Calculator Application Using Method Overloading

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Course: B.Tech (Cyber Security)

Subject: Java Programming

Project Objective:

This project demonstrates the concept of method overloading in Java through a simple calculator application that performs basic arithmetic operations like addition, subtraction, multiplication, and division.

Java Source Code:

```
import java.util.Scanner;

// Calculator class demonstrating Method Overloading
class Calculator {

    int add(int a, int b) {
        return a + b;
    }

    double add(double a, double b) {
        return a + b;
    }

    int add(int a, int b, int c) {
        return a + b + c;
    }

    int subtract(int a, int b) {
        return a - b;
    }

    double multiply(double a, double b) {
        return a * b;
    }

    double divide(int a, int b) {
        try {
            if (b == 0) {
                throw new ArithmeticException("Cannot divide by zero!");
            }
            return (double) a / b;
        } catch (ArithmeticException e) {
            System.out.println("Error: " + e.getMessage());
            return 0;
        }
    }
```

```
}

public class CalculatorApp {
    Scanner sc = new Scanner(System.in);
    Calculator calc = new Calculator();

    void performAddition() {
        System.out.println("Enter number of values to add (2 or 3): ");
        int count = sc.nextInt();
        if (count == 2) {
            System.out.print("Enter first number: ");
            int a = sc.nextInt();
            System.out.print("Enter second number: ");
            int b = sc.nextInt();
            System.out.println("Result: " + calc.add(a, b));
        } else if (count == 3) {
            System.out.print("Enter first number: ");
            int a = sc.nextInt();
            System.out.print("Enter second number: ");
            int b = sc.nextInt();
            System.out.print("Enter third number: ");
            int c = sc.nextInt();
            System.out.println("Result: " + calc.add(a, b, c));
        } else {
            System.out.println("Invalid number of inputs!");
        }
    }

    void performSubtraction() {
        System.out.print("Enter first number: ");
        int a = sc.nextInt();
        System.out.print("Enter second number: ");
        int b = sc.nextInt();
        System.out.println("Result: " + calc.subtract(a, b));
    }

    void performMultiplication() {
        System.out.print("Enter first number: ");
        double a = sc.nextDouble();
        System.out.print("Enter second number: ");
        double b = sc.nextDouble();
        System.out.println("Result: " + calc.multiply(a, b));
    }

    void performDivision() {
        System.out.print("Enter first number: ");
        int a = sc.nextInt();
        System.out.print("Enter second number: ");
        int b = sc.nextInt();
        double result = calc.divide(a, b);
        System.out.println("Result: " + result);
    }

    void mainMenu() {
        int choice;
        do {
            System.out.println("\n===== Welcome to Calculator Application =====");
```

```
            System.out.println("1. Add Numbers");
            System.out.println("2. Subtract Numbers");
            System.out.println("3. Multiply Numbers");
            System.out.println("4. Divide Numbers");
            System.out.println("5. Exit");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();
            switch (choice) {
                case 1:
                    performAddition();
                    break;
                case 2:
                    performSubtraction();
                    break;
                case 3:
                    performMultiplication();
                    break;
                case 4:
                    performDivision();
                    break;
                case 5:
                    System.out.println("Exiting... Thank you!");
                    break;
                default:
                    System.out.println("Invalid choice! Please try again.");
            }
        } while (choice != 5);
    }

    public static void main(String[] args) {
        CalculatorApp app = new CalculatorApp();
        app.mainMenu();
    }
}
```