

UNIT I

INTRODUCTION TO COMPUTER

A computer is an electronic device that manipulates information, or data. It has the ability to **store**, **retrieve**, and **process** data.

Computer hardware covers all of those parts of a computer that are tangible physical objects. Circuits, computer chips, graphic cards, sound cards, memory (RAM), motherboard, displays, power supplies, cables, keyboards, printers and "mice" input devices are all hardware.

Computer software, or simply **software**, is a collection of data or computer instructions that tell the computer how to work. Examples of software include web browsers, games, and word processors.

Charles Babbage is called the "Grand Father" of the computer. The First mechanical computer designed by Charles Babbage was called **Analytical Engine**. It uses read-only memory in the form of punch cards.

Basic Functions of Computer

1. Accepts data (Input)
2. Process data (Processing)
3. Stores results (Storage)
4. Produces result (Output)

Input

The Computer receives its data from input devices in the form of raw data and later this data is processed inhuman readable form with the help of other PC devices. The primary input devices of computer system are

- Keyboard
- Mouse
- Scanner
- Trackball
- Light pen
- Joystick

Output

The output devices of computer receives data from system and further process the data in human readable form .Some Common Output devices are

- Printers
- Monitors
- Speakers
- Headphones
- Projectors

Processing

This is the core function of modern day PC when the data is received from the memory it receives the data for further processing.

Storage

Storage is a process through which digital data is saved within a data storage device by means of computing technology. Storage is a mechanism that enables a computer to retain data, either temporarily or permanently.

There are mainly two storage unit of PC

- Primary Storage

Primary memory is the main memory of the computer system. Accessing data from primary memory is faster because it is an internal memory of the computer.

Two types of Primary Memory are:

- Read Only Memory (ROM)
- Random Access Memory (RAM)

- Secondary Storage

All secondary storage devices which are capable of storing high volume data is referred to secondary memory. It's slower than primary memory. However, it can save a substantial amount of data, in the range of gigabytes to terabytes. This memory is also called backup storage or mass storage media.

Types of Secondary memory

- Magnetic tape
- USB drives
- Optical drives

CHARACTERISTICS OF A COMPUTER

The characteristics of the computer system are as follows –

- Speed
- Accuracy
- Diligence
- Versatility
- Reliability
- Automation
- Memory

Speed

A computer works with much higher speed and accuracy compared to humans while performing mathematical calculations. Computers can process millions (1,000,000) of instructions per second. The time taken by computers for their operations is microseconds and nanoseconds.

Accuracy

Computers perform calculations with 100% accuracy. Errors may occur due to data inconsistency or inaccuracy.

Diligence

A computer can perform millions of tasks or calculations with the same consistency and accuracy. It doesn't feel any fatigue or lack of concentration. Its memory also makes it superior to that of human beings.

Versatility

Versatility refers to the capability of a computer to perform different kinds of works with same accuracy and efficiency.

Reliability

A computer is reliable as it gives consistent result for similar set of data i.e., if we give same set of input any number of times, we will get the same result.

Automation

Computer performs all the tasks automatically i.e. it performs tasks without manual intervention.

Memory

A computer has built-in memory called primary memory where it stores data. Secondary storage are removable devices such as CDs, pen drives, etc., which are also used to store data.

CLASSIFICATION OF COMPUTER

Computers can be classified into different categories based on the following criteria.

- Types of data processed
- Functions performed
- Processing capabilities

Classification of computers according to the type of data processed

- Analog Computers
- Digital Computers
- Hybrid Computers

Analog Computers

In analog computers, data is represented as continuously varying and operates essentially by measuring rather counting. As the data is continuously variable, the results obtained are estimated and not exactly repeatable. Voltage, temperature and pressure are assured using devices like voltmeters, thermometers etc. An analog computer has the ability to accept inputs which vary with time and intensity and directly apply them to various devices which perform desired operation. It produces output in the form of graph. These computer are mostly used in process control plants.

Digital Computers

In digital computers, data is represented as discrete units of electrical pulsars. The data is measured in quantities represented as either the ON or OFF state. Therefore, the results obtained from a digital computer are measured and precise. The modern day digital clock is a good example. Virtually all of today's computers are based on digital principles.

Hybrid Computers

Hybrid computer accepts data in analog form and present output also in analog form. The data, however, is processed digitally. Therefore, hybrid computers required analog digital converters for input and digital to analog converters for output.

For example: In a hospital ICU analog devices may measure a patient's heart function, temperature etc. these measurements may then be converted into numbers and supplied to digital devices.

Classifying computers according to their functions pertained

- Special Purpose Computer
- General Purpose Computer

Special Purpose Computer

Special purpose computers are also known as dedicated computers. They are designed to solve a single type of problem. The functions are uniquely adapted to control situations. Many computers are special purpose computers designed as computerized traffic control systems and automatic aircraft landing systems. Examples of special designed computers that could need to operate in real time are those involved in process control, missile obtained data and light control.

