🎓 Day 1 – JavaScript Introduction & Setup

🔷 1. What is JavaScript?

*JavaScript is a **high-level, interpreted programming language** primarily used to create **interactive and dynamic web content**.*

🔸 Key Features:

- ***Client-side language**: Runs directly in the browser.*
- ***Interpreted**: Doesn't need to be compiled.*
- ***Lightweight**: Designed for web pages.*
- ***Dynamic Typing**: No need to declare data types.*
- ***Event-driven**: Responds to user actions like clicks and inputs.*

🔸 Uses of JavaScript:

- *Form validation*
- *Showing/hiding elements dynamically*
- *Animations and effects*
- *Real-time updates (e.g., chat)*
- *Games and interactive content*
- *Full-stack development (via Node.js)*

📌 *JavaScript is one of the core technologies of the web, along with **HTML** and **CSS**.*

🔷 2. Where Does JavaScript Run?

*JavaScript was originally made to run **inside web browsers**, but now it can also run **on servers**.*

🔸 Runs In:

- ***Web Browsers** (Chrome, Firefox, Safari, Edge, etc.)*
  - *Each browser has its own JS engine:*
    - *Chrome: **V8***
    - *Firefox: **SpiderMonkey***
    - *Safari: **JavaScriptCore***
- ***Node.js**: Allows JS to run outside browsers (on servers, terminal apps, etc.)*

✅ *This makes JavaScript usable for **both frontend and backend development**.*

🔷 3. Ways to Add JavaScript to HTML

*There are **three methods** to include JavaScript in an HTML document:*

a. Inline JavaScript

*JS code is written **directly in an HTML tag's attribute**.*

```
<button onclick="alert('Button clicked!')">Click Me</button>
```

Use case: Small functions or quick testing.

b. Internal JavaScript

*JS code is written **inside a `<script>` tag** within the HTML file.*

```
<!DOCTYPE html>
<html>
  <head>
    <title>Internal JS</title>
  </head>
  <body>
    <script>
      console.log("Hello from internal JavaScript!");
    </script>
  </body>
</html>
```

Use case: When working on simple scripts or small projects.

c. External JavaScript

*JS code is written in a **separate `.js` file** and linked to the HTML using `<script src="">`.*

```
<!DOCTYPE html>
<html>
  <head>
    <title>External JS</title>
    <script src="script.js"></script>
  </head>
  <body></body>
</html>
```

In `script.js`:

```
console.log("Hello from external JavaScript!");
```

Use case: Clean code, reusability, and better project structure.

4. How JavaScript Executes in the Browser

Execution Flow:

1. *Browser reads HTML from **top to bottom**.*
2. *When it finds a `<script>` tag, it **pauses HTML rendering**, loads the JS, and runs it.*
3. *Then continues rendering HTML.*

🔶 Blocking Behavior:

- *JavaScript is **single-threaded**.*
- *Long-running code can **freeze the browser**.*
- *To avoid blocking, we can use **`defer`** or **`async`** attributes in the `<script>` tag.*

Example:

```
<script src="script.js" defer></script>
```

🔷 5. Setting Up JavaScript Development

✅Tools You Need:

1. VS Code (Code Editor)

- *Download from: https://code.visualstudio.com*
- *Features:*
  - *Syntax highlighting*
  - *Auto-completion*
  - *Extensions*

2. Live Server (VS Code Extension)

- *Instantly reloads browser when you save.*
- *To install:*
  - *Go to Extensions → Search "Live Server" → Click Install*
- *To use:*
  - *Right-click your HTML file → **Open with Live Server***

3. Node.js (Optional – For Practice Outside Browser)

- *Download from: https://nodejs.org*
- *After installing, check version:*

```
node -v
```

🔷 6. Writing Your First Script

Using console.log()

`console.log()` *is used to **print output to the browser's developer console**.*

Example:

```
console.log("JavaScript is working!");
```

Using Comments

- ***Single-line comment:***

```
// This is a comment
```

- ***Multi-line comment:***

```
/*
  This is a multi-line comment
  explaining something.
*/
```

🔷 7. Practice Task

Try this code in an `index.html` file:

```
<!DOCTYPE html>
<html>
  <head>
    <title>My First JS Page</title>
  </head>
  <body>
    <h1>Hello, JavaScript World!</h1>

    <script>
      // Print a welcome message
      console.log("Welcome to JavaScript!");

      /*
      This is a basic internal script.
      Let's learn JavaScript together!
    */
    </script>
  </body>
</html>
```

📌Bonus:

Try creating a button that shows an alert when clicked.

```
    <button onclick="alert('You clicked the button!')">Click Me</button>
```

🧠Key Takeaways

Topic	Summary
What is JS?	*A scripting language used for dynamic webpages*
Where it runs	*In browsers (Chrome, Firefox) and Node.js*
Adding JS	*Inline, Internal, External*
console.log	*Used to output messages to the console*
Comments	*`//` for single-line, `/* */` for multi-line*
Tools	*VS Code, Live Server, Node.js*

✅*Homework*

- ✅*Install VS Code and Live Server*
- ✅*Write a simple HTML page with internal JavaScript*
- ✅*Use `console.log()` to print your name*
- ✅*Try adding both single and multi-line comments*