

**Subject: Management**

Production of Courseware  
-Content for Post Graduate Courses

**Paper: 6, Management Information System**

**Paper: 5, Hardware and Software System**

### Development Team

Principal Investigator	Prof.(Dr.) S.P. Bansal Vice Chancellor, Maharaja Agrshen University, Baddi, Solan, Himachal Pradesh, INDIA
Co-Principal Investigator	Prof.(Dr.) YoginderVerma Prof.Vice Chancellor, Central University of Himachal Pradesh,Kangra Himachal Pradesh, INDIA
Paper Coordinator	Prof. Manu Sood Professor & Director, University Institute of Information Technology, Himachal Pradesh University, HP, INDIA
Content Writer	Dr. Sudhanshu Joshi Head, School of Management, Doon University, Dehradun PIN 248001, Uttarakhand, INDIA

Description of Module	
<b>Subject Name</b>	Management
<b>Paper Name</b>	Management Information System
<b>Module Title</b>	Hardware and Software System
<b>Module Id</b>	Module- 05
<b>Pre-requisites</b>	Basic Knowledge of Computer Hardware and Software
<b>Objectives</b>	1. To understand the concept, definitions and Scope of Computer Hardware and Software. 2. Understanding different types of Computer Hardware and Software.
<b>Keywords</b>	Computer Hardware, Computer Software, Primary Storage, Secondary Storage, Input Devices, Output Devices, Antivirus

### Quadrant-I

#### Learning Objectives:

The Learning objectives of the module are to explore relationship between corporate culture and Strategies, to address the following questions:

1. Discuss the different types of computer systems.
2. Enhance the knowledge about computer hardware and software
3. Understanding what is an operating system?

#### 1. Introduction:

**Computer System:** A computer system is a combination of an input device, a processor and an output device.

#### Types of Computer System:

Following are some of the types of computer systems:

##### A. Personal Computer:

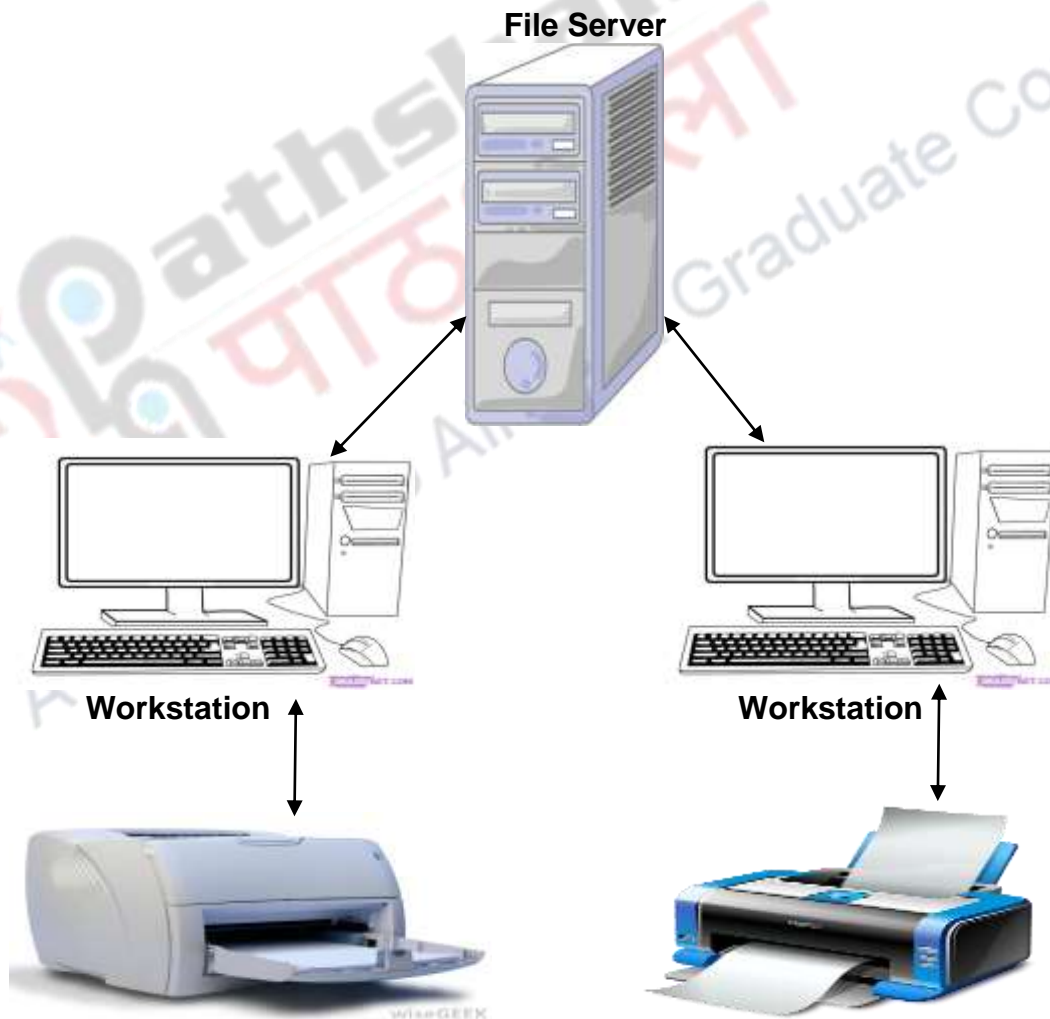
Personal computer is a computer designed for use by one person at a time. A personal computer is a small, relatively less expensive designed for an individual user. Personal computers are used by individuals for their own work.

