**Lesson 3: Operators and Basic Input/Output**

By the end of this lesson, students will be able to:

* Understand and Apply Arithmetic Operators:
  + Explain the purpose and functionality of arithmetic operators (e.g., addition, subtraction, multiplication, division, modulus).
  + Perform calculations using arithmetic operators to solve real-world problems in JavaScript, demonstrating the practical application of these operators.
* Utilize Assignment Operators:
  + Describe how assignment operators work in JavaScript.
  + Implement and combine assignment operators to store and update values in variables efficiently, saving time and resources.
* Employ Comparison and Logical Operators:
  + Understand the significance of comparison operators (e.g., ==, ===, !=, >, <) and their use in evaluating expressions.
  + Apply logical operators (&&, ||, !) to combine multiple conditions and produce Boolean results.
* Implement Basic Input/Output Functions:
  + Use prompt() to receive user input and alert() or console.log() to display messages or results.
  + Develop interactive programs that accept user input, process it using various operators, and produce meaningful output.
* Analyze and Debug Simple JavaScript Programs:
  + Identify and correct syntax errors related to operators and input/output functions.
  + Debug and test JavaScript code snippets to ensure they perform the intended operations correctly.
* Demonstrate the Integration of Operators in Real-World Scenarios:
  + Construct small programs that integrate arithmetic, comparison, and logical operators to solve practical problems, such as calculating the total cost of items in a shopping cart or determining if a user is eligible for a discount based on their age and purchase amount.
  + Design simple algorithms that incorporate basic input/output methods without relying on conditional statements like if or switch.

**Operators**

Operators in JavaScript are symbols that perform operations on variables and values. They are fundamental for performing arithmetic calculations, comparisons, logical decisions, and assigning values. Understanding how to use operators effectively is crucial for writing efficient and clear code.

* Arithmetic Operators

Arithmetic operators are used to perform mathematical calculations.

* + Addition (+) : Adds two operands.

let sum = 10 + 5; // sum is 15

* + Subtraction (-) : Subtracts the second operand from the first.

let difference = 10 - 5; // difference is 5

* + Multiplication (\*) : Multiplies two operands.

let product = 10 \* 5; // product is 50

* + Division (/) : Divides the first operand by the second.

let quotient = 10 / 5; // quotient is 2

* + Modulus (%) : Returns the remainder when the first operand is divided by the second.

let remainder = 10 % 3; // remainder is 1

* + Increment (++) : Increases an operand’s value by 1.

let counter = 10;

counter++; // counter is now 11

* + Decrement (--) : Decreases an operand’s value by 1.

let counter = 10;

counter--; // counter is now 9

* Assignment Operators

Assignment operators assign values to variables. The primary assignment operator is =, but some compound operators combine arithmetic operations with Assignment.

* + Basic Assignment (=) : Assigns the value on the right to the variable on the left.

let x = 10; // x is 10

* + Addition Assignment (+=) ; Adds the right operand to the left operand and assigns the result to the left operand.

let x = 10;

x += 5; // x is now 15

* + Subtraction Assignment (-=) : Subtracts the right operand from the left operand and assigns the result to the left operand.

let x = 10;

x -= 5; // x is now 5

* + Multiplication Assignment (\*=) : Multiplies the left operand by the right operand and assigns the result to the left operand.

let x = 10;

x \*= 5; // x is now 50

* + Division Assignment (/=) : Divides the left operand by the right operand and assigns the result to the left operand.

let x = 10;

x /= 5; // x is now 2

* Comparison Operators

Comparison operators are used to compare two values. Depending on the result of the comparison, they return true or false.

* + Equal to (==) ; Returns true if the operands are equal.

let isEqual = (10 == "10"); // true

* + Strict Equal to (===) : Returns true if the operands are equal and of the same type.

let isStrictEqual = (10 === "10"); // false

* + Not Equal to (!=) ; Returns true if the operands are not equal.

let isNotEqual = (10 != 5); // true

* + Strict Not Equal to (!==) : Returns true if the operands are not equal or not of the same type.

let isStrictNotEqual = (10 !== "10"); // true

* + Greater than (>) : Returns true if the left operand is greater than the right operand.

let isGreater = (10 > 5); // true

* + Less than (<) : Returns true if the left operand is less than the right operand.

let isLess = (5 < 10); // true

* + Greater than or equal to (>=) : Returns true if the left operand is greater than or equal to the right operand.

let isGreaterOrEqual = (10 >= 5); // true

* + Less than or equal to (<=) : Returns true if the left operand is less than or equal to the right operand.

let isLessOrEqual = (5 <= 10); // true

* Logical Operators

Logical operators are used to combine or invert Boolean values.

* AND (&&) : Returns true if both operands are true.

let result = (10 > 5) && (5 < 10); // true

* OR (||) : Returns true if at least one operand is true.

let result = (10 > 5) || (5 > 10); // true

* NOT (!) : Inverts the Boolean value of the operand.

let result = !(10 > 5); // false

**Basic Input/Output**

In JavaScript, we can interact with the user or display data using various input/output methods. Two standard methods are console.log() for output and prompt() for input.

* Output to Console

The console.log() method outputs messages to the browser’s console. It is widely used for debugging and displaying information during development.

let message = "Hello, world!";

console.log(message); // Outputs: Hello, world!

* Basic Input with prompt()

The prompt() function displays a dialog box that prompts the user for input. It returns the user’s input as a string.

let userName = prompt("Enter your name:");

console.log("Hello, " + userName + "!");

* Alerting the User with alert()

The alert() function displays an alert dialog box with a specified message. It is helpful in notifying users or displaying important information.

alert("This is an alert message!");

* Confirming Actions with confirm()

The confirm() function displays a dialog box with a message, an OK button, and a Cancel button. It returns true if the user clicks OK and false if they click Cancel.

let userConfirmed = confirm("Are you sure you want to proceed?");

console.log(userConfirmed); // Outputs: true or false