

Hardware and software

1. **Hardware:** is the tangible and physical electronic parts of a computer which have fixed shape and size. Hardware includes all components such as input, output, processing and storage devices and other physical media.
2. Computer Hardware can be classified into 4 categories based on functions:
 - a. **Input device / unit :** are the hardware that take input (instruction and data), convert input into machine language and send for processing - Eg : keyboard , Mouse, light-pen, scanner, digital camera etc.

Roles of input devices are:

- It takes/ accepts input (data and instruction) from the user,
- It convert input into machine language and
- It sends input into CPU for processing

- b. **Processing device / Unit:** are the parts that process data according to given instructions and also control over all systems of the computer. Eg : CPU. **CPU (Central Processing Unit):** is the main information processor that executes all software and operates hardware.

Components of CPU:

- i. Control unit (CU): controls and supervises all hardware and software .
- ii. Arithmetic and Logic Unit (ALU): performs all the mathematical analytical operations.
- iii. Register Array provides working space to ALU and CU.

- c. **Output device / unit:** are the parts that take results from the CPU and deliver to the user. There are two types of output device according to nature of output (results):

- i. Softcopy output device: • Speaker, • Projector, Monitor etc.
 - ii. Hardcopy output device: Printer, Plotter etc.

Roles of Output device:

- It accepts result from CPU
- It converts result into human understandable form
- It supplies the converted result to the user.

- d. **Storage device / Memory unit:** are the parts of computer that hold data, documents and software for temporary or permanently. Eg. : HD, RAM, ROM etc.

Types of Memory unit :

i. **Primary memory**

1. Volatile RAM, SRAM, DRAM, Cache memory
2. Non-Volatile Rom EROM PROM ect.
3. Virtual memory.

ii. **Secondary memory:**

1. Magnetic disk: Hard Disk Floppy disk
2. Optical disk: Blue-ray disk DVD
3. Flash disk: SD card SSD, pendrive,
4. Cloud storage

Difference between Primary and Secondary Memories:

Primary Memory	Secondary Memory
It is main memory	It is auxiliary memory
It has less memory power/ storage capacity	It has high storage capacity/ memory

It is expensive	It is cheaper
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Difference between volatile and non-volatile memory:

Volatile memory: RAM(Random Access Memory)	Non-volatile memory: ROM(Read Only Memory)
It holds data and program for temporarily	It holds data and program for permanently
Data can be changed in volatile memory	Data can not be changed in non-volatile memory

Full forms :

CPU : Central Processing unit

ALU : Arithmetic Logic Unit

RAM : Random Access Memory

ROM : Read Only Memory

OSS - Open Source Software

3. **Program** : is the set of instructions given to a computer to carry out the task .
4. **Software**: is the set of programs designed for specific tasks, by making hardware and human-ware functional.
5. **There are 2 types of software :**
 - a. **System Software:**
 - i. Operating system software
 - ii. Utility system software
 - iii. Language Translation
 - iv. Device drivers
 - b. **Application software Package software Tailored / Customised software:**
6. **System Software:** are the main software of the device / system designed to control, supervise and manage all operations. It is hardware oriented software
7. **Application Software:** are the software designed to solve specific tasks. It is users' problem oriented.
8. **Operating System Software:** is the main software designed to control and supervise all hardware, software and their functions (operations). Eg: Windows 10, Windows 11, Android 10s, Mac OS etc.
9. **Functions of Operating System Software:**
 - a. To make all hardware and software workable
 - b. To control input, output and devices.
 - c. To manage files in memory
 - d. To make computer communication with other devices
 - e. To provide a user-friendly working environment .
10. **Device Driver:** is a system software designed for any particular device that makes communication with CPU / computer. Eg: Printer driver, Scanner driver etc.
11. **Utility Software:** is the system software designed to manage and maintain errors and notify about to the user. Eg : Antivirus softwares, disk defragmenter etc.
12. **Language translators:** are the parts of operating system software that translates high level (human) language into machine level language and vice-versa
13. **Types of language translator:**
14. **Compiler:** is designed to translate the whole instruction (program) at once.
15. **Interpreter:** is designed to translate instruction by instruction / one instruction at a time.
16. **Assembler:** is designed to translate only assembly language.

17. **Package Software:** are the app/ software designed for general purpose to solve the common tasks.
E.g.: MS - Words, MS-Powerpoint, MS - Excel .
18. **Customised/ Tailored Software:** an app / software designed for a specific or particular group as per users' requirements. E.g: Billing software of a school, Result and certificate publishing software etc.
19. **Programming Language** is the language/ script used to program for the computer. It is a building block for all types of software.

Types/ classification/ categories of programming languages:

- a. First Generation / machine level language
- b. Second Generation / Assembly language
- c. Third Generation / High level language
- d. Fourth Generation / Problem oriented language

20. Difference between System software and Application software:

System software	Application software
It is main software for the device	It is secondary software for the device
It is designed for hardware, hardware oriented	It is problem oriented / designed to solve users' problems
It comes with device as installed	It is needed to buy and install.

21. Difference between Packaged and Tailored Software:

Packaged Software	Tailored Software
It is designed to solve general problems/ tasks	It is designed to solve specific problems/ tasks
It is designed for general people	It is designed for individual or specific groups.
It is cheaper	It is expensive