FUNDAMENTALS OF COMPUTER SYSTEM

CHAPTER 8

S0M9E

LEARNING OBJECTIVES

A student can understand the following in this chapter

1. Fundamentals of computer system
2. Basic Concepts of Operating System
3. Concepts of Motherboard
4. Function of CPU
5. Working of Hard disk drive.

8.1. FUNDAMENTALS OF COMPUTER SYSTEM

8.1.1. Introduction

In this modern world, 'computer' is the powerful and frequently using word for performing the day-today activities. Through the computer, we can view and feel all the activities of the real-world in a display virtually. Because, with the help of computer, we can watch all incidents (Political, Scientific, Climate, Sports etc.,) happening not only around us but in any part of the world. Above all the Computer is a slave to do our routine activities. In the present scenario, without two electronic gadgets, the World may become stand still. Those are none other than Computer and Cell-phone.

Computer is an electronic device that process the input according to the set of instructions provided to it and gives the desired output at a very fast rate.

8.1.2. History of Computer

Many centuries ago humans try to develop machine to perform some calculations. The speed of this development increased after the arrival of numerals.

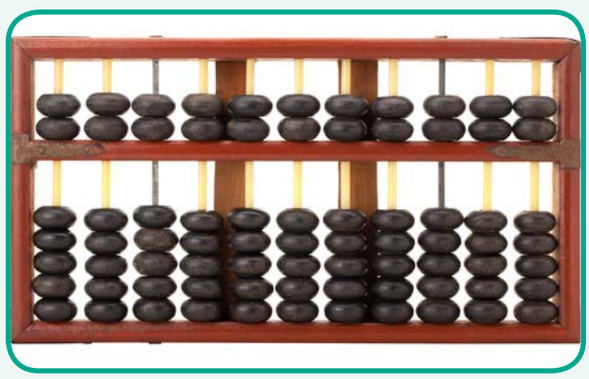


Figure 8.1: ABACUS

Figure 8.1 shows the ABACUS, the first calculating tool developed by human. The credit belongs to Chinese, some says it is Babylonians and Egyptians, but it is not actually known. Many calculating tools were derived or developed after the arrival of ABACUS, like Slide rule, Pascal calculating machine, Nappier Bones, etc.

Among these, the most important one is 'Analytical Engine' a mechanical device as shown in Figure 8.2, which was developed by the British mathematician Mr. Charles Babbage (1791-1871). It was developed by using gear wheels. Moving of each tooth rotates the numeral form 0-9.This way the counter was set.

The simple example to understand this concept is 'speedometer' used in vehicles. By keeping this as the base, the first electronic calculating machine i.e. 'calculator' was developed. From this, computer was developed. Hence, a 'computer' is nothing but a developed-stage of a calculator.

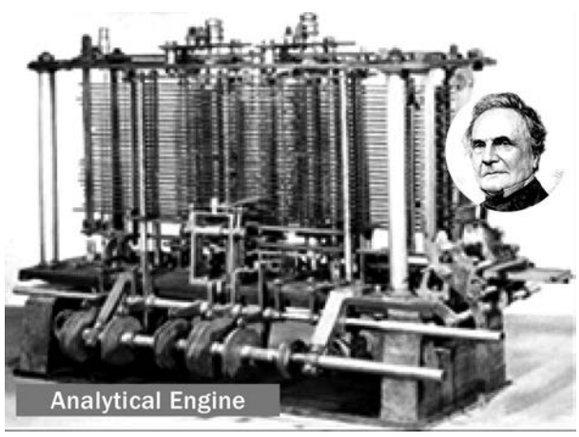


Figure 8.2 Analytical Engine

In simple terms, we can say calculator is a small calculating machine and computer is a big calculating machine.

Why?

Because calculator is small in size. Computer is big in size?

Before entering into the computer field, we have to keep two important basic things in our mind.

Basically computer is a fool. It is an idiot. It cannot do anything on its own.

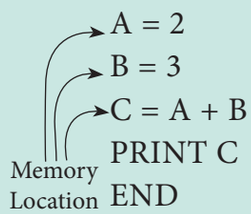
Computer never do mistakes. (Unless or otherwise we did a mistake….)

Clearly to say computer cannot think on its own.

For example: If you want to add 2, 3, etc., by switching on the computer if you give 2 + 3 = 5. You can't get the answer as '5'. Because the computer unable to understand what is '2' or '3'. So, we have to instruct the computer as like a child who is doing first standard or second standard to perform the above addition, as like the following format.

Keep the value of '2' in your memory. Leave three fingers and start to count three, four, five, etc.

Just like the same we have to instruct the computer. For your easy understanding there is an example.



In the mathematical A = 2 means, the value of 'A' is 2, whereas in computer terminology A = 2 means, we are asking the computer to keep the value of '2' in the memory location called 'A'. B = 3 means keep the value of 3 in the memory location called 'B'.

Likewise, we have to define each and everything to its memory. The memory location is nothing but an IC. Similarly, even the addition of 1-1000 numbers can be done very easily and quickly. The computer takes just a fraction of a second (Micro Second).

