

JAVATHON250925

1 Basic Input & Output

1. Write a Java program that reads the user's name and prints a personalized greeting on the screen.
2. Write a program that accepts two integers and displays their sum, difference, product, and quotient.
3. Write a program that reads a full sentence and counts the number of words.
4. Write a program that reads a single character and states whether it is a vowel or consonant.
5. A small shop wants a quick way to know which of three daily sales amounts is highest. Write a Java program that accepts three integers representing sales figures and prints the largest.

2 Variables & Data Types

6. Write a Java program to declare variables of all primitive data types, assign values, and print each value and its type.
7. Write a program that converts a temperature entered in Celsius to Fahrenheit and vice versa.
8. Write a program to swap two numbers without using a temporary variable.
9. Write a program to calculate and display the area and circumference of a circle given its radius.
10. A health app needs to estimate how many days a person has lived. Write a program that reads a person's age in years and outputs the total days lived (assume 365 days/year).

3 Operators & Expressions

11. Write a Java program that calculates compound interest using $A = P(1 + r/n)^{n*t}$.
12. Write a program that takes two boolean inputs and prints the results of AND, OR, and XOR operations.
13. Write a program to read two integers and show the remainder when the first is divided by the second.
14. Write a program that demonstrates increment and decrement operators step by step on a given number.
15. A civil engineer wants to find the roots of a quadratic equation. Write a program that accepts coefficients a, b, c and prints the real or complex roots.

4 Control Flow – If/Else

16. Write a Java program to determine if a given year is a leap year.
17. Write a program to read an integer and print whether it's positive, negative, or zero.
18. Write a program that reads a student's marks and outputs the letter grade (A–F).
19. Write a program to check if a character is uppercase, lowercase, digit, or special symbol.
20. A construction firm needs to classify triangles. Write a program that accepts the three side lengths and prints whether the triangle is scalene, isosceles, or equilateral.

5 Control Flow – Loops

21. Write a Java program that prints the multiplication table of any number up to 12.
22. Write a program that displays all prime numbers between 1 and 100.
23. Write a program to find the factorial of a number using a for loop.
24. Write a program that prints the Fibonacci sequence up to N terms.

25.A ticketing system needs to reverse seat numbers for final verification.
Write a program that reverses the digits of an integer entered by the user.

6 Arrays (5)

26. Write a Java program to read N integers into an array and print them in reverse order.
27. Write a program to find the largest and smallest numbers in an array.
28. Write a program to compute the average of array elements.
29. Write a program that merges two arrays and prints the sorted result.
30. A school records daily attendance numbers. Write a program that counts how many times a specific attendance figure appears in the array of a month's data.

7 Strings

31. Write a Java program to check if a given string is a palindrome.
32. Write a program to count vowels, consonants, digits, and spaces in a string.
33. Write a program to remove all duplicate characters from a string.
34. Write a program to find the first non-repeating character in a string.
35. A text-compression service needs a simple algorithm. Write a program that compresses consecutive repeated characters (e.g., “aaabb” → “a3b2”).

8 Methods & Functions

36. Write a Java method that returns the GCD of two numbers and call it from main.
37. Write a recursive method to calculate the power of a number ($\text{base}^{\text{exponent}}$).
38. Write a method to check if a number is an Armstrong number.
39. Write a method that converts a decimal number to binary.
40. A teacher wants to sort exam marks without using library functions. Write a program that defines a custom method to sort an integer array.

9 Exception Handling

41. Write a Java program that handles division by zero using a try-catch block.
42. Write a program that throws a custom exception when the entered age is less than 18.
43. Write a program to read a file and gracefully handle the case where the file is missing.
44. Write a program that catches multiple exceptions, including NumberFormatException and ArrayIndexOutOfBoundsException.
45. A banking application must always close the database connection. Write a program to demonstrate a finally block that executes regardless of errors.

10 Object-Oriented Programming

46. Write a Java class BankAccount with methods to deposit and withdraw money, and test it with sample transactions.
47. Write a class Rectangle with methods to compute area and perimeter, then create objects to test these methods.
48. Write a Student class with constructors, getters, and setters. Create an array of students and display their details.
49. Write an inheritance hierarchy where Animal is the parent and Dog and Cat are children, each implementing a sound() method.
50. A design team wants a common interface for shapes. Write a Java interface Shape with area() and perimeter() methods, then implement it in Circle and Square classes.