Internship Report – Frontend Dev

Week 4: JavaScript Basics

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Internship Domain: Front-end Intern
Task: JS Introduction, JS in browser, Variables(var, let, const), Data types

Task Overview: (Day1)

Today's task focused on the introduction to **JavaScript (JS)**, understanding how it runs in the browser, and learning about **variables (var, let, const)** and **data types in JavaScript**.

Content Covered:

- JavaScript Overview
- JavaScript Execution in the Browser
- JavaScript Variables (var, let, const)
- JavaScript Data Types

Introduction:

JavaScript is a powerful scripting language that adds interactivity and behavior to static web pages. It is used alongside HTML and CSS in front-end development. In this session, I learned how JavaScript works inside browsers, how to declare and use variables, and how different data types work in JS.

1. JavaScript Introduction:

JavaScript is a programming language used to make web pages interactive and dynamic.

- **HTML** = structure (skeleton)
- **CSS** = style (clothes, colors)
- **JavaScript** = behavior (movement, interaction)

For example:

- Want a button to do something when clicked? JS.
- Want to hide/show something on the screen? JS.
- Want to submit a form without reloading the page? JS.

JavaScript is client-side, meaning it runs in the browser, not on a server (although it can also run on servers using Node.js). It runs inside web browsers and is essential in front-end development.

2. How JavaScript Runs in the Browser:

Every browser (Chrome, Firefox, Edge, Safari) has a JavaScript engine built-in. For example: Chrome has V8 Engine and Firefox has SpiderMonkey.

Steps of Execution:

1. You write JavaScript code in a .js file or inside <script> tags in an HTML file.
2. When the browser loads the page, it reads the HTML, then the CSS, and then reaches the JavaScript.
3. The browser's engine converts the JavaScript into machine code and executes it line by line (top to bottom).
4. JavaScript can respond to user actions (clicks, typing, scrolling) using events.

3. Variables in JavaScript (var, let, const):

A variable is like a **named box/container to store data** in which you can store some value (like a number, name, etc.), that you can use or change later in your code.

Example: let age = 21;   (You're storing 21 in a box called age.)

Three ways to declare variables:

Keyword	Scope	Can Reassign?	Can Redeclare?	Use Case
var	Function	Yes	Yes	Old JS, avoid using
let	Block	Yes	No	When value will change
const	Block	No	No	When value will not change

Key Differences:

```
var x = 5;
var x = 10;     // Allowed, old-style

let y = 5;
y = 10;          // Allowed
// let y = 15;   Not allowed in same scope

const z = 5;
// z = 10;        Error, can't reassign
```

Data Types in JavaScript:

Used JavaScript supports **primitive** and **reference** data types.

i. Primitive Data Types:

These are the most basic types of data. They hold a **single value** and are stored directly in memory. There are 7 primitive types in JavaScript:

Type	Description	Example
String	Text	"Hello", 'Zainab'
Number	Numbers	25, 3.14
Boolean	True or false	true, false
Undefined	No value assigned	let x;
Null	Intentionally empty	let x = null;
BigInt	Very large numbers	1234567890n
Symbol	Unique identifiers	Symbol('id')

Example:

```
let name = "Zainab";        // String

let age = 22;            // Number

let isStudent = true;      // Boolean

let city;            // Undefined

let value = null;          // Null
```

ii. Reference Data Types:

These are more complex data types that store **collections of values** or functionality.

Type	Description	Example
Object	Key-value pairs	{name: "Ali", age: 25}
Array	List of values	["apple", "banana"]
Function	Reusable block of code	function greet() {...}