Since the computer be able to perform such a big task, without committing any error, that too with high speed, is termed as big calculating machine.

This is the first major difference between Calculator and Computer.

Yet another big difference is there. Let we see it later.

Now let us see the evolution of computer (i.e., generation of computer).

8.2. GENERATION OF COMPUTER

No.	Generation	Main Component used	Merits/Demerits
1	First Generation computer (1940-56)	 **Vacuum tube**	• Big in size • Consumed more power • Malfunction due to overheat • Machine Language was used
	First Generation Computers - ENIAC , EDVAC , UNIVAC 1 ENIAC weighed about 27 tons, size 8 feet × 100 feet × 3 feet and consumed around 150 watts of power		
2	Second Generation Computer (1956 – 1963)	 **Transistors**	• Smaller compared to First Generation • Generated Less Heat • Consumed less power compared to first generation • Machine language as well as Assembly language was used.
	Second Generation Computers IBM 1401, IBM 1620, UNIVAC 1108		
3	Third Generation Computer (1964 – 1971)	 **Integrated Circuits (IC)**	• Computers were smaller, faster and more reliable • Consumed less power • High Level Languages were used
	Third Generation Computers IBM 360 series, Honeywell 6000 series		
4.	Fourth Generation Computer (1971 of above)	 **Microprocessor Very Large Scale Integrated Circuits (VLSI)**	• Smaller and Faster • Microcomputer series such as IBM and APPLE were developed • Portable Computers were introduced.
5.	Fifth Generation Computer 1980 - till date	 Ultra Large Scale Integration (ULSI)	• Parallel Processing • Super conductors • Computers size was drastically reduced. • Can recognise Images and Graphics • Introduction of Artificial Intelligence and Expert Systems • Able to solve high complex problems including decision making and logical reasoning

Apart from human, the term *language* is used or needed is only in computer field.

Why the computer need a language?

If a human want to converse with other, certainly he/she is in need of a language. Likewise, if we want to interact with the computer, we are in need of a language.

Generation of Language

Hence, during the development of first generation computer, there was a language and along with generations of computer the language were also developed, concurrently.

First Generation Language

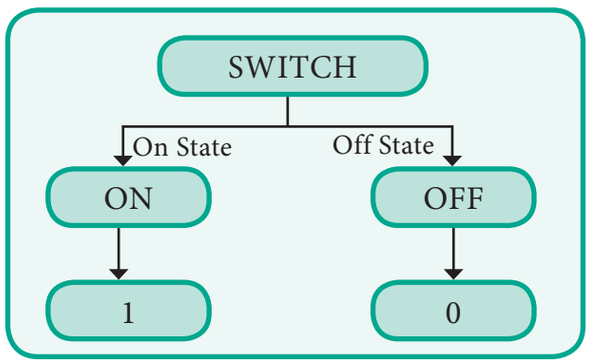
The name of the first generation language is called as **'Machine language'**.

What is meant by machine language? Here, the word machine denotes the computer. Basically, this machine is an electrical machine. So, the 'Machine Language' can also be called as 'Electrical language'. How about this Electrical language?

To understand this, let we take a SWITCH as shown in below. In how many modes we can operate a switch?

Normally a switch can be operated in two states.

1. 1. ON – state
2. 2. OFF - state



NOTE: Switch cannot be operated in any other modes.

When there is supply (ON-state), it is denoted by the letter (numeral) '1' and if there is no supply (OFF-state), it is denoted by the letter '0'.

So, in electrical language, there are only two (1, 0) digits, which are the direct electrical notations and thus machine language is nothing but 1s and 0s. Hence, during the period of first generation computer, they were able to interact with the computer only by using 1s and 0s. During the first generation computer, this machine language was used as shown in Table.

Decimal No	Machine Lang
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101

Since the computer doesn't know anything other than this 1s and 0s, any other alphabets or letters should be converted into this 1s and 0s. This becomes much laborious and tough for the people to understand and follow. Hence, along with second generation

computer the second generation language was also developed.

Second Generation Language

The name of the second generation language is **'Assembly Language'** as shown in table. In this, we can use both alphabets and also numbers but only in the form of abbreviations.

Instead of

ADDITION → ADD

SUBTRACTION → SUB

MULTIPLICATION → MUL

DIVISION→DIV……etc.,

Likewise, we can give only three or four letter words. Because, those days computer was just like three year old child.

Eg: As we use to teach a small child with CAT, RAT, BAT & BALL.

The words which are more than 3 or 4 letters should be abbreviated and used. Keeping so many abbreviations in memory is very tough and more to say abbreviations don't have any meaning also. Hence, this was also very tough for the people to understand and lead to the next generation language.

Third Generation Language

The name of the third generation language is called as **High Level Language** (HLL). In this, we are having:

BASIC, FORTRAN, PASCAL, 'C', PROLOG, ALGOL, PL-I, C++….

Likewise, thousand and odd languages are there.

