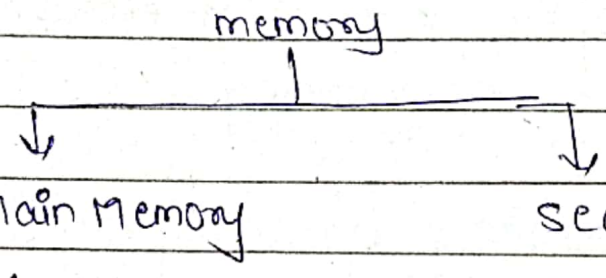
Computer: A programmable electronic device designed to accept data, perform prescribed mathematical and logical operations at high speed, and display the results of these operations.

Components of computer hardware

1. Memory:- This is used to store programs as well as data
- It is measured in units of bits, bytes and words.



* It is a semiconductor memory, used for permanent storage temporary storage of program and data. Eg: RAM, ROM.

* It is a magnetic memory used for permanent storage of programs and data Eg: Floppy disk, hard-disk

2. Input Unit: An input device delivers the response of the user to the computer system there by providing man-to-machine communication.
- The input unit comprises a variety of devices such as the keyboard, mouse, optical mark reader (OMR) disk etc.

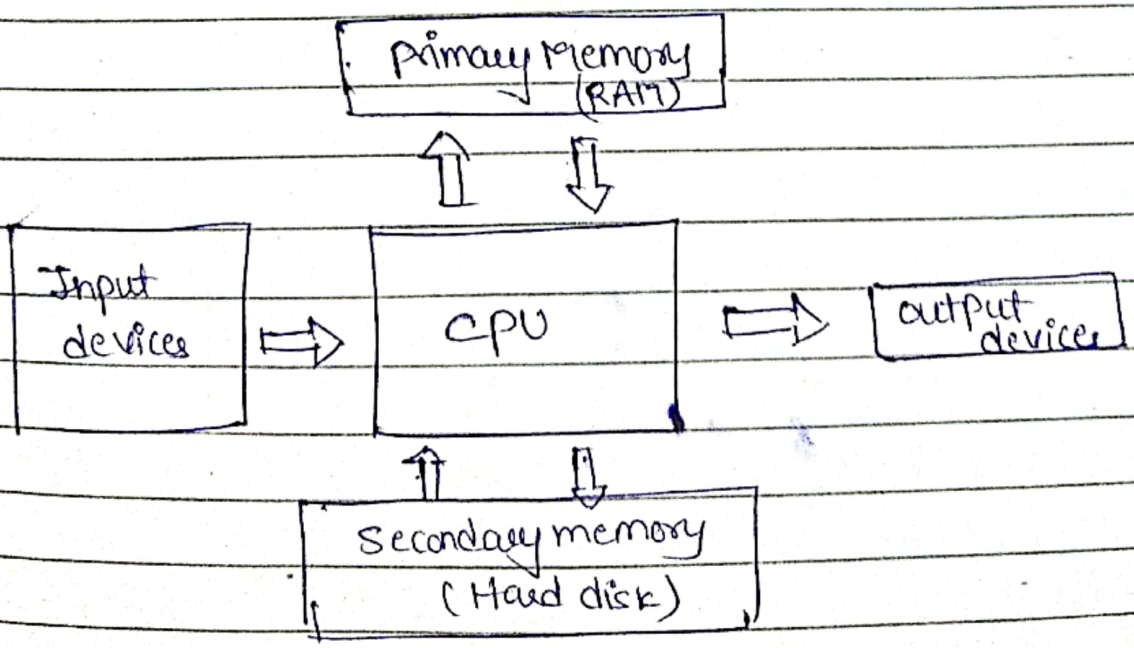
3. Central processing unit: This unit is also called the 'processor' indicating that it is the main component of the computer system that process

the instruction as well as data. It performs the following tasks:

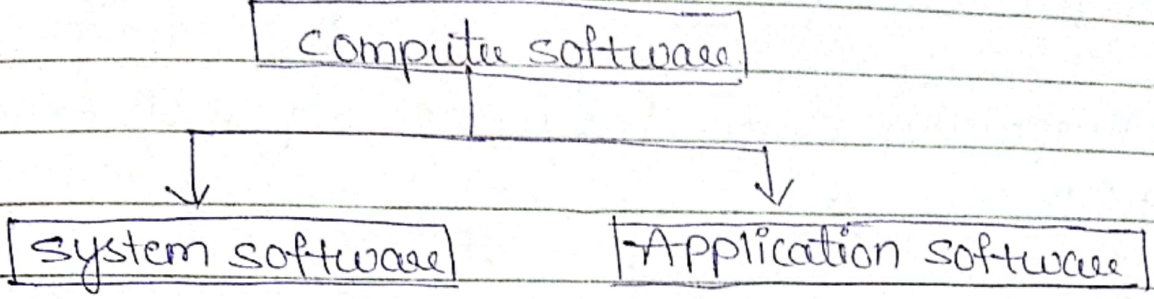
a. Fetches instructions from the memory
b. Interprets (understand) the fetched instruction to determine what action is to be performed and on what data
c. Fetches data, if required, from the main memory or an input device
d. performs arithmetic or logic operations on data
e. Writes data to the target location in memory or a device.

4. Output Unit: An output device delivers the results of a program to the user thereby providing a way of machine-to-man communication.

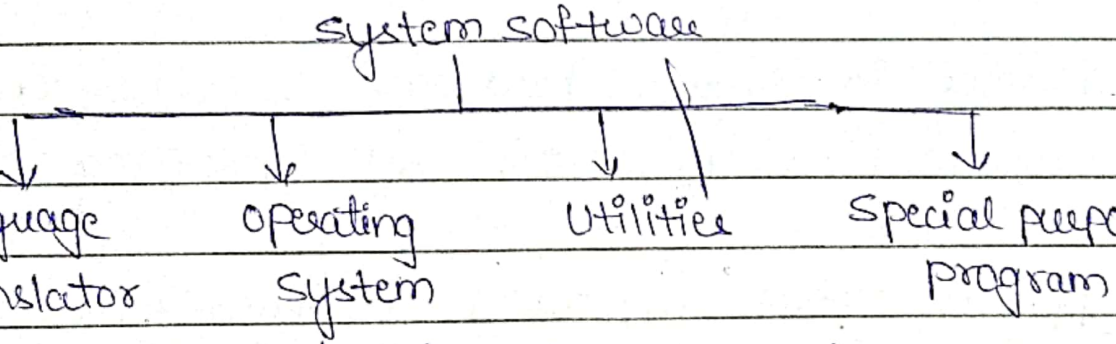
- The output unit comprises a variety of devices such the computer screen, printer, plotter, disks.



Compute software can be broadly classified into 2 categories: system software and application software



System software:
It is a collection of programs that interfaces with the hardware.



* categories of system software.

Language translator: It is a system software that transforms a compute program written by a user into a form that can be understood by the machine.

Operating system [OS]: This is the most important system software that is required to operate a compute system.
→ An operating system manages the computer resources effectively, takes care of scheduling multiple jobs for execution, and manages the compute resources effectively, take care

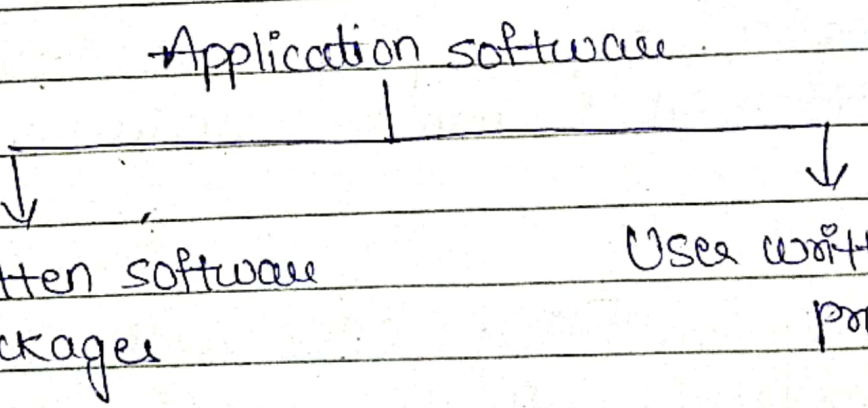
of scheduling multiple jobs for execution, and manages the flow of data and instructions between the input/output units and the main memory.

→ An operating system has become a part of computer s/w with the advent of the third generation computers.

