

Introduction to Computers

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‘The journey of a thousand miles begins with a single step’-Lao Tzu

Our lifestyles have undergone a sea change with the advancement in technology especially in the field of computers. Computers are an integral part of our lifestyles today and are found at offices, banks, homes, schools, colleges, hotels, shops etc. This advance in technology has made our lives easy and comfortable. For instance, we can execute a number of activities using computer based systems- we can write a draft on word processor and email it, make calculations using an electronic spread sheet and incorporate graphics, create a database of friends with their phone numbers, addresses and e-mail ids etc. This chapter gives overview of components of computer, different types of input and output devices, different types of memory, classification of computer, various computer generations, different types of computer languages and various applications in today’s arena.



Computer is an electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. The three main building blocks in a computer’s functioning are input, processor and output (fig.1.)



Fig. 1. Functioning of a computer

The data is entered through input devices like the keyboard, disks or mouse. These input devices help convert data and programs into the language that the computer can process. The process that the computer does on the input data goes into the main part of the computer called Central Processing Unit (CPU). The processed data is sent to the output device. Output devices translate the processed information from the computer into a form that we can understand.



Components of Computer System

Input: This is the process of entering data and programs into the computer system. A large number of input devices are available that can be used to enter information directly into the computer. Most commonly used input devices are keyboard and mouse. Image scanner joystick, light pen, track ball, webcam, audio input device like microphone etc. are some of the devices used to input information to computer.



Process: CPU is the brain of the computer. The CPU does the processing of the input data and instructions. It also controls the functions of all the components attached to it. Besides this, CPU is the place where the memory of the computer is present. CPU is made up of Arithmetic & Logic unit, control unit and memory unit.

Arithmetic and Logic Unit	Control Unit	Memory Unit
<ul style="list-style-type: none"> •is capable of performing addition, subtraction, division and multiplication as well as operations like comparisons. 	<ul style="list-style-type: none"> •controls all the operations of a computer based on the instructions received from the input devices. 	<ul style="list-style-type: none"> •stores the data and instructions temporarily for processing.

Output: This is the process of producing results from the data for getting useful information. Monitors, commonly called as Visual Display Unit (VDU), are the main output device of a computer. Printer is another output device, which is used to print information on paper.



Memory: We remember words, faces, names or the lessons we read, because we have a memory. A computer also has a memory. It can remember data and instructions. The data and instructions are stored in its memory. Different types of memory are detailed below.

Primary memory is the internal memory of the CPU. This memory can be quickly accessed by the CPU. Primary memory is of two types – Read Only Memory (ROM) and Random Access Memory (RAM). RAM is the temporary storage memory, which is volatile i.e., when the computer is turned off both data and instructions get lost

from the RAM. ROM is permanent in nature and non-volatile. As the name suggests, computer can only read the data and instructions from it, but cannot make any changes to it. These instructions remain permanently in the computer, even when the computer is switched off.

Secondary memory refers to storage devices that cannot be accessed directly by the CPU. These storage devices store data and instructions permanently. The input and output can be stored for later use in storage devices. Hard disk, CD-ROM, DVD, flash drive are examples of storage devices.



Cache memory is now part of a computer. It is a high speed memory used for temporarily storing the most frequently used data and instructions. It can be accessed more quickly than a regular RAM in computer.

Generations of computers

Using size and features as the bases, computers are classified into various generations. There are totally five computer generations known till date.

Generation	Period & Description
First	1946-1959, Vacuum tube
Second	1959-1965, Transistor
Third	1965-1971, Integrated Circuit
Fourth	1971-1980, VLSI Microprocessor
Fifth	1980-onwards, ULSI microprocessor

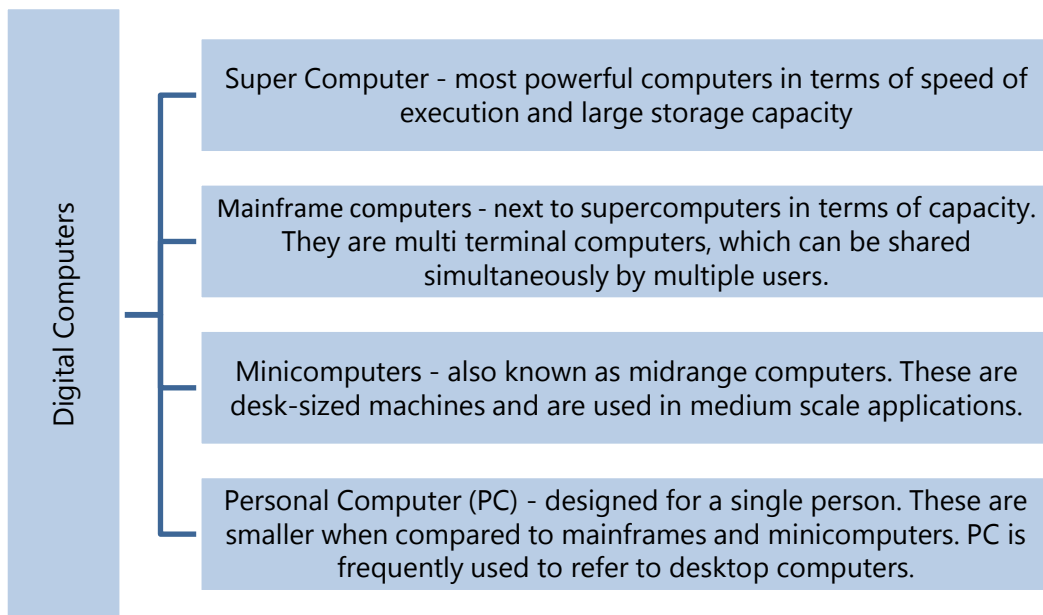


Types of computers

Computers can be classified in a variety of ways depending upon their physical size, processing speed, storage capacity, cost and ability to get connected to other computers and input or output devices. Various types of computers are discussed in this section.