We have seen, the previous two generation languages were so tough to understand and follow.

What is the development and advantage in third generation?

In this, we can write any type of instruction to the computer just in the form of English like sentence.

Example:
IF AGE >18 ALLOW THE PERSON TO VOTE

If we ask the meaning for the above sentence, any one can say.

No one can believe, if the above sentence is written in computer language. But, this is a typical COBOL language statement. Like this, in all the High Level Languages, we can write any instruction in simple English like sentences.

Now tell me, which generation language is easy?

Certainly the third generation is quite easier than previous two. After the arrival of third generation language many start to learn, interact and extract work from the computer. Further, the development was going on and fourth generation was developed.

Fourth Generation Language

The name of the fourth generation language is Application language or packages. In this, there are so many numbers of languages as given below.

FoxBASE, FoxPro, EXCEL, ACCESS, POWER POINT, MS –WORD …etc.

We have seen that the III generation language itself becomes more easy to use.

Then, what is the added development in fourth generation language?

A question may arise in your mind, why the computer cannot be operated as like a calculator? like addition, subtraction, multiplication and division directly.

As we have seen earlier in third generation language even a small procedure can be executed only by writing four or five lines (instruction).But in fourth generation language we can execute few things directly (even without writing few lines).

For Example, in FoxPro language after giving a question mark ?10 + 20 and press enter. You will get the answer as 30. Whereas in COBOL(III- generation language), if you give as like above, it won't give you the answer. Because here in III-generation if we give10 + 20, the computer cannot understand what is meant by this 10 and 20 (since the computer doesn't know anything on its own).

Then, how it becomes possible in fourth generation language like FoxPro? Even, there the computer doesn't know anything, then how the answer 30 comes.

Please remember whatever we are giving to the computer it should be referred to its memory.

So in FoxPro, if we give any value after giving a question mark(?), it will be referred to a memory as shown in below Figure 8.3

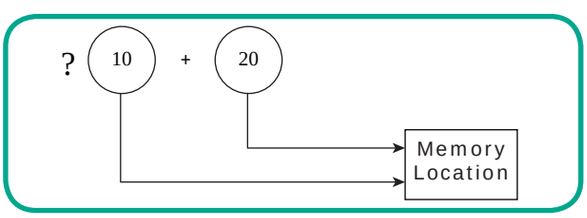


Figure 8.3

These referring instructions were given inside the FoxPro language itself. Hence, it is enough to give remaining instructions. But in third generation language, no such referring instructions were written inside the language. So we have to instruct the computer from minimum level.

If we want to understand the advantage of fourth generation language, it is better to understand the difference between the both.

8.4. MAJOR PARTS OF COMPUTER

To be precise, only one particular part is said to be computer. To understand this let us see the working of each part illustrated in Figure 8.7

1. KEY BOARD: It is a device which is used to give any data or instruction to the computer.
2. MOUSE: Mouse is used to select the instruction to the computer by clicking the icons.
3. MONITOR (OR) VDU: This will show what we are giving and what the computer is doing.
4. CPU (System Unit or Central Processing Unit): This is the part which is going to execute all the instructions given by us. So to say, this is the heart and brain of the computer. (The other parts keyboards, mouse, VDU are peripherals as like human hands and legs)

8.4.1. Hardware Parts of Computer

With reference to the computer, the parts which we able to see through our eyes are

called as Hardware parts of computer, as shown in Figure 8.4.

Example: Keyboard, Mouse, VDU, CPU and even the parts inside these, right from IC to small screw.

8.4.2. Software Parts of Computer

With reference to the computer the parts which we unable to see through our eyes are termed as software parts of computer.

Example: All languages, program, even a single instruction that we are giving to the computer.

8.5. CLASSIFICATION OF COMPUTER PARTS

The computer parts are classified into three categories based on its functions

1. Input Devices (I/P)
2. Output Devices (O/P)
3. Both (I/P) and (O/P)

Input Device	Output Device
1. Key Board 2. Mouse 3. Light Pen	1. VDU (or) Monitor 2. Printer 3. Plotter

Both (I/P) & (O/P) Device

1. Touch Screen
2. Compact Disk
3. Hard Disc
4. Memory Card
5. Pen Drive

Till this, we have seen the peripherals of computer. Now let us see the working of computer i.e., CPU.