**B. Stand-alone Computer:**

Stand-alone computer is a computer on which all of the software used is installed and on which all of the data or files are electronically stored. Stand-alone computers are also known as workstations.

**C. Networked Computer:**

The networked computer may be any combination of workstations (stand-alone computers) which are electronically connected with a central computer that acts as a server on which files and data are stored for access to all other computers and shared software programs. Following figure shows an example of a small office or home network.



**Figure 1: A small office or home computer; a file server and two workstations**

### **D. Mini-computer:**

Mini-computers are used by small businesses and firms. These computers are not designed for a single user. Individual department of a company or organizations use mini-computers for specific purposes. For example, a production department can use mini-computers for monitoring certain production process. Mini-computers are also known as mid range computers.

### **E. Mainframe Computer:**

It is another important kind of computer system. It is mainly used by large organizations or firms and government organizations to run their business operations more efficiently and effectively. Mainframe computers are able to store a large amount of data. Basically, banks, educational institutions and insurance companies utilize mainframe computers to store data about their customers, students and insurance policy holders.

### **F. Super Computer:**

Super computer is the most powerful computer in terms of performance and data processing. These are task specific computers used by large organizations. These computers are used for research and exploration purposes, like NASA uses supercomputers for launching space shuttles, controlling them and for space exploration purpose.

### **Computer Hardware:**

All physical components that constitute a computer system are known as computer hardware. Computer hardware is the physical parts or components of a computer system such as monitor, keyboard, hard disk drive etc. The tangible parts of a computer system are known as hardware. For example, the storage devices (Hard Disks, CDs etc.), mouse, keyboard, CPU, and display devices (Monitor) are hardware.