Example:

```
let person = { name: "Zainab", age: 22 }; // Object

let fruits = ["apple", "banana"];        // Array

function greet() {
 console.log("Hi!");
}                    // Function
```
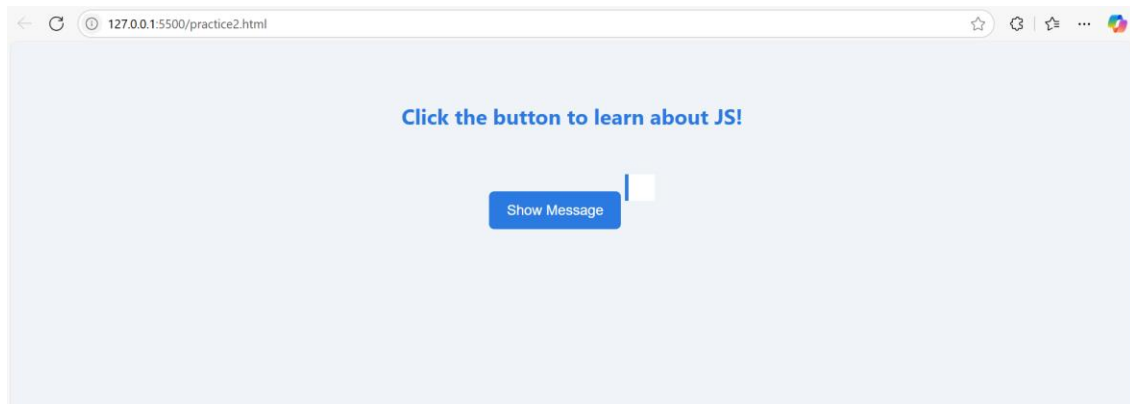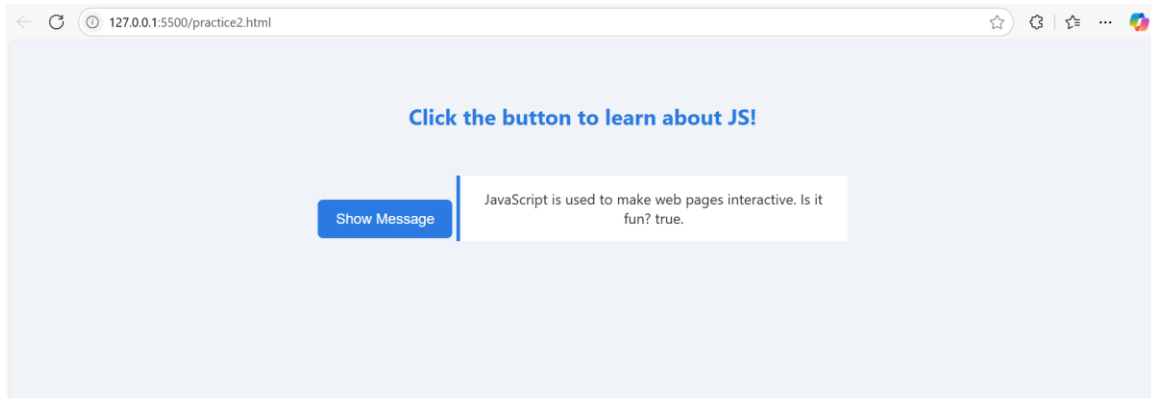
Practice Code:

Code 1: JS in Browser + Functions + DOM + Data Types

```html
<!DOCTYPE html>
<html>
<head>
  <title>JS Function Demo</title>
  <style>
    body {
      font-family: 'Segoe UI', Tahoma, Geneva, Verdana, sans-serif;
      background-color: #f0f4f8;
      text-align: center;
      padding: 40px;
      color: #333;
    }
    h2 {
      color: #2a7ae2;
      margin-bottom: 20px;
    }
    button {
      background-color: #2a7ae2;
      color: white;
      border: none;
      padding: 12px 20px;
      font-size: 16px;
      border-radius: 6px;
      cursor: pointer;
      transition: background-color 0.3s;
    }
    button:hover {
      background-color: #1c5db6;
    }
    #message {
```

```html
<html>
<head>
  <style>
    #message {
      margin-top: 30px;
      padding: 15px;
      background-color: #fff;
      border-left: 4px solid #2a7ae2;
      display: inline-block;
      max-width: 400px;
    }
  </style>
</head>
<body>
  <h2>Click the button to learn about JS!</h2>
  <button onclick="showMessage()">Show Message</button>
  <p id="message"></p>

  <script>
    function showMessage() {
      const language = "JavaScript";
      let purpose = "make web pages interactive";
      var isFun = true;

      document.getElementById("message").innerHTML =
        "JavaScript is used to " + purpose + ". Is it fun? " + isFun + ".";
    }
  </script>
</body>
</html>
```
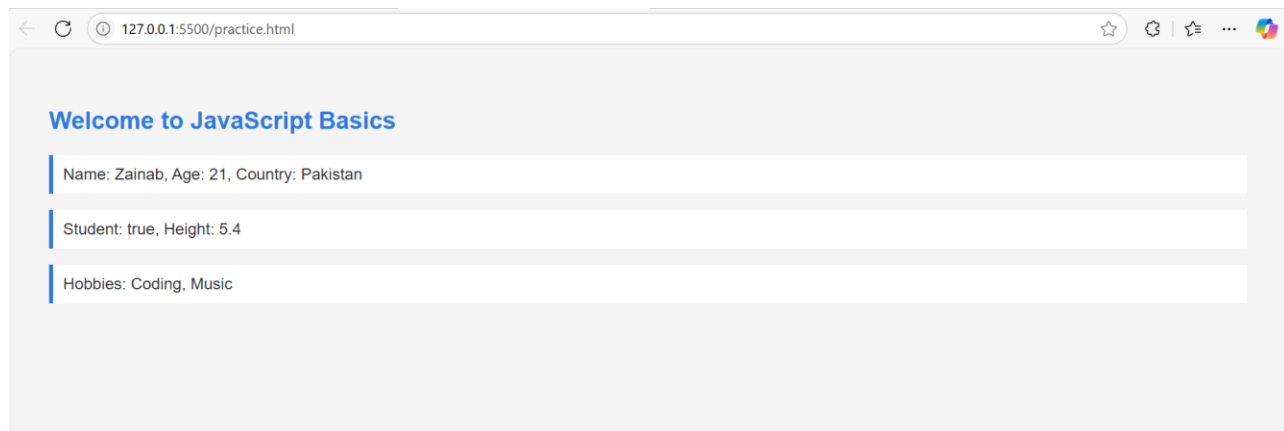
After the button is clicked:

Code 2: JS Variables and Data Types


```html
<!DOCTYPE html>
<html>
<head>
    <title>JS Basics</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #f4f4f4;
            padding: 30px;
            color: #333;
        }

        h2 {
            color: #2a7ae2;
        }

        p {
            background: #fff;
            padding: 10px;
            border-left: 4px solid #2a7ae2;
            margin-bottom: 10px;
        }
    </style>
</head>
<body>

    <h2>Welcome to JavaScript Basics</h2>
    <p id="info1"></p>
    <p id="info2"></p>
    <p id="info3"></p>
```

```
practice.html

practice.html > html > head > style > p
 2   <html>
25   <body>
27     <h2>Welcome to JavaScript Basics</h2>
28     <p id="info1"></p>
29     <p id="info2"></p>
30     <p id="info3"></p>
31
32     <script>
33       // Variables
34       let name = "Zainab";
35       const country = "Pakistan";
36       var age = 21;
37
38       // Data Types
39       let isStudent = true;        // Boolean
40       let height = 5.4;            // Number
41       let city = undefined;        // Undefined
42       let car = null;              // Null
43       let hobbies = ["Coding", "Music"]; // Array
44       let profile = { name: name, age: age }; // Object
45
46       // Display in browser
47       document.getElementById("info1").innerHTML = "Name: " + name + ", Age: " + age + ", Country: " + country;
48       document.getElementById("info2").innerHTML = "Student: " + isStudent + ", Height: " + height;
49       document.getElementById("info3").innerHTML = "Hobbies: " + hobbies.join(", ");
50     </script>
51
52   </body>
53   </html>
54
```

127.0.0.1:5500/practice.html

Welcome to JavaScript Basics

Name: Zainab, Age: 21, Country: Pakistan

Student: true, Height: 5.4

Hobbies: Coding, Music

Conclusion:

Today's session introduced me to JavaScript — the language that adds logic and interactivity to websites. I learned how JS runs in browsers, the difference between var, let, and const, and how to use various data types in real code.