

Introduction to Information Technology

UNIT 1

Computer

“The Computer is an Electronic Device which accepts the input data processing according to their Instruction and it gives output result”.

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.



FIGURE 1-7
Typical computer hardware.

Basic Fundamental Functions of Computer

1. Accepts data (Input)
2. Processes data (Processing)

3. Produces result (Output)
4. stores results (Storage)

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
- Lightpen
- 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 :: There are mainly two storage unit of PC

- Primary Storage
- Secondary Storage

A computer System:

COMPUTER SYSTEM = HARDWARE + SOFTWARE+ USER

- Hardware = Internal Devices + Peripheral Devices (All physical parts of the computer.)
- Software = Programs (Software gives "intelligence" to the computer.)
- User = Person (who operates computer.)

Characteristics of a Computer

- **Speed**
- **Accuracy**
- **Diligence**
- **Storage capacity/memory**
- **Versatility**
- **Reliability**
- **Power of remembering**

- **Compactness**

1.Speed: - As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second.

2.Accuracy: - The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is 7.determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

3.Diligence: - A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

4. Versatility: - It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.

5. Power of Remembering: - Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

6. No IQ: - Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

7. No Feeling: - It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

8. Storage: - The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers.

Classification of Computer

Computers can be classified into following category

- Analog
- Digital
- Hybrid

Analog:-A computer designed to respond to an infinite number of variations and signals. It operates by measuring rather than counting. These computers are mostly used in scientific applications. Ex. Thermometer, Speedometer.

Digital:- These computers convert data into digits and then count the numbers that represent numbers, letters or other symbols. Mostly these computers are used for scientific and business purpose. Ex. PC, PC-XT, PC-AT

Hybrid:- A computer which behaves like both analog and digital is known as hybrid computer. It is mostly used for individual process controls in plants. Ex. E.C.G, Intensive Care Unit etc.

Further a digital computer can be classified the four classes

1. **Micro Computer:-** The computer uses Microprocessors are called Micro computer. The first microprocessor computer was built of 8-bit chip. Means 8-bit of data can be send for process into C.P.U. Further it improved to 16-bit system. Which is known as 8086 and 8088,80486. These computers were first introduced by Intel Corporation. The storage capacity of this computer is about 1 GB and onwards.
2. **Mini Computer:-** Mini computers are the multi-user systems. It is mainly used in a official networks or like that networks. Where some terminals are connected trough this computer. Mini computers have large storage capacity and have high C.P.U speed.
3. **Mainframe Computer:-**Mainframe computers are generally 32-bit machines or the higher sides. These are suited to big organization , to manage high volume applications. Few of the mainframe machines are *IBM, HP* etc. Mainframe computers provides inlarge storage capacity and faster C.P.U speed rather than mini computer.
4. **Super Computer:-**The upper end of the state of the art mainframe machine are the super computer These are amongst the fastest machines in term of processing speed and multiprocessing techniques, Where a number of processors are used for solving a problem. Super computers mainly are being used for weather forecasting, remote sensing, image processing, biomedical applications etc. Example- CRYPT, XMP-14, PARAM-10000 etc.

Application of computer

The various applications of computers in today's arena :

1. Business
2. Education
3. Marketing
4. Banking
5. Insurance
6. Communication

7. Health Care
8. Military
9. Engineering Design

› **Business**

A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which made it an integrated part in all business organisations. Computer is used in business organisations for: Payroll calculations, Sales analysis, Budgeting, Financial forecasting, Managing employees database and Maintenance of stocks etc.

› **Education**

Computers have its dominant use in the education field which can significantly enhance performance in learning. Even distance learning is made productive and effective through internet and video-based classes. Researchers have massive usage of these computers in their work from the starting to till the end of their scholarly work.

› **Marketing**

In marketing, uses of computer are :

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.

Home Shopping - Home 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.

› **Banking**

Today banking is almost totally dependent on computer. Banks provide the facilities of: Banks provide online accounting facility, which includes current balances, deposits, overdrafts, interest charges, shares, and trustee records.

