C++ - A02: Operators and Conditional Statement

1. Number Comparison with Conditions

Problem:

Write a program that takes three integers as input and checks the following conditions:

- If all are equal, print "All numbers are equal."
- If any two are equal, print "Two numbers are equal."
- Otherwise, print the largest number.

Input:

```
Enter three numbers: 15 10 15
```

Output:

```
Two numbers are equal.
```

2. Triangle Validity and Type Check

Problem:

Write a program to check whether a given set of three sides forms a valid triangle. If valid, determine if it is:

- Equilateral (all sides equal)
- Isosceles (two sides equal)
- Scalene (all sides different)

Input:

```
Enter sides of the triangle: 5 5 8
```

Output:

```
Valid Isosceles Triangle
```

---

3. E-commerce Discount Calculation

Problem:

A shopping website offers discounts based on the total amount spent:

- More than ₹5000 → 20% discount
- ₹3000 to ₹5000 → 10% discount
- Less than ₹3000 → No discount

Write a program to calculate the final bill amount after applying the discount.

Input:

```
Enter the bill amount: 4500
```

Output:

```
Discount: ₹450
Final amount: ₹4050
```

---

4. Number Properties Checker

Problem:

Write a program to check whether a given number is:

- Positive or Negative
- Even or Odd
- Divisible by 3 or 5

Input:

```
Enter a number: 30
```

Output:

```
Positive Even
Divisible by 3 and 5
```

---

5. Quadratic Equation Roots Calculation

Problem:

Write a program to take coefficients of a quadratic equation (`ax² + bx + c`) and find the nature of its roots (real & equal, real & distinct, or imaginary) using the discriminant formula:

D=b2−4acD = b^2 - 4ac

Input:

```
Enter values of a, b, c: 1 -3 2
```

Output:

```
Real and Distinct Roots
```

---

6. Gym Membership Plan Selection

Problem:

A gym offers three membership plans based on age and fitness level:

- If age < 18 → "Teen Plan"
- If age ≥ 18 and BMI < 25 → "Standard Plan"

- If BMI ≥ 25 → "Weight Loss Plan"

Write a program to suggest the best plan for a person based on their age and BMI.

Input:

```
Enter age: 22
Enter BMI: 27
```

Output:

```
Suggested Plan: Weight Loss Plan
```

---

7. Online Exam Passing Criteria

Problem:

An online exam requires a student to pass both the theory and practical tests to qualify. The passing criteria are:

- Theory marks >= 40
- Practical marks >= 50
- If both conditions are met, print "Passed," else "Failed."

Input:

```
Enter theory marks: 42
Enter practical marks: 45
```

Output:

```
Failed
```

---

8. Electricity Bill Calculation

Problem:

Write a program to calculate the electricity bill based on the following conditions:

- Up to 100 units → ₹5 per unit

- 101-300 units → ₹8 per unit
- Above 300 units → ₹10 per unit

Input:

```
Enter electricity units: 250
```

Output:

```
Total Bill: ₹2000
```

---

9. Check Leap Year and Century Year

Problem:

Write a program to check whether a given year is:

- A leap year
- A century year (divisible by 100)

Input:

```
Enter year: 2000
```

Output:

```
Leap Year and Century Year
```

---

10. Determine the Type of Character

Problem:

Write a program to check whether an input character is:

- A digit
- An uppercase letter
- A lowercase letter
- A special character

Input:

```
Enter a character: A
```

Output:

```
Uppercase Letter
```

---

11. Employee Salary Calculation

Problem:

An employee's salary is calculated based on the following criteria:

- If years of experience > 10, add a 10% bonus.
- If salary is above ₹50,000, deduct 5% tax.
- If both conditions are met, apply both.
  Write a program to calculate the final salary after deductions and bonuses.

Input:

```
Enter salary: 60000
Enter years of experience: 12
```

Output:

```
Final Salary: ₹62700
```

---

12. Fitness BMI Category Finder

Problem:

Write a program to categorize a person based on their Body Mass Index (BMI).

Categories are:

- BMI < 18.5 → "Underweight"
- 18.5 ≤ BMI < 24.9 → "Normal weight"
- 25 ≤ BMI < 29.9 → "Overweight"
- BMI ≥ 30 → "Obese"

Input:

```
Enter weight (kg): 68
Enter height (m): 1.75
```

Output:

```
BMI: 22.2
Category: Normal weight
```

---

13. Travel Fare Calculator

Problem:

A transport service charges fare based on distance traveled:

- Up to 10 km → ₹8 per km
- 11 to 50 km → ₹6 per km
- Beyond 50 km → ₹5 per km
  Write a program to calculate the total fare for the given distance.

Input:

```
Enter distance traveled (km): 25
```

Output:

```
Total Fare: ₹150
```

---

14. ATM Cash Withdrawal

Problem:

Write a program to simulate an ATM cash withdrawal system with the following conditions:

- Minimum balance required is ₹500.
- Withdrawal should be a multiple of ₹100.
- If both conditions are met, deduct the withdrawal amount; otherwise, print an error.

Input:

```
Enter current balance: 2500
Enter withdrawal amount: 1300
```

Output:

```
Error: Amount must be a multiple of 100
```

---

15. Student Grade Calculation with Attendance

Problem:

A student is graded based on the following criteria:

- If marks ≥ 90 and attendance ≥ 75% → "A"
- If marks ≥ 75 and attendance ≥ 60% → "B"
- If marks ≥ 50 and attendance ≥ 50% → "C"
- Otherwise, "Fail"

Write a program to determine the student's grade based on input values.

Input:

```
Enter marks: 85
Enter attendance percentage: 70
```

Output:

```
Grade: B
```

Keep Practicing!