

## **Unit I:**

### **Computer Definition**

The word compute is derived from the Latin word 'computare', was meaning "arithmetic, accounting".

The Computer meaning is the digital device that stores information in memory using input devices and manipulate information to produce output according to given instructions.

### **Applications of computer**

#### **Business :**

Computer is used in business organizations for –

Payroll calculations

Budgeting

Sales analysis

Financial forecasting

Managing employee database

Maintenance of stocks, etc.ork.

banking is almost totally dependent on computers.

#### **Banking**

**Banks provide the following facilities –**

Online accounting facility, which includes checking current balance, making deposits and overdrafts, checking interest charges, shares, and trustee records.

ATM machines which are completely automated are making it even easier for customers to deal with banks.

#### **Insurance**

Insurance companies are maintaining a database of all clients with information showing –

Procedure to continue with policies

Starting date of the policies

Next due installment of a policy

Maturity date

Interests due

Survival benefits

Bonus

### **Education**

The computer helps in providing a lot of facilities in the education system.

The computer provides a tool in the education system known as CBE (Computer Based Education).

CBE involves control, delivery, and evaluation of learning.

Computer education is rapidly increasing the graph of number of computer students.

There are a number of methods in which educational institutions can use a computer to educate the students.

It is used to prepare a database about performance of a student and analysis is carried out on this basis.

### **Marketing**

In marketing, uses of the computer are following –

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

**Home Shopping** – Home shopping has been made possible through the use of computerized catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

### **Communication**

Communication is a way to convey a message, an idea, a picture, or speech that is received and understood clearly and correctly by the person for whom it is meant. Some main areas in this category are –

E-mail

Chatting

Usenet

FTP

Telnet

Video-conferencing

### **Government**

Computers play an important role in government services. Some major fields in this category are –

### **Budgets**

Sales tax department

Income tax department

Computation of male/female ratio

Computerization of voters lists

Computerization of PAN card

Weather forecasting

### **Advantage of computer :**

Computer has making human life faster because of its incredible speed, Accuracy and storage, with which human can save anything and search it out easily when needed. We can say computer a versatile machine because it is very flexible in performing their jobs. but Computers have several important advantages and disadvantages.

### **Multitasking**

Multitasking is one of the major advantage of computer. Person can perform multiple task, multiple operation, calculate numerical problems within few seconds. Computer can perform trillion of instructions per second.

### **Speed**

Now computer is not just a calculating device. Now a day's computer has very important role in human life. One of the main advantages of computer is its incredible speed, which helps human to complete their task in few seconds. All the operations can be performed very fast just because of its speed elsewise it takes a long time to perform the task.

### **Cost/ Stores huge amount of data**

It is a low cost solution. Person can save huge data within a low budget. Centralized database of storing information is the major advantage that can reduce cost.

### **Accuracy**

One of the root advantage of computer is that can perform not only calculations but also with accuracy.

### **Data Security**

Protecting digital data is known as data security. Computer provide security from destructive forces and from unwanted action from unauthorized users like cyber attack or access attack.

### **Characteristic of computer**

### **Basic characteristics about computer are:**

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

Therefore, we determine the speed of computer in terms of microsecond ( $10^{-6}$  part of a second) or nanosecond ( $10^{-9}$  part of a second). From this you can imagine how fast your computer performs

2. **Accuracy:** – The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is 7.

determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

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

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

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

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

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

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

### **Elements of computer**

The major components of general-purpose computer system are **Input Unit, main/internal Memory or Storage Unit, Output Unit, Central Processing unit**. The CPU is further includes **Arithmetic logic unit (ALU) and control unit (CU)**. All the units also referred to as “The functional units”. Devices that are not integral part of CPU referred to as peripherals.

## **Input Unit**

Input unit is used for transfers' raw Data and control signals into the information processing system by the user before processing and computation. All the input unit devices provide the instructions and data are transformed into binary codes that is the primary memory acceptable format.

Example of Input unit devices: keyboard, mouse, scanner, joystick, MICR, Punched cards, Punched paper tape, Magnetic tape etc.

## **Memory or Storage Unit**

Memory or Storage unit is used for storing Data during before and after processing. The capacity of storage is expressed in terms of Bytes.

### **Memory**

This unit retains temporarily results till further processing, For example, Random Access Memory (RAM). This memory is volatile, which means data is disappears when the power is lost.

### **Storage**

The storage or "secondary storage" is used for retain digital data after processing for permanently. For example hard drive. The Storage is non-volatile in nature. CPU does not access directly to secondary storage memories, instead they accessed via input-output unit. The contents of secondary storage memories are first transferred to the main memory (RAM) and then CPU access it.

