- **Program:**
  Computer program, detailed plan or procedure for solving a problem with a computer; more specifically, an unambiguous, ordered sequence of computational instructions necessary to achieve such a solution. The distinction between computer programs and equipment is often made by referring to the former as software and the latter as hardware.

  Programs stored in the memory of a computer enable the computer to perform a variety of tasks in sequence or even intermittently.
- **Characteristics of good program:**
  A computer program is a sequence or set of instructions in a programming language for a computer to execute. While making great projects, we need to follow the specific rules of the programming language to make an effective program. These are some best practises we should always have in mind.

  - Meaningful identifiers
  - Consistent indentation
  - Limit line length
  - File and folder structure
  - Comments
- **Programming steps:**
  All programming involves creating something that solves a problem. The problems can range from something of great scientific or national importance, through to something as trivial as relieving personal boredom!

  This section describes one approach to solving such problems - think of it as a rough guide to the things you should do when entering the land of programming.

  In broad terms, those things are:

  1. Identify the Problem
  2. Design a Solution
  3. Write the Program

4. Check the Solution

- **Algorithms:**
  The word Algorithm means ” A set of finite rules or instructions to be followed in calculations or other problem-solving operations ” Or ” A procedure for solving a mathematical problem in a finite number of steps that frequently involves recursive operations”.

  The Algorithm designed are language-independent, i.e. they are just plain instructions that can be implemented in any language, and yet the output will be the same, as expected.

  Properties of Algorithm:
  - It should terminate after a finite time.
  - It should produce at least one output.
  - It should take zero or more input.
  - It should be deterministic means giving the same output for the same input case.
  - Every step in the algorithm must be effective i.e. every step should do some work.

  Example:

  <u>Algorithm to add 3 numbers and print their sum:</u>

  1. START
  2. Declare 3 integer variables num1, num2 and num3.
  3. Take the three numbers, to be added, as inputs in variables num1, num2, and num3 respectively.
  4. Declare an integer variable sum to store the resultant sum of the 3 numbers.
  5. Add the 3 numbers and store the result in the variable sum.
  6. Print the value of the variable sum
  7. END

- **Flow chart:**
  Flowchart is a graphical representation of an algorithm. Programmers often use it as a program-planning tool to solve a problem. It makes use of symbols which are connected among them to indicate the flow of information and processing.

The process of drawing a flowchart for an algorithm is known as "flowcharting".

Basic Symbols used in Flowchart Designs:

1. Terminal:
   The oval symbol indicates Start, Stop and Halt in a program's logic flow. A pause/halt is generally used in a program logic under some error conditions. Terminal is the first and last symbols in the flowchart.
2. Input/Output:
   A parallelogram denotes any function of input/output type. Program instructions that take input from input devices and display output on output devices are indicated with parallelogram in a flowchart.
3. Processing:
   A box represents arithmetic instructions. All arithmetic processes such as adding, subtracting, multiplication and division are indicated by action or process symbol.
4. Decision:
   Diamond symbol represents a decision point. Decision based operations such as yes/no question or true/false are indicated by diamond in flowchart.
5. Connectors:
   Whenever flowchart becomes complex or it spreads over more than one page, it is useful to use connectors to avoid any confusions. It is represented by a circle.
6. Flow lines:
   Flow lines indicate the exact sequence in which instructions are executed. Arrows represent the direction of flow of control and relationship among different symbols of flowchart.

Rules for Creating Flowchart:

A flowchart is a graphical representation of an algorithm. It should follow some rules while creating a flowchart.
Rule 1: Flowchart opening statement must be 'start' keyword.
Rule 2: Flowchart ending statement must be 'end' keyword.

Rule 3: All symbols in the flowchart must be connected with an arrow line.
Rule 4: The decision symbol in the flowchart is associated with the arrow line.

Example:
Draw a flowchart to input two numbers from the user and display the larger of two numbers.