Chapter-1

Introduction to Computer

1.1 Introduction

The invention of computer is the greatest achievement of the twentieth century. Today computer needs no introduction. Today there is no field or aspect of life where computer is not being used. The use of computer has become inevitable in fields like scientific research, business, industry, environment,meteorology, space research, communication, transport, medicine and health care, education, entertainment etc. Internet is a communication network with all the computers world wide connected to one another and this network has left such an enormous influence on life that it has ushered in a new era "Information Technology Era". It is impossible for us to image life without computer in this information technology era.

Computer has contributed in all the fields of development of mankind. Computer has solved many a complex problem and has made impossible things possible. Computer is absolutely essential for a developing country like India because computer can play an important role in improving the economical condition of the country

1.2 Defination of Computer

The term computer is derived from the English word 'compute' which means to calculate or count. In reality the main purpose of the invention of computer was to manufacture a machine which could claculate. But today more than 80 percent of the work done by the computer is not of mathematical or statistical nature. So to define computer as a computing machine is to ignore the 80 percent work done by computer. Besides having the capacity to calculate, computer has the storage of memory and reasoning and it follows instructions in a glimpse.

Diagram 1.1 Computer

Today the most acceptable definition of a computer is as follows :-

A computer is an automatic electronic machine in which we put raw data and by program controlling change them into meaningful and desired information.

Raw data are the inputs given to computer in the form of raw facts and figures. For example if we want to prepare marks sheets of students of a class we need Roll Number, Names, Class, Subjects, Marks Obtained etc. These are known as Raw Data.

The set of instructions written in the specific language of a computer is known as program. Computers are controlled with these programs. Here we take the example of marks-sheet. To prepare a marks-sheet a program has to be made. Assume that in this program Roll Number is to be filled in as the first instruction. After these the program without any manual efforts will find the sum total of the marks obtained, percentage, division, merit number etc. all in a glimpse.

Meaningful Information are those information which we get as a result of a computer programme and which convey proper meaning and they are useful. Meaningful information are the orderly form of the disorderly, separate and original data. For example when we get the marks-sheet and there is sum total, percentage, division, merit number etc. we call it meaningful information.

1.3 Types of Computer

Different types of computers were invented for different purposes. So generally computers are classified according to their applications, size and purposes.

1.3.1 Classification Based on Application

Computers are classified into the following three types according to their applications.

I.   Analog Computer

These computers don't calculate data but directly work on physical quantities. The physical quantities are in the form of temperature, pressure, length, flow of electricity or fluids. These computers are used where the physical quantities have to be measured continuously like the fields of engineering, industries, and science. The analog signals are continuous. Analog computer is a machine with definite objective.
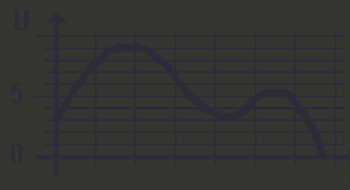
Diagram 1.2 Analog Signal

Analog computer fixed at the petrol pump not only measures petrol in liters but also calculates amount and displays on the screen. In fire alarm the computer measures the temperature of atmosphere and the alarm rings when the temperature crosses the limit .Speedometer, watches, electricity meter, thermometer, voltage meter are examples of analog computer.

II.   Digital Computer

These computers work upon data. They work upon data which are in the form of the binary digits. In a digital computer all the data and instructions are entered as input and the computer calculates according to the given instructions and display the result in the form of output. They not only calculate but also perform logical operations. These computers are multipurpose and so they are used for different functions. Whenever we talk about computer we mean digital. The signals of these computers are discontinuous.
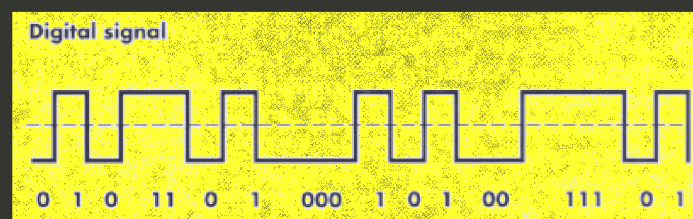
Diagram 1.3 Digital Signal

III.   Hybrid Computer

These computers encompass the characteristics of both analog and digital computers. They can take continuous signals of temperature, speed, and flow as inputs and can also perform arithmetic and logic operations. The output is in the form of digits or

some other unit which can be measured. Hybrid computer is being extensively used in the field of machine where patients temperature, pulse, blood pressure etc. are received by the computer as analog signals and then they can be converted into digital signals and the result is displayed in digits.

1.3.2 Classification Based on Size

Modern computers can be classified into the following four types according to their size:

I.   **Micro Computer:** They are small in size and less costly. They are used at homes, in schools. A micro computer consists of a single CPU. They have comparatively less memory and working speed. A single person can work on it at a given time. They are also called personal computers.They are of the following types:

(A)   **Desktop Computer:** They are operated by placing them on the desk or table. These are slightly larger in size. It contains CPU, Monitor, Keyboard etc.

Diagram 1.4 Desktop Computer

(B)   **Laptop Computer:** This computer looks like briefcase. It is smaller in size A person can operate it by placing it in his lap. They are portable and can be very easily shifted form one place to another. These includes CPU, Monitor, Keyboard, Mouse. Battary is use to provided the power.

Diagram 1.5 Laptop Computer

(C)   **Palmtop Computer:** These are smaller in size of Laptop Computer. They can be operated on palm. These are light in weight and smaller in size. Battery is

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used to provide the power. The working capacity of this computer is lesser than laptop.

Diagram 1.6 Palmtop Computer

(D) **Note Book Computer:** Notebook computer are similar to laptop computer. It can be operated on legs. These are eassily movable from one place to another. In these computers CPU, Keyboard, Mouse are tied together. The working capacity of these are lesser than laptop computer.

Diagram 1.7 Note Book Computer

(E) **Tablet Computer:** These are bigger than mobile and operated by fingers.

Diagram 1.8 Tablet Computer

II. **Minicomputer**

They are of medium size. They are more powerful, faster and more expensive than Micro Computers. They have more processing power and storage capability. They have more then one CPU. More then one person can work upon them at a given time. They are generally used in big offices, banks etc.

Diagram 1.9 Mini Computer

III.   Mainframe Computer

They are very large in size. They have greater processing power and memory as compared to minicomputers. Multiple user works at a time on these computer. They are expensive. They are generally used in railway reservations, insurance companies, research institutes and professional organizations.1BM 4300, IBM4381, UAX 8842 etc are examples of mainframe computers.

Diagram 1.10 Mainframe Computer

IV.   Super Computer

Super computers are the largest in size. They are the most powerful in processing and memory. They process complex calculations with high accuracy. They are most expensive. They cost millions of rupees. They can support many users at a time .They are mainly used in scientific research centers, weather forecasting, space research laboratories, defence centers, controlling nuclear power plants, genetic engineering etc. PARAM, CRAY, X-MP, NEC, CDC etc. are examples of super computers.

Diagram 1.11 Super Computer

PARAM

This super computer has been developed in Pune, India, by C-DAC (Centre for Development of Advanced Computing). This is a completely Indian computer. Its manufacturing is a major scientific achievement of India. Many improved and better versions of PARAM like PARAM 1000, PARAM ANANT and PARAM PADAM have been developed. These computers are being used not only in India but also abroad. They are gaining popularity there. They have unique working capacity.

Diagram 1.12 PARAM Super Computer

The story of the development of PARAM is interesting. In 1980 America banned the supply of technology in the particular field and the supply of computer hardware and CRAY X-MP super computer. But it proved as a blessing in disguise. The Indian scientists took it as a challenge and the result was development of PARAM super computer, a computer with matchless features and unique capacity.

