**Operators in Java**

In Java, **operators** are special symbols or keywords used to perform operations on variables and values. Java operators are broadly categorized into following types:

**1. Arithmetic Operators**

Used to perform basic arithmetic operations.

| **Operator** | **Description** | **Example (a = 10, b = 5)** | **Result** |
| --- | --- | --- | --- |
| + | Addition | a + b | 15 |
| - | Subtraction | a – b | 5 |
| \* | Multiplication | a \* b | 50 |
| / | Division | a / b | 2(Quotient) |
| % | Modulus (remainder) | a % b | 0(Remainder) |

**2. Relational (Comparison) Operators**

Used to compare two or more than 2 values.

| **Operator** | **Description** | **Example (a = 10, b = 5)** | **Result** |
| --- | --- | --- | --- |
| == | Equal to(Comparison) | a == b | false |
| != | Not equal to | a != b | true |
| > | Greater than | a > b | true |
| < | Less than | a < b | false |
| >= | Greater than or equal | a >= b | true |
| <= | Less than or equal | a <= b | false |

**3. Logical Operators**

Used to combine multiple conditions.

| **Operator** | **Description** | **Example a=10,b=5** | **Result** |
| --- | --- | --- | --- |
| && | Logical AND | a > 5 && b < 10 | true |
| || | Logical OR a>5 | || b>10 | true |
| ! | Logical NOT | !(a == b) | true |

**4. Assignment Operators**

Used to assign values to variables.

| **Operator** | **Description** | **Example** | **Equivalent to** |
| --- | --- | --- | --- |
| = | Assign | a = 10 | — |
| += | Add and assign | a += 5 | a = a + 5 |
| -= | Subtract and assign | a -= 5 | a = a - 5 |
| \*= | Multiply and assign | a \*= 5 | a = a \* 5 |
| /= | Divide and assign | a /= 5 | a = a / 5 |
| %= | Modulus and assign | a %= 5 | a = a % 5 |

**5. Unary Operators**

Operate on a single operand.

| **Operator** | **Description** | **Example** | **Result** |
| --- | --- | --- | --- |
| + | Unary plus | +a | +10 |
| - | Unary minus | -a | -10 |
| ++ | Increment | a++ / ++a | 11 |
| -- | Decrement | a-- / --a | 9 |
|  |  |  |  |

**6. Bitwise Operators**

Operate on bits.

| **Operator** | **Description** | **Example (a = 5, b = 3)** | **Result** |
| --- | --- | --- | --- |
| & | Bitwise AND | a & b | 1 |
| ` | ` | Bitwise OR | `a |
| ^ | Bitwise XOR | a ^ b | 6 |
| ~ | Bitwise complement | ~a | -6 |
| << | Left shift | a << 1 | 10 |
| >> | Right shift | a >> 1 | 2 |
| >>> | Unsigned right shift | a >>> 1 | 2 |

**7. Ternary Operator**

A shorthand for if-else.

int result = (a > b) ? a : b; if(a>b){ sout(a);}else{sout(b);

This returns the greater of a and b.

**8. Instanceof Operator**

Checks if an object is an instance of a specific class.

if (obj instanceof String)

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