Analogue computers: The varying quantities like temperature, air pressure, weight etc. are converted by analogue computers into varying voltages and then these voltages become input to the analogue computers. Today analogue computers are used for industrial process control.

Digital computers: Computers that process digital signals are known as Digital Computers. The Digital signal is a discrete signal with two states 0 and 1. In practice, the digital computers are used and not analogue. Examples of digital computers are personal computers, supercomputers, mainframe computers etc.



Computer languages

The computer performs its functions based on the instructions given by the user. The set of such instructions written for a particular task is known as a computer program. Program is the set of instructions that tells the computer how to process the data into the form desired by the user. The language in which a computer program is written is known as programming language. Computer can process information only in the form of a series of numbers. So, all information and instructions given to a computer must finally reach it in a special language which consists of numbers only. The language of numbers is called machine language. This was the first computer language. In the first generation of computers, all instructions and data had to be fed in this language. This was an extremely difficult task and could be done by an expert only. Later, a number of other computer languages are developed and used in different generations of computers. Third generations of computer languages are known as high-level languages. Today you do not even need the knowledge of a computer language to work on the computer. The graphic environment makes working on the computer very simple. You only have to select and click icons to start using applications. Computers have now become extremely user-friendly and can be used by anyone with very little knowledge of computers.



Advantages of computers

Compared to traditional systems, computers offer many noteworthy advantages. This is one reason that traditional systems are being replaced rapidly by computer-based systems. The main advantages offered by computers are High Accuracy, Superior speed of operation, large storage capacity, User-friendly features, portability and platform independence.

Applications of Computers

Now let us look into some of the applications of computers in today's arena in various fields.

Business: computer is an integrated part in all business organisations and used for Payroll calculations, Budgeting, Sales analysis, Financial forecasting, Managing employees database, Maintenance of stocks etc.

Banking: Today banking is almost totally dependent on computer. Banks provide facilities on online accounting facility, which includes current balances, deposits, overdrafts, interest charges, shares, etc. ATM machines are making it even easier for customers to deal with banks.

Insurance: Insurance companies are keeping all records up-to-date with the help of computers. Insurance companies maintains a database of all clients with information showing procedure to continue with policies, starting date of the policies, next due installment of a policy, maturity date, interests due, survival benefits, bonus etc.

Education: The computer has provided a lot of facilities in the education system. The computer provides a tool in the education system. There are number of methods in which educational institutions can use computer to educate the students. It is used to prepare a database about performance of a student and analysis is carried out on this basis.

Advertising: With computers, advertising professionals create art and graphics, write and revise copy, and print and disseminate ads with the goal of selling more products.

Online Shopping - shopping has been made possible through use of computerised catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

Health Care: Computers have become important part in hospitals, labs, and dispensaries. The computers are being used in hospitals to keep the record of patients and medicines. It is also used in scanning and diagnosing different diseases. ECG, EEG, Ultrasounds and CT Scans etc. are also done by computerised machines.

Engineering Design: Computers are widely used in engineering purpose. One of major areas is CAD (Computer aided design).that provides creation and modification of images. Some fields are Structural Engineering, Industrial Engineering, and Architectural Engineering.

Military: Computers are largely used in defence. Modern tanks, missiles, weapons etc. Military also employs computerised control systems.

Communication: Communication means to convey a message, an idea, a picture or speech that is received and understood clearly and correctly by the person for whom it is meant for. Some main areas in this category are: E-mail, chatting, file transfer protocol, video-conferencing.

Government: Computers play an important role in government. Some major fields in this category are: budgets, sales tax department, income tax department, computerization of voters lists, weather forecasting etc.

Activity Corner



Evolution of Computer Technology
 Advantages of Computers
 Digital and Analog computers
 Computer generations
 Different types of digital computers
 Difference between RAM and ROM
 Primary Vs. Secondary Memory
 Programming languages
 Applications of computer
 Advantages of computer

Summary

- ✦ Computer is an electronic machine that can store, organise and find information, do calculations and control other machines.
- ✦ A computer system exhibits four characteristics: speed, precision, reliability and memory.
- ✦ Information and the instructions given to the computer are the input. Eg., keyboard, mouse, scanner
- ✦ Input is processed in the CPU of the computer. CPU is the brain of the computer. It is made up of ALU, memory unit and control unit.
- ✦ Result obtained by the computer is the output. It is obtained on output devices. Eg., monitor, printer
- ✦ ROM stands for Read Only Memory and it stores data and instructions permanently.
- ✦ RAM or Random Access Memory stores data and instructions temporarily.
- ✦ Devices that store data and programs permanently are called secondary storage devices. Eg., Hard disk, flash drive, CD-ROM, DVD etc.
- ✦ Computers are classified as Super Computer, Mainframe computer, Minicomputer and Personal Computer.