PARAM is a multipurpose super computer. It is used at a large scale in weather forecasting, medicine, designing, making nuclear models, distant communication, health care etc. Its use is also remarkable in space and nuclear program and for removing the different snags. Finding out oil and gas reservoirs in different parts of the country is also its achievement. The development of PARAM is the testimony of the capability, talent, sincerity and dedication of the scientists of India.

1.4 Uses of Computer

Immense are the uses of computer. Today the utility of computer in life is so great that the modern age is known as computer age.

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With the invention of computer complex calculations, which were beyond the reach of man, have become easier. In fact the purpose of the invention of computer was to calculate in an automatic and accurate manner. In the fields where punctuality and accuracy are of paramount importance, the use of computer is indispensable. Weather predictions,processes related to space exploration and research ,monitoring of nuclear power plants are the special fields which can not be developed without computer. Man could step on the moon because of the accuracy and high speed of computer. The use of computer has brought about revolutionary changes in the fields of communication. We can contact the person sitting in any corner of the world by tapping only a few keys and touching some switches and by spending only a very small amount of money. Internet is a very powerful medium of receiving and transmitting information.It is a vast   reservoir of information and knowledge from where any information can be obtained instantly. Examinees can know their results and marks through internet as soon as the result is declared.

Diagram 1.13 Website of Board of Secondary Education, Ajmer

With the help of the telephone directory available on internet we can find the telephone number of anyone. The schedule of trains, buses and aeroplanes can be known and the actual position of their running can be known. The information regarding a general passenger train of India is available on internet. All the leading newspapers of the world are available on the internet. On internet we can read the regional page of the main newspapers of Rajasthan by sitting at any corner of the world. We can get the reservation of train done sitting at home, we can have the information regarding telephone bill, bank balance etc. There is hardly any information that is not available on the internet. Internet serves as a source of resource for the researchers and writers. With E-mail

available on the internet messages can be exchanged from one computer to the other. Sending messages by using e-mail saves both time and money. The message is sent in an instant and it can be received on the other computer lying in any corner of the world the very next instant. We can carry on live conversation with other computer users using Internet Relay Chat. We can contact any phone by using net telephony. The person to be contacted may not have the computer. Conversing with a person abroad is very economical. Internet telephony is legal in India now. Video conferencing provides the facility of watching the person we are talking to.
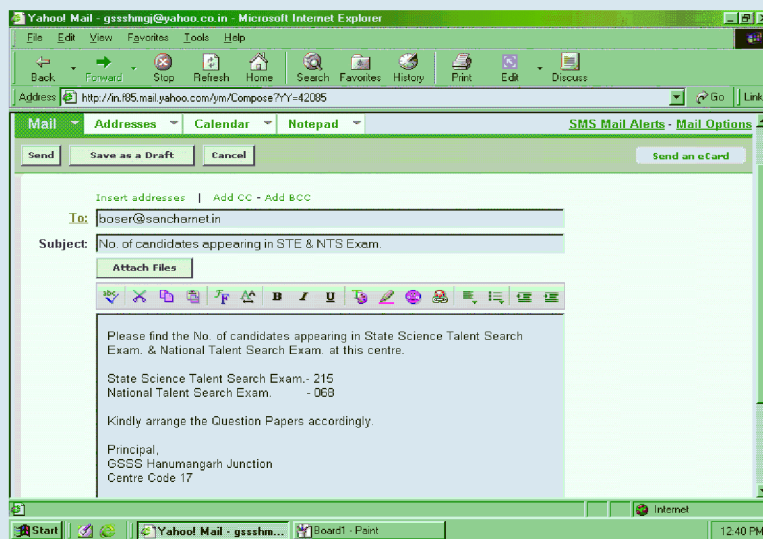

Diagram 1.14 Layout of E-mail

The use of computer has increased in the world of business. Computers are used for general official records and for managing national and international share markets. With the combination of computer and internet a new business system has come into being and it is known as e-commerce. Buying and selling of things and services through internet is called e-commerce. The producers and sellers have found world wide markets of things and services sand there is a great reduction of time and cost in exchanging trade information. Today housewives are buying the household things by sitting at home. The reservations are getting done the cinema tickets are being bought, the hotels are being booked by sitting at home. E-banking is a branch of e-commerce. The account holders can check their balance in the account and they can transfer money from one account to the other by using the internet. We can pay the bills of telephone, electricity, water and transact any business. E-banking has provided the facility of ATM (Automatic Teller Machine) to the customers. We can withdraw amount any time and anywhere. That is why ATM is also called 'Any Time Money' in the popular sense. Computer has already replaced type writer in the offices, besides that the records of the offices, details of establishment and salary records are also maintained by computer. Computer has given birth to the concept of "Paper less Office". E-Governance is being used for administration. In a library, complete details of books, the record of the members of the library, the

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issuing and returning of books etc. can be done easily by using computer.

Diagram 1.15 ATM Machine

Computers are used in publication and printing. These are known as Desktop Publishing (D.T.P.). The traditional work of printing used to be very hard and tedious but computer has made it very easy.

Computers are being used extensively in the field of medicine and health care. Computers are used for diagnosing illness, curing ailments, surgery, monitoring patients. Ultrasound, CT Scan, MRI etc. tests are used to detect different diseases and malfunctionings .With the help of pictures generated by computers the diagnosing becomes easier.

Diagram 1.16 Ultrasound   Diagram 1.17 CT Scan

Pacemaker is a little computer, which is fixed inside potients having heart problems. The use of computer is indispensable in the field of Genetic Engineering where DNA structures are studied. By DNA firger printing many complex criminal cases can be solved .With the combination of Bio-Medical science and computer a branch of science- Bio-Informataics has come into being.

In the field of education computer is playing a significant role. In classrooms, computers are used to develop science projects, prepare reports, gather information and as an interactive learing pool. Computer is used as a supplement to the teacher. Under Computer Based Teaching (CBT) numerous software are available which provide information of different subjects in succeession. Multimedia (a combination of sound, graphics , animation and video) CBT software is very useful to help student understand any subject. Nowadays, online learning and training is possible through networks. A student sitting at home can speak to his/her teacher and can get response for his/her queries. Virtual classrooms are a reality these days.
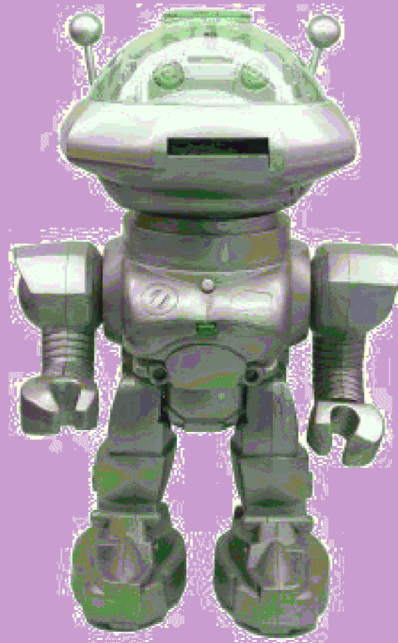

Diagram 1.18 Roboot

Computers are being extensively used in the field of engineering and architecture. Computer aided engineering is used by the designers to specify the type of material to be used in buildings, things and parts of machines and to calculate/ determine whether the part could withstand the necessary stress and temperatures. the use of CAE is essential to guaranteeing the safety of big buildings, bridges and planes. through computer aided (CAD) the interior and exterior of objects can be designed, three dimensional design can be prepared and viewed in details on the screen. with the help of the map on the paper we cannot determine how the house will look after completion. But with the help of CAD we

can have an idea of how the house will look when built. In hazardous conditions where it is dangerous for man to work, the use of robot has begun. robot is a computer controlled mechanical man.

