INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
DEPARTMENT OF MATHEMATICS AND STATISTICS

MA517M-Basic Programming Laboratory

Tutorial Problem - 2   18 August 2025

Examples

1. **Leap Year Checker**

   Write a C++ program to find whether the given year is a leap year or not.

2. **Positive Validator**

   Write a C++ program to check positive, negative, or zero. (using If...else)

3. **Triangle Validator**

   Write a C++ program to get three sides of a triangle and check whether it is a valid triangle. If it is a valid triangle, check whether it is an equilateral, a scalene, or an isosceles triangle (Using if...else)

4. **Triangle Validator**

   Input three angles. Use `if...else` to check whether they can form a triangle. If valid, further check whether the triangle is acute, right, or obtuse.

5. **Roots Classifier**

   Compute the roots of the quadratic equation $ax^2 + bx + c = 0$. Accept the values of a, b, c as input. Calculate the roots and print out the roots and their nature, real or imaginary, real and equal, real and distinct, based on their discriminant. (Using switch case)

6. **Electricity Bill Calculator**

   Given the number of units consumed:

   - First 100 units: Rs. 1/unit

   - Next 200 units: Rs. 2/unit

   - Above 300 units: Rs. 5/unit

   Use nested `if` statements to calculate the total bill.

7. **Day of the Week**

   Input a number (1 to 7) and use `switch` to print the corresponding day of the week.

8. **Character Type Detector**
   Input a character. Use nested `if` or `switch` to detect whether it's:

   - A vowel or consonant
   - A digit
   - A special character

9. **Leap Year Checker**
   Input a year. Use nested `if` to check leap year conditions:

   - Divisible by 4
   - If divisible by 100, then check if divisible by 400

10. **Simple Tax Calculator**
    Input income and apply tax slabs using nested `if`:

    - Up to Rs. 2,50,000: No tax
    - Rs. 2,50,001 – Rs. 5,00,000: 5%
    - Rs. 5,00,001 – Rs. 10,00,000: 20%
    - Above Rs. 10,00,000: 30%

11. **Quadrant Checker**
    Input x and y coordinates. Use `if...else` to determine in which quadrant the point lies or if it's on an axis/origin.

12. **BMI Calculator**
    Input weight (kg) and height (m). Compute BMI using $BMI = \frac{weight}{height^2}$ and classify:

    - Underweight: < 18.5
    - Normal: 18.5 – 24.9
    - Overweight: 25 – 29.9
    - Obese: ≥ 30