

# Java operators

Java operators allow literals and variables to perform mathematical calculations, comparisons, and logical evaluations. They are grouped into several categories based on their functionality.

## The main types of operators in Java are:

- **Arithmetic Operators:** Used for basic mathematical operations.
  - + (Addition)
  - - (Subtraction)
  - \* (Multiplication)
  - / (Division)
  - % (Modulus, which returns the remainder of a division)
- **Assignment Operators:** Used to assign values to variables.
  - = (Simple assignment)
  - +=, -=, \*=, /=, %=, &=, ^=, |=, <<=, >>=, >>>= (Compound assignment operators, e.g., a += 5 is equivalent to a = a + 5)
- **Unary Operators:** Operations that require only one operand.
  - + (Unary plus, indicates positive value)
  - - (Unary minus, negates an expression)
  - ++ (Increment, increases value by 1)
  - -- (Decrement, decreases value by 1)
  - ! (Logical complement, inverts the boolean value)
- **Relational (Comparison) Operators:** Used to compare two values and return a boolean result (true or false).
  - == (Equal to)
  - != (Not equal to)
  - > (Greater than)
  - < (Less than)
  - >= (Greater than or equal to)
  - <= (Less than or equal to)
- **Logical Operators:** Used to combine boolean expressions.
  - && (Logical AND, true if both conditions are true)
  - || (Logical OR, true if at least one condition is true)
  - ! (Logical NOT, reverses the boolean result)

**Bitwise and Bit Shift Operators:** Perform operations directly on the individual bits of integer data types.

- & (Bitwise AND)
  - | (Bitwise inclusive OR)
  - ^ (Bitwise exclusive OR, XOR)
  - ~ (Bitwise complement)
  - << (Signed left shift)
  - >> (Signed right shift)
  - >>> (Unsigned right shift)
- **Ternary Operator:** A conditional operator that acts as a shorthand for an if-else statement.
    - ? : (Syntax: condition ? expression1 : expression2)
  - **Other Special Operators:**
    - . (Dot operator, used to access members of a class)
    - new (Used to create new instances of objects)
    - [] (Array subscript operator, used to access array elements)
    - isinstance (Used to test whether an object is an instance of a specific class or interface)
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The order in which operations are performed in an expression is determined by [operator precedence and associativity](#).