Computers are being extensively used in the field of entertainment. Nowadays numerous computer games are available which not only provide entertainment but also increase knowledge and develop reasoning faculty of the children. The computer games are so popular that they not only attract the young ones but also the aged ones. Film industry use computers to incorporate special effects and create such scenes which have no place in reality. You must have seen Films like "Jurasic Park", "Godzilla", "Anaconda","Little Struart" etc. All these Films have used computers to create such special effects. With the help of computer the coloured versions of the old Indian Films in black version "Mugal-E-Azam" and "Naya Daur" have been prepared.

Diagram 1.19 computer generated dinosaur in "Jurasic Park"

Computers have earned a significant place in the relay of Television channels. The channels relaying programs by using computers are called digital channels. The digital channels show batter performance than general channels.

Computer is used to produce new musical notes. One computer can produce the musical notes of many musical instruments. producing musical notes by using computer is known as musical instrument digital interface (MIDI).

Computer has entered our houses today. Computers are used for education, entertainment, Writing letters, E-Mails, Chatting, getting various information from internet etc.

We see that no Field of our life has remained untouched by computer. It is not only useful for a special class but for every person.

1.5   Characteristics of Computer

Computer is playing an important role in the development of modern age. Let us see what are the characteristics that make it so important. These characteristics are:

1.   **Speed :** Computer performs at a very high speed. It performs even complex operations in less than a second. A personal computer can execute millions of instructions in one second. If a computer completes a task within a minute, the same task can be completed by man in his whole life .

2.   **Accuracy :** Computer performs all the tasks and calculations accurately. Once the correct instructions are given to computer it declares the results accurately. computer does not commit errors. If the error takes place it is due to human mistake. Computer commits errors if it is out of order and due to virus.

3.   **Deligence :** Computer does not get tired . It can work continuously for hours together and it does not suffer lack of concentration or speed.

4.   **Power of Remembering** : Like man computer has also a power to remember which is called "Memory" in which crores of data can be stored. These data can be seen when we want.

5.   **Versatility :** computer can be used to perform many different jobs. Computer plays significant part in different fields in Schools, Colleges, Hospitals, Factories, Homes, Offices, Research,meteorology, Entertainment etc.

6.   **Automation :** Computer has the characteristic of automation. It can perform a number of tasks automatically and thus we can save time and money.

7.   **Storage :** Computer has vast capacity for storage . It can amass crores of files.

1.6   Limitations of Computer

Inspite of having the above given characteristics, computers do possess some limitations. These are :

1.   Computer cannot think and decide on its own. It is a dumb machine. It works according to the instructions provided. Even a child of two years is more intelligent than a computer. Efforts are on to incorporate artificial intelligence in high quality computers today. Hopefully we may have computers that can think.

2.   Computer techniques are changing fast. The old computers become less useful. The need to upgrade computers arises and it is costly.

3.   Various efforts have to be made to save and secure the important files. Computers are most susceptible to virus that are very harmful for files.

4.   Various cases of cheating and fraud are being reported in E-Commerce, E-Banking, A.T.M. etc.

1.7 Computer Generation

Computer entered the commercial arena about 70 years aego. Before that the use of computer was limited to the field of science, engineering and army. The commercial computer has been clasified into generations keeping in mind the evolution and new techniques. In the process of evolution, the working speed, storage capacity and new application programs have increased whereas the size and price have gone down. The production has increased and it is easily available now.

The evolution of computer has been divided into five generation.

First Generation (1942-1955)

During this generation, Vacuum Tubes were used in computers Vacuum Tubes were large in size, so the size of the computer of this generation was big. They were slow in speed, punch cards were used for input and output. Magnetic drums were used for internal memory. Machine and assembly languages were used. The main computers of this generation were: ENIAC, EDVAC.
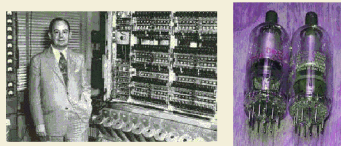

Diagram 1.20 First Generation Computer

Second Generation (1955-1964)

The second generation computers were based on transistors. Transistor was invented by Bell Laboratories in 1947. Transistor is a solid state device made of semi conductor metal. They served the same "function as was done by the vacuum tubes in the computers of the first generation. But they were much smaller in size compared to the vacuum tubes and they were comparatively more reliable and faster in working speed. They also consumed very less power.

During this generation there was improvement in memory technique. During the decade of 1960's primary memory, based completely on transistor technique, was attained. The use of magnetic tape and disks for secondary memory began which still goes on.

With the use of transistor, the size of computer became small and the problem of high temperature also decreased to a large extent. The reliability of the computer increased. Small size helped in the increase of internal memory. The working speed of the computer

also increased and far better input-output devices than those used in the past began to be used. The cost of the computer decreased.

The main computers of this generation were: IBM-70 series, IBM1400 series, IBM-1600 series, CDC-3600 etc.

Diagram 1.21 Second Generation Computer

Third Generation (1964-1975)

In this generation the transistors in computers were replaced with integrated circuit. They were called ICs. An IC is a flat rectangular piece consisting of thousands of transistors and other electronic components. Because of their small flat shape, they are popularly called chips. With the use of ICs the size of computer decreased further, speed increased, memory increased and cost decreased. Along these their reliability also increased.
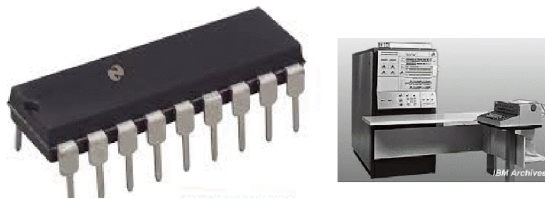

Digram 1.22 Third Generation Computer

The main computers of the generation were: IBM-360, ICL-1900, VAX-750 etc.

Fourth Generation from (1975 -1989)

In the computers of this generation Very Large Scale Integrated Circuits (VLSI) were used. In one fourth of an inch of these circuits lakhs of transistors and other electronic components are used. Hence, the circuits were called microchips. The first microchip Intel4004 was prepared by Intel Corporation in 1970. This small chip later began to be called micro processor. The computer with microprocessor is called micro computers.
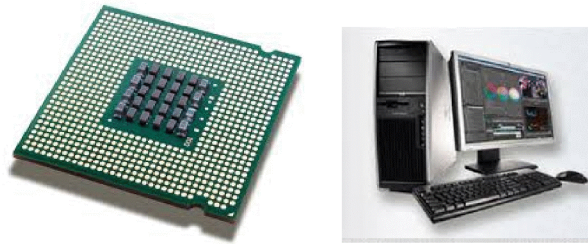
Digram 1.23 Forth Generation Computer

With the use of micro processor the computers decreased in size very much. Consequently, the computers for which large rooms were needed now began to be put on a table (Desktop Computer).

The micro processor based computers of this generation have gained in speed in an un imaginable manner. They have also gained in capacity, memory and reliability in an astonishing manner.

On the basis of size the computers of this generation are classified into micro computer (Desktop, Laptop or Palmtop), mini computer, Main Frame computer and Super computer.

Fifth Generation (1989 to till date)

These computers are still in the process of evolution. It is being tried to develop in them the intellectual capacities like the power of reasoning, thinking, understanding and taking decision etc. These computers are going to be faster at speed, more reliable and can work in unfavorable conditions. The programming methods will also become simpler. "They will be able to understand human language and behavior so it will be easier for providing input and command. The mobile computers will come into vogue as the size is growing smaller.

Digram 1.24 Fift Generation Computer

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1.8   Computer Block Diagram and Working Process

The group of units working to achieve one or more than one objectives is called system. Computer system means Physical parts of computer.

Units of Computer System

Computer is made up of three units: 1. System Unit, 2. Input Unit, 3. Output Unit.

1.   **System Unit:** It is the main component of computer and it consists of Central Processing Unit (CPU). System unit is a box in which there are CPU, other devices and circuits and they are connected to main circuit board called Mother Board. In this way the main circuit of computer lies in system unit.

