Introduction to JavaScript (JS)

JavaScript is a programming language that we use to make our web pages interactive and dynamic. While **HTML** gives structure and **CSS** handles the design, **JavaScript** helps us **control how the page behaves**.

Why we use JavaScript:

- We can make our pages respond to clicks, typing, and scrolling.

- We can show alerts, change images, and load data without refreshing the page.

- JavaScript allows us to make our websites feel alive and interactive.

How JavaScript Runs in the Browser

Let's understand how our JavaScript code actually runs when someone opens our website.

1. The Browser Loads Our HTML First

- When a browser (like Chrome or Firefox) opens our site, it reads the HTML from top to bottom.

- As soon as it sees a <script> tag, it pauses the HTML reading and runs our JavaScript code.

2. The JavaScript Engine Takes Over

- Every browser has its own **JavaScript engine** to run our code:

  o Chrome uses **V8**

  o Firefox uses **SpiderMonkey**

  o Safari uses **JavaScriptCore**

- This engine reads and executes our JavaScript instructions.

3. Our Code Gets an Execution Environment

- The browser gives our code a **place to run**, called an **execution context**.

- It tracks our variables, functions, and the order of execution (called the **call stack**).

4. We Can Use Browser Features (Web APIs)

- Even though JavaScript is single-threaded, we can still do things like:

- o Set timeouts

- o Handle clicks

- o Make HTTP requests

- That's because the browser gives us special tools called **Web APIs**, and it manages tasks using the **event loop**.

Example:

js

console.log("Start");

setTimeout(() => console.log("Delayed"), 1000);

console.log("End");

Output:

sql

CopyEdit

Start

End

Delayed

Here, the delayed message runs after everything else because it's asynchronous.

5. We Can Change Our Page Dynamically

Using the **DOM (Document Object Model)**, we can select elements from our HTML and update them like this:

js

document.getElementById("title").innerText = "Welcome to our page!";