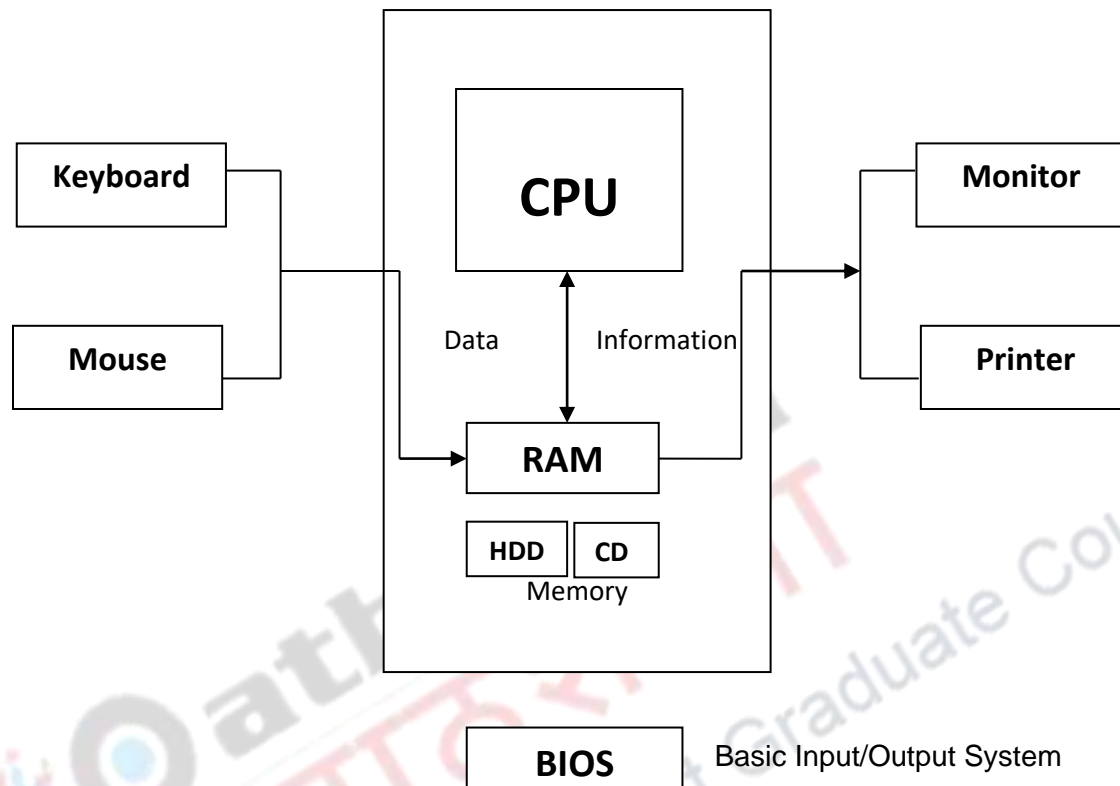
### **Computer Software:**

Software is a computer program that gives instructions to computer hardware about what to do and how to do it. A computer cannot do anything on its own. It must be instructed to do a job desired by us.

Computer software is a program that provides instructions to computer hardware to do a specific task such as preparing documents, sorting information, performing computations etc.

### **Computer System Hardware:**

Following figure shows hardware of a computer system:



**Figure 2: Structure of Computer System Hardware**

## 2. Types of Computer Hardware:

There are four types of computer hardware. Following table shows the types of computer hardware.

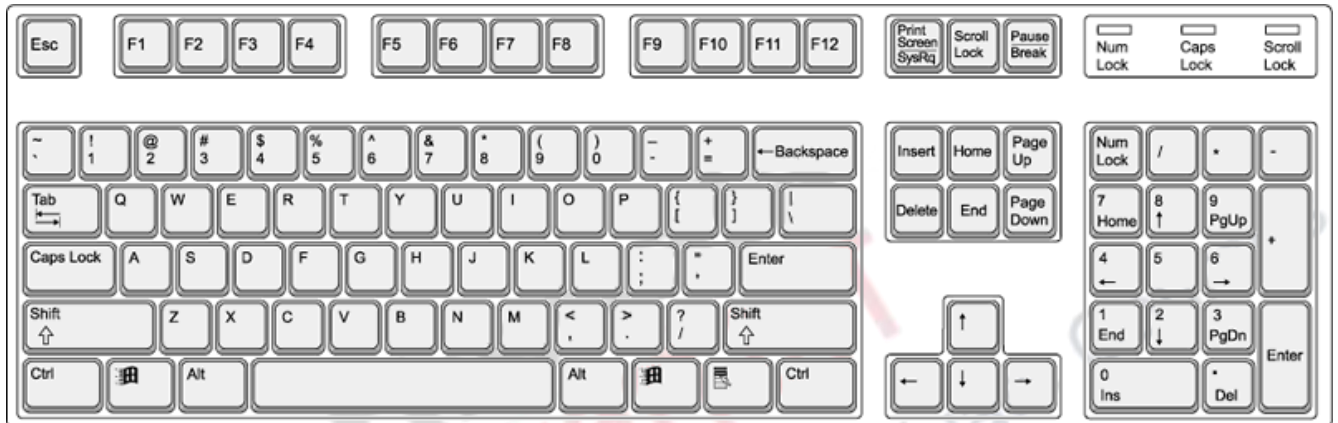
Types of Hardware	Function and Examples
Input Devices	Input devices are used to insert data in a computer system. Examples of input devices are keyboard and mouse.
Processing and Internal Memory Devices	They are used to process data using program instructions. Examples include Motherboard, CPU, RAM.
Output Devices	Output devices are used to display data and programme installed in a computer system. Examples of output devices are Monitor and Printer.
Storage Devices	Storage devices are used to store data. Examples include Hard Disk Drive, Optical Disk Drive.

