

UNIT 1

PROBLEM SOLVING WITH COMPUTER

(LH - 2 HRS)

PRESENTED BY:

ER. SHARAT MAHARJAN

C PROGRAMMING

CONTENT (LH - 2HRS)

1.1 Problem analysis

1.2 Algorithm and flowchart

1.3 Coding, Compilation and Execution

1.4 History of C

1.5 Structure of C program

1.6 Debugging, Testing and Documentation

1.1 Problem analysis

- Problem analysis is the process of defining a problem and decomposing overall system into smaller parts to identify possible inputs, processes and outputs associated with the problem.
- A 'C' program contains various functions which are part of a library. We can add our features and functions to the library. We can access and use these functions anytime we want in our program. This feature makes it simple while working with complex programming.

1.2 Algorithm and Flowchart

Steps to Solve a Problem With the Computer

- Step 1: Problem Definition
- Step 2: Problem Analysis
- Step 3: Designing a program
- Step 4: Coding
- Step 5: Program testing
- Step 6: Installation and Maintenance

Algorithm:

- Algorithm is a step-by-step procedure, which defines a set of instructions to be executed in a certain order to get the desired output.
- Algorithms are generally created independent of underlying languages, i.e. an algorithm can be implemented in more than one programming language.

Characteristics of an Algorithm

- An algorithm should have the following characteristics:
 1. **Unambiguous** – Algorithm should be clear and unambiguous. Each of its steps (or phases), and their inputs/outputs should be clear and must lead to only one meaning.
 2. **Input** – An algorithm should have 0 or more well-defined inputs.
 3. **Output** – An algorithm should have 1 or more well-defined outputs, and should match the desired output.
 4. **Finiteness** – Algorithms must terminate after a finite number of steps.
 5. **Independent** – An algorithm should have step-by-step directions, which should be independent of any programming code.

Problem 1 – Design an **algorithm** to **add two numbers** and display the result.

Step 1 – START

Step 2 – Input a & b

Step 3 – Calculate $c = a + b$

Step 4 – Display c

Step 5 – STOP






Problem 2 - Design an algorithm to **input principal, time and rate** and display the **interest**.

Problem 3 - Design an algorithm to **find largest number** among three numbers.

Problem 4 - Design an algorithm to **find sum and average of first n natural numbers**.

Flowchart:

- A flowchart in C language is a graphical representation of an algorithm.
- Flowchart in C is a diagrammatic representation of a sequence of logical steps of a program.
- Flowcharts use simple geometric shapes to depict processes and arrows to show relationships and process/data flow.

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

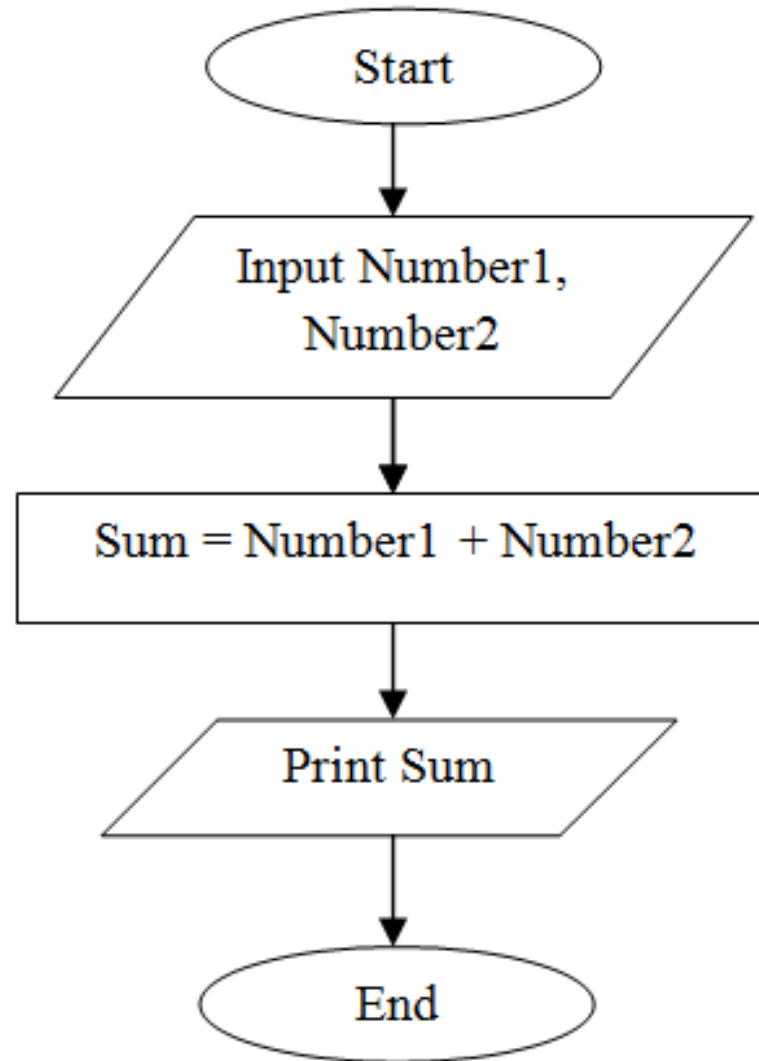
Advantages of Flowchart in C:

1. **Communication**: A flowchart is a better way of communicating the logic of a program.
2. **Efficient Coding**: Flowcharts act as a guide for a programmer in writing the actual code in a high-level language.
3. **Proper Debugging**: Flowcharts help in the debugging process.
4. **Effective Analysis**: Effective analysis of logical programs can be easily done with the help of a related flowchart.
5. **Testing**: A flowchart helps in the testing process.

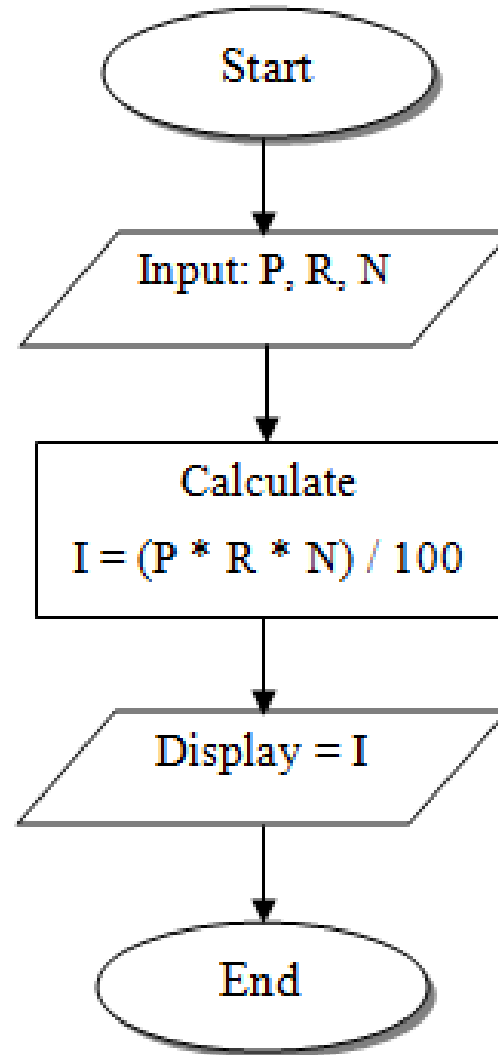
Disadvantages of Flowchart in C:

1. **Time-consuming**: Designing a flowchart is a very time-consuming process.
2. **Complex**: It isn't easy to draw a flowchart for large and complex programs.
3. **Difficult to modify**: It is very difficult to modify the existing flowchart.

