Java Programming Assignment: Simple Console Calculator

Objective: Create a basic console-based calculator in Java that performs addition, subtraction, multiplication, and division based on user input.
Requirements:

1. **User Input:** Your program must prompt the user to enter:
    - The first number.
    - The second number.
    - An operator (+, -, *, or /).
2. **Conditionals:** Use if-else if statements (or a switch statement) to determine which arithmetic operation to perform based on the user-provided operator.
3. **Boolean Logic:** (Implicitly used in conditional checks for operators, but you can also explicitly check for valid operator input using boolean logic).
4. **Several Datatypes:** Utilize at least three different Java data types (e.g., double or int for numbers, String for the operator).
5. **Output:** Print the calculated result of the equation to the console.

Instructions:

- Start by getting the two numbers and the operator from the user.
- Implement the logic to perform the correct calculation based on the operator.
- Display the result clearly.

```
import java.util.Scanner;

public class Main {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      // Variables using different data types
      double firstNumber;  // double data type for numbers
      double secondNumber; // double data type for numbers
      String operator;     // String data type for operator
      double result = 0.0; // double data type for result
      boolean validOperator = false; // boolean data type for validation

      System.out.println("=== Basic Console Calculator ===");
      System.out.println("This calculator performs addition, subtraction, multiplication, and
division.");
      System.out.println();

      // Get first number from user
```

```
        System.out.print("Enter the first number: ");
        firstNumber = scanner.nextDouble();

        // Get second number from user
        System.out.print("Enter the second number: ");
        secondNumber = scanner.nextDouble();

        // Clear the newline character left by nextDouble()
        scanner.nextLine();

        // Get operator from user
        System.out.print("Enter an operator (+, -, *, /): ");
        operator = scanner.nextLine();

        // Use if-else if statements to determine operation
        if (operator.equals("+")) {
            result = firstNumber + secondNumber;
            validOperator = true;
        } else if (operator.equals("-")) {
            result = firstNumber - secondNumber;
            validOperator = true;
        } else if (operator.equals("*")) {
            result = firstNumber * secondNumber;
            validOperator = true;
        } else if (operator.equals("/")) {
            // Check for division by zero using boolean logic
            if (secondNumber != 0) {
                result = firstNumber / secondNumber;
                validOperator = true;
            } else {
                System.out.println("Error: Division by zero is not allowed!");
                validOperator = false;
            }
        } else {
            System.out.println("Error: Invalid operator! Please use +, -, *, or /");
            validOperator = false;
        }

        // Display result if operation was valid
        if (validOperator) {
            System.out.println();
            System.out.println("Calculation: " + firstNumber + " " + operator + " " + secondNumber
+ " = " + result);
```

```
        }

        System.out.println("Thank you for using the calculator!");
        scanner.close();
    }
}
```

Part 1: Logical Operators (AND, OR, NOT)

1. true && false False
2. true || true True
3. !false True
4. false || false False
5. !(true && false) True
6. !true || true True
7. false && !true False
8. !false && !false True
9. true && (false || true) True
10. (false || true) && !false True

Part 2: Relational Operators (EQUALS, GREATER THAN, LESS THAN, GREATER OR EQUALS, LESS THAN OR EQUALS)

11. 10 == 10 True
12. 5 > 8 False
13. 95 < 90 False
14. 18 >= 18 True
15. 25 <= 26 True

Part 3: Mixed Operators with Integers

16. (7 > 5) && (5 != 7) True
17. (10 == 10) || (10 < 5) True
18. !(3 >= 8) && (3 + 8 > 10) True
19. (20 <= 20) || (25 > 20 && 20 < 25) True
20. (1 == 2) || (2 < 3) && (3 != 1) True