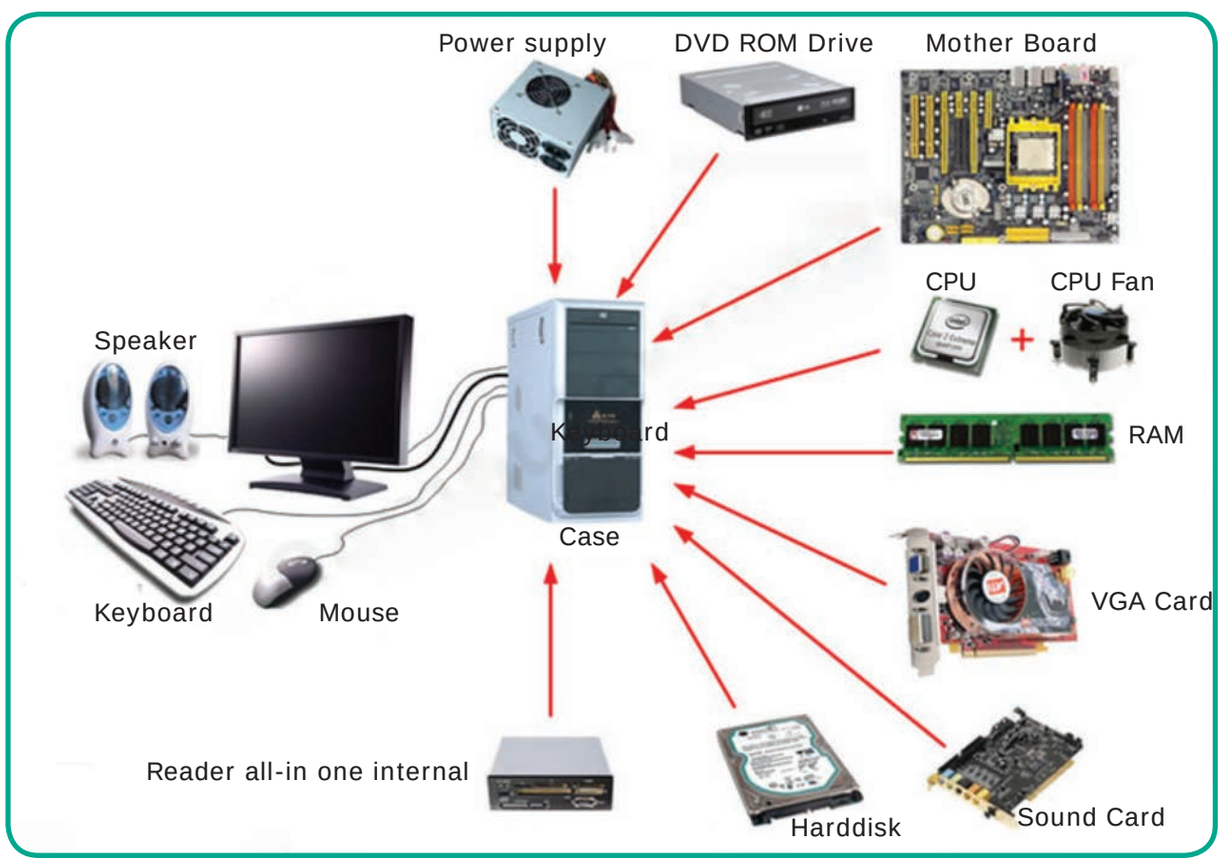


Figure 8.4 Parts of the Hardware

Figure 8.5: Types of Computer based on Working Method or Technology

Figure 8.6: Types of Computers based on performance and memory

8.6. CLASSIFICATION OF COMPUTER

Computers are classified into two broad categories.

1. Based on Working Method (Technology)
2. Based on (size) performance and Memory

Based on Work Method there are three types as shown in Figure 8.5

1. Analog Computer
2. Digital Computer
3. Hybrid Computer (Here Hybrid is easy to carry – i.e., Laptop)

Based on (size) Performance and Memory Figure 8.6.

1. Micro Computer
2. Mini Computer
3. Main Frame Computer
4. Super Computer

8.7. MAJOR DIVISION OF CPU

The CPU consists of three major divisions as shown in Figure 8.7. They are,

1. ALU
2. MEMORY UNIT
3. CONTROL UNIT

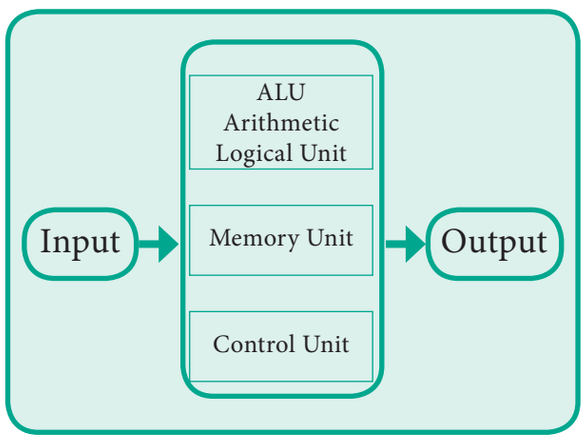


Figure 8.7: Major Division of Central Processing Unit

8.7.1. ALU

What is meant by Arithmetic?

In general, Arithmetic means operations using numbers like Addition, Subtraction,

Multiplication, division, etc. In computer, any type of calculation is known as Arithmetic operations.

LOGIC →What is meant by this?

To say, the speciality of computer lies in this word. Let us see regarding this in a different way.

What do you mean by this word logic?

