**SVKM’s NMIMS**

**Mukesh Patel School of Technology Management and Engineering, Shirpur**

**Department of Electronics & Telecommunication**



**Manual of Programming for Problem Solving**

**Experiment: 1**

PART A

(PART A: TO BE REFFERED BY STUDENTS)

**Aim:** **To study Algorithm and Flow charts**

**Learning Outcomes: Learner would be able to**

1. Interpret the steps of algorithm into a flowchart.
2. Explain the features of each symbol of the flowchart.
3. Analysis the scenario to write algorithm and flowchart (breaking the problem into steps of selection, sequence).

**Task 1:**

For the following Problem Statements write Algorithm and Draw a Flowchart.

|  |  |
| --- | --- |
| 1. | Krishna goes to market for buying milk and vegetables. He is having a currency of Rs.500 with him. From a shop he purchases 2.0 liters Milk priced Rs.50.0 per liter, 1.5 kg Carrots priced Rs.35.0 per kg, 2.5 kg Tomatoes priced Rs.10.0 per kg. He gives the currency of Rs.500 to the shopkeeper. Find out the amount shopkeeper will return to Krishna.  Inputs to the algorithm are:  1. amount of different items purchase, for example 2.0 kg Apple etc.  2. price of the items, for example Mango is Rs. 35.0 per kg  3. total amount given to the shopkeeper  Expected output:  Amount to be returned by shopkeeper after deducting total price of the purchased  vegetables and fruits, and total items purchased.  Algorithm:  Step1: Total ß 0, i ß 1;  Step2: Read amount purchased and unit price of itemi  Step3: Totalß Total + amount of itemi \* price per unit of itemi  Step4: iß i+1  Step5: Repeat Step 2 to 4 for each purchased item  Step6: Read Total amount given to the shopkeeper as GivenAmount  Step7: RefundAmount ß GivenAmount­Total  Step8: Print amount to be refund is Rs.: RefundAmount  Step9: Print total item purchased are: i |
| 2. | The below given flowchart is used to find whether a number X is even or odd. What will be content in the decision box? Write an algorithm for the same. |
| 3. | Obtain the user’s choice to find area of given shape (Rectangle, Circle and Triangle). Calculate and output the area of the shape chosen. List the variables required and draw the flowchart (using the same names as your variable list). Also perform a dry run using input of 6 for the circle. |
| 4. | Obtain a temperature in degrees Fahrenheit from the user. If the temperature is 60 to 65 degrees display the message "Go play Cricket", otherwise if the temperature is between 65 to 70 degrees display the message "Go for indoor games", otherwise if the temperature is more than 70 degrees display the message "It is too hot", otherwise display the message "It is chilling". |

**Theory:**

**Algorithm:**

Defined as: “A sequence of activities to be processed for getting desired output from a given input.”

|  |  |
| --- | --- |
| + | Addition |
| - | Subtraction |
| \* | Multiplication |
| / | Division |
| ß | Assignment. For example B ß Y\*7 means B will have the value of Y\*7 |
| Read | For taking input |
| Print | For displaying output |
| Start | For beginning the algorithm steps |
| End | For stopping the algorithm steps to make it a finite algorithm |
| if <condition> then <statement> else <statement> | For conditional statement |
| Go to step n | For moving to step n |
| Repeat | For repeating a set of statements/instructions |

**Flowchart:**

Defined as a diagram which visually presents the flow of data through processing systems. Flowchart can be used for representing an algorithm. It describes the operations (and in what sequence) are required to solve a given problem.

|  |  |  |
| --- | --- | --- |
| Sr.No | Shape | Description |
| 1 |  | **Terminal:** To represent the start and end of algorithms |
| 2 |  | **Input/Output:** To represent the input and output or the read and write operations of algorithms. |
| 3 |  | **Processing:** To represent the processing of instructions like arithmetic operation and data manipulators. |
| 4 |  | **Decision:** To represent branching of the statements. To take decisions. There will be one entry point and more than one exit point. |
| 5 |  | **Flow Line:** To represent flow of data or the sequence of statements. |
| 6 |  | **On-page Connector:** Used to join different flowline |
| 7 |  | **Off-page Connector:** Used to connect flowchart portion on different page. |
| 8 |  | **Predefined Process/Function:** Used to represent a group of statements performing one processing task. |

PART B

(PART B: TO BE COMPLETED BY STUDENTS)

Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the portal at the end of the practical. The filename should be **PPS\_batch\_rollno\_experimentno Example: PPS\_A1\_A001\_P1**

|  |  |
| --- | --- |
| **Roll No.:** | **Name:** |
| **Prog/Yr/Sem:** | **Batch:** |
| **Date of Experiment:** | **Date of Submission:** |

Task 1: Algorithm and Flowchart

1.

2.

**Conclusion (Learning Outcomes):** Reflect on the questions answered by you jot down your learnings about the Topic: Algorithm and Flowchart.

**Homework Questions:**

1. Write an algorithm and draw a flowchart that will obtain from the user a length and width for a rectangle. Calculate and output the area and perimeter of the rectangle. Perform a dry run using inputs of 6 and 12 for the rectangle.
2. Draw a flowchart to match the following algorithm:

Step1: Assign variable n1 a starting value of 6

Step2: Assign variable n2 a starting value of 8

Step3: Add 9 to n2

Step4: Store the value n1 times n2 in variable n3

Step5: Store the value n2 minus n1 in n2

Step6: Display n1, n2 and n3

1. Write an algorithm and draw flow chart to read the marks of students and classify them into different grades. If the marks secured are greater than or equal to 90, the student is awarded grade A; but if they are greater than or equal to 80 but less than 90, Grade B is awarded; if they are greater than or equal to 65 but less than 80, Grade C is awarded; otherwise Grade D is awarded.