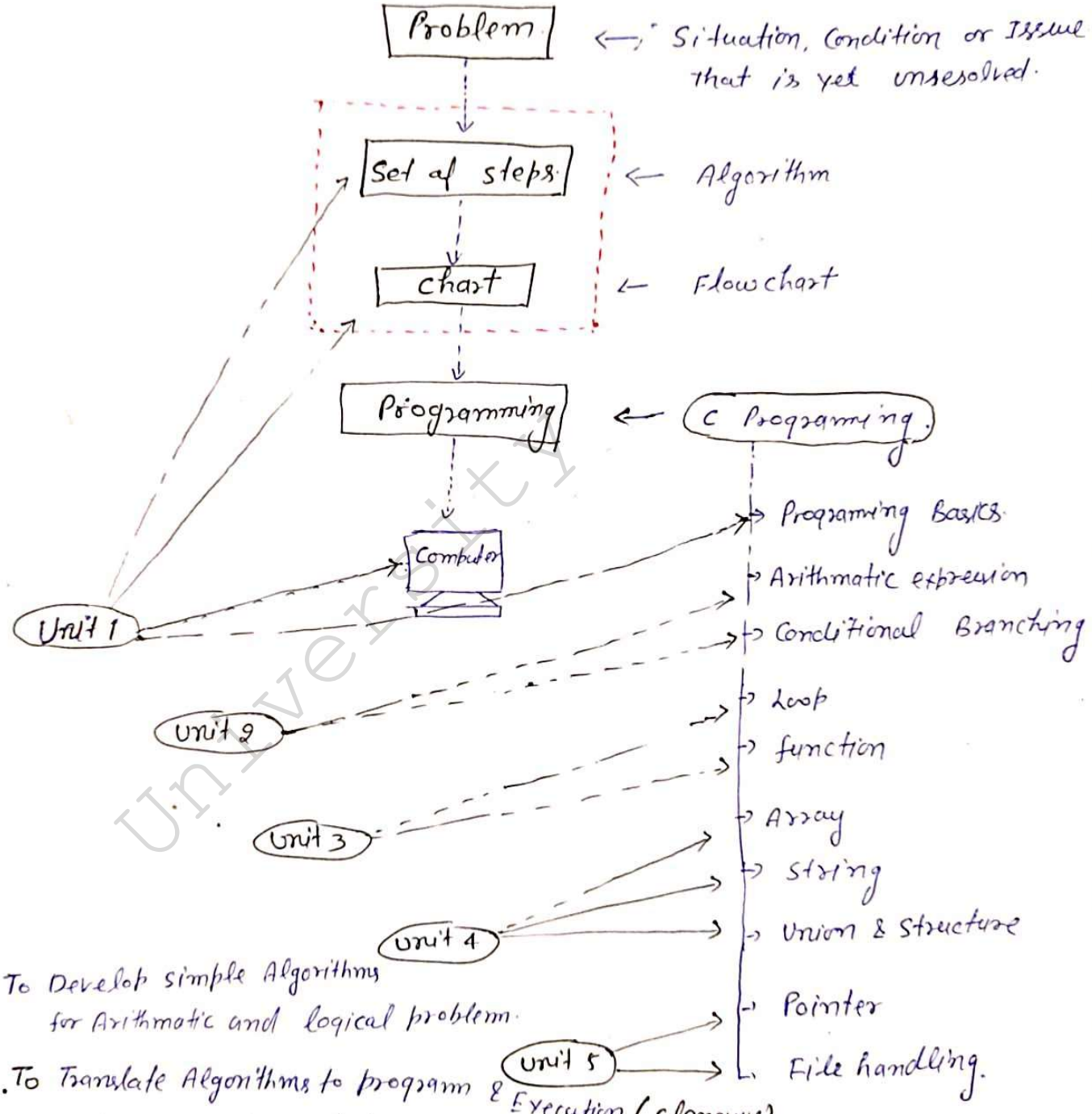
PROGRAMMING FOR PROBLEM SOLVING

Overview of Subject



CO1: To Develop simple Algorithms for Arithmatic and logical problem.