2.   **Input Unit:** The devices used to feed data and program in a computer are called input unit. Key-board, Mouse, Floppy Disk are examples of input devices which will be discussed in detail later in this book.

3.   **Output Unit:** The devices that help in producing results and conclusions and presenting them in human language are called Output Units. Monitor and Printer are some common output devices and they will also be discussed later.
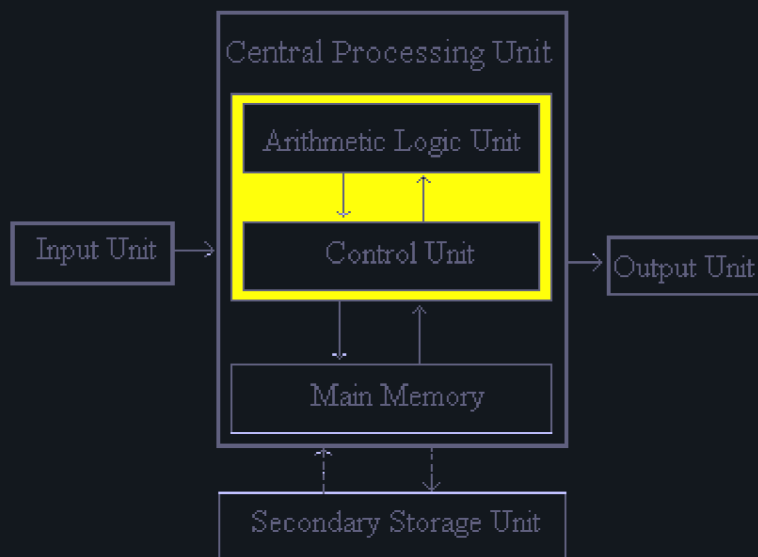
Diagram 1-25 Block Diagram of Computer

Central Processing Unit

CPU is the brain of computer. To execute instructions, it reads them, interprets them, controls and calculates. In fact whatever instructions are given to computer they

first go to CPU and CPU takes action on given instructions and shows outputs (results) on the monitor. It is not wrong to say that if there is no CPU in a computer than computer cannot do anything.

As brain controls our whole body parts, CPU controls the remaining parts of computer like- Memory, Input and Output devices etc. and makes them Function. Program and data get stored in memory under the control of CPU. Under its direction output is visible on the screen or is printed on the page through printer. CPU can perform crores of mathematical operations and decisions in seconds.

CPU has three components:

1.   Control Unit (CU)

2.   Arithmetic Logic Unit (ALU)

3.   Memory or Storage Unit

CPU is a small micro processor in a micro computer. There can be more than one microprocessor in big computers. Microprocessor undertakes most of the functions of computer. There are the following components in the internal structure of CPU- C.U, ALU, Registers, internal bus.

Before the invention of microprocessor the circuit of computer was prepared by joining together many transistors. To make computer more dexterous, efficient and useful the number of transistors in the circuit of micro processor kept on increasing.
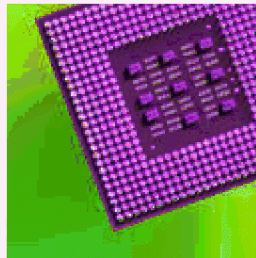

Diagram 1-26 Microprocessor

The circuits of transistors became more and more complex and the temperature of the circuit began to increase and the transistors began to develop snags. So there arose the need of a component which had a circuit equivalent to many transistors put together. This component is known as microprocessor. The first microprocessor was prepared by Intel corporation in 1970 and was named Intel 4004, it had the capacity equal to 2300 transistors. Microprocessor is a silicon metal made rectangular piece and it is fitted in an envelope with small connectors. It is flat and is also called chip. After Intel 4004 the technique of microprocessor continued to develop constantly and its capacity and power kept on increasing. Nowadays microprocessors with different speed and computing

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capacity are available- Pentium IV, Core2due, I-3, I-5, AMD, Syrix are notable among these.

Control Unit (CU)

Control unit plays a significant role in C.P.U. True to its name it controls the exchange of information and other components of computer. The major functions of control unit are given below:

1. This unit controls the internal functioning of the computer.

2. It controls input output operations.

3. It reads program from memory, interprets it and instructs ALU and memory for the desired operation.

4. It tells ALU where data is lying in memory, what operation has to be done and where result has to be stored.

All these instructions are communicated to different parts of the computer in the form of electrical signals through control bus of system bus. It is known as bundle of several wires bus.

Arithmetic Logic Unit (ALU)

This unit performs arithmetic and logic operations. The arithmetic operations are addition, subtraction, multiplication and division. There is certain electronic circuit in ALU which performs arithmetic operations. ALU can compare two numbers or data in logic operations .the result of comparison is either true or false, and it helps in decision making.

ALU functions under the guidance of control unit. It receives data from memory, performs calculations on them and returns the result to the memory. ALU works at a very high speed. It can perform a million calculations within a second.

ALU comprises of millions of registers and accumulators which during calculation serve as memory for temporary storage.

After operation is done on data in ALU the result is sent for either displaying to the output devices or it is stored in memory.

1.9   Memory

Man has the capacity to remember in his brain and it is called memory. In the same way computer has the capacity to store data and information and it is known as memory of computer. Computer's memory is that location where data, information, and

programs are stored and are available when the need be. Memory is a very important part of computer. Computer cannot work without memory.

There are many locations in memory for storage memory capacity and memory size depends on the number of these locations. There is identity number of each location and it is called address.

Memory is two types: 1. Main memory 2. External memory

When term 'memory' is used it means main memory. It is also called internal memory or primary memory. It is a part of CPU. Main memory has high speed and it calculates primary facts according to the instructions given in the program. It is used to store intermediate and last results. Memory is a semiconductor chip.

Main memory is of two types:

1.   **Random Access Memory (RAM):** RAM is the most important memory. The data, after having been fed by keyboard or other input devices and before process, get stored in RAM and it is retrieved from there via CPU. The data stored in RAM can be accessed anytime and can be read from as well as written to. The Information stored in RAM can be retrieved within one tenth of a second.
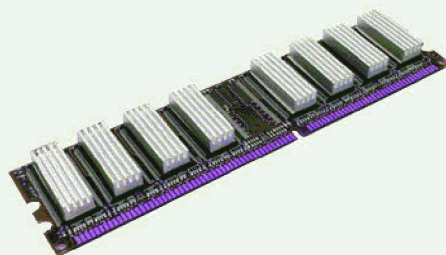
Diagram 1.27 RAM chip

Data or programs are stored temporarily in RAM. The data get erased when the computer is switched off or when electricity fails. That is why RAM is called temporary or volatile memory.

2.   **Permanent Memory or Read Only Memory (ROM)**

Programs stored in this memory cannot be changed or destroyed and they can be only read. This memory is called permanent or non-volatile. It does not come to an end when electricity fails or the computer is switched off. This memory is used to store basic instructions. The best example of ROM is BIOS (Basic Input Output System) in which

the booting program is stored. When computer is turned on it gets information from ROM and starts booting. ROM is used in automatic machines, toys etc.
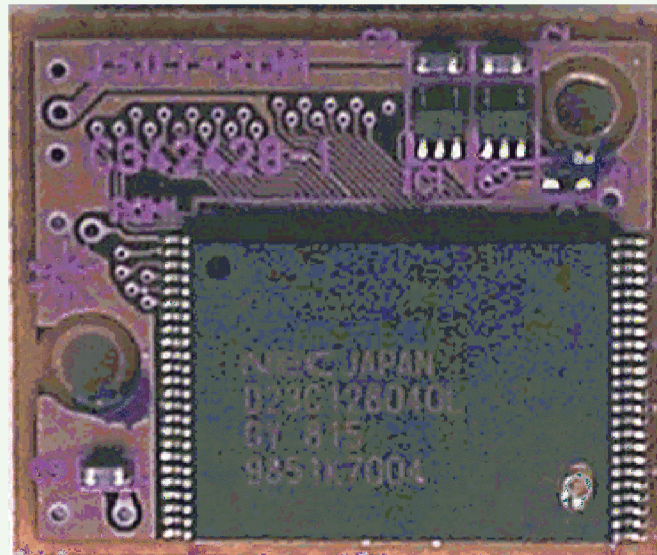

Diagram 1.28 ROM Chip

ROM is of three types:

1.   **PROM: Programmable Read Only Memory:** In this memory we can write only once. But it can be read again and again.