For example: Assume that there is a long-standing issue in your area where you are residing. You and your friends decided to find a solution for it. What will be your first step? You start to discuss among with your friends regarding that issue. By the time, everyone will say their suggestion. For Example assumed that 10 of your friends are involved in that discussion. All the 10 will give their suggestions. Each suggestions might be a solution for that problem. But among the ten we can select only one as 'final' (i.e. decision) solution. The following illustration shown in Figure 8.8 simply explains the concept "logic".

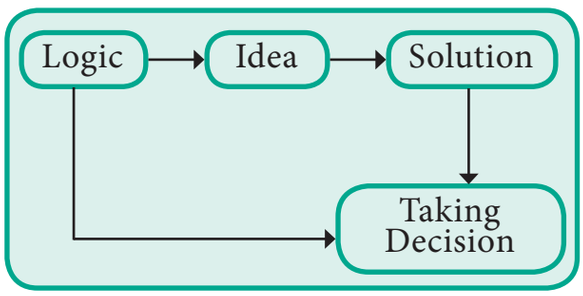


Figure 8.8: Illustration of Logic

With reference to the above example and illustration, Logic is nothing but an idea, idea is nothing but a solution and solution is nothing but taking decision.

Hence, logic is nothing but taking decision.

If so! Whether the computer has decision taking capacity?

If not, there is no use of thinking about all these things.

Logical Capability → Decision taking capacity

We may think., How foolish computer be able to take decision? How it possible?

Let us think... In general, while we are taking decision, in how many ways we can take decision?

For example:

Assume that your friend is inviting you for a movie.

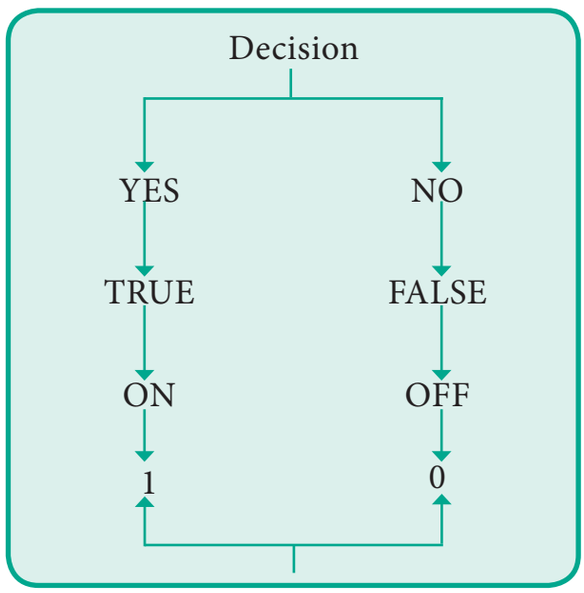
What you will say?

If you intent, you say yes, otherwise, Sorry no.

Otherwise, is there is any other option?

Usually we say, let us see, which is not at all an answer, because any answer should give finite result.

So, for any action, there are only two possible answers.

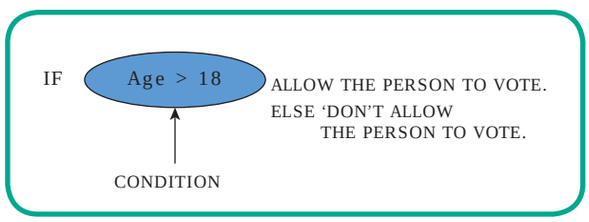


At last where we came? We come to the 1, 0, i.e., the machine language.

Till date the computer directly knows only one thing, i.e., the Machine Language

Go through the following statement

Example:



NOTE: whenever we are coming across a condition, we have to take a decision

While the computer is reading the above particular statement, it has to take decision.

1. When the given condition is true, (i.e., the person age is more than 18) it receives '1' pulse. When it receives '1' pulse, the computer continuously reads the remaining part of the statement after the conditions and do, accordingly.
2. When the given condition is false (i.e., the person age is below 18), it receives a '0' pulse. On receiving the '0' pulse, the computer terminates that particular line (it won't continue that line) and starts to read the next line.

   Because of this, while you are writing program you will be instructed to write, 'what to be done if the condition is true', must be immediately followed the condition, and 'what to be done if the condition is false ', in the next line.

   Though the decision taking capacity is in the form of machine language, i.e., 1, 0 ., the computer can take the decision directly.

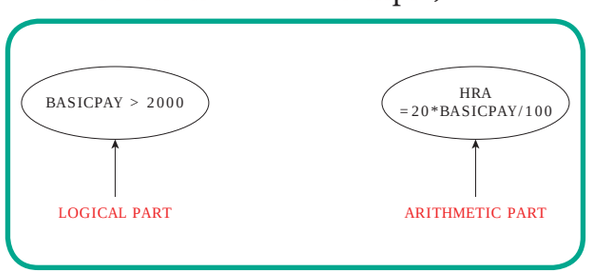
   Because of this logical capability, the computer is said to be superior than the calculator.

   This is the second major difference between calculator and computer.

   The action of ALU can also be explained through yet another example.

Example: IF BASICPAY> 2000 CALCULATE HRA = 20 * BASICPAY/100.

