

National University of Computer and Emerging Sciences



Lab Manual # 4.2

Programming Fundamentals

(Section BSC-A)

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Lab Manual

Objectives

The objectives of this lab are to cover the following:

- Input output
- If else statement
- Nested If else
- Switch statement
- While Loop

Problems

Problem 1:

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:

$$\text{BMI} = \text{weight} \times 703 / \text{height}^2$$

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 sedentary 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.

Problem 2:

Create a change-counting game that gets the user to enter the number of coins required to make exactly one dollar. The program should ask the user to enter the number of pennies, nickels, dimes, and quarters. If the total value of the coins entered is equal to one dollar, the program should congratulate the user for winning the game. Otherwise, the program should display a message indicating whether the amount entered was more than or less than one dollar.

Problem 3: (5 marks)

A mobile phone service provider has three different subscription packages for its customers:

Package A: For \$39.99 per month 450 minutes are provided. Additional minutes are \$0.45 per minute.

Package B: For \$59.99 per month 900 minutes are provided. Additional minutes are \$0.40 per minute.

Package C: For \$69.99 per month unlimited minutes provided.

Write a program that calculates a customer's monthly bill. It should ask which package the customer has purchased and how many minutes were used. It should then display the total amount due.

Input Validation: Be sure the user only selects package A, B, or C.

Problem 4:

Assuming the ocean's level is currently rising at about 1.5 millimeters per year, write a program that displays a table showing the number of millimeters that the ocean will have risen each year for the next 25 years.

Problem 5:

Running on a particular treadmill you burn 3.6 calories per minute. Write a program that uses a loop to display the number of calories burned after 5, 10, 15, 20, 25, and 30 minutes.

Problem 6:

Write a program that calculates how much a person would earn over a period of time if his or her salary is one penny the first day and two pennies the second day, and continues to double each day. The program should ask the user for the number of days. Display a table showing how much the salary was for each day, and then show the total pay at the end of the period. The output should be displayed in a dollar amount, not the number of pennies.

Input Validation: Do not accept a number less than 1 for the number of days worked.

Problem 7:

Write a program that calculates the occupancy rate for a hotel. The program should start by asking the user how many floors the hotel has. A loop should then iterate once for each floor. In each iteration, the loop should ask the user for the number of rooms on the floor and how many of them are occupied. After all the iterations, the program should display how many rooms the hotel has, how many of them are occupied, how many are unoccupied, and the percentage of rooms that are occupied. The percentage may be calculated by dividing the number of rooms occupied by the number of rooms.

NOTE: It is traditional that most hotels do not have a thirteenth floor. The loop in this program should skip the entire thirteenth iteration.

END