**Operators** are symbols used to perform operations on variables and values.

**1. Arithmetic Operators**

Used to perform **basic mathematical operations**.

|  |  |  |  |
| --- | --- | --- | --- |
| + | for Addition |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| - | for Subtraction |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| \* | for Multiplication |  |  |
| / | for Division |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|  |  |
| --- | --- |
| % | for Modulus (remainder) |

**2. Relational Operators**

Used to **compare** two values.

| **Operator** | **Meaning** | **Example** | **Result** |
| --- | --- | --- | --- |
| == | Equal to | a == b | 0 |
| != | Not equal to | a != b | 1 |
| > | Greater than | a > b | 1 |
| < | Less than | a < b | 0 |
| >= | Greater than or equal to | a >= b | 1 |
| <= | Less than or equal to | a <= b | 0 |

**3. Logical Operators**

Used to **combine multiple conditions**.

| **Operator** | **Meaning** | **Example** | **Result** |
| --- | --- | --- | --- |
| && | Logical AND | (a > b) && (b > 0) | true if both are true |
| ` |  | ` | Logical OR |
| ! | Logical NOT | !(a > b) | reverses result |

**4. Assignment Operators**

Used to **assign values** to variables.

| **Operator** | **Example** | **Same as** |
| --- | --- | --- |
| = | a = 5 | — |
| += | a += 3 | a = a + 3 |
| -= | a -= 2 | a = a - 2 |
| \*= | a \*= 4 | a = a \* 4 |
| /= | a /= 2 | a = a / 2 |
| %= | a %= 2 | a = a % 2 |

**5. Increment and Decrement Operators**

Used to **increase or decrease** a variable’s value by 1.

| **Operator** | **Description** | **Example** | **Result** |
| --- | --- | --- | --- |
| ++ | Increment | ++a or a++ | increases by 1 |
| -- | Decrement | --a or a-- | decreases by 1 |

**Bitwise Operators**

Used to perform operations **on bits** (binary level).

| **Operator** | **Meaning** | **Example (a=5, b=3)** | **Result** |
| --- | --- | --- | --- |
| & | AND | a & b | 1 |
| ` | ` | OR | `a |
| ^ | XOR | a ^ b | 6 |
| ~ | NOT | ~a | -6 |
| << | Left shift | a << 1 | 10 |
| >> | Right shift | a >> 1 | 2 |