From the above example,



So, wherever the computer reads this line, this will be carried out by the arithmetic logical unit.

8.7.2. Memory Unit

This is yet another important division of CPU. Normally this is classified into two broad categories.

1. Internal Memory
2. External Memory

Internal Memory

The memories which are kept inside the CPU (or) on mother board are known as Internal Memory. There are five types,

such as ROM, RAM, PROM, EPROM and EEPROM. All are nothing but IC's. Let us see the purpose and usage of each memory device in following sections.

ROM →Read Only Memory

From the above expansion itself, we could understand that the content of this IC can be read only. The function and working of this IC can be easily explained through the following example.

Let we take a calculator:

Switch on the calculator.

What you will get on the screen?

'0'

But you didn't press zero. Then, how the zero comes?

Whether it came automatically?

No, someone is making it to display.

Just like the same, whenever we are switching on the computer, the computer has to do something on its own to get ready.

We know basically the computer cannot do anything on its own.

Then, it is doing something means, the necessary command is delivered from a particular memory. That particular memory is called as ROM.

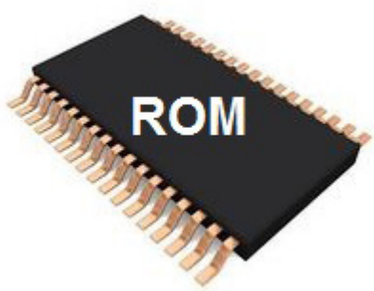


Figure 8.9: **ROM-IC**

This is an IC (Integrated Circuit), whenever we are switching ON the computer, the pointer will enter into this memory, read the content and do accordingly.Initially, it will do a self-test, which is called as POST(Power On Self-Test). After performing POST, it will hand over the charge to us. Then only, we can give anything to the computer.

After storing the necessary instruction, the IC will be sealed. Then, the content cannot be altered, deleted and changed. But, can only be read. Because of this it is called as Read Only Memory or permanent memory. Without this ROM, no calculator or computer can get ready.

RAM →Random Access Memory

Random means without any proper order. Let we see the purpose of this memory. Let we again take calculator for example.

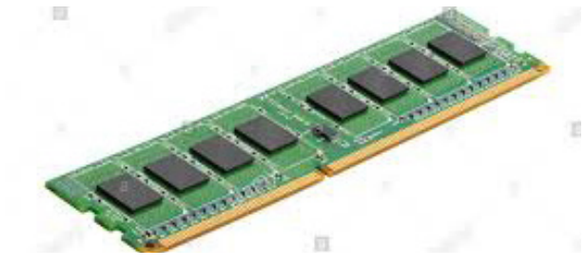


Figure 8.10: **RAM**

Assume that you want to perform the addition of 5, 10 in the calculator. What we will do?

Step1 : Switch ON the calculator.
:You can get '0' on the screen.

Step2 :Now press'5'.
:5 will be displayed on the screen.

Step3 : Next press '+'.

Step4 : For '10' you have to press'1'.

Now what will happen to that '5' it is not on the screen, then where it would

be. Certainly, these numbers have gone to a memory and that particular memory is RAM. Since we cannot find the location where it is going is called as Random Access Memory.

As like the calculator, the computer is also having RAM. After the computer got ready whatever be the thing that we are giving, it should go to a memory and that particular memory is RAM. But, it will lose or the content of this memory will get erased when the computer is switched OFF or due to power failure. Hence, it is called as temporary memory or volatile memory. But it is live memory.

Without the concern of the RAM nothing can be done in the computer

If we are seeing something on the monitor, it is understand that, the content present from the RAM. Hence, the capacity of RAM is much important. Even the configuration of the computer is decided by the capacity of the RAM. So, without this ROM and RAM, no calculator or computer can work.

PROM→Programmable Read Only Memory

Figure 8.11: PROM

This is like a ROM. The purpose of this IC is also the same as ROM. The difference between ROM and PROM is, in PROM we can (a software engineer) store the necessary booting(POST) instruction. But it can be done only once. After that the content cannot be altered, deleted or changed.

EPROM→Erasable Programmable Read Only Memory

Figure 8.12: EPROM

The purpose and use of this memory is similar to ROM and PROM. The difference is, the content of this memory can be erased by passing ultra violet rays through a small hole provided on the top surface of the IC. Again it can be re-programmed.

EEPROM→Electrically Erasable Programmable Read Only Memory

Figure 8.13: EEPROM

This is also same like EPROM. Here the content of this IC can be erased by passing external electrical pulse through a particular pin of the IC. And again it can be re-programmed. From the above, ROM, PROM, EPROM and EEPROM are doing the same work and hence any one can be used in the computer. In majority of recent computers, EPROM is used as Booting IC and RAM is the live memory.

So far, we have seen the purpose and working of internal memory. For your notice, we cannot store anything permanent in this.

