4.3 Phases in Programming

1) **Problem identification :** This is the first phase in programming. The problem must be identified then only it can be solved, for this we may have to answer some questions.

   During this phase we have to identify the data, its type, quantity and formula to be used as well as what activities are involved to get the desired out put is also identified for example if you are suffering from stomach ache and consult a Doctor. To diagnose the disease the Doctor may ask you some question regarding the diet, duration of pain, previous occurrences etc, and examine some parts of your body by using stethoscope X-ray, scanning etc.

2) Deriving the steps to obtain the solution.

   There are two methods, Algorithm and flowchart, are used for this.

   a) **Algorithm :-** The step-by-step procedure to solve a problem is known as algorithm. It comes from the name of a famous Arab mathematician Abu Jafer Mohammed Ibn Musaa Al-Khowarizmi, The last part of his name Al-Khowarizmi was corrected to algorithm.

   b) **Flowchart :-** The pictorial or graphical representation of an algorithm is called flowchart.
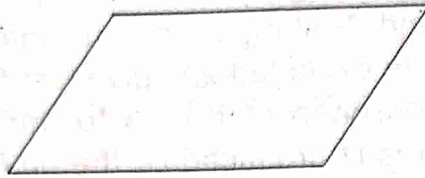
Flow chart symbols are explained below
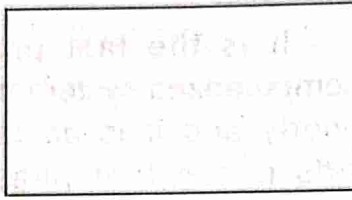
1) Terminal (Oval)

It is used to indicate the beginning and ending of a problem

2) Input/Output (parallelogram)
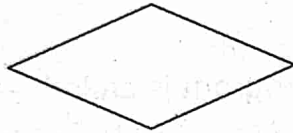
It is used to take input or print output.

3) Processing (Rectangle)

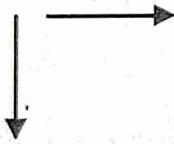It is used to represent processing
That means to represent arithmetic operation such
an addition, subtraction, multiplication....
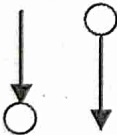
4) Decision (Rhombus)

It is used to represent decision making. It has one
entry flow and two exit flows but one exit path will
be executed at a time.

5) Flow lines (Arrows)

It is used to represent the flow of operation

6) Connector

3) Coding :- The dummy codes (algorithm) or
   flowchart is converted into program by using a
   computer language such s Cobol, Pascal, C++,
   VB, Java, ... etc.

4) Translation :- The computer only knows machine
   language. It does not know HLL, but the human
   beings HLL is very easy to write programs.
   Therefore a translation is needed to convert a
   program written in HLL into machine code (object
   code). During this step, the syntax errors of the
   program will be displayed. These errors are to
   be corrected and this process will be continued
   till we get "No errors" message. Then it is ready
   for execution.

5) Debugging :- The program errors are called
   'bugs' and the process of detecting and
   correcting errors is called debugging. In general

there are two types of errors syntax errors and logical errors. When the rules or syntax of the language are not followed then syntax errors occurred and it is displayed after compilation. When the logic of a program is wrong then logical errors occurred and it is not displayed after compilation but it is displayed in the execution and testing phase.

6) Execution and Testing :- In this phase the program will be executed and give test data for testing the purpose of this is to determine whether the result produced by the program is correct or not. There is a chance of another type of error, Run time error, this may be due to inappropriate data.

7) Documentation :- It is the last phase in programming. A computerized system must be documented properly and it is an ongoing process that starts in the first phase and continues till its implementation. It is helpful for the modification of the program later.