2.   **EPROM: Erasable programmable Read only Memory:** In this memory program can be erased and the new program can be fed when the need be. Its contents can be erased by exposing it to ultra-violet light.

3.   **EEPROM: Electrically Erasable Programmable Read Only Memory:** In this memory the program can be erased by applying specific voltage to its input pins and new programs can be fed.

External memory

External memory is required to store data permanently. It is also called secondary memory. This memory is magnetic or optical. The data stored in it always remains safe and does not disappear when the computer is switched off. Hard disk, floppy disk, magnetic tape are the examples of secondary memory. They are also called secondary storage devices.

1.9.1 Units of Memory

In memory information is stored in the form of bits. Bit is a word which has been formed with binary digit. The entire external operation of computer is based on binary number system. There are only two digits 0 and 1 in this system. The value of a bit may be 0 or 1. In an electronic circuit if there is some potential in form of out put, it is represented as 1 and if potential is zero it is represented as 0.

In the electronic circuit of a computer '1' means pulse is present and '0' means pulse is absent.

In a computer all the data is stored in either 0 or 1. But it is very difficult for man to provide all the information using 0 or 1 So the user gives all the inputs to computer in his own language and the computer changes them into its own language (bit).When a key 'A' is pressed in the memory of the computer 1000001 is fed.

Though bit is the primary unit of memory yet it is so small that it is not used for measuring memory. Generally for measuring memory byte unit is used. Eight bits make a byte.

There is another unit nibble between bit and byte. There are four binary digits in a nibble. So it is half of a byte.

The different units of memory can be presented in the following manner.

1. **Bit:** The smallest unit of memory. In binary number system its value is either 0 or 1.

2. **Nibble:** The set of 4 bits is called nibble.

    So   1 nibble   =   4 Bits

3. **Byte:** The set of 8 bits is known as a byte. Generally a character is represented through one byte.

    So   1 byte   =   8 Bits

4.   **Kilobyte (KB):** 1024 Bytes make 1 Kilobyte (1KB)

    So   1 Kilobyte   =   1024 Bytes

5. **Megabyte (MB):** 1024 Kilobytes form 1 Megabyte.

    So   1 Megabyte   =   1024 Kilobytes

                             Or   1024*1024 Bites

6.   Gigabyte (GB): 1024 Megabytes from

    So   1 Gigabyte   =   1024 Megabytes

                                Or   1024*1024 Kilobytes or

                                Or   1024*1024*1024 Bytes

7.   Terabytes (TB): 1024 Gigabytes together are known as 1 Terabyte.

    So   1 Terabyte   = 1024 Gigabytes

                              = 1024*1024 Megabytes

                              = 1024*1024*1024 Kilobytes

                              = 1024*1024*1024*1024 Bytes

1.10   Number system - Introduction

Every computer stores numbers, letters, and other special characters in a coded form. Before going into the details of these codes, it is essential to have a basic understanding of number system. This chapter also introduces some of commonly used number systems by computer professionals and the relationship between them.

1.10.1 Binary number system

The Binary number system is exactly like the decimal system except that the base is 2 instead of 10. We have only two symbols or digits (0 and 1) that can be used in this number system. Note that the largest single digit is 1 (one less than base). Again, each position in a binary number represents a power of the base (2). As such, in this system, the rightmost position is the units (2^0) position, the second position from the right is the 2^0s (2^1) position and proceeding in this way we have 4' s (2^2) position, 8's (2^3) position, 16's (2^4) position, and so on. Thus, the decimal equivalent of the binary number 10101 (Written as 10101_2) is

$(1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$

or $16 + 0 + 4 + 0 + 1$

or 21

In order to be specific about which system we are referring to, it is common practice to indicate the base as subscript. Thus we write

$10101_2 = 21_{10}$

"Binary digit" is often referred to by the common abbreviation bit. A binary number consisting of n bits is called an n-bit number. Table 1-1 lists all the 3-bit numbers along with their decimal equivalent.

Binary	Decimal Equivalent
000	0
001	1
010	2
011	3
100	4
101	5
110	6
111	7

Table 1-1 3-bit numbers with their Decimal values.

Remember that we have only two digits, 0 and 1, in the binary system, and hence the binary equivalent of the decimal number 2 has to be stated as 10 (read as one, zero). It may be seen that a 3-bit number can have one of the 8 values. In fact, it can be shown that any decimal number in the range 0 to 2^{n-1} can be represented in the binary form as an n-bit number.

1.10.2 Octal Number System

In the octal number system the base is 8. So in this system there are only eight symbols or digits; 0, 1, 2, 3, 4, 5, 6, 7. Here also the largest single digit is 7 (one less than the base). Again each position in an octal number represents a power of the base (8). Thus the decimal equivalent of the octal number 2057 written as 2057_8 is :

$(2 \times 8^3) + (0 \times 8^2) + (5 \times 8^1) + (7 \times 8^0)$

or $1024 + 0 + 40 + 7$

or 1071

So we have $2057_8 = 1071_{10}$

Observe that since there are only 8 digits in the octal number system, so 3 bits ($2^3 = 8$) are sufficient to represent any octal number in binary (see table 1.1).

1.10.3 Hexadecimal Number System

The hexadecimal number system is one with a base of 16. The base 16 suggests choices of 16 single character digits or symbols. The first 10 digits are the digits of decimal system 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. The remaining six digits are denoted by A, B, C, D, E, F representing the decimal values 10, 11, 12, 13, 14, 15 repectively. Therefore, the letters A through F are number digits in hexadecimal number system. Thus, largest single digit is F or 15 (one less than the base). Again, each position in a hexadecimal system represents a power of the base (16). Thus the decimal equivalent of the hexadecimal number 1AF (Written as $1AF_{16}$) is :

$(1 \times 16^2) + (A \times 16^1) + (F \times 16^0)$

or $(1 \times 256) + (10 \times 16) + (15 \times 1)$

or $256 + 160 + 15$

or 431

Thus $1AF_{16} = 431_{10}$

Since there are only 16 digits in the hexadecimal number system, so 4 bits ($2^4 = 16$) are sufficient to represent any hexadecimal number in binary.

1.10.4 Converting from one Number System to another

Numbers expressed in decimal are much more meaningful to us than are values expressed in any other number system. However, any number value in one number system can be represented in any other number system. Because the input and the final output values are to be in decimal, so we are required to convert numbers in other systems to decimal and vice-versa. There are many methods or techniques that can be used to convert numbers from one base to another.

Converting to Decimal from another Base

The following three steps are used to convert to a base 10 value from any other number system:

Step 1: Determine the column (Positional) value of each digit (this depends on the position of the digit and the base of the number system).

Step 2: Multiply the obtained column values in step 1 by the digits in the corresponding columns.

Step 3: Sum the products calculated in step 2. The total is the equivalent value in decimal.

Example - 1 $(11001)_2 = (?)_{10}$

Step 1 : Determine column values.

Column Number	Column Value (from right)
1	$2^0 = 1$
2	$2^1 = 2$
3	$2^2 = 4$
4	$2^3 = 8$
5	$2^4 = 16$

Step 2 : Multiple column values by corresponding column digits.

