Experiment: 3
PART B

(PART B: TO BE COMPLETED AND SUBMITTED BY STUDENTS)

Students must execute all the programs, write executed code in the workbook, and submit part B of experiment 3 on the student portal. The filename should be PPS_batch_rollno_experimentno. Example: PPS_A1_A001_P3

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

Aim: Implementing programs using conditional/Decision making/selection statements

	Tasks:	
Sr. No.	**Problem Statement**	**Flow chart**
1	Write a program to calculate the Goods and Services Tax (GST) for a given amount based on the GST rate. The program should be able to handle different GST rates and provide a clear breakdown of the total amount, GST amount, and the amount before GST. Your program should accept the original price of the item and the GST rate. The rate can be a whole number or a decimal. The program should display the amount of GST applied, price before GST and after GST. **Constraints:** The original price should be a positive number and the GST rate should be a non-negative number and can be a decimal ranging from 0% to 28%.	
2	Build a program to determine the second largest number from a set of three numbers.	
3.	Implement a program to find roots of quadratic equation using if-else.	✓
4.	Develop a program to calculate the electricity bill including a discount based on the total bill amount. The initial base bill is 100 Rs, and the program should calculate the total bill amount by multiplying the number of units consumed by 10 Rs per unit and then adding this amount to the base bill. The discount should be applied according to predefined ranges of bill amounts based on the following ranges: • Bill Amount ≤ 200: No discount • 200 < Bill Amount ≤ 500: 5% discount	

	• 500 < Bill Amount ≤ 800: 10% discount • 800 < Bill Amount ≤ 1100: 15% discount • Bill Amount > 1100: 20% discount The program should display initial base bill amount, bill amount, percentage discount applied, the discount amount applied and the total bill amount after applying the discount.	
5.	Write a program that uses a switch-case statement to determine whether an entered character is a vowel or a consonant. The program should also validate (using if-else) the input to ensure that only alphabetic characters are processed. If the input is a number or a special symbol, the program should indicate that the input is not an alphabetic character.	
6.	Implement a menu-driven program to calculate the area of a triangle, rectangle, circle, and sphere.	
7.	Develop a program that takes an arithmetic operator (+, -, *, or /) and two operands from the user. Perform corresponding arithmetic operations on the operands using switch case.	

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B. Tech/MBA Tech	**Workbook**	**Academic Year- 2024-25**
Year:-First	**Subject:-** Programming for Problem Solving	**Semester:- First**

Executed Code, Input and Output

1.	Write a program to calculate the Goods and Services Tax (GST) for a given amount based on the GST rate. The program should be able to handle different GST rates and provide a clear breakdown of the total amount, GST amount, and the amount before GST. Your program should accept the original price of the item and the GST rate. The rate can be a whole number or a decimal. The program should display the amount of GST applied, price before GST and after GST. **Constraints:** The original price should be a positive number and the GST rate should be a non-negative number and can be a decimal ranging from 0% to 28%.

Executed Code: -
// Paste the executed code here

Input Output: -
// Paste the input/output of executed code

2.	Build a program to determine the second largest number from a set of three numbers.

Executed Code: -
// Paste the executed code here

Input Output: -
// Paste the input/output of executed code

3.	Implement a program to find roots of quadratic equation using if-else. Note:- Flowchart is to be drawn in workbook

Executed Code: -
// Paste the executed code here

	SVKM's NMIMS
NMIMS (logo)	**Mukesh Patel School of Technology Management & Engineering / School of Technology Management & Engineering**

B. Tech/MBA Tech	**Workbook**	**Academic Year- 2024-25**
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Input Output: -

// Paste the input/output of executed code

4.	Develop a program to calculate the electricity bill including a discount based on the total bill amount. The initial base bill is 100 Rs, and the program should calculate the total bill amount by multiplying the number of units consumed by 10 Rs per unit and then adding this amount to the base bill. The discount should be applied according to predefined ranges of bill amounts based on the following ranges:

- Bill Amount ≤ 200: No discount
- 200 < Bill Amount ≤ 500: 5% discount
- 500 < Bill Amount ≤ 800: 10% discount
- 800 < Bill Amount ≤ 1100: 15% discount
- Bill Amount > 1100: 20% discount

The program should display initial base bill amount, bill amount, percentage discount applied, the discount amount applied and the total bill amount after applying the discount.

Executed Code: -

// Paste the executed code here

Input Output: -

// Paste the input/output of executed code

5.	Write a program that uses a switch-case statement to determine whether an entered character is a vowel or a consonant. The program should also validate (using if-else) the input to ensure that only alphabetic characters are processed. If the input is a number or a special symbol, the program should indicate that the input is not an alphabetic character.

Executed Code: -

// Paste the executed code here

Input Output: -

// Paste the input/output of executed code	
6.	Implement a menu-driven program to calculate the area of a triangle, rectangle, circle, and sphere.

Executed Code: -
// Paste the executed code here

Input Output: -
// Paste the input/output of executed code

7.	Develop a program that takes an arithmetic operator (+, -, *, or /) and two operands from the user. Perform corresponding arithmetic operations on the operands using switch case.

Executed Code: -
// Paste the executed code here

Input Output: -
// Paste the input/output of executed code

Observation and Learning: -

- Write your observation and learning

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Additional Questions

1. Develop a program that accepts sales amount; if the sales amount is more than 5000, then the discount is 12% of the sales amount; otherwise, it is 7%—display the total discount and amount to be paid after the discount.
2. Implement a program to accept a year as input and print whether it is a leap. A year is a leap if divisible by 4, and centennial years (years divisible by 100) are leap years only when divisible by 400.
3. Write a program to test whether a given character is a capital or small letter and change small letters to capital letters and vice versa.
4. Develop a program to perform divisibility tests by 3 and 5. If the entered number is divisible by three and not by five print "THREE"; if the number is divisible by five and not by three print "FIVE"; if divisible by both 3 & 5 print "BOTH" otherwise, print "NOT"
5. Vitamin D3 is recommended as the best indicator of vitamin D's nutritional status. If any patient is undergone a Vitamin D3 test, its value ranges from 0 <= to >100 nm/ML. Scott is a Pathologist, and he is doing a vitamin D3 test on his patient. You have to help him automate this process to know the status/level of vitamin D3 depending on its values in nm/mL. Write a program to help Scott to tell the status/level to patients as given in the table below.

D3 in nm/ML	Status
<20	Deficiency
20-30	Insufficiency
30-100	Sufficiency
>100	Toxicity