General Purpose Computer

General Purpose computers are designed to be flexible and versatile. They can be used to solve a variety of problems by changing the program or instructions that govern their operations. The range of problems that can be solved by a General Purpose Computer stretches from the simplest accounting to the most complex simulation and forecasting.

Classification of Computers based on Size

Modern computers vary in size from large computers that fill entire rooms to the CPU that is smaller in size than the nail of the little finger.

- Microcomputers
- Minicomputers
- Mainframe Computers
- Supercomputers

While large systems have greater processor speed, greater storage capacity, are able to handle large number of powerful input and output devices, the smaller processors are generally cater to single uses. They may be special purpose devices performing a single task example controlling the ignition system in an automobile. Personal computers are ranging from the Desktop model to the laptop, to the Notebook.

Micro-Computers

The microcomputer is the smallest type of computer available. Inside the microcomputer, the arithmetic and control unit is combined on a single chip called a microprocessor.

Microcomputer contains two types of store or memory.

- Random Access Memory (RAM) where programs and data are held during processing temporarily. Data stored in the RAM is lost when the machine is switched off.
- Read Only Memory (ROM) where permanent instructions of data are held. The wrong does not require a continuous supply of power to retain its contents.

Microcomputer site is used as home computers for the family or as personal computers by business executives or by small businesses where volumes of data processing and speed requirements are small.

Types of micro computer or personal computers

- Desktop computer
- Laptop computer
- Palmtop computer,
- Digital Diary,
- Notebook

Minicomputer

They are smaller version of the mainframes. Generally they offer the same computing power as bigger counterparts. The most important advantage of a minicomputer over the mainframe is that it is cheaper in cost smaller in size and reliable. It does not require air conditioning and can be operated in room temperature. In business they are being used for involvement stock payroll etc. It is generally used as server system on networks with personal computers as nodes.

Mainframes

The earliest computers were called mainframes due to their large size. The term is still used for the large computers today. The capacities of the earlier mainframes and the mainframes of today are numerous to different. Mainframes are very large computers with a very high capacity of main store. Because they can process large amounts of data are very quickly; big companies, banks, government departments as their main computer use them. They can be linked into a network with smaller departmental computers, Microcomputers or with each-other. They act as hosts of larger national and international communication

networks, handling hundreds of users. Some examples of mainframes are IBM 4381, ICL 39 series and CDC cyber series.

Supercomputers

Complex and difficult applications like weather forecasting require a large amount of data to be manipulated within a very short time. Large supercomputers are with faster processing using multiple processors and superior technology. Examples of supercomputers are CARY XMP-24 and NEC-500.

ANATOMY OF A COMPUTER

A computer is an electronic device that can perform arithmetic operations at high speed and it can process data, pictures, sound and graphics. It can solve highly complicated problems quickly and accurately.

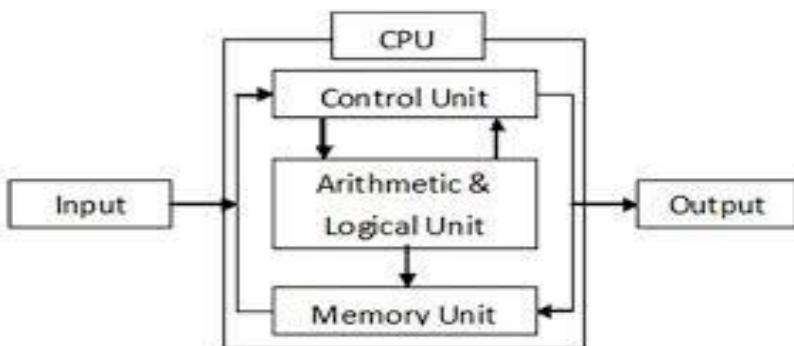


Fig. Block Diagram of Computer

Input Unit

An Input Unit accepts the input from the outside world. There are many kinds of input devices like Keyboard, Mouse etc.

There are mainly 3 functions of input device are as follows:-

- It accepts (or reads) instructions and data from outside world.
- It converts these instructions and data in computer acceptable form.
- It supplies the converted instructions and data to the computer system for further processing.

Central Processing Unit

It is responsible for processing all the Instruction which is given to computer system or PC. The CPU is known as the heart /Brain of a computer because without the necessary action taken by the CPU the user cannot get the desired output.

The Central processing unit (CPU) again consists of 3 parts:-

1. ALU (Arithmetic Logic Unit)
2. CU (Control Unit)
3. Memory Unit

ALU

It performs simple arithmetic operation such as +, -, *, / and logical operation such as >, <, =<, <= etc.

Control Unit

It manages the various components of the computer. It reads instructions from memory and interpretation and changes in a series of signals to activate other parts of the computer. It controls and co-ordinate the input output memory and all other units.

Memory Unit

Memory is used to store data and instructions before and after processing. There are 2 types of memory unit called Primary memory or internal memory and Secondary memory.