### 2.1. Input Devices:

Input devices are a kind of computer hardware. An input device is a device which allows the user to insert data into a computer system and control the system. The most commonly used input devices are keyboard and mouse.

### What is a keyboard?

A keyboard is an input device that allows the user to input letters, numbers and other symbols into a computer system.



**Figure 3: Structure of a Keyboard**

### What is a Mouse?

It is a small handheld device which is moved across a mat or flat surface to move the cursor on a computer screen. It is a pointing (hand controlled) device. Following figure shows structure of a mouse.





**Figure 4: Structure of Mouse**

## **2.2 Processing and Internal Memory Devices:**

They are used to process data using programme instructions. It includes motherboard, CPU, RAM etc.

### **What is a Motherboard?**

A motherboard is a very essential part of a computer system. It holds together very crucial parts of a computer system such as CPU (Central Processing Unit), memory and connectors for input and output devices.

The base of a motherboard consists of a very firm sheet of non-conductive material, typically some sort of rigid plastic. Thin layers of copper or aluminum foil, referred to as traces, are printed onto this sheet. These traces are very narrow and form the circuits between the various components. In addition to circuits, a motherboard contains a number of sockets and slots to connect the other components.



**Figure 5: Structure of Motherboard (Source: [www.study.com](http://www.study.com))**

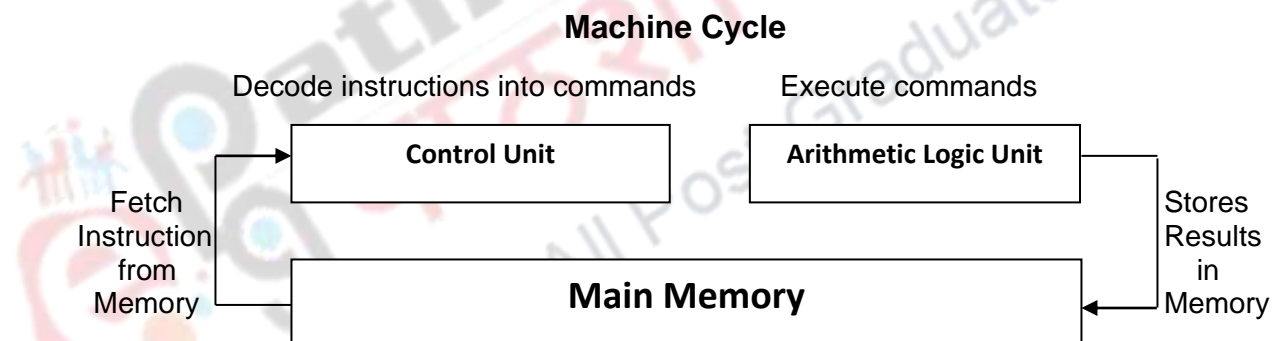
**What is Central Processing Unit?**

Central Processing Unit is a computer chip and memory module that performs the basic computer functions. CPU is the main component of a computer system. It is a chip that interprets computer instructions and processes data.

It is the part of a computer system in which operations are controlled and executed. Central processing unit (CPU) handles all instructions received from hardware and software installed in a computer system.

**Components of Central Processing Unit (CPU):**

Central processing unit (CPU) has two components namely, arithmetic logic unit (ALU) and control unit (CU). Arithmetic logic unit (ALU) performs all logical and mathematical operations whereas, control unit (CU) give directions to all processors.



**Figure 6: A simple structure of machine cycle (Source: [www.computerhope.com](http://www.computerhope.com))**

**CPU History:**

The first CPU was developed at Intel with the help of Ted Hoff and others in 1970s. The first processor released by Intel was the 4004 processor, shown in following figure.



Intel 4004



**Figure 7: Processor**

**Random Access Memory (RAM):**

It is also known as main memory, primary memory or system memory. Random Access Memory (RAM) is a hardware device that allows information to be stored and retrieved on a computer. In RAM information is accessed randomly instead of sequentially like a CD. As information is accessed randomly, the computer can access the data much faster. It requires power to keep the data accessible because RAM is a volatile memory. When the computer is turned off, all data contained in RAM is lost.

The first form of RAM came in picture in 1947 with the use of the Williams tube. It utilized a cathode ray tube (CRT) and data was stored on the face of the CRT as electrically charged spots.

