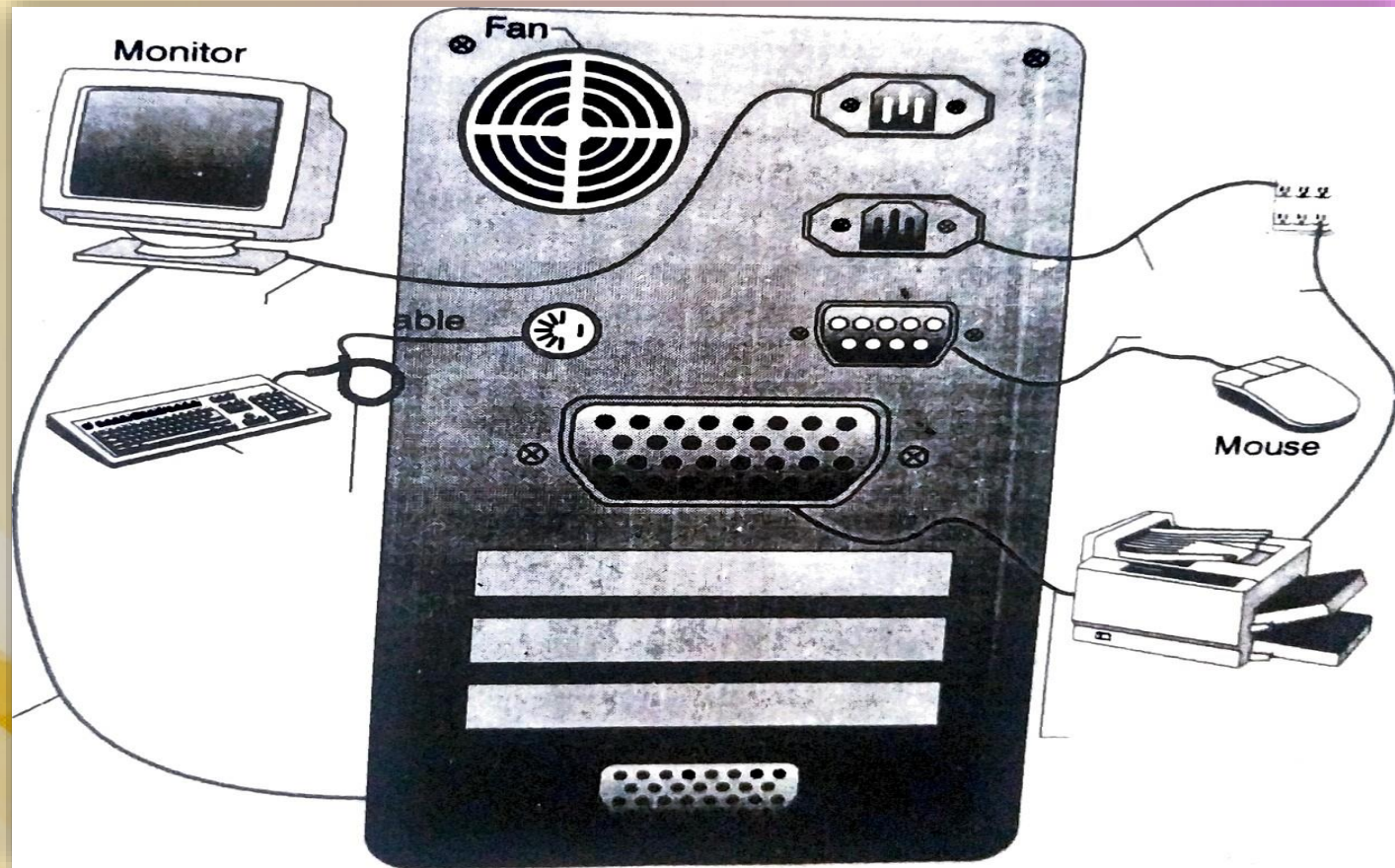
- Digital Versatile Disk(DVD): It is primarily used to store movies or music, and can be played back on your computer as well as on your television screen.
- It is similar to CD but has a larger capacity. Can store about 17GB of data.
- They are not rewritable.

## The computer system



**Schematic Diagram of a Computer System**

## Connectivity Layout



## Connectivity Layout of the Computer System

## **Types of computer**

### **Personal computer:**

- Personal computer (PC) is a small, single-user based on a microprocessor.
- PC's are designed as single user systems, it is common to link them to form a network.

### **Personal Computer types:**

- 1. Desktop: It is not designed for portability. The execution with desktop systems is that you will set up the computer in a permanent location.
- 2. Laptop computer: also called Notebook computer. They are portable computers that can run on batteries.
- 3. palmtop: commonly known as Personal Digital Assistants(PDAs).

## **Work station:**

- powerful, single-user computer. A workstation is like a personal computer, but it has a more powerful microprocessor.
- It is used for engineering applications (CAD/CAM), desktop publishing, software development and other applications that require a moderate amount of computing power and relatively high quality graphics capabilities.
- In networking, a workstation refers to any computer connected to a Local Area Network (LAN).

## **Mainframes:**

- Originally, mainframes were huge computers that could fill the entire room. They are expensive computers.
- The computers has reduced while the power has increased, mainframes have fallen out of use in favor of enterprise server.

## **Supercomputers:**

- Sophisticated, expensive computers, using state-of-the-art technology. It is one of the fastest computer currently available.
- They are particularly utilized in simulation and modeling of computer system.