External Memory

If we want to store anything permanent it can be stored only under external memory. There are few types of external memory as listed below.

a. Floppy Disc
b. Hard Disc
c. Magnetic Tape
d. Compact Disc
e. Pen Drive
f. Memory Card

From the above, floppy disc is totally out-dated. CD, Hard disc, pen-drive and memory-card are widely used. Let us see about the capacity of these. When we talk about any capacity it should have its own unit. Normally. the unit of memory is 'Byte'. It is better to know about hierarchical structure of it. The memory capacity is mentioned in the following units summarized in Table 8.1.

Table 8.1: Memory Capacity

0	Bit
1	Bit
8Bits	1 Byte
1024 Bytes	1 kilo Byte
1024 KB	1 Mega Byte
1024 MB	1 Giga Byte
1024 GB	1 Terra Byte

8.7.3. Control Unit

In general, the computer is doing various activities, besides; some activities are handling by many peripherals. In order to monitor and control all these, a system is used, which is called as control unit.

Controls Input Device

Assume that you are typing a matter consists of many pages. While you are typing speedy, we press one or more keys at a time. That moment, the respective letters altogether try to enter into the RAM, which is not possible. By that time the control unit will take charge and block it and give a beep sound. On hearing beep sound, we can able to identify that we are doing something wrongly. Thus, the control unit is controlling the input device, i.e., keyboard.

Controls Output Device

Assume that you typed around 50 pages of a matter. Now, the matter is in RAM and you want to take a print-out. On giving print command, all the 50 pages content will try to go to the printer, which is not possible. Here too, the printer and CPU are interfaced through a set of wires. If it is possible to travel or send data with reference to the capacity of the wire, all the pages tend to go at a time. This is elucidated by the following example.

Example:

- Assume a class room
- Evening closing bell rang.
- There is only one door in the class room.
- What the students will do?
- Everyone will tend to go-out of the class through the single door.
- By that time if a master is there, he will control them and regulate to go one by one.

Just like students, here all the pages will tend to go to the printer, which is not possible. Here, the control unit is taking charge, regulate and send little by little to the printer. Thus, the control unit controls the output device.

Controls both I/P and O/P Devices

E.g.: Assume that there is a movie in a pen-drive and you want to view it.

After inserting the pen-drive into the respective slot, you will click the particular icon. Now, the entire movie will try to go to the RAM (Live Memory). Once again, the pen-drive (External Memory) and the RAM (Internal Memory) are connected through set of wires, which cannot transfer much data at a time. Now, the control unit will take charge, regulate and send little by little to RAM. Then, the control unit controls both input and output devices.

Thus, the control unit controls the entire system. Without the concern of the control unit, nothing can be done in the system.

Control unit – Is as like a father in a family.

8.8. COMPILERS AND INTERPRETERS

We studied, till date the computer knows only one language,i.e., machine language. But we know only High Level Languages and Application Languages, which the computer does not know. But, we both want to interact. How this become possible?

Example:

- *Assume that our prime minister is going to RUSSIA to meet the Russians president.*
- *Our PM knows Hindi and English. And the Russian president knows only RUSSIAN language.*
- *But, both want to converse.*
- *How?*
- *You can see a man (translator) who knows both Russian and English will sit near to them. He will translate English to Russian and vice versa.*

Just as like the above, we need a translator to translate our High Level Languages and Application Languages into corresponding machine language.The compilers and interpreters are here used as translator.

Oh….fine…

- Whether it is software or hardware?

Absolutely, it is a software written in one particular high level language.

Then, why we should need both, compiler and interpreters?

To understand this let we see the working method of compiler and interpreter.

Compiler: Compiler means taking together. This will take entire program (whatever be the number of lines) and convert it into machine language. Wherever the mistake, just it will mark it and go to next line. After completing the entire program, it will list out the errors at the last.

Interpreter: The interpreter will read line by line. If there is a mistake in the first line, it will stop there and the error will be displayed. It can go to the next line, only after the particular line gets corrected.

This is the difference between Compiler and Interpreter.

NOTE: Along with each High Level Language and Application language either Compiler or Interpreter will be attached. Widely compilers are used.

8.9. OPERATING SYSTEM

The word system denotes computer. Hence Operating System means operating computer. In this, we are going to see actually how the computer gets operated.

Before going further, recollect the following.

- Basically computer never do anything on its own.
- ROM, RAM (Internal Memory).
- Hard disc (External Memory)…etc.

Operating System helps us to do some important and vital operations (like copy, delete, etc.) before entering into any particular language and after coming-out. It forms a bridge in between the user and the computer.

Let us see why?

Whenever we are switching on the computer what it will do?

It will read the content of ROM and do accordingly. After finishing the POST it will hand over the charge to the RAM. Now we can start to give instruction to the computer.

If we want to interact with the computer, we are in need of a language. Without a language we cannot give even single instruction or interact with the computer.

i.e., the speciality of computer.

If so, I need a language. Where are they?

- They all in external memory. To select a particular language, we have to give a command to the computer. But, even that particular command should also be in one particular language. Now, I don't have any language on my hand.
- Everything is get locked in the external memory, then, what can we do?
- In order to understand this, let me try to explain you through an old story.