**2.3. Output Devices:**

An output device is a device which produces output to the user in lieu of the input provided by him to the computer system. An output device is any peripheral that receives data from a computer, usually for display, projection or physical reproduction. The most common output devices are monitor and printer.

**Monitor:**

It is also known as video display terminal (VDT) and video display unit (VDU). Monitor is a hardware device that encompasses a display screen for video, images, text etc.

The early computer monitor's were comprised of a CRT (Cathode Ray Tube), and a fluorescent screen. Today, all monitors are created using flat panel display technology.





<http://www.computerhope.com>

**Figure 8: Old Computer Monitor**

**Figure 9: Latest Computer Monitor**

**Printer:**

A printer is an external hardware output device. It takes data stored in a computer system and provides hard copy of that data to the user. Printers are one of the most commonly used peripherals on computers and are commonly used to print text and photos.



**Figure 10: Structure of a Printer**

**Types of Printers:**

Different types of printer includes following:

1. All-in-One Printer
2. 3-D Printer
3. Laser Printer
4. Inkjet Printer
5. Dot Matrix Printer

### **All –in-One Printer:**

A printer, who does various kinds of activities such as printing a document, fax, scanning etc., is known as all – in – one printer. It is called all-in-one printer due to its diversified activities. Following figure shows the structure of an all-in-one printer:



**Figure 11: Structure of All-in-One Printer**

### **3-D Printer:**

It is also known as additive manufacturing. 3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

3D printer was first invented by Charles Hull in 1984. It is a printing device that creates a physical object from a digital model using materials such as metal alloys, polymers or plastics.

Exhibit: Following link shows how 3D printer works.

<https://www.youtube.com/watch?v=ZIPYMdxw4qU>

### **Laser Printer:**

The laser printer was first developed at Xerox PARC by Gary Starkweather and released in 1971. It utilizes laser technology for printing. The laser printers are mainly used for official work. It is often used in corporate world, schools and other environments that require print jobs to be completed quickly and in large quantities. The main advantage of a laser printer is speed. It prints documents, pictures etc. very quickly. The main disadvantage of a laser printer is its cost. It costs much more as compared to inkjet printer.

Lexmark C782n laser printer



<http://www.computerhope.com>

**Figure 12: Structure of a Laser Printer**

### **Inkjet Printer:**

An inkjet printer is a printer that provides hard copy of a document or image by spraying ink onto the paper. A typical inkjet printer can produce copy with a resolution of at least 300 dots per inch (dpi). Some inkjet printers can make full color hard copies at 600 dpi or more.

An inkjet printer is mainly used for personal use. It prints documents or images by spraying streams of quick-drying ink on paper. The ink is stored in disposable ink cartridges. A separate cartridge is used for each of the major colors. These colors are usually Black, Red/Magenta, Green/Cyan and Yellow. Following figure shows a typical inkjet printer.



**Figure 13: Structure of an Inkjet Printer (Source: [www.google.com](http://www.google.com))**

### **Dot matrix Printer:**

Dot matrix printers were first introduced by Centronics in 1970. The term dot matrix refers to the process of using dots to form an image. In a dot matrix image, the image quality is determined by the number of dots per inch.

A dot matrix printer is a printer that produces characters and illustrations by striking pins against an ink ribbon to print closely spaced dots in the appropriate shape. It is also known as a pin printer. The main disadvantage of a dot matrix printer is that it does not produce a high quality printing.



**Figure 14: Dot matrix Printer (Source: [www.google.com](http://www.google.com))**

## **2.4. Storage Devices:**

A storage device is a computer hardware device that stores data and information either temporarily or permanently. There are two types of storage devices namely, primary storage device and secondary storage device.

### **2.4.1. Primary Storage Devices:**

It is also known as primary memory, internal memory or main memory. Primary storage simply means a computer's internal hard drive. A primary storage device is a medium that holds memory for short periods of time while a computer is running. It is volatile. Random access memory (RAM) is a kind of primary storage.

RAM, commonly called "memory" is considered primary storage, since it stores data that is directly accessible by computer's CPU. RAM is a high speed storage medium that can be accessed with minimal delay. Because the RAM is directly connected to the CPU via the memory bus, the CPU can access data stored in RAM very quickly. For this reason, RAM is used to store data loaded by active programs and the operating system. It loses its content whenever it loses power that's why it is known as volatile memory.

