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Introduction to 'JavaScript' Language

Introduction to JavaScript Programming

Module 6 - Operators in Java Script



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Operators

Definition

An Operator is a symbol that tells to perform specific operation. Let us take a simple expression $5 + 3$ is equal to 8. Here 5 and 3 are called operands and "+" is called the operator.



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Types of Operators:

JavaScript supports the following types of operators.

1. Arithmetic Operators
2. Comparison Operators
3. Logical (or Relational) Operators
4. Assignment Operators
5. Conditional (or ternary) Operators



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JavaScript Arithmetic Operators



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JavaScript provides a set of arithmetic operators to perform mathematical operations on numbers. These operators are fundamental in calculations and are commonly used in programming.

List of Arithmetic Operators

Operator	Description	Example	Result
+	Addition: Adds two numbers.	$10 + 5$	15
-	Subtraction: Subtracts one number from another.	$10 - 5$	5
*	Multiplication: Multiplies two numbers.	$10 * 5$	50
/	Division: Divides one number by another.	$10 / 5$	2
%	Modulus: Returns the remainder of division.	$10 \% 3$	1
++	Increment: Increases a number by one.	let x = 10; x++	11
--	Decrement: Decreases a number by one.	let x = 10; x--	9
**	Exponentiation: Raises one number to the power of another.	$2 ** 3$	8



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Solved Example: Using Arithmetic Operators in JavaScript

```

<!DOCTYPE html>
<html>
<head>
  <title>JavaScript Arithmetic Operators</title>
</head>
<body>
  <h2>JavaScript Arithmetic Operators</h2>
  <script>
    let a = 10;
    let b = 5;

    // Addition
    document.write("Addition (a + b): " + (a + b) + "<br>");

    // Subtraction
    document.write("Subtraction (a - b): " + (a - b) + "<br>");

    // Multiplication
    document.write("Multiplication (a * b): " + (a * b) + "<br>");

    // Division
    document.write("Division (a / b): " + (a / b) + "<br>");

    // Modulus
    document.write("Modulus (a % b): " + (a % b) + "<br>");

    // Increment
    a++; // Increment a by 1
    document.write("Increment (a++): " + a + "<br>");

    // Decrement
    b--; // Decrement b by 1
    document.write("Decrement (b--): " + b + "<br>");

    // Exponentiation
    let base = 2;
    let power = 3;
    document.write("Exponentiation (2 ** 3): " + (base ** power) + "<br>");
  </script>
</body>
</html>

```

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OUTPUT:

Addition (a + b): 15
 Subtraction (a - b): 5
 Multiplication (a * b): 50
 Division (a / b): 2
 Modulus (a % b): 0
 Increment (a++): 11
 Decrement (b--): 4
 Exponentiation (2 ** 3): 8

JavaScript Comparison Operators

Comparison operators in JavaScript are used to compare two values and return a boolean result (true or false). These operators help determine relationships between values, such as equality, inequality, or order.

JavaScript Comparison Operators

Operator	Description	Example	Result
==	Equal to	5 == "5"	true
===	Strict equal (value and type)	5 === "5"	false
!=	Not equal to	5 != "5"	false
!==	Strict not equal (value and type)	5 !== "5"	true
>	Greater than	10 > 5	true
<	Less than	10 < 5	false
>=	Greater than or equal to	10 >= 10	true
<=	Less than or equal to	5 <= 10	true

Solved Example: Using Comparison Operators in JavaScript

```
<!DOCTYPE html>
<html>
<head>
  <title>JavaScript Comparison Operators</title>
</head>
<body>
  <h2>JavaScript Comparison Operators</h2>
  <script>
    let x = 10;
```

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```
let y = "10";  
let z = 5;
```

```
// Equal to  
document.write("x == y: " + (x == y) + "<br>"); // true
```

```
// Strict equal  
document.write("x === y: " + (x === y) + "<br>"); // false
```

```
// Not equal  
document.write("x != z: " + (x != z) + "<br>"); // true
```

```
// Strict not equal  
document.write("x !== y: " + (x !== y) + "<br>"); // true
```

```
// Greater than  
document.write("x > z: " + (x > z) + "<br>"); // true
```

```
// Less than  
document.write("z < x: " + (z < x) + "<br>"); // true
```

```
// Greater than or equal to  
document.write("x >= 10: " + (x >= 10) + "<br>"); // true
```

```
// Less than or equal to  
document.write("z <= 10: " + (z <= 10) + "<br>"); // true
```

```
</script>  
</body>  
</html>
```

OUTPUT:

```
x == y: true  
x === y: false  
x != z: true  
x !== y: true  
x > z: true  
z < x: true  
x >= 10: true  
z <= 10: true
```

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Logical Operators in JavaScript

Logical operators in JavaScript are used to combine or modify boolean values or expressions. They return a boolean value (true or false) based on the evaluation of the expressions.

Types of Logical Operators

Operator	Description	Example	Result
&&	Logical AND: Returns true if both conditions are true.	(5 > 3 && 10 > 5)	true
	Logical OR: Returns true if at least one condition is true.	(5 > 10 10 > 15)	false
!	Logical NOT: Inverts the truth value of the condition.	!(5 > 3)	false

Solved Example: Using Logical Operators in JavaScript

```

<!DOCTYPE html>
<html>
<head>
  <title>Logical Operators Example</title>
</head>
<body>
  <h2>Logical Operators in Action</h2>
  <script>
    let age = 20;
    let hasID = true;

    // Using Logical AND (&&)
    document.write("Eligible to vote: " + (age >= 18 && hasID) + "<br>"); // true