CO2: To Translate Algorithms to program & Execution (clanguage)

CO3: To Implement conditional branching, Iteration & Recursion

CO4: To Decompose a problem into functions and synthesize a complete program using devide & conquer approach.

CO5: To Use Array, pointer, and structure to develop algo and program.

UNIT - 1

1.1 What is Computer ?

Computer is a programmable electronic device designed to solve different problem, process data, store and retrieve data, perform faster & efficiently than human.

The term computer is derived from Latin word "Computare" this's mean to calculate, to count, to sum up, or to think together.

History of Computer

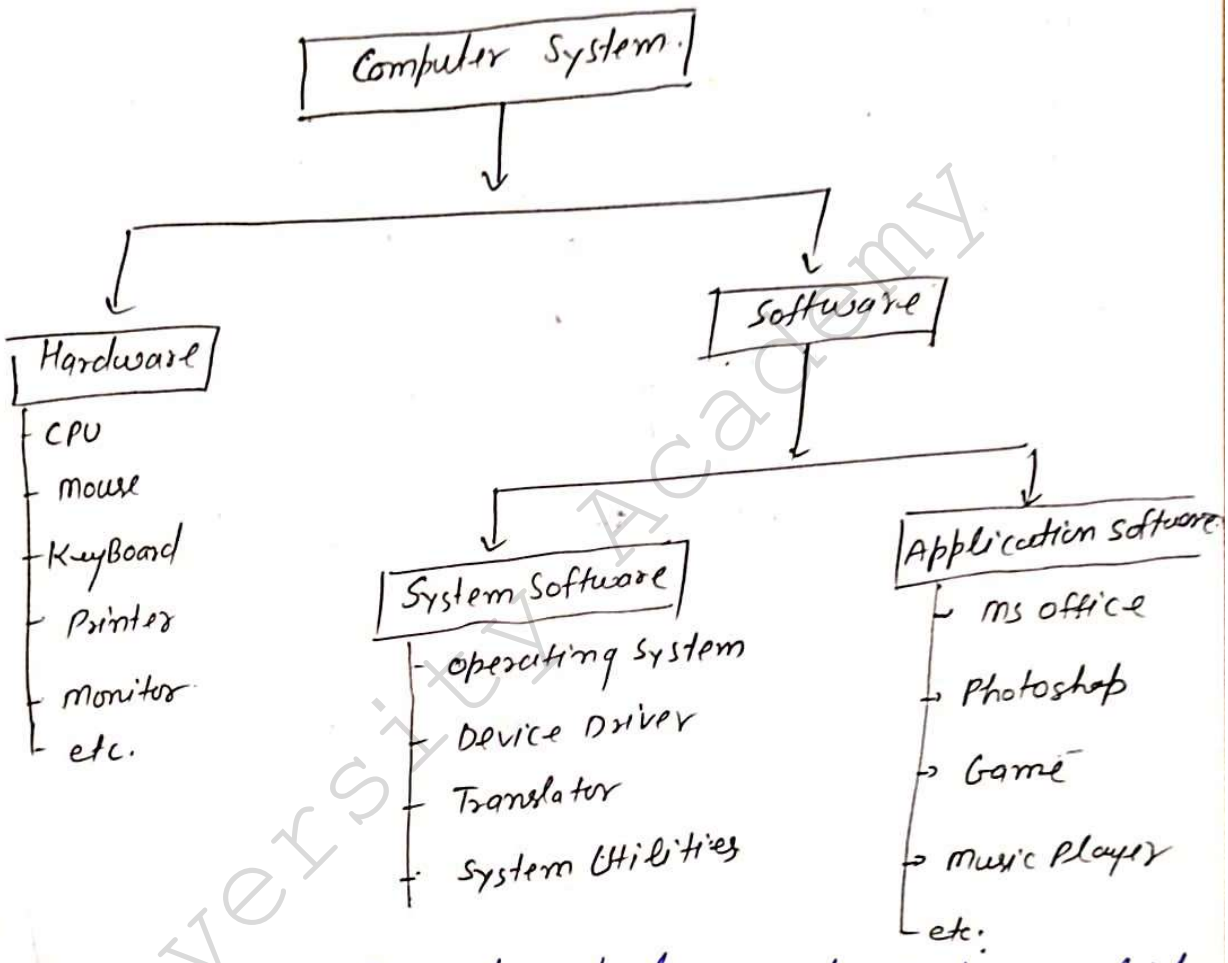
1. ABACUS : To count number, invented around 4000 years ago.
2. Napier's Bone : To multiply and divide invented in 1617.
3. Slide rule : To perform Addition, Subtraction, multiplication and division, invented in 17th century.
4. Pascal's Machine : To perform Addition and subtraction, invented in 17th century.
5. Leibniz's Machine : To perform multiplication & division, invented in 17th century.
6. Computer : Charles Babbage built mechanical machine to do complex calculation. in 1823.