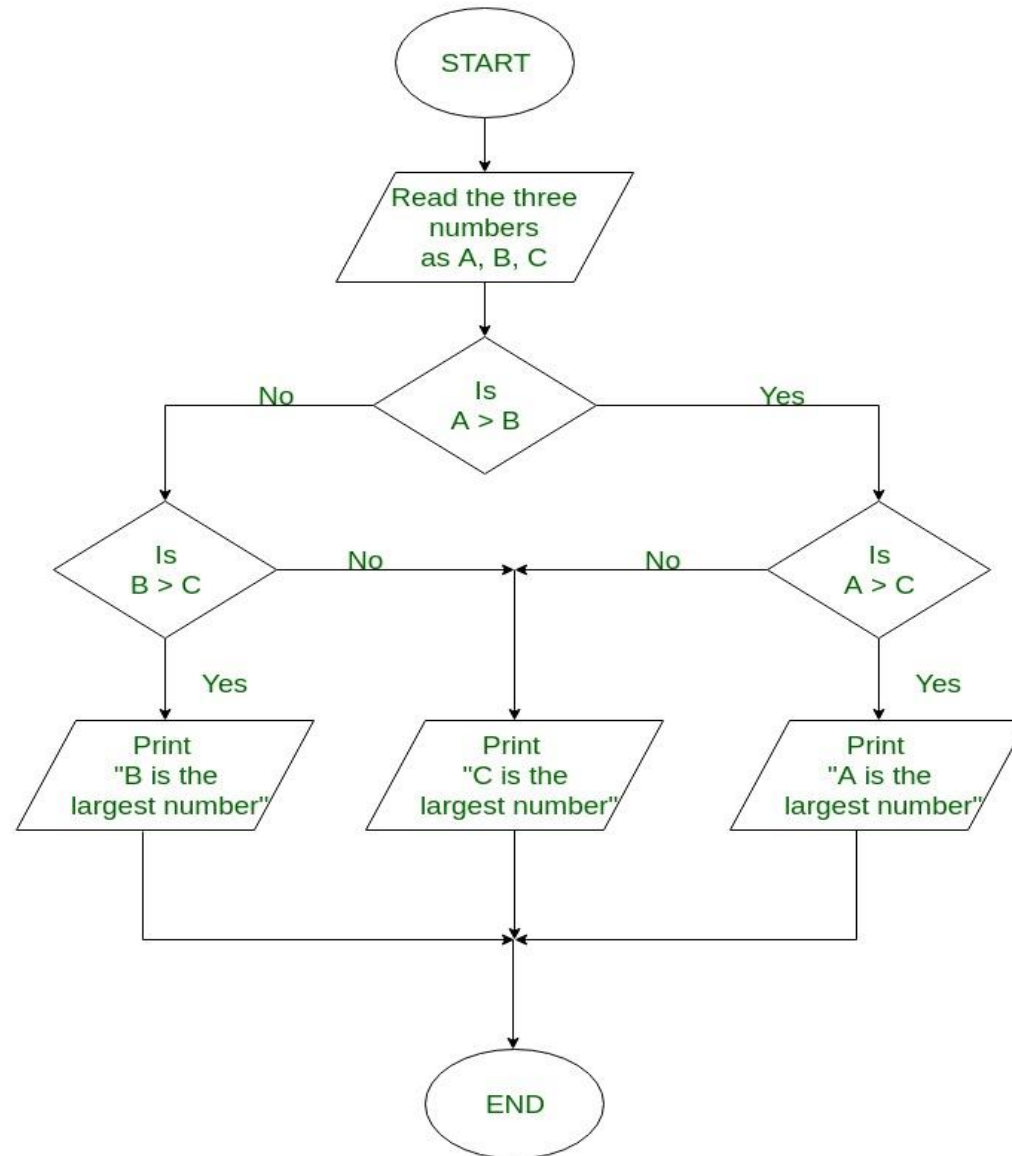
1. Draw a **flowchart** to add two numbers:



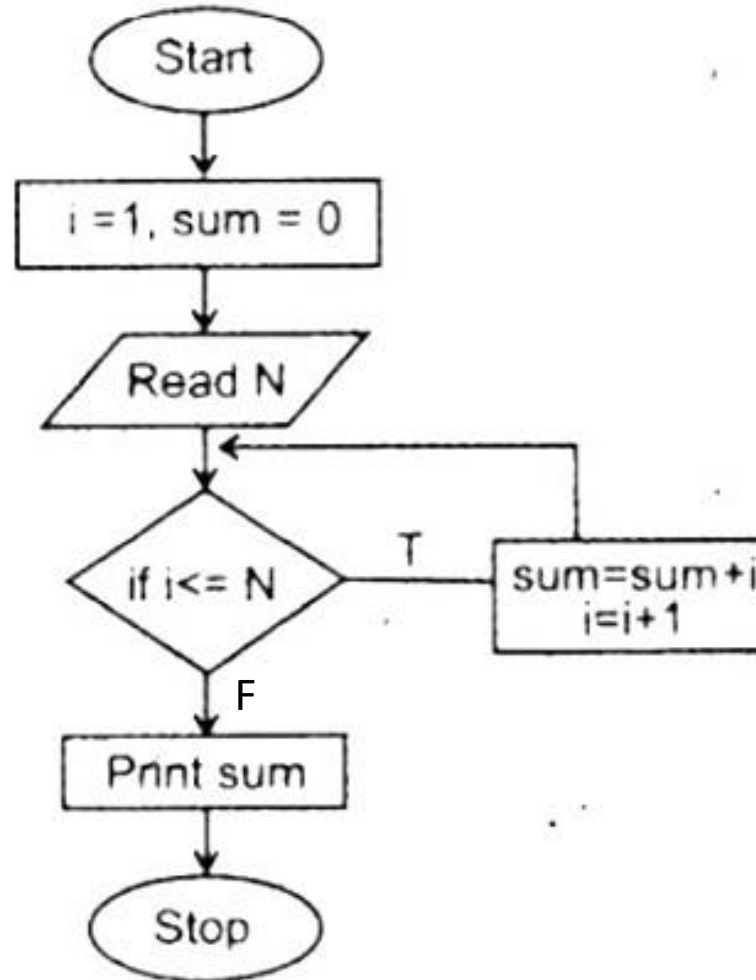
2. Draw a flowchart to input principal, time and rate and display interest.



3. Draw a flowchart to find largest among three numbers.



4. Draw a flowchart to find sum of n natural numbers.



THANK YOU FOR YOUR ATTENTION