16	8	4	2	1
$\times 1$	$\times 1$	$\times 0$	$\times 0$	$\times 1$
16	8	0	0	1

Step 3 : Sum the products.

$16 + 8 + 4 + 0 + 1 = 25$

Thus $(11001)_2 = (25)_{10}$

Example - 2 $(4706)_8 = (?)_{10}$

Solution :

Step 1 :

Column Number (from right)	Column Value
1	$8^0 = 1$
2	$8^1 = 8$
3	$8^2 = 64$

4                   $8^3 = 512$

Step 2 :

512	64	8	1
×4	×7	×0	×6
2048	448	0	6

Step 3 :

2048 + 448 + 0 + 6 = 2502

Hence, $(4706)_8 = (2502)_{10}$

Example -3 $(1AC)_{16} = (\ ? \ )_{10}$

Solution :

$$(1AC)_{16} = 1 \times 16^2 + A \times 16^1 + C \times 16^0$$

$$= 1 \times 256 + 10 \times 16 + 12 \times 1$$

$$= 256 + 160 + 12$$

$$= (428)_{10}$$

Example - 4 $(4052)_7 = (\ ? \ )_{10}$

Solution:

$$(4052)_7 = 4 \times 7^3 + 0 \times 7^2 + 5 \times 7^1 + 2 \times 7^0$$

$$= 4 \times 343 + 0 \times 49 + 5 \times 7 + 2 \times 1$$

$$= 1372 + 0 + 35 + 2$$

$$= (1409)_{10}$$

Converting from Base 10 to a New Base (Division - Remainder Technique) The following four steps are used to convert a number from base 10 to a new base :

Step 1: Divide the decimal number to be converted by the value of the new base.

Step 2 : Record the remainder from step 1 as the rightmost digit (least significant digit) of the new base number.

Step 3: Divide the quotient of the previous divide by the new base.

Step 4: Record the remainder from step 3 as the next digits (to the left) of the new base number.

Repeat step 3 and 4, recording remainders from right to left, until the quotient becomes zero in step 3. Note that the last remainder thus obtained will be the most significant digit (MSD) of the new base number.

Example - 1 $(25)_{10}$ = (?)$_2$

Solution:

Step 1 & 2 : 25/2 = 12 and remainder 1

Steps 3 & 4 : 12/2 = 6 and remainder 0

Steps 3 & 4 : 6/2 = 3 and remainder 0

Steps 3 & 4 : 3/2 = 1 and remainder 1

Steps 3 & 4 : 1/2 = 0 and remainder1

Hence $(25)_{10}$ = $(11001)_2$

Example - 2 $(42)_{10}$ = (?)$_2$

Solution :	2	42	Remainder
	2	21	0
	2	10	1
	2	5	0
	2	2	1
	2	1	0
		0	1

Hence $(42)_{10}$ = $(101010)_2$

Example - 3 $(952)_{10}$ = (?)$_8$

Solution:	8	952	Remainder

8	119	0
8	14	7
8	1	6
	0	1

Hence $(952)_{10} = (1670)_8$

Example - 4 $(428)_{10} = (\ ?\ )_{16}$

Solution:

16	428	12 = C Remainder
16	26	10 = A
16	1	1
	0	

Hence $(428)_{10} = (1AC)_{16}$

Example - 5 $(100)_{10} = (\ ?\ )_5$

Solution :

5	100	0	Remainder
5	20	0	
5	4	4	
	0		

Hence $(100)_{10} = (400)_5$

Converting from a Base other than 10 to a Base other than 10.

The following two steps are used to convert a number from a base other than 10 to a base other than 10.

Step 1: Convert the original number to a decimal (base 10)

Step 2: Convert the decimal number so obtained to the new base.

Example -1 : $(545)_6 = (\ ?\ )_4$

Solution :

Step 1: Convert from base 6 to a base 10

$545 = 5 \times 6^2 + 4 \times 6^1 + 5 \times 6^0$

$= 5 \times 36 + 4 \times 6 + 5 \times 1$

$= 180 + 24 + 5$

$= (209)_{10}$

Step 2: Convert $(209)_{10}$ to base 4.

4	209	1	Remainder
4	52	0	
4	13	1	
4	3	3	
	0		

Hence $(209)_{10} = (3101)_4$

So $(545)_6 = (209)_{10} = (3101)_4$

Thus, $(545)_6 = (3101)_4$

Example $(101110)_2 = (?)_8$

Solution:

Step 1: Convert $(101110)_2$ to base 10

$(101110)_2 = 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

$= 32 + 0 + 8 + 4 + 2 + 0$

$= (46)_{10}$

Step: 2 Convert $(46)_{10}$ to base 8

8	46		Remainder
8	5	6	
	0	5	

So $(46)_{10} = (56)_8$

Hence: $(101110)_2 = (56)_8$

Example -3 $(11010011)_2 = (\ ?\ )_{16}$

Step 1: Convert 11010011_2 to base 10

$(11010011)_2$ $= 1\times2^7 + 1\times2^6 + 0\times2^5 + 1\times2^4 + 0\times2^3 + 0\times2^2 + 1\times2^1 + 1\times2^0$

$= 1\times128 + 1\times64 + 0\times32 + 1\times16 + 0\times8 + 0\times4 + 1\times2 + 1\times1$

$= 128 + 64 + 0 + 16 + 0 + 0 + 2 + 1$

$= (211)_{10}$

Step 2 : Convert $(211)_{10}$ to base 16.

$(211)_{10} = (?)_{16}$

	16	211		3	Remainder
	16	13		13=D	
		0			

Hence $(211)_{10} = (D3)_{16}$

So, $(11010011)_2 = (211)_{10} = (D3)_{16}$

Thus, $(11010011)_2 = (D3)_{16}$

Shortcut Method for Binary to Octal conversion.

The following steps are used in this method:

Step 1: Divide the binary digits into groups of three (Staring from the right)

Step 2: Convert each group of three binary digits into one octal digit. Since there are only digits (0 to 7) in the octal number system, So 3 bits ($2^3 = 8$) are sufficient to represent any octal number in binary.

Example 1: $(101110)_2 = (\ ?\ )_8$

Solution :

Step 1: Divide the binary digits into groups of 3 starting from right (LSD)

$$\underline{101} \quad \underline{110}$$

Step 2 : Convert each group into one digit of octal (use binary to decimal conversion)

$(101)_2$ $\qquad = 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

$\qquad\qquad = 4 + 0 + 1$

$\qquad\qquad = 5_8$

$(110)_2$ $\qquad = 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

$\qquad\qquad = 4 + 2 + 0$

$\qquad\qquad = 6_8$

Hence $(101110)_2 = (56)_8$

Example -2: $(1101010)_2 = (\ ? \ )_8$

Solution:

$(1101010)_2 = \underline{001} \quad \underline{101} \quad \underline{010}$

$\qquad\qquad$ (Group 3 digits from Right)

$\qquad\qquad = (152)_8$

(Convert each group to an octal digit)

Hence $(1101010)_2 = (152)_8$

Shortcut Method for octal to Binary Conversion.

The following step are used in this method.

Step 1: Convert each octal digit to a 3 digit binary number (The octal digits may be treated as decimal for this conversion).

Step 2: Combine all the resulting binary groups (of 3 digits each) into a single binary number.

Example- 1: $(562)_8 = (\ ? \ )_2$

Solution:

Step 1: Convert each octal digit to 3 binary digits.

$5_8 = 101_2$

$6_8 = 110_2$

$2_8 = 010_2$

Step 2: Combine the binary groups

$(562)_8 = $ <u>101</u>   <u>110</u>   <u>010</u>

      5   6   2

Hence, $(562)_8 = (101110010)_2$

Example –2: $(6751)_8 = (\ ?)_2$

Solution:

$6751_8 = $ <u>110</u>   <u>111</u>   <u>101</u>   <u>001</u>

      6   7   5   1

      $= 110111101001_2$

Hence, $(6751)_8 = (110111101001)_2$

Shortcut method for Binary to Hexadecimal conversion.