Generation of Computer

Generation	Technology (Chips)	Language.	Speed (time)	Size (Infrastructure)	Example.
First Generation (1940-1956)	Vacuum Tube	Machine Language (0,1)	Milliseconds	Large room	UNIVAC, ENIAC
Second Generation (1957-1963)	Transistors	Assembly Language	microsecond	Reduced size	PDP-8 IBM 1401
Third Generation (1964-1971)	Integrated circuits.	High level Language (eg. C, C++, JAVA)	nanosecond	Quite small	IBM 370, PDP 11.
Fourth Generation (1972-1980)	Microprocessors VLSI (very Large Scale Integration	High level Language	Picoseconds	Personal computer: Small size	IBM, Apple,
Fifth Generation (1980- Present)	Artificial Intelligence Super large scale Integrated (SLSI)	High level Language, Machine learning	femto second or faster.	very small	Expert System NLP, Speech Reco; Supercomputer

1.2 Introduction to Components of a Computer System.

A Computer system consist two major component Hardware and software;



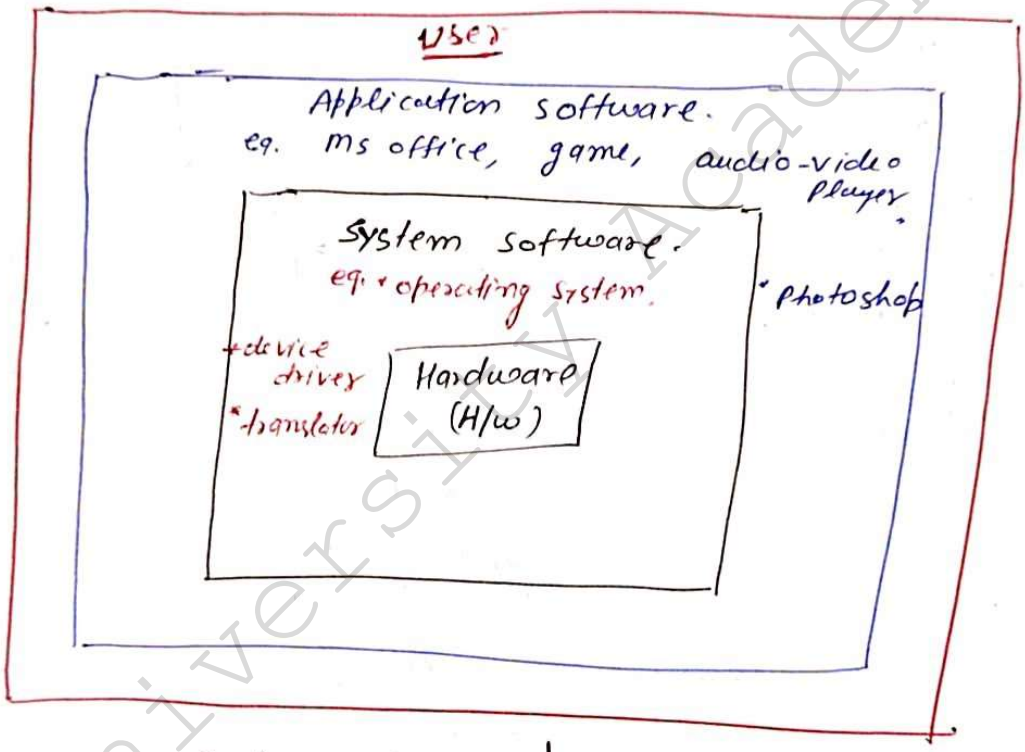
Hardware: The Physical component of computer system which can interconnected called Hardware. we can see and touch it. eg: CPU, Mouse keyboard, Printer, moniter etc.

