

# Operators in Java – Complete Detailed Notes

## 1. Introduction to Operators

Operators in Java are special symbols used to perform operations on variables and values. Java supports seven main types of operators which are frequently asked in exams and interviews.

## 2. Arithmetic Operators

Arithmetic operators are used to perform basic mathematical operations.

- 1 + (Addition) – adds two values
- 2 - (Subtraction) – subtracts one value from another
- 3 \* (Multiplication) – multiplies values
- 4 / (Division) – divides values
- 5 % (Modulus) – returns remainder

Example: `int a = 10, b = 3; System.out.println(a + b); // 13`

## 3. Relational Operators

Relational operators compare two values and return a boolean result.

- 1 == (Equal to)
- 2 != (Not equal to)
- 3 > (Greater than)
- 4 < (Less than)
- 5 >= (Greater than or equal to)
- 6 <= (Less than or equal to)

Example: `System.out.println(a > b); // true`

## 4. Logical Operators

Logical operators are used to combine multiple conditions.

- 1 && (Logical AND) – true if both conditions are true
- 2 || (Logical OR) – true if any condition is true
- 3 ! (Logical NOT) – reverses the condition

Example: `if(a > 5 && b < 5) { System.out.println("True"); }`

## 5. Assignment Operators

Assignment operators assign values to variables.

- 1 = (Assign)
- 2 +=, -=, \*=, /=, %= (Compound assignment operators)

Example: `int x = 5; x += 3; // x becomes 8`

## 6. Unary Operators

Unary operators operate on a single operand.

- 1 + (Unary plus)
- 2 - (Unary minus)
- 3 ++ (Increment)
- 4 -- (Decrement)
- 5 ! (Logical NOT)

Example: `int n = 5; n++;` // n becomes 6

## 7. Bitwise Operators

Bitwise operators perform operations at the bit level.

- 1 & (Bitwise AND)
- 2 | (Bitwise OR)
- 3 ^ (Bitwise XOR)
- 4 ~ (Bitwise Complement)
- 5 << (Left shift)
- 6 >> (Right shift)

Example: `int a = 5, b = 3; System.out.println(a & b);`

## 8. Ternary Operator

The ternary operator is a shorthand for if-else conditions.

Syntax: `condition ? value1 : value2`

Example: `int max = (a > b) ? a : b;`

## 9. Important Interview Questions

- 1 Difference between `==` and `equals()`
- 2 Difference between `&&` and `&`
- 3 What is ternary operator?
- 4 Difference between `++i` and `i++`

## 10. Summary

Operators are the backbone of Java programming. Understanding all seven operator types is essential for writing efficient programs and cracking interviews.