# Operators

Challenge 1: Demonstrate all arithmetic operators using two integers

```
public class ArithmeticOperators {
    public static void main(String[] args) {
        int a = 10, b = 3;
        System.out.println("Addition: " + (a + b));
        System.out.println("Subtraction: " + (a - b));
        System.out.println("Multiplication: " + (a * b));
        System.out.println("Division: " + (a / b));
        System.out.println("Modulus: " + (a % b));
    }
}
```

Output:
Addition: 13
Subtraction: 7
Multiplication: 30
Division: 3
Modulus: 1

Challenge 2: Use relational operators to compare ages

```
public class RelationalOperators {
    public static void main(String[] args) {
        int age1 = 25, age2 = 30;
        System.out.println("age1 > age2: " + (age1 > age2));
        System.out.println("age1 < age2: " + (age1 < age2));
        System.out.println("age1 == age2: " + (age1 == age2));
        System.out.println("age1 != age2: " + (age1 != age2));
    }
}
```

Output:
age1 > age2: false
age1 < age2: true
age1 == age2: false
age1 != age2: true

Challenge 3: Implement a basic calculator using switch and operators

```
import java.util.Scanner;

public class BasicCalculator {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first number: ");
        int a = sc.nextInt();
        System.out.print("Enter second number: ");
        int b = sc.nextInt();
        System.out.print("Enter operator (+, -, *, /): ");
        char op = sc.next().charAt(0);

        switch (op) {
            case '+': System.out.println("Result: " + (a + b)); break;
            case '-': System.out.println("Result: " + (a - b)); break;
            case '*': System.out.println("Result: " + (a * b)); break;
            case '/': System.out.println("Result: " + (a / b)); break;
            default: System.out.println("Invalid operator");
        }
        sc.close();
    }
}
```

Output:
Enter first number: 8
Enter second number: 2

Enter operator (+, -, *, /): *
Result: 16

Challenge 4: Use bitwise AND, OR, XOR on two binary values

```
public class BitwiseOperators {
    public static void main(String[] args) {
        int a = 5;  // 0101
        int b = 3;  // 0011

        System.out.println("a & b: " + (a & b));  // 0001 = 1
        System.out.println("a | b: " + (a | b));  // 0111 = 7
        System.out.println("a ^ b: " + (a ^ b));  // 0110 = 6
    }
}
```

Output:
a & b: 1
a | b: 7
a ^ b: 6

Challenge 5: Demonstrate logical operators with Boolean expressions

```
public class LogicalOperators {
    public static void main(String[] args) {
        boolean x = true, y = false;

        System.out.println("x && y: " + (x && y));
        System.out.println("x || y: " + (x || y));
        System.out.println("!x: " + (!x));
    }
}
```

Output:
x && y: false

x || y: true
!x: false