Software: The set of Instruction to perform any operation is called Program and the collection of program is called software. the computer cannot perform any operation without software.

There are two type of software : System s/w and Application s/w.

System Software: System Software is set of programs that control and manage the operation of computer hardware, it also helps Application program to execute correctly.

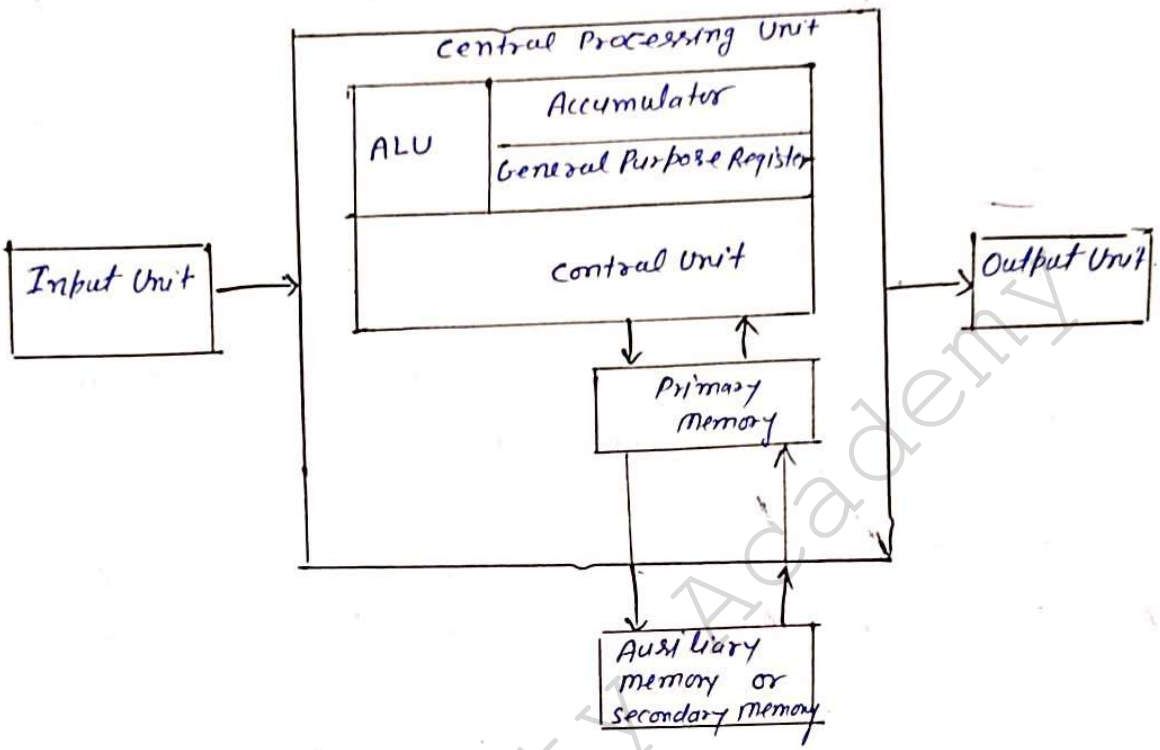
Application Software: Application software is a program that does real work for user. It mostly created to perform specific task for a user.



System software Vs Application software.

