

Introduction to JavaScript Basics

Title: JavaScript Basics and Node.js Setup

Instructor: Pramod Kumar Jena

1. Setting Up JavaScript Development Environment

Objective:

Introduce students to the development setup, ensuring they can run JavaScript code in VS Code.

Steps:

1. Install Node.js:

Download and install Node.js from nodejs.org.

- Ensure Node.js and npm are installed correctly by typing `node -v` and `npm -v` in the terminal.
- Node.js allows students to run JavaScript code on their local machines.

2. Set Up VS Code:

- Install Visual Studio Code.
- Show them how to set up a new project folder.
- Create a file called `index.js` (JavaScript file).
- Show how to use the terminal in VS Code to run a JavaScript file using `node index.js`.

Exercise:

Run the following code to verify the setup:

```
console.log("Hello, JavaScript World!");
```

2. JavaScript Variables and Constants

Objective:

Introduce the concepts of variables and constants using `var`, `let`, and `const`.

2.1. What is a Variable?

A variable is a container where you can store data for use later. In JavaScript, variables can store different data types like numbers, strings, or booleans.

2.2. Declaring Variables: **var**, **let**, and **const**

- **var**: Function-scoped variable, can be reassigned.
- **let**: Block-scoped, can be reassigned.
- **const**: Block-scoped, cannot be reassigned (used for constants).

Example:

```
var age = 25;  
let name = "John";  
const birthYear = 1995;
```

2.3. Real-Life Example

Imagine storing the details of a person in a system:

```
let personName = "Alice"; // A variable can change, e.g., someone  
                           updating their name.  
const birthDate = "2000-01-01"; // Birthdate remains constant.
```

Exercise:

- Declare variables for **userName**, **userAge**, and **userCity**.
 - Create a constant for the **birthYear**.
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3. Keywords: **let**, **var**, **const**

3.1. Scope Differences:

- **Block scope (**let** and **const**):** Accessible only within a block `{ }`.
- **Function scope (**var**):** Accessible within the function or globally if declared outside a function.

Example:

```
if (true) {  
    let blockScoped = "Inside block";  
}
```

```
    var functionScoped = "Inside block";  
  }  
  console.log(functionScoped); // Works  
  console.log(blockScoped);    // Error: blockScoped is not defined
```

3.2. Reassignment Behavior:

- Variables declared with `let` and `var` can be reassigned.
 - Variables declared with `const` cannot be reassigned.
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4. Naming Conventions

Objective:

Introduce different naming conventions used in JavaScript.

4.1. Camel Case:

First word is lowercase, and subsequent words are capitalized.

`myVariableName`

4.2. Pascal Case:

All words are capitalized.

`MyVariableName`

4.3. Snake Case:

Words are separated by underscores.

`my_variable_name`

5. Basic JavaScript Syntax and Printing Output

Objective:

Understand the basic syntax and how to display output.

5.1. Syntax Rules:

- JavaScript is case-sensitive (`age` is not the same as `Age`).
- Variables must be declared before use.

5.2. Printing Output:

- `console.log()` is used to display output in the console.

Example:

```
let message = "Hello, World!";  
console.log(message); // Output: Hello, World!
```

Exercise:

- Ask students to declare a variable `greeting` and print it using `console.log()`.
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6. JavaScript Operators

Objective:

Explore arithmetic, assignment, comparison, and logical operators.

6.1. Arithmetic Operators:

- Addition (+)
- Subtraction (-)
- Multiplication (*)
- Division (/)

Example:

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

6.2. Assignment Operators:

- Assign (=), Add and assign (+=), Subtract and assign (-=)

6.3. Comparison Operators:

- Equal to (==), Strict equal to (===)
- Greater than (>) or less than (<)

6.4. Logical Operators:

- AND (&&), OR (||), NOT (!)

Example:

```
let isAdult = age >= 18;  
let hasID = true;  
console.log(isAdult && hasID); // true
```

Exercise:

Use comparison and logical operators to evaluate a person's age and print if they are eligible to vote.

7. Data Types in JavaScript

7.1. Primitive Data Types:

- **String:** "Pramod"
- **Number:** 25, 3.14
- **Boolean:** true, false
- **Undefined:** Variable declared but not assigned.
- **Null:** Represents intentional absence of any object value.

7.2. Non-Primitive Data Types:

- **Array:** A list of values.
- **Object:** Key-value pairs.