Another kind of primary storage is Read Only Memory (ROM). It is a non-volatile primary storage. It does not lose its content whenever it loses the power due to its non-volatile characteristics. As its name indicates, the content stored by ROM cannot be edited, it can only be read. It is useful for storing such kind of data that doesn't require any change in future.

### **Types of Read Only Memory (ROM):**

Read only memory (ROM) has three types which are as follows:

- A. Programmable Read Only Memory (PROM)
- B. Erasable Programmable Read Only Memory (EPROM)
- C. Electrically Erasable Programmable Read Only Memory (EEPROM)

#### **Programmable Read Only Memory (PROM):**

Programmable read only memory (PROM) is a kind of chip which is created blank, and then the user may add the content in the chip as desired. However, once the chip is programmed it becomes read only.

#### **Erasable Programmed Read Only Memory (EPROM):**

It is another kind of ROM. It involves a chip that can be reprogrammed more than once. A chip once programmed can be erased by exposing it to strong ultraviolet light from a mercury-vapour light source. It is suitable for testing and developing new applications, because of its ability to be reprogrammed.

#### **Electrically Erasable Programmable Read Only Memory (EEPROM):**

EEPROM is user-modifiable read only memory that can be erased and reprogrammed repeatedly through the application of higher than normal electrical voltage. It is a kind of read only memory whose contents can be erased and reprogrammed using a pulsed voltage.

#### **2.4.2. Secondary Storage Devices:**

Secondary storage device is also known as external memory, secondary memory and auxiliary storage. A secondary storage device is a non-volatile device that holds data until it is deleted or overwritten. External hard drivers and other external media are known as secondary storage devices.

Types of Secondary Storage Device:

Following are the main types of secondary storage devices:

- A. Hard Disk Drive
- B. magnetic Tape
- C. Magnetic Disk



### **Hard Disk Drive:**

A hard disk drive is a non-volatile memory hardware device that permanently stores and retrieves data on a computer. It consists of one or more platters to which data is written using a magnetic head, all inside of an air-sealed casing.

### **Magnetic Tape:**

It is another kind of secondary storage device. Magnetic tapes are mainly used for recording and storing data. It is a plastic reel similar to long lengths of movie film. A tape is usually ½" wide and 2400 feet in length. It is coated with particles of ferric oxide on which data can be recorded magnetically. The records on magnetic tape are stored in sequential order.

### **Magnetic Disk:**

A magnetic disk is a circular metal plate coated on both side by ferrous oxide material. It uses magnetization process to write, rewrite and access data.

## **3. Computer Software:**

Software is a computer programme that gives instructions to computer hardware about what to do and how to do it. A computer cannot do anything on its own. It must be instructed to do a job desired by us.

Computer software is a programme that provides instructions to computer hardware to do a specific task such as preparing documents, sorting information, performing computations etc. Computer software are intangible in nature.

Computer software can be divided into three categories which are as under:

- A. System Software
- B. Application Software
- C. Utility Software

### **3.1. System Software**

System software is a set of one or more computer programmes designed to control and extending the processing power of a computer system. The programmes included in a system software package are known as system programmes.

System software is a kind of software that manages and controls computer hardware so that application software can perform a task.

Operating system is the example of system software.

### **What is an Operating System?**

The operating system is a kind of system software required by the computer to make sure that it works correctly and efficiently. Without an operating system a computer can't be open. It manages the computer and allows the user to communicate with computer hardware.

Modern operating systems are typically stored on Hard disk and loaded into RAM when the computer is switched on. Storing the operating system on disk means that it can be easily updated.

The most important part of an operating system is the bootstrap loader. The bootstrap loader is permanently stored in ROM. The bootstrap loader starts to run when the computer is first switched on. The main function of bootstrap loader is to check up the functionality of the RAM and input/output devices of a computer system. After this check up, it loads the operating system (OS) into RAM and the OS takes over control.

The examples of operating system include Windows XP, Windows7, Windows8, Windows10, Linux, UNIX and Mac OS etc.

**Compiler:**

A compiler is a program that reads a program in one language (source language) and translates it into an equivalent program in another language (target language).

Following table shows an example of source language and target language:

Source Language	Target Language
'C' Language	'C' Language
'PASCAL' Language	'Machine' Language

**Interpreter:**

An interpreter is another kind of system software. It translates and executes instructions written in a computer programming language line-by-line, unit-by-unit etc.

