What is JavaScript (JS)?

JavaScript (JS) is a scripting language used to make web pages interactive and dynamic. It runs inside the browser and allows you to control how web pages behave after loading.

Why We Use JS

We use JavaScript to add interactivity to web pages, update web page content without reloading, validate form inputs, create animations, build web apps, and communicate with servers using APIs. In short: HTML provides structure, CSS provides style, and JavaScript provides behavior.

When We Use JS

We use JavaScript when we need to respond to user actions (click, hover, input), change content dynamically, fetch or send data from a backend without reloading, or create single-page applications like Gmail or YouTube.

Where We Use JS

JavaScript can be used on the client side (inside the browser) and on the server side using Node.js. For example, in the frontend, it makes buttons interactive, and in the backend, it handles logic and database connections.

Ways (Types) of Using JavaScript

1. Inline JS: Click me
2. Internal JS: document.write('Welcome!');
3. External JS: (Recommended method for clean code).

What Happens When We Use JS on a Webpage

When you add JS, the browser executes the script after reading HTML and CSS. JS can manipulate HTML elements (DOM), change styles, content, and respond to events like mouse clicks. It can also interact with web APIs to load data dynamically.

Other Frontend Programming Languages / Technologies

HTML – Defines the content and layout.
CSS – Styles the webpage (colors, fonts, layout).
JavaScript – Adds interactivity and logic.
Frameworks – React, Angular, Vue.js for advanced web apps.
Styling frameworks – Bootstrap, Tailwind CSS for responsive layouts.
TypeScript – Superset of JavaScript with type checking.

What is TypeScript?

TypeScript is a superset of JavaScript created by Microsoft. It means every JavaScript code is valid TypeScript code, but TypeScript adds extra features like type safety.

Difference Between JavaScript and TypeScript

JavaScript is dynamic and doesn’t have type checking. TypeScript is static and checks types before running. TypeScript helps catch errors early and supports advanced object-oriented programming features like classes, interfaces, and generics.

Example

JavaScript:
```
let num = 10;
num = 'Hello'; // no error
```

TypeScript:
```
let num: number = 10;
num = 'Hello'; // Error: Type 'string' is not assignable to type 'number'.
```

Why Developers Use TypeScript

To avoid runtime errors with type checking, make code easier to maintain, use modern JS features safely, and get better IDE support with auto-completion.

How TypeScript Works

1. You write code in a .ts file (example.ts)
2. TypeScript compiles it to plain JavaScript (example.js)
3. The browser runs the JavaScript file.

In Short

TypeScript = JavaScript + Type Checking + Modern Features. It is a language, not a framework or library. Frameworks like Angular are built using TypeScript.