    // Using Logical OR (||)
    let hasMembership = false;
    let hasCoupon = true;
    document.write("Eligible for discount: " + (hasMembership || hasCoupon) +
  <br>"); // true

  </script>
</body>
</html>

```

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Explanation of the above code

Logical AND (&&): Checks if the age is greater than or equal to 18 and the person has an ID.
Both conditions must be true for the result to be true.

Logical OR (||): Checks if the person has either a membership or a coupon.
Only one condition needs to be true for the result to be true.

Assignment Operators in JavaScript

Assignment operators are used to assign values to variables. They can also combine an operation (like addition, subtraction, etc.) with assignment.

Types of Assignment Operators

Operator	Description	Example	Explanation
=	Assigns a value to a variable	x = 5	Assigns 5 to x.
+=	Adds and assigns a value	x += 3	Equivalent to x = x + 3.
-=	Subtracts and assigns a value	x -= 2	Equivalent to x = x - 2.
*=	Multiplies and assigns a value	x *= 4	Equivalent to x = x * 4.
/=	Divides and assigns a value	x /= 2	Equivalent to x = x / 2.
%=	Modulus and assigns a value	x %= 3	Equivalent to x = x % 3.
**=	Exponentiation and assigns a value	x **= 2	Equivalent to x = x ** 2.
<<=	Left shift and assigns a value	x <<= 2	Equivalent to x = x << 2.
>>=	Right shift and assigns a value	x >>= 2	Equivalent to x = x >> 2.
>>>=	Unsigned right shift and assigns a value	x >>>= 2	Equivalent to x = x >>> 2.
&=	Bitwise AND and assigns a value	x &= 2	Equivalent to x = x & 2.

Solved Example: Using Assignment Operators in JavaScript

```
<!DOCTYPE html>
<html>
<head>
```

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```

<title>Assignment Operators</title>
</head>
<body>
<h2>JavaScript Assignment Operators</h2>
<script>
  let x = 10;

  // Basic Assignment
  x = 5;
  document.write("Basic Assignment (x = 5): " + x + "<br>"); // Output: 5

  // Add and Assign
  x += 3; // Equivalent to x = x + 3
  document.write("Add and Assign (x += 3): " + x + "<br>"); // Output: 8

  // Subtract and Assign
  x -= 2; // Equivalent to x = x - 2
  document.write("Subtract and Assign (x -= 2): " + x + "<br>"); // Output: 6

  // Multiply and Assign
  x *= 4; // Equivalent to x = x * 4
  document.write("Multiply and Assign (x *= 4): " + x + "<br>"); // Output: 24

  // Divide and Assign
  x /= 2; // Equivalent to x = x / 2
  document.write("Divide and Assign (x /= 2): " + x + "<br>"); // Output: 12

  // Modulus and Assign
  x %= 5; // Equivalent to x = x % 5
  document.write("Modulus and Assign (x %= 5): " + x + "<br>"); // Output: 2

  // Exponentiation and Assign
  x **= 3; // Equivalent to x = x ** 3
  document.write("Exponentiation and Assign (x **= 3): " + x + "<br>"); //
Output: 8
</script>
</body>
</html>

```

OUTPUT:

Basic Assignment (x = 5): 5
Add and Assign (x += 3): 8
Subtract and Assign (x -= 2): 6

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- Multiply and Assign (x *= 4): 24
- Divide and Assign (x /= 2): 12
- Modulus and Assign (x %= 5): 2
- Exponentiation and Assign (x **= 3): 8

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Conditional (Ternary) Operator in JavaScript

The **conditional operator** in JavaScript is a shorthand for if-else statements. It uses three operands: a condition, an expression to execute if the condition is true, and an expression to execute if the condition is false.

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Syntax:

condition ? expressionIfTrue : expressionIfFalse;

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- condition: The test to evaluate (returns true or false).
- expressionIfTrue: Executes if the condition is true.
- expressionIfFalse: Executes if the condition is false.

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Solved Example: Using Conditional Operators in JavaScript

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```
<!DOCTYPE html>
<html>
<head>
  <title>Conditional Operator Example</title>
</head>
<body>
  <h2>Conditional (Ternary) Operator in JavaScript</h2>
  <script>
    let marks = 75;

    // Check if marks are above 50
    let result = (marks >= 50) ? "Pass" : "Fail";

    // Display the result
    document.write("Marks: " + marks + "<br>");
    document.write("Result: " + result + "<br>");
  </script>
</body>
</html>
```

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The + Operator Used on Strings

The + operator can also be used to add string variables or text values together. To add two or more string variables together, use the + operator.

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```
txt1="What a very";  
txt2="nice day";  
txt3=txt1+txt2;
```

After the execution of the statements above, the variable txt3 contains
"What a verynice day".

To add a space between the two strings, insert a space into one of the strings:

```
txt1="What a very ";  
txt2="nice day";  
txt3=txt1+txt2;
```

or insert a space into the expression:

```
txt1="What a very";  
txt2="nice day";  
txt3=txt1+" "+txt2;
```

After the execution of the statements above, the variable txt3 contains:
"What a very nice day"

Assignment

1. Write a program to calculate the area of a rectangle using the * operator.
2. Use the % operator to determine if a number is even or odd.
3. Find the result of the expression: $5 + 3 * 2 - 8 / 4$. What will happen if you use parentheses?
4. Assign a value to a variable and use += to increase it by 10. What is the final value?
5. Create a program that uses *= to double the value of a variable three times.
6. Write a script where you initialize a variable to 50 and decrease it by 5 using -=.



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