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. The insurance companies, finance houses and stock broking firms are widely using computers for their concerns.

>**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: Chatting, E-mail, Usenet, FTP, Video-conferencing and Telnet.

› **Health Care**

Most of the medical information can now be digitized from the prescription to reports. Computation in the field of medicine allows us to offer varied miraculous therapies to the patients. ECG's, radiotherapy wasn't possible without computers.

› **Military**

Computers are the main tools which help in developing missiles and other equipment in the defence system. Designing and the maintenance are possible only through computers. Computer builds the links between the soldiers and commanders through the satellite. Construction of weapons and controlling their function is not possible without the aid of

computers. The list of the criminals and the records of the cops are maintained regularly in the system.

› **Engineering Design**

As per the title, computers aid in designing buildings, magazines, prints, newspapers, books and many others. The construction layouts are designed beautifully on system using different tools and software's.

Uses of Computers

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.

Online Training Resources

- Lynda.com (For different Software training and Web development and CMS tutorials)
- CBT Nuggets (For certification in Networking Technologies by CISCO & Microsoft)
- Nettuts + (For web technologies and web programming languages)
- Byte-Notes (And of course Byte-Notes.com for intrudctory level programming tutorials and lecture notes)
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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 softwares 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

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

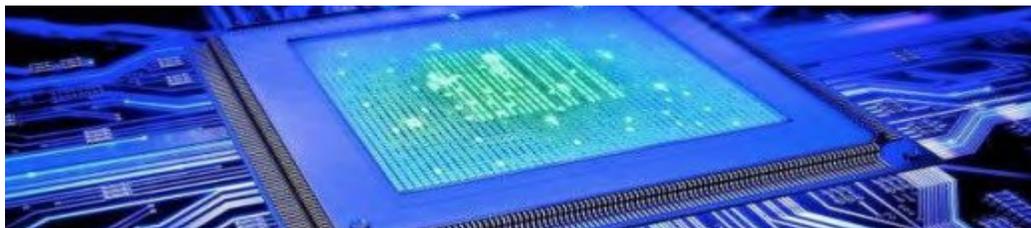
Diagnosis Purpose

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

The Anatomy of a Computer

When breaking down the components of a computer, they are oftentimes likened to the parts of the body. The processing unit may be compared to the brain, with the access memory and hard

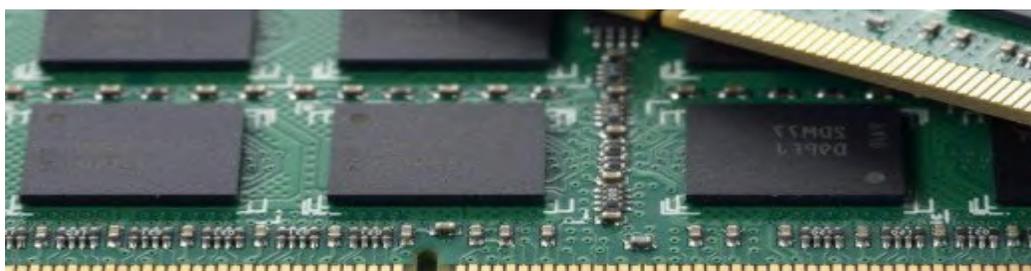
drive are equated to short and long term memory, while the motherboard is sometimes considered the central nervous system of a computer. All these parts hidden beneath the casing work much like organs, performing essential functions that allow a computer to perform tasks.



Central Processing Unit (CPU)

The central processing unit is an essential part of the computer. It controls and executes operations, interpreting input provided by the user and directing the output to complete a requested task. While it is generally a physical component of the computer, cloud computing can subdivide CPU operation into virtual central processing units (vCPU).

CPU's are distinguished by their computing speed, which is referred to as a clock rate. Depending on the speed, this is measured in hertz (Hz) or gigahertz (GHz) per second. Tasks like watching high-definition movies, simultaneous online gaming and streaming, manipulating graphics or other large programs generally require processors with higher speeds.