A family of rats are living in a house and there is a CAT also. The cat catches a rat per day, as its food. Due to this the rats are so worried and decided to find a solution. They conversed a meeting. While on discussion a rat says, let we tie a bell on the cat neck. So that on getting the bell sound we could run away. Yes good idea, all the other rats appreciate that particular rat. It brought a rope and a bell and asks other rats., come-on go and tie the bell. Each rat is asking other rat to perform the task. Now the rats realised that they cannot able to execute the task on their own.

A Rat can tie the bell to the CAT, when only a third person helps them.

Now our situation is also the same. In order to bring any one of the language from the external memory, someone has to help us. Here, that particular helping hand is this Operating System.

If it so …whether it is a hardware or a software?

- **Absolutely it is software.**

If it is software, it should be stored in a particular memory permanently. Permanent in the sense, it should be stored only in external memory. So, whenever we are switching on the computer, this operating system which is normally in the hard disk should be loaded to the RAM, to serve the user instruction.

Whether it can be loaded automatically to the RAM? Certainly, Not. If so where would be the command? It should be in ROM. After performing the POST the next command is to seek the hard disk (or any external memory) in the computer and

to search for operating system program. On finding that, bring it and load it in the RAM. These sequences of commands will be in ROM. Now, the Operating System will be loaded to the RAM. (You can see it on the monitor as,"Loading Windows", because Windows is the operating system).

Earlier there was an operating system named as DOS (Disk Operating System). It was developed as PC-DOS (Personnel computer DOS) and then, Microsoft Company entered into the Operating System development and released MS-DOS (Version 1 to 6). These were up to the years 1993-94. Then, Windows operating system evolved. But, truly speaking till now the windows is working on the platform of MS-DOS. The difference is, in DOS, we have to type commands to execute few things like COPY to Copy files, DEL to delete files, MD to create directory (say folders), CD to change folders, etc., whereas in Windows these operations are performed by selecting the respective menus or icons.

Loading Operating System either from hard-disk or from any other external memory to the RAM is known as Booting process.

Now the computer is ready to take our commands or instructions.

Operating system plays a role of a bridge between the user and the computer. Operating System is the tool connecting user with the computer. It is responsible for entire operation carried over by the computer. In computer, any software can be executed through the Operating System. Operating System is a software which is permanently installed in secondary memory, called Hard disk. Hence, Operating System is a very important tool to handle any type of input, output and both input/output devices as shown in Figure 8.14.

DO YOU KNOW?

Can a computer or a Smart Phone (Mobile Phone) work without an Operating System..? The Answer is… No

Figure 8.14: Operating System

LEARNING OUTCOMES

After studying this chapter, a student can understand the following

1. **Fundamentals of computer system**
2. **Basic Concepts of Operating System**
3. **Concepts of Motherboard**
4. **Function of CPU**
5. **Working of Hard disk drive.**

QUESTIONS

PART A

I. Choose the Best Answer

1. The first calculating tool developed by human.....
   (a) Slide Rule (b) Nappier Bones
   (c) Abacus (d) Analytical Engine

2. Who developed Analytical Engine?
   (a) Blaise Pascal
   (b) Newton
   (c) Neil Bohr
   (d) Charles Babbage

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3. Who is father of Computer?
   (a) Blaise Pascal (b) Charles Babbage
   (c) Bill Gates (d) John Nappier

4. What is the name of the first computer?
   (a) IBM (b) Microsoft
   (c) ENIAC (d) DELL

5. With reference to the computer Machine language is .....
   (a) High level language
   (b) Low Level Language
   (c) Very High level language
   (d) None of the above

6. With reference to the computer the parts which we cannot see through our eyes are termed as .....
   (a) Hardware
   (b) Software
   (c) Both Hardware & Software
   (d) None of the above

7. Write the Odd one from the following.
   (a) Monitor (b) Printer
   (c) Mouse (d) Plotter

8. Which is the Live memory among the below?
   (a) ROM (b) RAM
   (c) PROM (d) EPROM

9. Choose the odd one
   (a) Bit (b) Byte
   (c) Kilowatt (d) Megabyte

10. Compilers & Interpreters are .....
    (a) Hardware parts (b) Language
    (c) Translators (d) Operating System

PART B

II. Write answers in One or Two sentences. (3 marks)

1. Define computer.
2. Write down the names of the generation of computer.
3. Write down the major divisions of CPU.
4. What is the difference between Compiler and Interpreter?
5. Define arithmetic operations in computer.

PART C

III. Explain in One or Two Paragraphs. (5 marks)

1. Write about generations of computer.
2. Define the working of ROM & RAM.
3. Define Operating System.

PART D

IV. Write answers in detail. (10 marks)

1. Explain in detail the generations of languages.
2. Explain the working of CPU with neat diagram.

ANSWERS

1. **(c)** 2. **(d)** 3. **(b)** 4. **(c)** 5. **(b)**
6. **(b)** 7. **(c)** 8. **(b)** 9. **(c)** 10. **(c)**