There are many functions of CPU that is as follows:-

- It controls all the parts of software and data flow of computer.
- It performs all operations.
- It accepts data from input device.
- It sends information to output device.
- Executing programs stored in memory.
- It stores data either temporarily or permanent basis.
- It performs arithmetical and logical operations.

Output Unit

An Output Unit accepts the output from the CPU. There are many kinds of output devices like Monitor, Printer etc.

There are mainly 3 functions of output device are as follows:-

- It accepts the results produced by the computer, which are in coded form and hence, cannot be easily understood by us.
- It converts these coded results to human acceptable (readable) form.

APPLICATION/USES OF COMPUTER

Uses of Computer at Home

Computer can be used at home in the following ways.

Home Budget

Computer can be used to manage Home Budget. You can easily calculate your expenses and income. You can list all expenses in one column and income in another column. Then you can apply any calculation on these columns to plan your home budget. There are also specialize software that can manage your income and expenses and generate some cool reports.

Computer Games

An important use of computers at home is playing games. Different types of games are available. These games are a source of entertainment and recreation. Many games are available that are specially developed to improve your mental capability and thinking power.

Working from Home

People can manage the office work at home. The owner of a company can check the work of the employees from home. He can control his office while sitting at home.

Entertainment

People can find entertainment on the internet. They can watch movies, listen to songs, and watch videos download different stuff. They can also watch live matches on the internet.

Information

People can find any type of information on the internet. Educational and informative websites are available to download books, tutorials etc. to improve their knowledge and learn new things.

Chatting & Social Media

People can chat with friends and family on the internet using different software like Skype etc. One can interact with friends over social media websites like Facebook, Twitter & Google Plus. They can also share photos and videos with friends.

Uses of Computers in Education

CBT are different programs that are supplied on CD-ROM. These programs include text, graphics and sound. Audio and Video lectures are recorded on the CDs. CBT is a low cost solution for educating people. You can train a large number of people easily.

Benefits of CBT

Some benefits of CBT are as follows:

1. The students can learn new skills at their own pace. They can easily acquire knowledge in any available time of their own choice.

2. Training time can be reduced.
3. Training materials are interactive and easy to learn. It encourages students to learn the topic.
4. Planning and timing problems are reduced or eliminated.
5. The skills can be taught at any time and at any place.
6. It is very cost effective way to train a large number of students.
7. Training videos and audios are available at affordable prices.

Computer Aided Learning (CAL)

Computer aided learning is the process of using information technology to help teaching and enhance the learning process. The use of computer can reduce the time that is spent on preparing teaching material. It can also reduce the administrative load of teaching and research. The use of multimedia projector and PowerPoint presentations has improved the quality of teaching. It has also helped the learning process.

Distance Learning

Distance learning is a new learning methodology. Computer plays the key role in this kind of learning. Many institutes are providing distance learning programs. The student does not need to come to the institute. The institute provides the reading material and the student attends virtual classroom. In virtual classroom, the teacher delivers lecture at his own workplace. The student can attend the lecture at home by connecting to a network. The student can also ask questions to the teacher.

Online Examination

The trend of online examination is becoming popular. Different examination like GRE, GMAT and SAT are conducted online all over the world. The questions are marked by computer. It minimizes the chance of mistakes. It also enables to announce the result in time.

Uses of Computers in Business

The use of computer technology in business provides many facilities. Businessmen are using computers to interact with their customers anywhere in the world. Many business tasks are performed more quickly and efficiently. Computers also help them to reduce the overall cost of their business. Computer can be used in business in the following ways.

Marketing

An organization can use computers for marketing their products. Marketing applications provide information about the products to customers. Computer is also used to manage distribution system, advertising and selling activities. It can also be used in deciding pricing strategies. Companies can know more about their customers and their needs and requirements etc.

Stock Exchange

Stock Exchange is the most important place for businessmen. Many stock exchanges use computers to conduct bids. The stockbrokers perform all trading activities electronically. They connect with the computer where brokers match the buyers with sellers. It reduces cost as no paper or special building is required to conduct these activities.

Uses of computers in Medical Field

Hospital Management System

Specialized hospital management software are used to automate the day to day procedures and operations at hospitals. These tasks may be online appointments, payroll admittance and discharge records etc.

Patient History

Hospital management systems can store data about patients. Computers are used to store data about patients, their diseases & symptoms, the medicines that are prescribed.

Patients Monitoring

Monitoring systems are installed in medical wards and Intensive care units to monitoring patients continuously. These systems can monitor pulse, blood pressure and body temperature and can alert medical staff about any serious situations.

Life Support Systems

Specialized devices are used to help impaired patients like hearing aids.

Diagnosis Purpose

A variety of software are used to investigate symptoms and prescribed medication accordingly. Sophisticated systems are used for tests like CT Scan, ECG, and other medical tests.

References:

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