## **Output Unit**

Output Unit receives information from the CPU and then delivers it the external storage or device in the soft or hard processed form. The devices which are used to display output to the user are called output devices. The Monitor or printer is common output device.

## **Central Processing Unit**

The main chip in a computer is the microprocessor chip, which is also known as the CPU (central processing unit).

### **Arithmetic logic unit (ALU)**

Arithmetic Logical Unit is used for processing data after inputting data is stored into primary unit. The major operations of Arithmetic Logical Unit are addition, subtraction, multiplication, division, logic and comparison.

### **Control unit (CU)**

It is like a supervisor, that checks ordaining operations or check sequence in which instructions are executed.

## **Operating system :**

## **Definition of operating system :**

An operating system is a program that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs.

## **Functions of operating systems :**

### **Security –**

The operating system uses password protection to protect user data and similar other techniques. It also prevents unauthorized access to programs and user data.

### **Control over system performance –**

Monitors overall system health to help improve performance. records the response time between service requests and system response to have a complete view of the system health. This can help improve performance by providing important information needed to troubleshoot problems.

### **Job accounting –**

Operating system Keeps track of time and resources used by various tasks and users, this information can be used to track resource usage for a particular user or group of user.

### **Error detecting aids –**

Operating system constantly monitors the system to detect errors and avoid the malfunctioning of computer system.

### **Coordination between other software and users –**

Operating systems also coordinate and assign interpreters, compilers, assemblers and other software to the various users of the computer systems.

### **Memory Management –**

The operating system manages the Primary Memory or Main Memory. Main memory is made up of a large array of bytes or words where each byte or word is assigned a certain address. Main memory is a fast storage and it can be accessed directly by the CPU. For a program to be executed, it should be first loaded in the main memory. An Operating System performs the following activities for memory management:

It keeps tracks of primary memory, i.e., which bytes of memory are used by which user program. The memory addresses that have already been allocated and the memory addresses of the memory that has not yet been used. In multi programming, the OS decides the order in which process are granted access to memory, and for how long. It Allocates the memory to a process when the process requests it and deallocates the memory when the process has terminated or is performing an I/O operation.

### **Processor Management –**

In a multi programming environment, the OS decides the order in which processes have access to the processor, and how much processing time each process has. This function of OS is called process scheduling. An Operating System performs the following activities for processor management.

Keeps tracks of the status of processes. The program which perform this task is known as traffic controller. Allocates the CPU that is processor to a process. De-allocates processor when a process is no more required.

#### **Device Management –**

An OS manages device communication via their respective drivers. It performs the following activities for device management. Keeps tracks of all devices connected to system. designates a program responsible for every device known as the Input/Output controller. Decides which process gets access to a certain device and for how long. Allocates devices in an effective and efficient way. Deallocates devices when they are no longer required.

#### **File Management –**

A file system is organized into directories for efficient or easy navigation and usage. These directories may contain other directories and other files. An Operating System carries out the following file management activities. It keeps track of where information is stored, user access settings and status of every file and more... These facilities are collectively known as the file system.

### **Types of operating system :**

**There are four types of operating systems –**

**1.Real-time operating system(RTOS)**

**2.Single-User/Single-Tasking operating system**

**3.Single-User/Multitasking operating system**

**4.Multi-User/Multitasking operating system**

#### **Real-time operating system(RTOS)**

Real-time operating system is designed to run real-time applications. It can be both single- and multi-tasking. Examples include Abbasi, AMX RTOS, etc.

#### **Advantages**

It works very fast.

It is time saving, as it need not be loaded from memory.

Since it is very small, it occupies less space in memory.

## **Single-User/Single-Tasking OS**

An operating system that allows a single user to perform only one task at a time is called a Single-User Single-Tasking Operating System. Functions like printing a document, downloading images, etc., can be performed only one at a time. Examples include MS-DOS, Palm OS, etc

### **Advantages**

This operating system occupies less space in memory.

It can perform only a single task at a time.

## **Single-User/Multitasking OS**

An operating system that allows a single user to perform more than one task at a time is called Single-User Multitasking Operating System. Examples include Microsoft Windows and Macintosh OS.

### **Advantages**

It is time saving as it performs multiple tasks at a time yielding high productivity.

### **Disadvantages**

This operating system is highly complex and occupies more space.

## **Multiuser/Multitasking OS**

It is an operating system that permits several users to utilize the programs that are concurrently running on a single network server. The single network server is termed as "Terminal server". "Terminal client" is a software that supports user sessions. Examples include UNIX, MVS, etc.

### **Advantages**

It is highly productive as it performs multiple tasks at a time.



It is time saving as we don't have to make changes in many desktops, instead can make changes only to the server.

### **Disadvantages**

If the connection to the server is broken, user cannot perform any task on the client as it is connected to that server.