Random access memory is just like it sounds: a computer's memory. More specifically, it stores the data and machine code currently being used. This allows the information to be read or written quickly regardless of where the physical location of the data is inside the complete memory.

The more RAM a computer has, the better it can manage several programs at once. It isn't difficult to add more memory after an initial build, but investing in more RAM is considered just as vital, if not more, than a good processor. A good starting point is at least 512 megabytes.



Hard Drive

While RAM could be regarded as short term memory, a hard drive is long term storage. It is a high-capacity, self-contained storage device with the ability to both store and recall data. It includes one or more hard disk inside a sealed unit, each of which can hold up to 12 terabytes of information.

All data created on the computer - from work files to installed programs - are stored on the hard drive. IBM compatible computers often labeled alphabetically, starting at "C:", with A and B reserved for removable media. Hard drives can also be external as well and are often used for backing up computer data or storing exceptionally large files.



Motherboard

The motherboard is the main printed circuit board in a computer. It holds and allows communication between essential electrical components of a system, such as the CPU and the memory, and provides input connectors. Without it, nothing else would work.

Selection of a motherboard depends mostly on size restrictions and the types of components that will be included. It is suggested that at least two USB ports be included, but more may be required depending on which attachments will be used internally and externally and how they connect.



Video, Graphics & Sound Cards

Most motherboards come with a integrated processors for these functions. If higher performance is required for graphics or audio, like for running games or multimedia programs, a dedicated processing unit comes highly recommended. They can also be upgraded over time fairly easily, with laptops being the exception, by plugging into the motherboard.



Keyboard & Monitor

A keyboard and monitor are required for inputting commands and receiving output. There is a large variety of monitors available, but the specs required are determined along the same lines as the graphics card. If large programs with high graphics are frequently used, a monitor to compliment that will make the dedicated processor worth the investment. Keyboards offer less of a variety, though there are some styles that provide specialized tools or additional buttons for various uses.

Block Diagram of 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.

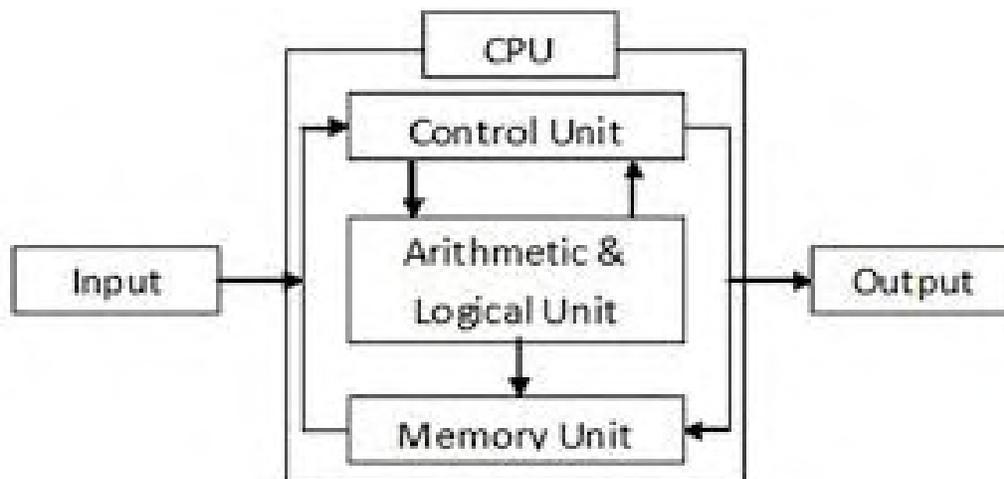


Fig. Block Diagram of Computer

Input Unit :- An Input Unit accept 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.

CPU :- 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 accept 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.

TEXT BOOKS:

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3. Introduction to Information Technology, PelinAksoy, Laura DeNardis, Cengage Learning India Private Limited.