→ Since then a number of operating systems have been developed and some have undergone several revisions and modifications to achieve better utilization of computer resources.

→ Advances in computer hardware have helped in the development of more efficient operating systems.

* Application software: It is written to enable the computer to solve a specific data processing task.



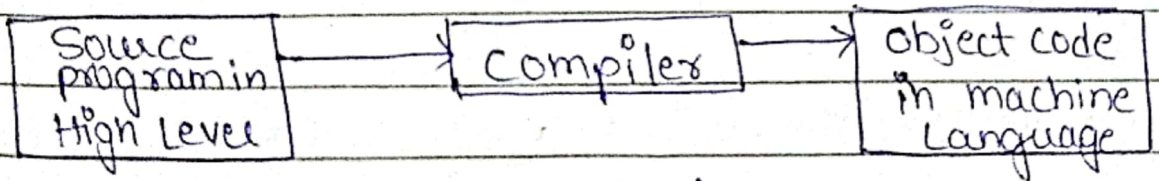
* categories of application softwares.

→ The most important categories of software packages available are.

→ Database management software
→ spreadsheet software
→ Word processing, Desktop publishing and presentation software
→ multimedia software
→ Data communication software
→ statistical and operational research software.

COMPILER:, INTERPRETER:

- For executing a program written in a high-level language, it must be first translated into a form the machine can understand.
- This is done by a software called the compiler.
- The compiler takes the high-level language program as input and produces the machine language code as output for the machine to execute the programs.



compiler action.

- During the process of translation, the compiler reads the source program statement wise and checks for syntax errors.
- In case of any errors, the computer generates a printout of the same.

This action is known as diagnostics.

→ There is another type of software that also does translation. This is called an Interpreter.

* Differences between a compiler and an Interpreter.

Compiler	Interpreter
1. scans the entire program before translating it into machine code.	1. Translates and Executes the program line by line
2. Converts entire program to machine code and executes program only when all the syntax errors are removed.	2. The interpreter executes one line at a time, after checking and correcting its syntax errors and then converting it to machine code.
3. Slow in debugging of removal of mistakes from a program	3. Good for fast debugging
4. program execution time is less	4. program execution time is more.
5. Debugging is difficult	5. Debugging is easy

Compiles phases:

→ preprocessor
- compiler
- Assembler
- Linker.

preprocessor: The source code is the code which is written in a text editor and the source code file is given an extension ".c". preprocessor expands this source code is passed to compiler.

Compiler: compiler converts this code into assembly code.

Assembler: The assembly code is converted into object code by using an assembler.
- The name of the object file generated by the assembler is the same as the source file.

Linker: All the programs written in C use library functions. These library functions are precompiled, and object code of these library files is stored with '.lib' extension.

- The main working of the linker is to combine the object code of library files with the object code of our program.

Steps involved in problem solving:

The following is the seaurence of steps involved in solving a problem using computer.

a. problem definition:

- Includes stating the problem clearly and unambiguously, and clearly understanding of what is reaaired for its solution.

b. problem analysis: Involves the identification of
a) inputs i.e., the data that are to be manipulat
b) outputs, i.e., the expected results and
c) other additional requirements or constraints, if any, on the solution.

c. Algorithm design:

- Involves the design of the procedural solution for the problem, i.e. step by step procedure to arsive at the expected outputs by giving the available inputs in the problem domain.

- If the given problem is complex, we can adopt top-down design approach, i.e., the given problem is broken down repeatedly into smaller, easily understandable and manageable sub problems.

- The process of breaking down a given problem is also called as step-wise refinement.

d. coding: Here the algorithm designed is converted into a program using a programming language.
- Each step in the algorithm is realized by means of one or more statements in the programming language.

e. Testing and debugging.
- Testing involves verification of the correctness of the program created.
- Debugging is the process of detection and correction of errors in the program code like syntax errors, runtime errors and logical errors.

f. Documentation: It includes recording the general description of the program's behaviour under different situations and its special features.
There are two types of documentation namely
- Technical documentation: Involves the technical details of the program which are of use for its further maintenance by the programmers
- User documentation: Involves instructions about the usuage of the program.

g. Maintenance: Maintenance of programs is another vital step. Due to the fact that the user requirements keep changing, the programs also need to be changed to meet the changing requirement.