Algorithm

For solving a problem in a computer a detailed set of instructions are necessary which is given to a computer. Such a set of instructions which leads to a step by step procedure for solving a problem is called an algorithm.

An algorithm coded in a computer language is called a program and the language used for coding is called a programming language.

The program is typed using a keyboard which is an Input/output unit. From the I/P unit the program is transferred to the memory of the computer. Execution of the program is initiated after the entire program is stored in the memory. To begin execution, the first instruction is decoded by the control unit. This unit activates and supervises the execution of the instructions.

E.g.: A Fibonacci series

0, 1, 1, 2, 3, 5, 8, 13, 21, 34…

Algorithm of Fibonacci series

previous term ← 0

current term ← 1

new term ← current term + previous term

write previous term, current term, new term

while new term ≤ 100 do

begin

previous term ← current term

current term ← new term

new term ← current term + previous term

write new term

end

stop

The “while” instruction is a very useful instruction which sets up a repetitive cycle of computation called a program loop. This loop is called a while loop.

The word ‘begin’ and ‘end’ are used to group statements and writing ‘stop’ or ‘end’ completes the program.

Flow Chart: Flow chart is a diagrammatic representation of an algorithm. These diagrams are used to show program and processes

Flow chart symbols

Start: It represents the start of a program. Usually ellipse or rounded squares are used to represent start.

Arrow: arrow represents flow of control in a program. Usually it means going from one command to another.

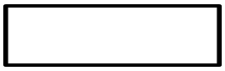
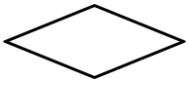
Rectangles: It is used to show computation on specific process.

Parallelogram: It is used for getting I/P or sending O/P to the user.

Rhombus: It is used for conditional flow control where program has to decide which way to go.

End: End represents the end of a program. Usually ellipse or rounded squares are used.

The table below describes all the symbols that are used in making flowchart

Symbol	Purpose
	Flow line
	Terminal (Stop/Start)
	Input/output
	Processing
	Decision
	On-page Connector
	Off-page Connector

Computer programming

A computer program is a sequence of instructions that a computer follows to solve a particular problem. Computer programs are written using one of the programming languages (FORTRAN, C, C^{++} etc). A program has a set of instructions written in correct order to get the desired result. The method of writing the instructions to solve the given problem is called programming.

High level language and its advantages

C is a general purpose high level language that was originally developed by Dennis M. Ritchie to develop the UNIX/ Linux operating system.

The advantages of high level language are:

Easy to learn

It produces efficient programs

It can handle low level activities

It can be compiled very easily

Linux

LINUX can view and edit the source code for the operating system. It is stable, fast and powerful. It is designed for multi-users. Sharing of data and program is done very easily.

The main parts of LINUX operating system are:

i) Kernel
ii) Shell
iii) Programs

Kernel is the hub of the operating system. It allocates time and memory to the program and handles the file.

Shell is the interface between the user and the Kernel. When the user logs in, the login program check the user name and password and then starts another program called the Shell.

Operating system (OS)

An operating system is a program which connects the user and the electronic hardware in a computer. It has a set of programs which supervises the activities of a computer and controls the operations of the hardware components such as CPU, main memory, disk drives, key board, monitor, printer etc. Service programs available in operating system for operations like copying a file, deleting a file, formatting a disk, printing a file are usually stored in the disk. Operating system programs are also called System Software. There are many operating systems used in computers. Commonly used OS are MS-DOS, Windows 95/98/2000, UNIX etc. OS is used to link the hardware and application software i.e. program → Instructions.

An OS is a program that controls the execution of application program and acts as an interface between applications and computer hardware.

Array and a string

An array is a fixed-size sequenced collection of elements of the same data type. It is simply a grouping of like type data. In its simplest form, an array can be used to represent a list of numbers or a list of names. Examples: list of employees in an organization, test scores of a class of students.

String is one dimensional array of characters. Strings must be terminated by the null character '\O' which is called the end of string character.

E.g.: 'I', 'v', 'a', '\O'

Arithmetic operators

The primary arithmetic operator and their corresponding symbol in C are:

Subtraction –

Addition +

Multiplication *

Division /

Modulus %

When the operator / is used to perform integer division the resulting integer is obtained by discarding the actual floating point value.

Example: 1/2 = 0.5 the answer is 0

3/2 = 1.5 the answer is 1

The modulus operator % works with integer operands. The expression a % b is read as "a modulus b" and evaluates to the remainder obtained after dividing a by b

Example: 7 % 2 → 1

12 3 → 0