**3.2. Application Software:**

Application software is a set of one or more programmes designed to solve a specific problem or do a specific task. Some commonly known application software are:

**Word – processing Software:**

Word-processing software make use of a computer for creating, editing, viewing, formatting, storing, retrieving, and printing documents. Microsoft Word is an example of word processing software.

### **Spreadsheet Software:**

Spreadsheet software is mainly used for numeric data analysis. It is a tool that allows us to create a kind of computerized ledger. Microsoft Excel is an example of spreadsheet software.

### **Database Software:**

It is another kind of application software. Database software is mainly used to store the important data of the user. Microsoft Access is an example of database software.

### **Graphics Software:**

It enables the user to create and edit pictures, graphs etc. Microsoft Power-point is an example of graphics software.

### **Educational Software:**

Educational software allows a user to utilize his/her computer as a teaching and learning tool.

### **3.3. Utility Software:**

Utility software is a kind of system software designed to help analyze, configure, optimize or maintain a computer system.

Disk editor and virus checker are the main types of utility software.

#### **Disk Editor:**

Disk editor is a utility program that enables a user to read, edit and write the low level raw data on a disk. It can be used to repair or reconstruct damaged files and directories. This type of utility gives a user complete power over the contents of every block on the disk and so it requires considerable knowledge and care to use it effectively.

#### **Virus Checker:**

**Virus:** A computer virus is a type of malicious software program (malware) that, when executed, replicates by reproducing itself. Reproducing itself means copying its own source code. A computer virus infecting other computer programs. It can modify other programs. The programs which are affected by a computer virus may include data files, or the boot sector of the hard drive.

Virus checker is a kind of utility software which identifies such kind of viruses available in the computer system and helps the user to resolve them. A virus checker examines a computer system to find virus software. A good virus checker will constantly work in the background and checking for signs of virus activity.

Viruses can be classified by the type of file which they infect. Following are the some types of viruses:

### **A. File Virus:**

A file virus attaches itself to an executable file (program which you can run). It may be attaches with a Word file document, Photoshop file etc.

### **B. Boot Sector Virus:**

A boot sector virus infects the system files that your computer uses when the bootstrap loader begins. Due to boot sector virus a computer system can't be able to work properly.

### **C. Macro Virus:**

A macro virus contains instructions which may damage a document or other software. It causes a sequence of actions to be performed automatically when the application is started or something else triggers it. Once a macro virus gets onto your machine, it can embed itself in all future documents you create with the application.

## **4. Difference between Viruses, Worms and Trojan Horses:**

Viruses, worms and Trojan horses are not same. They all are different from each other.

### **Virus:**

A virus is a program or programming code that replicates itself into another program or document. A virus cannot be spread without a human action.

### **Worms:**

Worms spread from computer to computer and unlike a virus, have the ability to travel without any help from a person. A worm does not alter files but resides in active memory and replicates. Worms use parts of an operating system that are automatic and usually invisible to the user.

Due to the ability of worms to travel across networks, it consumes too much system memory. This causes Web servers, network servers, and individual computers to stop responding.

### **Trojan Horses:**

Trojan horses do not reproduce by infecting other files nor do they self-replicate. At first glance they will appear to be useful software but will actually do damage once installed or run on your computer.

A Trojan horse or Trojan is a type of malware that is often disguised as legitimate software. Trojans can be employed by cyber-thieves and hackers trying to gain access to users systems. Users are typically tricked by some form of social engineering into loading and executing Trojans on their

systems. Once activated, Trojans can enable cyber-criminals to spy on you, steal your sensitive data, and gain backdoor access to your system.

A Trojan can delete your important data, block data, modify your data, copying your data and disrupting the performance of computers or computer networks.

### **Antivirus:**

Antivirus software is a kind of utility software designed to protect your computer or network against computer viruses. If and when a virus is detected in the system, the computer displays a warning and asking what action should be done. It often giving the options to remove, ignores, or moves the file to the vault.



### Summary:

**Antivirus:** It protects your computer from viruses.

**Computer:** A computer system is a combination of an input device, a processor and an output device.

**Hardware:** All physical components that constitute a computer system are known as computer hardware.

**Software:** Computer software is a program that provides instructions to computer hardware to do a specific task such as preparing documents, sorting information, performing computations etc.