System software	Application software
1. System s/w manage the resource of computer like memory, process, security.	1. Application s/w full fill the requirement of user to perform specific task.
2. Written in Low level like Machine or Assembly language.	2. A High level language used to write Application s/w.
3. It is general purpose software	3. It is specific purpose software.
4. System s/w are independent of Application s/w.	4. Application s/w need system s/w to run.
5. Example: OS, Compiler, driver etc.	5. Example: ms office, web browser, media player

1.2.1. Block Diagram of Computer System.



Central processing Unit (CPU) : It is the Brain of Computer System. All major calculation and comparisons are made inside the CPU. It is also responsible for activation and controlling the operation of other unit.

the CPU Consist of two major component (i) Arithmetic logic Unit (ALU) and (ii) Control Unit (CU)

Arithmetic logic Unit (ALU) : ALU Performs all the arithmatic operation such as addition, Subtraction, multiplication and division and uses logical operations such as AND, OR, NOT etc.

Control Unit (CU) : CU Controls all the operation including control of input/output devices and primary memory.

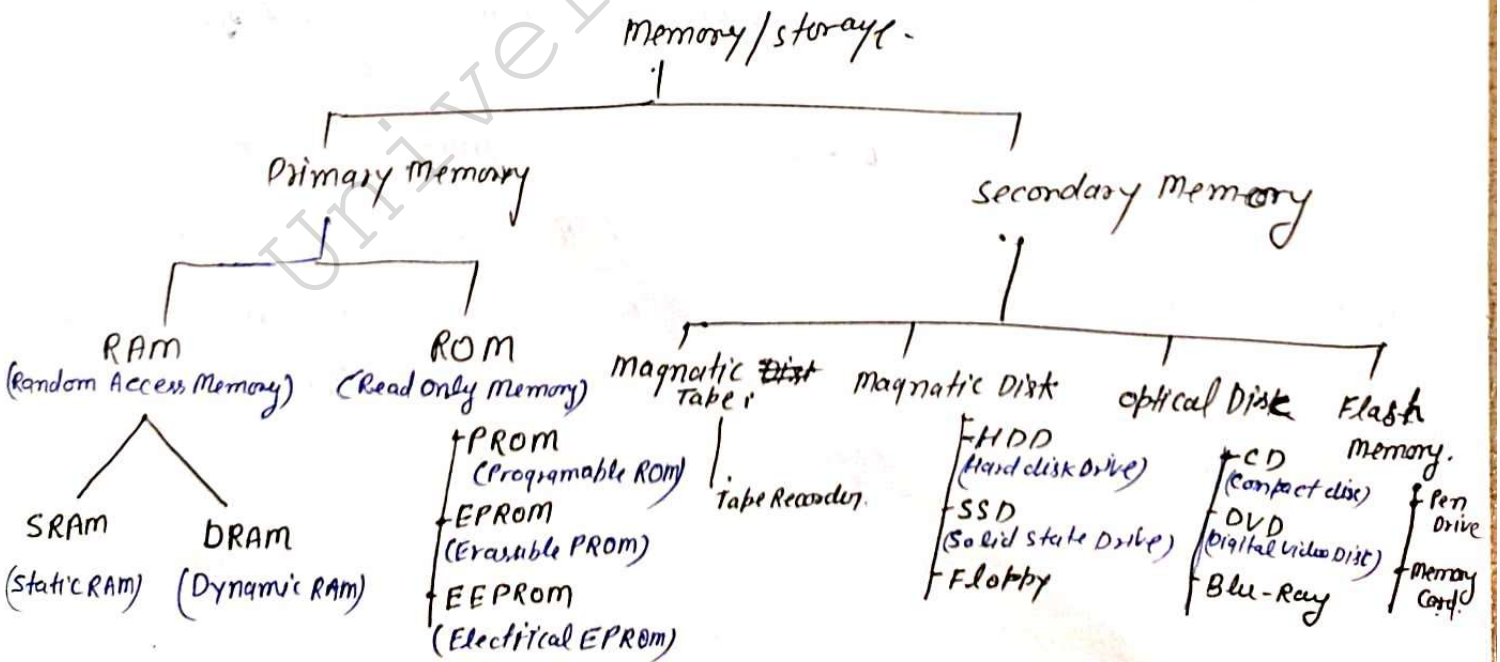
Primary Memory: It is simply known as memory unit. It is essential component of computer. It stores the input data and calculation result. eg. RAM (valatile), ROM (Non-Valatile)

Auxiliary Memory: It is also known as secondary storage. It stores data permanently for long time. eg. Harddisk, CD, DVD.

