

## Chapter 4 – Principles of Programming and Problem Solving

**Computer program:** A sequence of instructions given to a computer to solve a problem.

**Program instruction:** It is an action oriented statement and it tells the computer what operation it should perform.

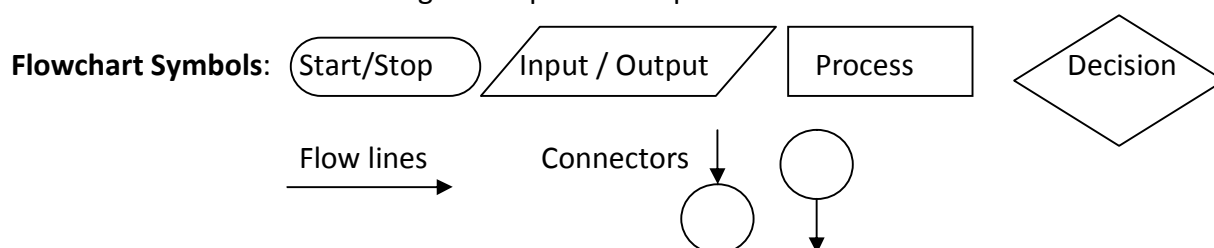
**Top down design:** It is the process of solving a complex problem by breaking it down into different tasks and solving each task from main to sub.

**Bottom up design:** It is the process of breaking a complex problem into smaller sub tasks and solving each task from sub to main.

**Stages of problem solving:** (i) Problem identification (ii) Preparing algorithms and flowcharts (iii) Coding the program using programming language (iv) Translation (v) Debugging (vi) Execution and Testing and (vii) Documentation

**Algorithm:** It is a step-by-step procedure to solve a problem, where each step represents a specific task to be carried out.

**Flowchart:** The pictorial representation of an algorithm with specific symbols for instructions and arrows showing the sequence of operations.



**Advantages of flowcharts:** Better communication, Effective analysis, Effective synthesis, Efficient coding.

**Translation:** It is the process of converting a program written in high level language into its equivalent version in machine language.

**Debugging:** It is the process of detecting and correcting the errors in a program.

**Syntax errors:** The errors occur when the rules or syntax of the programming language are not followed. Such program errors typically involve incorrect punctuation, incorrect word sequence, undefined term, or illegal use of terms or constructs.

**Logical error:** It is due to improper planning of the program's logic and revealed during the execution of the program.

**Run time error:** These errors occur unexpectedly when computer becomes unable to process some improper data.

**Documentation:** An on-going process of documenting the code that starts in the problem-study phase of the system and continues till its implementation and operation. Internal documentation is done through comments in programs. Various manuals provide external documentation.