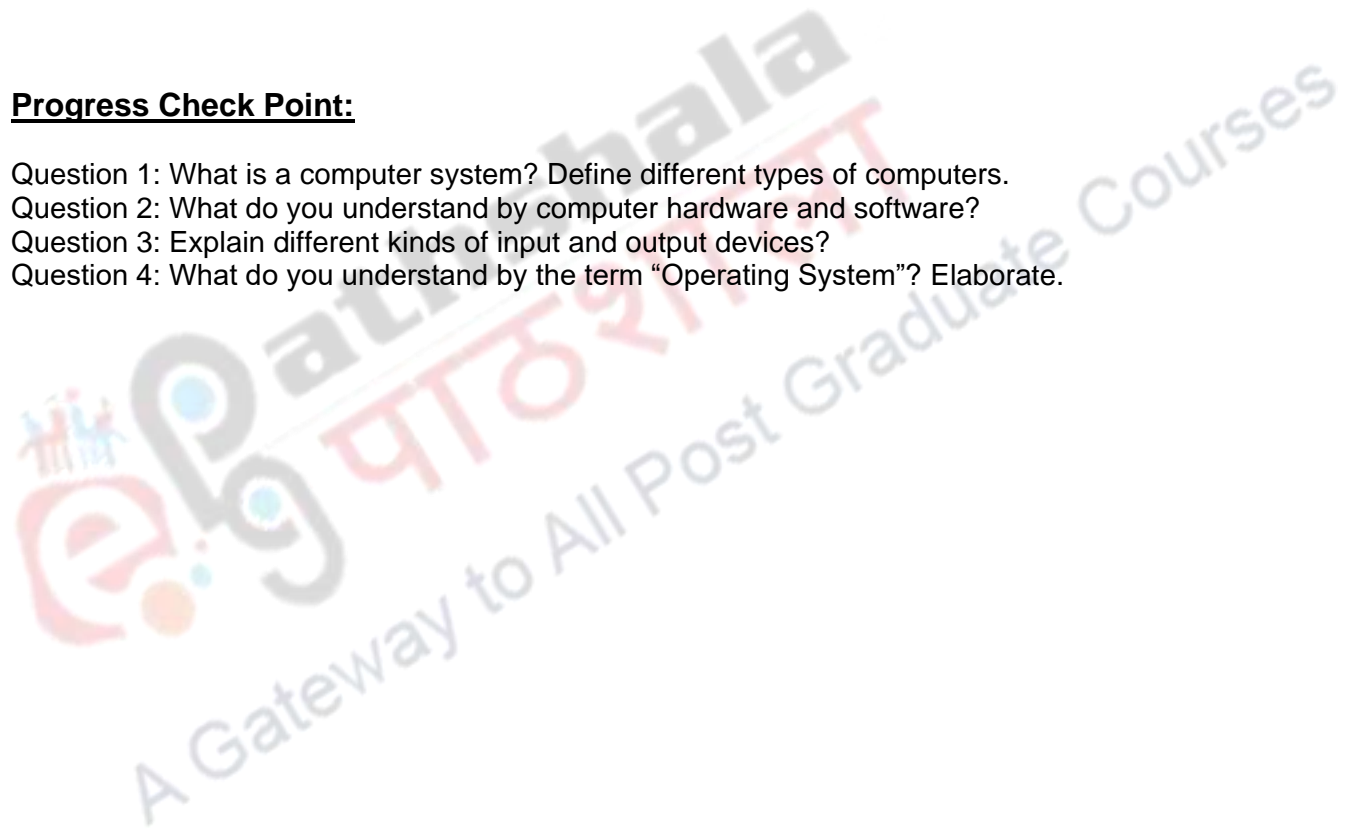
### Progress Check Point:

Question 1: What is a computer system? Define different types of computers.

Question 2: What do you understand by computer hardware and software?

Question 3: Explain different kinds of input and output devices?

Question 4: What do you understand by the term "Operating System"? Elaborate.





References:

1. [www.google.com](http://www.google.com)
2. [www.wikipedia.com](http://www.wikipedia.com)
3. [www.computerhope.com](http://www.computerhope.com)
4. [www.slideshare.net](http://www.slideshare.net)
5. [www.kaspersky.co.in](http://www.kaspersky.co.in)

