

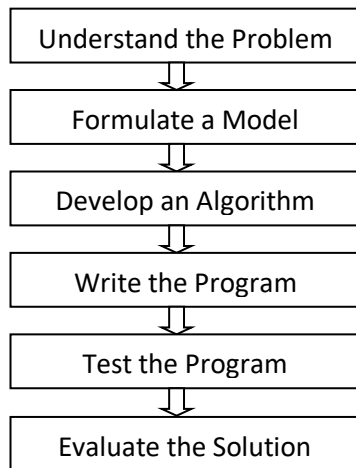
Unit # 3: Algorithmic Thinking and Problem Solving

Q.: Explain the features of information processing model?

Ans: Computer is used to solve problems by processing the information according to given instruction. In this process, some kind of data is obtained and entered into computer by using input devices like keyboard, mouse, scanner etc. Then the input data is processed according to given instructions and accordingly the output is generated. For larger and complex problems, it need to repeat the input/process/output steps for a number of times, producing intermediate results to solve a part of problem.

Q.: Demonstrate the main steps to solve a problem?

Ans:



Q.: How nested loops are useful in arranging a calendar?

Ans: Nested loop is useful in arranging the calendar as calendar has 12 months and each month has 30 days. The outer loop of nested loop will arrange the months and inner loop will arrange the days of a particular month. Its mean that for each pass or iteration of outer loop which arrange the months, the inner loop will be repeat 30 times to arrange the days for each month.

Q.: Differentiate between scope and limitations of a problem?

Ans: The scope of a problem defines the boundaries of what a solution must provide to meet the requirements. Whereas the limitation of a problem refers to the aspects that are beyond the implementation of the problem. For a example if the problem is to design a calculator with basic arithmetic operations then its scope is to have just four functionalities (Addition, Subtraction, Multiplication and Division). Any other operations are its limitations.

Q.: Define the following terms:

- a. **Problem.** b. **Problem Solving** c. **Algorithm** d. **Flowchart**

Ans: **Problem:**

A problem is a challenge or situation for which a solution is required.

Problem Solving:

Problem solving is the process of analyzing and finding the solution of a problem.

Algorithm:

The step by step procedure to solve a problem is called algorithm.

Flowchart:

The pictorial or diagrammatic representation of an algorithm is called flow chart.

Q.: Define Halting Problem?

Ans: The Halting Problem is a decision problem about the computer program to determine, whether this will finish the running or will run forever.

Q.: What does Algorithm Efficiency means?

Ans: Algorithm efficiency is a property of an algorithm which relates to the amount of resources used by the algorithm. A good algorithm should not only generate the correct or expected result but should also use limited resources in a better way.

Q.: Write a short note on Pseudo code?

Ans: Pseudo code is a method of writing informal programming code for an algorithm using natural languages like English. The purpose of pseudo code is to provide clear plan or blueprint of a program or algorithm before it is implemented in a computer programming languages. Pseudo code is not an actual program, it is only meant to be read and understood by humans.

Q.: Define Conditional statements?

Ans: A statement that selects a statement or set of statements to execute on the basis of a condition is called conditional statement. It is used to control the flow of a program using condition.

Q.: Define Loop and Nested Loop?

Ans: A statement or a set of statements that is executed repeatedly is known as loop. Loop is used to perform an action again and again.

A loop within another a loop is called nested loop. Nested loop are useful when an iterative task is to be done for multiple times. The loop that contains another loop in its body is called outer loop. The loop used inside the body of outer loop is called inner loop.

Q.: Differentiate between Variable and Constant?

Ans: A variable refers to a memory location that is used to hold some data and that data could be changed during the program execution.

A constant refers to a data value that does not change during the execution of program.

Q.: Write a pseudo code to check whether the input (any number) is even or odd?

Ans: Line – 0: Start
Line – 1: Take input (Any Number)
Line – 2: IF number MOD 2 = 0
Line – 3: number is EVEN
Line – 4: ELSE
Line – 6: number is ODD
Line – 7: Stop

Q.: Write a Pseudo code to take three different numbers and find the largest number?

Ans: Line – 0: Take three numbers (A, B, C)
Line – 1: IF (A > B and A>C) Then:
Line – 2: Output (A is the largest number)
Line – 3: ELSE IF (B>A and B>C) Then:
Line – 4: Output (B is the largest number)
Line – 5: ELSE
Line – 6: Output (C is the largest number)

Q.: Write a pseudo code to print the multiplicative table of a given number?

Ans: Line – 0: Take input (any number N)
Line – 1: SET index = 1
Line – 2: LOOP Repeat:
Line – 3: Result = Multiply N with index
Line – 4: Display (N X index = Result)
Line – 5: SET index+1
Line – 6: UNTIL (index 10)