The following steps are used in this method:

Step 1: Divide the binary digits into groups of four (Staring from the right)

Step 2: Convert each group of four binary digits to one Hexadecimal digit. Remember that Hexadecimal digits 0 to 9 are equal to decimal   digits 0 to 9, and hexadecimal digits A to F are equal to decimal digits 10 to 15.

Example -1 : $(11010011)_2 = (\ ? \ )_{16}$

Solution:

Step 1: Divide the binary digits into groups of 4.

   <u>1101</u>   <u>0011</u>

Step 2: Convert each group of 4 binary digits to 1 hexadecimal digit.

$(1101)_2 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

$$= 8 + 4 + 0 + 1$$

$$= 13_{10}$$

$$= D16$$

$$(0011)_2 = 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$$

$$= 0 + 0 + 2 + 1$$

$$= 3_{16}$$

Hence $(11010011)_2 = (D3)_{16}$

Example -2 : $(10110101100)_2 = (\ ? \ )_{16}$

Solution:

$(10110 \ 10 \ 1100)_2 = \underline{0101} \qquad \underline{1010} \quad \underline{1100}$

(Group four digits from right)

$= \ 5 \ \ A \ C$ (convert each group to a hexadecimal digit)

$(10110101100)_2 \quad = (5 \ AC)_{16}$

Hence, $(10110101100)_2 = (5AC)_{16}$

Shortcut method for Hexadecimal to Binary conversion.

The following steps are used in this method:

Step 1: Convert the decimal equivalent to each Hexadecimal digit to 4 binary digit.

Step 2: Combine all the resulting binary groups (of 4 digits each into a single binary number.

Example:1 : $(2AB)_{16} = (\ ? \ )_2$

Solution:

Step 1: Convert the decimal equivalent of each hexadecimal digit to 4 binary digits.

$2_{16} = 2_{10} \quad = 0010_2$

$A_{16} = 10_{10} = 1010_2$

$B_{16} = 11_{10} = 1011_2$

Step 2: Combine the binary groups.

$2AB_{16}$- = <u>0010</u>   <u>1010</u>   <u>1011</u>

                2   A   B

      = $(101010111100)_2$

Hence, $(2AB)_{16} = (001010101011)_2$

Example-2 $(ABC)_{16} = (?)_2$

Solution :

    $(ABC)_{16}$ =   <u>1010</u>   <u>1011</u>   <u>1100</u>

                           A   B   C

             = $(101010111100)_2$

Hence $(ABC)_{16}$= $(101010111100)_2$

Fractional Numbers.

In binary number system, fractional numbers are formed in the same general way as in the decimal system. Just as in the decimal system.

Example:

$0.235 = (2 \times 10^{-1}) + (3 \times 10^{-2}) + (5 \times 10^{-3})$

and $68.53 = (6 \times 10^1) + (8 \times 10^0) + (5 \times 10^{-1}) + (3 \times 10^{-2})$

Similarly in binary number system.

$0.101 = (1 \times 2^{-1}) + (0 \times 2^{-2}) + (1 \times 2^{-3})$

and $10.01 = (1 \times 2^1) + (0 \times 2^0) + (0 \times 2^{-1}) + (1 \times 2^{-2})$

Thus the binary point serves the same purpose as the decimal point.

Example :1 $(110.101)_2 = (\ ?\ )_{10}$

Solution :

$(110.101)_2 = (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)$

$= (1 \times 2^{-1}) + (0 \times 2^{-2}) + (1 \times 2^{-3})$

$= 4 + 2 + 0 + \dfrac{1}{2} + 0 + \dfrac{1}{8}$

$= 6 + 0.5 + 0.125$

$= 6.625_{10}$

Hence, $(110.101)_2 = (6.625)_{10}$

Example-2: $(127.54)_8 = (\ ? \ )_{10}$

Solution :

$(127.54)8 = (1 \times 8^2) + (2 \times 8^1) + (7 \times 8^0) + (5 \times 8^{-1}) + (4 \times 8^{-2})$

$= 64 + 16 + 7 + \dfrac{5}{8} + \dfrac{4}{64}$

$= 87 + 0.625 + 0.0625$

$= 87.6875_{10}$

Hence, $(127.54)_8 = (87.6875)_{10}$

Example 3: $(2B.C4)_{16} = (\ ? \ )_{10}$

Solution:

$(2B.C4)_{16} = 2 \times 16^1 + B \times 16^0 + C \times 16^{-1} + 4 \times 16^{-2}$

$= 32 + 11 + \dfrac{12}{16} + \dfrac{4}{256}$

$= 43 + 0.75 + 0.015625$

$= 43.765625_{10}$

1.11   Software & Hardware
Computer work is operated by two parts 1. Hardware 2. Software

A computer system consists of hardware and software. The devices, things, programs etc. which comes under the computer system are either hardware or software. So we should know both of them.

Hardware: Hardware represents the physical and tangible components of the computer i.e. the components that can be touched. CPU, keyboard, mouse, printer, speaker etc. are the examples of computer hardware. We can not only see them but also touch them.

Software: To complete the computer work we have to tell computer what it is to do. We have to instruct the computer. These instructions are called software. The set of these instructions are called program also. Software activates hardware. The hardware works when it gets instructions from the software. Software is in the electronic form which cannot be seen or touched.

1.11.1 Types of Software

Software is used to control the activities between user and computer it is used to computerised any work. Software can be classified into two categories: 1. System software 2. Application software

System Software

The software necessary to run a computer which are necessary to control and coordinate program are known as system software. They make a computer more effective and more useful. System software is a group of programs which controls the physical parts of computer and software. Without system software application software can't be used in a computer. System software is used by computer specialists. It is an essential part of computer system. It control the activities between user and computer hardware .

Works of System Software

1.	System software control & execute another software

2.	It works between user & Computer hardware.

3.	This is used to prepare different softwares

4.	It controls the resources of computer like memory, processor, Input, output divices.

The system software includes the following programs:

(A)	Operating System:

(B)	Utility program

(C)	Programming Languages

(D)	Language Translator

Application Software

Application software is a group of those programs which are written in high level language for special problems. These programs provide ability to do special work on computer. For eg. Word processing, Inventory Control, Payroll, Railway Reservation system etc. These software come under this category. This software is prepared to perform specific tasks. Depending upon the nature of tasks they can be written in any language. Doctors, Engineers, Designers, Advocates need different programs for their different needs. These professionals carry out their work in a better way by using application software. Nowadays they are being used extensively in banks, insurance, offices, factories, hospitals and engineering tasks etc. Education Boards and universities also use the software for preparing results. Pay bills are being prepared by using the software.

1.12   Computer Languages

Language means by which we can understand each other easily. The language used to complete the task with Machine or computer is called user language or computer language. The language which can be understand by computer machine is called binary or machine language. So if we want to complete the task with machine we have to provide the machine instructionss. The software which is used to translate user language in to machine language is called Translator. This also convents machine language into user language computer language is mainly categorized into three types.

1.   Machine language a Low level language (LLL)

2.   Assembly language or Middle level language (MLL)

3.   High Level Langage (HLL)

1.   Low Level Language or Machine Language

Machine Language is a computer Language which is understable by computer machine. It is also called Binary (0,1) Language. It is called machine Language because it is directly works with machine. Working in this language is very difficult.

Instruction given in machine language works very fast, because of no translation is required. Output also comes in the form of machine language.

eg- when we type 'A' then machine converts 'A' into equivalent machine code then machine works.

2.   Assembly Language or Middle Level Language

Assembly Language was developed to remove the difficulties of machine language. The Mnemonic code is used in place of Binary language, which is easy to remember.

