National University of Computer and Emerging Sciences

Lab Manual # 3

Programming Fundamentals

(Section BCS-1H1&1H2)

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Objectives:

After performing this lab, students will be able to solve programming problems using

- 'If' statements
- 'If-else' statement
- Nested 'if' structure

Question 1: **10 marks**

Write a program that inputs five integers. It finds and prints the largest and smallest integer (use simple if statements).

Question 2: **10 marks**

Write a program that calculates and displays a person's body mass index (BMI). The BMI is often used to determine whether a person with a sedentary lifestyle is overweight or underweight for his or her height. A person's BMI is calculated with the following formula:

$$BMI = weight \times 703 / height^2$$

Where weight is measured in pounds and height is measured in inches. The program should display a message indicating whether the person has optimal weight, is underweight, or is overweight. A person's weight is considered to be optimal if his or her BMI is between 18.5 and 25. If the BMI is less than 18.5, the person is considered to be underweight. If the BMI value is greater than 25, the person is considered to be overweight.

Question 3: **10 marks**

A shop will give a discount of 30% if the cost of the purchased quantity is more than 600. Ask the user for quantity. One unit will cost 50. Judge and print the total cost for the user.

Question 4: **10 marks**

Take input of age of 3 people by the user and determine the oldest and youngest among them.

Question 5: **10 marks**

Write a program that takes an alphabet as input and displays whether it's a vowel or consonant. But before it must check if the input is valid. Alphabet can be both capital or small.

Question 6: **10 marks**

Display the range of the number entered by the user, using nested-if, and also tell if it's even or odd.
Validate that the number must be positive.

Range
0 to 10
11 to 20
21 to 30
31 to 40
41 to 50
More than 50

Question 7: **10 marks**

Write an interactive program that contains an if statement that may be used to compute the area of a square (area = side^2) or a circle (area = π * radius^2) after prompting the user to type the first character of the figure name (S or C).

Question 8: **10 marks**

Write an if statement that might be used to compute and display the average of a set of n numbers whose sum is stored in variable total. This average should be found only if n is greater than 0; otherwise, an error message should be displayed.

Question 9: **10 marks**

Implement the following decision table using a nested if statement. Assume that the grade point average is within the range 0.0 through 4.0.

Grade Point Average	Transcript Message
0.0–0.99	Failed semester—registration suspended
1.0–1.99	On probation for next semester
2.0–2.99	(no message)
3.0–3.49	Dean's list for semester
3.5–4.00	Highest honors for semester

Question 10: **10 marks**

Design a C++ program that simulates a simple calculator using an if-else statement. The program will take two integer numbers as input and an operation as a character +, -, *, %, and /. It will then perform that operation on both numbers and print the result. For division avoid division by zero and should output the result in floating point.