Session 3

Flowcharts and Pseudocodes

Objectives

❑ Explain algorithm

❑ Explain flowcharts

❑ Explain pseudocodes

Overview of Programming Tools

❑The programmer has to plan and write down the solution to a problem in a particular manner and this is known as algorithm.

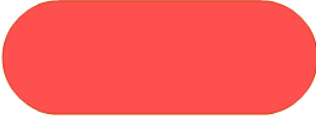❑The two tools used by the programmer are flowchart and pseudocode.

Algorithm

❑ Algorithm is an ordered set of instructions.

❑ The algorithm should have the ability to alter the order of execution of the instructions.

❑ The three types of statement constructs that an algorithm can have are as follows:
 ➢ Sequential
  ➢ Conditional
  ➢ Iteration

Flowcharts 1-5

❑A flowchart is a graphical representation of an algorithm.

❑It charts the logical flow of instructions or activities in a process.

❑Flowcharts help programmers to view how the statements in a program are interrelated.

❑Each activity in a flowchart is depicted using symbols.

Symbol	Description
	Marks the start or end of the program and are represented as rounded rectangles
	Is used for any process, function, or action and is represented as a rectangle
	Used for accepting or displaying (Input/Output) instructions and is represented as a parallelogram
	Used to represent decision making and branching statements and is represented as diamond
	Is used to represent the exit to and entry from another part of the same flowchart and is known as Connectors
	Used to show the flow of control and is known as Flow Line

❑Consider a program accepting two numbers from the user and displaying the sum of the two numbers using a third variable. The flowchart for this example is shown in the figure.
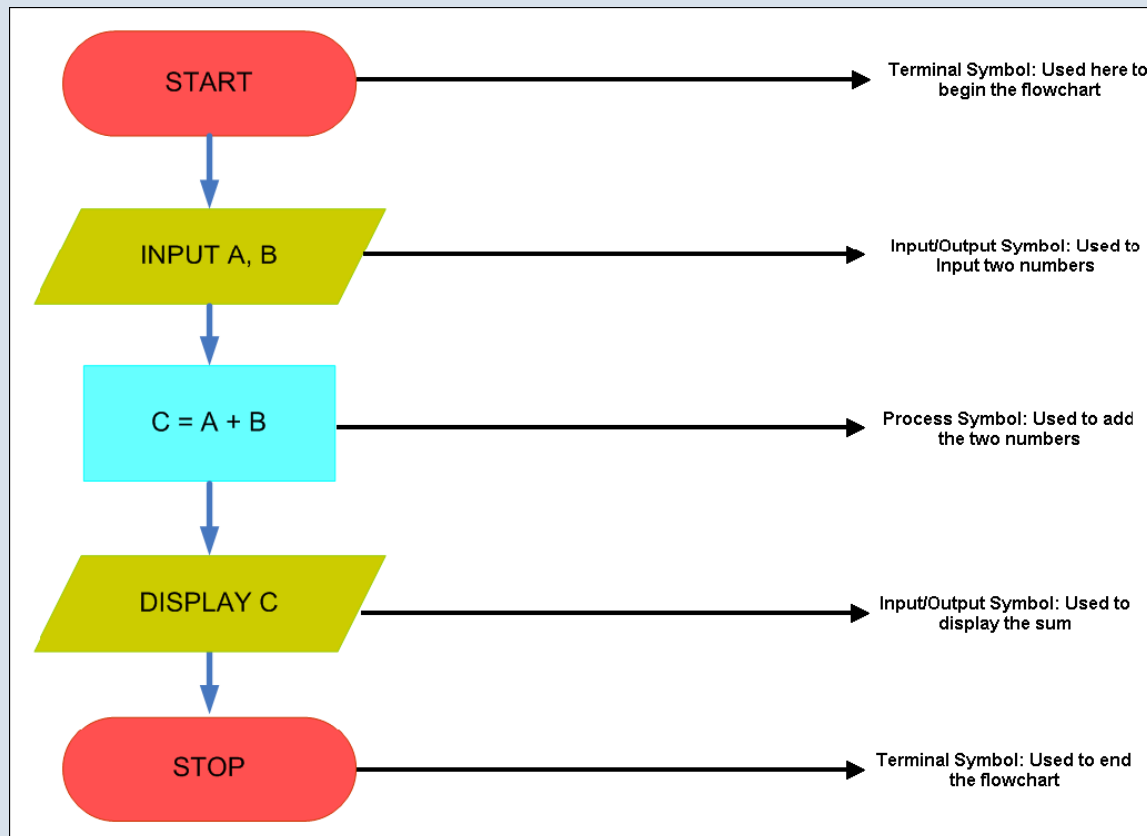
Flowcharts 3-5