Input: the user provide the set of instruction or information to the computer system with the help of Input devices. eg. Keyboard, Mouse, Scanner etc.

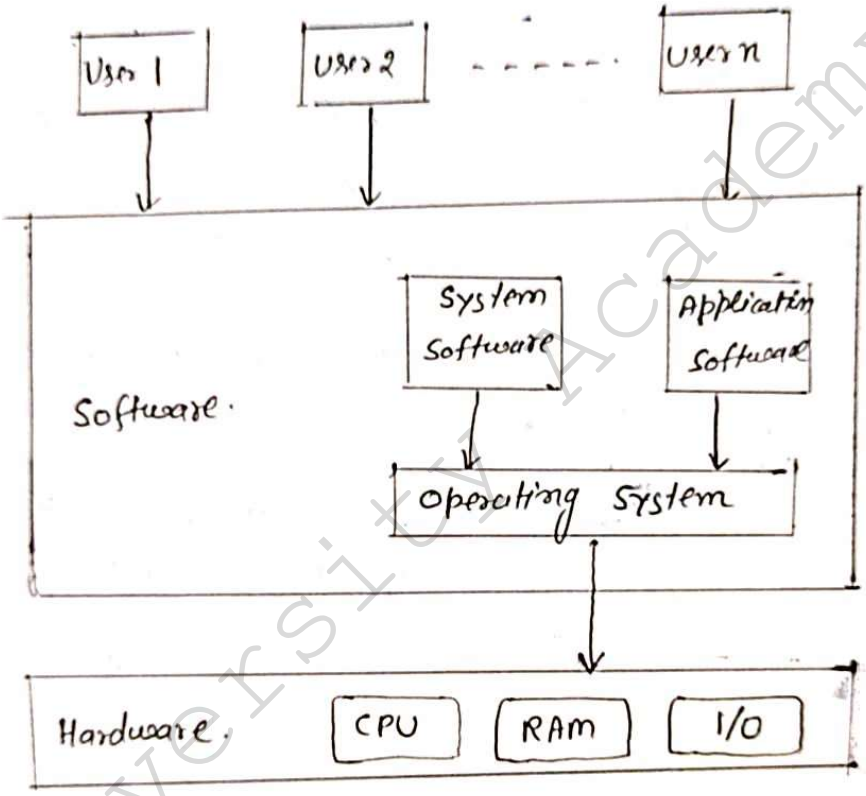
Output: the Output devices produce or generate the desired result according to our input such as printer, monitor etc.

1.2.2 Memory / storage Classification.



1.2.3. Operating System:

An operating system is a program that acts as an interface betⁿ the user and the computer hardware and controls the execution of all kind of programs. Some popular operating systems are. Linux, Windows, MacOS. etc.



Functions of operating System.

i) Memory Management: It refers to management of primary memory and keep track of it. Operation system also do the allocation and de-allocation of the memory.

2) Process Management: All the processes these are given by user or system own process are handled by the operating system.

3) Device Management: Operating System keep track of all devices such as input/output devices. OS also decide which process gets the device when and for how much time.

4) File Management: A file is normally organized into directories. for easy navigation and uses. the directories may contain files and other directories.

5) Security: operating System prevents unauthorized access of program and data by providing user login with passward.

6) Error Detecting: OS Produce error messages for any software and hardware failure.

7) Provide the Translator: Provide the assemble to translate each Instruction in binary form (0, 1).