■ An Introduction to JavaScript

■ What is JavaScript?

- Initially created to “make web pages alive”.
- Programs written in JavaScript are called scripts.
- Scripts can be written directly inside an HTML page and run automatically as the page loads.
- They are provided as plain text, no special preparation or compilation required.
- JavaScript is very different from Java, even though the names sound similar.

■ Why is it called JavaScript?

- Originally named LiveScript.
- Renamed during the rise of Java’s popularity to ride on its fame as a “younger brother”.
- Over time, it became an independent language with its own standard called ECMAScript.
- Today, JavaScript has no relation to Java.
- JavaScript can now run in the browser, on the server (Node.js), and on devices that have a JavaScript engine.

■■ JavaScript Engines

- A JavaScript engine is the program that runs JavaScript code.
- Browsers have built-in engines, also called JavaScript virtual machines.
- Popular Engines: V8 (Chrome, Opera, Edge), SpiderMonkey (Firefox), Chakra (IE), JavaScriptCore/Nitro/SquirrelFish (Safari).
- If a feature is supported by V8, it works in Chrome, Opera, and Edge.

■ How Do Engines Work?

- Parse – The engine reads the script.
- Compile – Converts script into machine code.
- Execute – Runs the code very fast.
- Optimize – Continuously improves performance as the code runs.

■ What Can In-Browser JavaScript Do?

- Add/change HTML and CSS.
- React to user actions (clicks, typing, scrolling).
- Communicate with servers (AJAX, fetch).
- Work with cookies, local storage, and session storage.
- Show messages, prompts, and notifications.

■ What CAN’T In-Browser JavaScript Do?

- Cannot read/write arbitrary files on your hard disk.
- Cannot run programs on your computer.

- Cannot secretly use the camera or microphone (requires user permission).
- Cannot access data from other browser tabs (protected by Same Origin Policy).
- These restrictions prevent malicious websites from stealing private data.

■ What Makes JavaScript Unique?

- Full integration with HTML/CSS.
- Simple tasks are easy to write.
- Supported by all major browsers by default.
- This makes JavaScript the most widely used tool for building web interfaces.

■ Languages Built on Top of JavaScript

- CoffeeScript – Shorter syntax.
- TypeScript (by Microsoft) – Adds static typing.
- Flow (by Facebook) – Type checking.
- Dart (by Google) – Can run in browsers or mobile apps.
- Brython – Write JavaScript in Python syntax.
- Kotlin – Concise modern language that compiles to JS.
- Even when using these, knowing core JavaScript is essential.

■ Summary

- JavaScript started as a browser-only language, but now runs in many environments (browsers, servers, apps).
- It is the most widely adopted web language, tightly integrated with HTML/CSS.
- Many modern languages are built on top of it, but learning JavaScript itself is the foundation.