❑ Some of the essential points to be considered while drawing a flowchart are as follows:

➢ Initially concentrate on the logic of the problem and draw out the main path of the flowchart

➢ Maintain consistent level of detail for a flowchart

➢ Must not contain minute details. Only the essential and meaningful steps need to be represented

➢ Common and easy to understand words should be used

➢ Consistent usage of variable names

➢ Flow should be from left to right and top to bottom

➢ Must have only one START and one STOP point

➢ Should be simple

❑Some of the advantages of using flowcharts are as follows:

➢Easy to understand

➢Effective analysis of problem

➢Effective joining of different parts

➢Ease in coding

➢Systematic debugging

➢Systematic testing

❑Besides the advantages, flowcharts have some disadvantages. They are as follows:

➢Time consuming

➢Difficult to change

➢No standards

Best Practices for Drawing Flowcharts

❑ The best practices for drawing flowcharts are as follows:

➢ The direction of the arrow flow should be to one side either from top to bottom or from left to right.

➢ Standard symbols must be used in a flowchart so that it can be understood by all.

➢ All the symbols in a flowchart must be named appropriately.

➢ Use the connector symbol for complex flowcharts.

➢ The size of the symbols used in a flowchart must be consistent.

Pseudocodes 1-6

❑The word pseudo means false. As the name suggest, pseudocode is not the actual code.

❑It is a method of algorithm writing which uses a certain standard set of words which makes it resemble a code.

❑However, pseudocode cannot be complied or executed as a code.

Pseudocodes 2-6

- ❑ Each pseudocode must start with the word **BEGIN** or **START**, and end with **END** or **STOP**.

- ❑ The statements between **START** and **END** are English phrases and indented to make the word **START** and **END** stand out.

- ❑ To display some value, the word **DISPLAY**, **WRITE**, or **PRINT** is used.

- ❑ To accept a value from the user, the word **INPUT** or **READ** is used.

❑ The pseudocode shows the process to store the sum of variables in a third variable, and then display the value stored in this third variable as shown in the example.

```
BEGIN
    INPUT A, B
    C = A + B
    DISPLAY C
END
```

❑ A set of instructions or steps in a pseudocode is collectively called a construct. There are three types of programming constructs namely, sequence, selection, and iteration.

❑Some of the rules to be followed while writing pseudocodes are as follows:

➤The pseudocode must be easy to understand by all and not just the programmer. The variables mentioned in the pseudocode must be self-descriptive. Avoid using abbreviations and shortened versions of words in the pseudocode.

➤The pseudocode must not contain actual programming code but should have only logical steps to show how to operate a code.

❑Some of the advantages of using pseudocode are as follows:

- ➢Easy to create

- ➢No symbols

- ➢No specific syntax

- ➢Easy to translate

- ➢Reduces time

❑ Besides the advantages, pseudocodes have some disadvantages. They are as follows:

➢ Lack of standards

➢ Do not focus on big picture

Best Practices for Writing Pseudocodes

❑ The best practices for writing pseudocodes are as follows:

➢ The vocabulary used to write a pseudocode must be simple to understand and should be on the lines of structured programming.

➢ Each statement in the pseudocode must be written in a separate line.

➢ The keywords, procedure names, and module names must be capitalized in pseudocode.

➢ Use descriptive names that can be understood by non-technical persons also.

➢ Maintain consistency when using generic terms such as DISPLAY, PRINT, END, and so on.

➢ Indent the statements as required to show logical hierarchy.

Summary

❑ An algorithm can be defined as a procedure, formula, or recipe for solving a problem.

❑ A flowchart is a graphical representation of an algorithm. It charts the flow of instructions or activities in a process. Each activity in a flowchart is depicted using symbols.

❑ A flowchart begins with the START or BEGIN keyword, and ends with the END and STOP keyword.

❑ The DISPLAY keyword is used to display some value to the user in a flowchart.

❑ Pseudocode is not actual code. It is a method of algorithm writing which uses a certain standard set of words which makes it resemble a code.

❑ Each pseudocode must start with the word BEGIN or START, and end with END or STOP.

❑ The word DISPLAY, PRINT, or WRITE is used to display some value in pseudocode.