Assembler is used to converts assembly language into machine language. The working in this language is simpler than machine language. The speed is lower than machine language because of conversion from assembly to machine language. To write a program in assembly language user must know the hardware and related assembly language. This is a machine dependent language. eg. of statements HLT,ADD,CLA, SUB etc.

3.   High Level Language

High level language was developed to remove the difficulties of Assembly language. In the language user provides the instructions like English language in place of mnemonic code. English like statements are used in High level language, due to this understanding and writing became simple. This language is not dependent on machine. Compiler or Interpreter is used to translate high level language into machine language. Now a day's generally high level language is used. The examples of high level language are C, C++, Java etc. Specific hardware is not required for these languages so work with these language be completed on all type of computers therefore it is independent on machine or computer.

1.13   Language Tranlator

These are the programs which accepts instructions in one language and convert the equivalent instructions in another language. Complier, Intreprete, assembler are the examples of language translators.

Compiler : It is a system Software which is used to convert high level programing language into machine language. Complier complies whole program at a time and displays the errors with their line numbers. When Complier complies the program, program need not to reside in memory.

Interpreter: The language processor which converts High level programming langage into machine language line by line is called interpreter. It shows the error in any line immediately. At the time of execution program must reside in the memory.

Assembler: It converts Assembly language program into M/C (Machine) language. It is a system software. Assembler translate one row into machine language in one time.

1.14   Operating System

It is a set of programs which operates all the works of computer known as operating system. It is a medium between user and computer. When user on the computer the operating system automatically loads into the main memory of computer then it controls all the activities of computer. Some popular operating system available in market are MS DOS, WINDOWS and LINUX.

Functions of operating System

1. **Memory Management:-** Any program and related data where to place in memory and bring from where is deiced by operating system.

2. **File Management** In file management the work of file storation by their name and

returned back from the memory is completed.

3. **Input Output Management:-** It manages the devices used to give or take data from computer.

4. **User Interface:-** Under this, operating system keeps relation with user so the work of users is simplified.

5. **Utilities:-** These programs makes distance of users from work complexities. Theses programes simplify the work for users.

Need of operating System

It is a medium between user and computer. It also works as bridge between hardware and software. Computer can not work without operating system. There is no existance of computer without operating system. System manages and controls all the resources of computers like keyboard, Monitor, CPU, Processor, Memory etc.

Types of Operating System

Single user operating System:- Those operating system which manage a single user is called single user operating system for eg. Dos, Windows.

Multi-user Operating System:- Those operating system which manages more than one user is called Multi-user operating System for eg. LINUX.

1.15   Utlity Program

These programs maintain and repair different parts of computer for eg. Disk recovery program, Data backup program etc.

By executing these special programs on system we can maintain the speed of computer and can make the hard disk to store maximum data. The required data can be backup with the help of these programs. The software provides some utility for the user so therefore called utility software. These utility software are used for the following purpose:-

1.   To maintain the Hard disk i.e. scan disk.

2.   To maintain the speed of hard disk i.e. disk defragmentor.

3.   To make backup of files and to restore again on disk i.e. backup utility.

4.   To store the maximum data in compressed mode i.e. compressing utility.

5.   To scan the virus in the system and to remove the virus. i.e. anti virus programe etc.

Important Points

1.   There is no field where computer is not using.

2.   Computer is made from english world computer whose means is calcutation.

3.   Computer is an automatic machine, by providing data and program we can convert it into useful in formation.

4.   Main uses of computer are weather selated research., weather forecasting, space related, transmission, communication e-commerce, book printing & Publication, education, engineering medical, entertainment, research etc.

5.   Charactership of computer (a) speed (b) Accurary (c) Diligency (d) Memory (e) Versatile utility (f) Automatic

6.   Limitation of computer - can not think and understand, no mind, danger of viruses.

7.   We can not think of life without computer in information technoloty.

8.   The main parts of computer are: 1. System unit 2. Input unit 3. Output unit.

9.   Central Processing Unit (CPU) is the brain of computer and it carries out processing.

10.   **ALU:** This unit performs arithmetic and logic operations.

11.   According to applications computers are of three types: 1. Analog Computers 2. Digital Computers 3. Hybrid Computers

12.   According to size computers are of four types: 1. Micro Computers 2. Mini Computers 3. Mainframe Computers 4. Super Computers.

13.   **PARAM:** Developed fully in India, full of positive traits and unique working capability multipurpose super computer.

14.   **Memory**: It is the storage of computer where data, information and programs are stored and are available when the need be.

15.   The two types of memory are: 1.Main Memory 2. External Memory

16.   Main memory is of two types: 1. RAM (Temporary Memory) 2. ROM (Permanent 1Memory).

17.   **Bit:** it is the smallest unit of binary number system and its value is either 0 or 1.

18. **Byte:** A unit of computer information equal to eight bits. Generally one character is represented as one byte.

19. Radix or base in number system shows total nos.

20. In binary system 1+1=10, to show the radix use the subsecript So $1_2 + 1_2 = 10_2$

21. To convert binary number into decimal number we add the position weight (1,2,4,8....) of binary number.

22. **Hardware:** All the components related to computer which can be seen and touched are called hardware.

23. **Software:** The set of instructions (Program) that we feed in to a computer when we want it to do particular jobs are called hardware.

24. The development of computer is divided quto five generations.

25. Translator is used to convert use language into machine language.

26. Computer language are mainly categorized into 1. low level language 2. Assenbly language 3. High level language.

27. Software is of two types: 1. System software 2. Application software

28. Compiler, interpreter, Assembler, operating system are examples of System Software.

Exercise

Multiple choice questions

1. The device that accepts data is:

   (A) CPU   (B) CU

   (C) Input Unit   (D) Output Unit   (   )

2. The set of instructions written in a specific language of computer is known as:

   (A) Program   (B) Data

   (C) Information   (D) All of the above   (   )

3. All the Physical parts of a computer which can be seen or touched are called:

(A) Software   (B) Hardware

(C) Program   (D) None of the above (   )

4.   One byte is equal to:

(A) 4 Bits   (B) 8 Bits

(C) 16 Bits   (D) 32 Bits   (   )

5.   The computer used to measure oil at petrol pump is:

(A) Digital computer   (B) Analog Computer

(C) Mainframe Computer (D) Super Computer   (   )

Very short type questions

1.   Name the basic units of computer system.

2.   Give examples of input unit.

3.   Write the functions of the Arithmetic Logic Unit (ALU).

4   Write equivalent decimal of following binary nos.

5.   Write binary equivlant of decimal 23.45

6.   Write fullname of ATM

7.   Digital computer works on which principle?

8.   Write example of super computer.

9.   Write full name of ALU

10.   Write the name of any two operating system.

Short type questions

1.   Write the definition of computer.

2.   What is program?

3.   Write four characterstics of computer.

4.   What are the limitation of computer.

5. Write any four uses of computer.

6. What is the difference between Hardware and software.

7. What are RAM and ROM? Write their full forms.

8. Write the functions of application software.

9. Describe the features of super computer.

10. What is the work of translator?

11. What is the importance of base in any number system.

Essay type questions

1. Write essay on the uses of computer in different fields.

2. Describe the charactestic of computer.

3. Describe in detail the various components of a computer and draw the block diagram also.

4. Write the features of Super computer (PARAM).

5. How many types of computers are there according to size? Describe each type.

6. Why is memory required in a computer? Describe the different types of computer memory.

7. Explain binary with example.

8. Convert following binary number into decimal number.

   (a) 00111　　　(b) 11001　　　(c) 1010.001　　(d) 111.11

9. Convert following Hexadecimal number into binary number.

   (a) FF　　　　(b) ABC　　　　(c) CD42　　　(d) F329

10. Convert following binary number into Hexa decimal number.

   (a) 11101000　(b) 10101110110 (c) 11001011　(d) 1000101111010110