

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 (base^{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.