**JavaScript Fundamentals (Variables, Data Types, Operators)**

**Introduction to JavaScript**

JavaScript is a versatile and widely-used programming language that enables the creation of dynamic and interactive web applications. Unlike HTML and CSS, which are used for structuring and styling web pages, JavaScript allows you to add interactivity, such as responding to user inputs, manipulating the Document Object Model (DOM), and communicating with servers.

JavaScript can be used both on the client-side (in the browser) and the server-side (using environments like Node.js). In the browser, it is often used to enhance user experience by enabling real-time updates, animations, form validations, and more.

Vue.js, angular.js, react.js, node.js.

GUI - Graphical User Interface

**Basic JavaScript Concepts**

1. \*\*Variables:\*\*

Variables in JavaScript are containers that store data values. You can declare variables using `var`, `let`, or `const`.

- `var`: Function-scoped variable (avoid using in modern JavaScript).

- `let`: Block-scoped variable.

- `const`: Block-scoped variable that cannot be reassigned.

\*\*Example:\*\*

```javascript

let name = "Alice"; - string

var name = “Daniel”;

const age = 25; integer

Let measurement = 20.4; float (decimal or fraction)

```

2. \*\*Data Types:\*\*

JavaScript supports various data types that can be categorized into two main types: primitive and reference.

- \*\*Primitive Data Types:\*\*

- `String`: Represents textual data. e.g., `"Hello, world!"`

- `Number`: Represents numeric values. e.g., `42`

- `Boolean`: Represents logical values. e.g., `true` or `false`

- `Undefined`: Represents a variable that has been declared but not assigned a value.

- `Null`: Represents the intentional absence of any object value.

- `Symbol`: Represents a unique and immutable value.

- `BigInt`: Represents integers with arbitrary precision.

- \*\*Reference Data Types:\*\*

- `Object`: Collections of properties.

- `Array`: Ordered lists of values.

\*\*Example:\*\*

```javascript

let message = "Hello";

let count = 10;

let isActive = true;

let address;

let user = null;

let uniqueID = Symbol('id');

let bigNumber = BigInt(1234567890123456789012345678901234567890n);

var person = { name: "John", age: 30 };

let detail = {

name: “John”,

age: 25,

color: :”Blue”,

food: “rice”

}

let numbers = [1, 2, 3, 4, 5];

```

3. \*\*Operators:\*\*

Operators in JavaScript are used to perform operations on variables and values. They can be categorized into several types:

- \*\*Arithmetic Operators:\*\*

- `+` (Addition)

- `-` (Subtraction)

- `\*` (Multiplication)

- `/` (Division)

- `%` (Modulus)

- `\*\*` (Exponentiation)

5 / 2 = 2 r 1

5 \* 2 = 10

5 \*\* 1 = 5

5 \*\* 2 = 25

5 \*\* 3 = 125

\*\*Example:\*\*

```javascript

10 + 5

var a = 10;

var b = 5;

var add = a + b; // 15

var subtract = a - b; //5

var multiply = a \* b; //50

var divide = a / b; //2

var reminder = a % b; //2

var

let sum = a + b; // 15

let difference = a - b; // 5

let product = a \* b; // 50

let quotient = a / b; // 2

let remainder = a % b; // 0

let power = a \*\* b; // 100,000

```

- \*\*Assignment Operators:\*\*

- `=` (Assignment)

- `+=` (Addition assignment)

- `-=` (Subtraction assignment)

- `\*=` (Multiplication assignment)

- `/=` (Division assignment)

- `%=` (Modulus assignment)

\*\*Example:\*\*

```javascript

let c = 10;

c +=5; //c = 15

c -= 3; // c = 12

c \*= 2; // c = 20

c /= 4; // c = 2

c %= 3; // c = 1

````

- \*\*Comparison Operators:\*\*

- `==` (Equal to)

- `===` (Strict equal to)

- `!=` (Not equal to)

- `!==` (Strict not equal to)

- `>` (Greater than)

- `<` (Less than)

- `>=` (Greater than or equal to)

- `<=` (Less than or equal to)

\*\*Example:\*\*

```javascript

let x = 10;

let y = '10';

console.logk // true

console.log(x === y); // false

console.log(x != y); // false

console.log(x !== y); // true

console.log(x > 5); // true

console.log(x < 15); // true

```

- \*\*Logical Operators:\*\*

- `&&` (Logical AND)

- `||` (Logical OR)

- `!` (Logical NOT)

Greatman && Oye

Oye || God’stime

&& - and

true \* true -> true

true \* false -> false

false\* true -> false

false \* false -> true

|| - or

true \* true -> true

true \* false -> false

false\* true -> true

false \* false -> false

! - not

! true -> false

!false -> true

Example:

```javascript

let isLoggedIn = true;

let hasPremiumAccount = false;

console.log(isLoggedIn && hasPremiumAccount); // false

console.log(isLoggedIn || hasPremiumAccount); // true

console.log(!isLoggedIn); // false

```

#### Classwork: Coding Exercises

Students will practice writing basic JavaScript code using variables, data types, and operators in an online code editor such as CodePen.

\*\*Exercise 1: Declare and Assign Variables\*\*

```javascript

let username = "JohnDoe";

let userAge = 28;

let isSubscriber = true;

console.log(username, userAge, isSubscriber);

```

\*\*Exercise 2: Perform Arithmetic Operations\*\*

```javascript

let num1 = 20;

let num2 = 5;

let sum = num1 + num2;

let difference = num1 - num2;

let product = num1 \* num2;

let quotient = num1 / num2;

let remainder = num1 % num2;

console.log(sum, difference, product, quotient, remainder);

```

\*\*Exercise 3: Use Comparison Operators\*\*

```javascript

let value1 = 15;

let value2 = "15";

console.log(value1 == value2); // true

console.log(value1 === value2); // false

console.log(value1 != value2); // false

console.log(value1 !== value2); // true

```

\*\*Exercise 4: Use Logical Operators\*\*

```javascript

let isAdult = true;

let hasID = false;

console.log(isAdult && hasID); // false

console.log(isAdult || hasID); // true

console.log(!isAdult); // false

```

#### Assignment: Create a Simple JavaScript Program

**Assignment Description:**

Create a simple JavaScript program that prompts the user for their name, stores it in a variable, and then displays a greeting message on the webpage using an alert or `innerHTML` manipulation.

\*\*Example Code:\*\*

```html

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Greeting Program</title>

</head>

<body>

<h1 id="greeting"></h1>

<script>

// Prompt the user for their name

let userName = prompt("Please enter your name:");

// Store the greeting message in a variable

let greetingMessage = "Hello, " + userName + "! Welcome to our website.";

// Display the greeting message using an alert

alert(greetingMessage);

// Alternatively, display the greeting message on the webpage

document.getElementById("greeting").innerText = greetingMessage;

</script>

</body>

</html>