

Web Technologies

Web technologies provides a variety of tools and techniques used to develop and manage websites and web applications.

These technologies enable the creation of dynamic, interactive, and user-friendly websites.

Hyper Text Markup Language(HTML):

- HTML (Hypertext Markup Language) is the standard language used to create and design the structure of web pages and web applications.
- It consists of a series of elements or tags that describe the content and structure of a webpage, such as headings, paragraphs, links, images, and other multimedia.

Features of HTML:

Elements: HTML documents are composed of elements, which are the building blocks of web pages. Elements are defined by tags, such as <html>, <head>, <body>, <div>, <p>.

Tags: Tags usually come in pairs: an opening tag (<tagname>) and a closing tag (</tagname>). Some elements, like and
, are self-closing and do not require a closing tag.

Attributes: HTML tags can have attributes that provide additional information about the element. Attributes are included in the opening tag and usually come in name-value pairs, such as href="https://example.com" in an <a> tag or src="image.jpg" in an tag.

Links: The <a> tag is used to create hyperlinks, allowing users to navigate between different web pages. The href attribute specifies the destination URL.

Media: The tag is used to embed images in a web page. Attributes like src, alt, width, and height are commonly used to define the image source and display properties.

Lists: HTML supports ordered lists (), unordered lists (), and definition lists (<dl>). List items are defined using tags within or .

Tables: Tables are created using the <table> tag, with rows defined by <tr> and cells by <td> (for data cells) or <th> (for header cells).

Forms: HTML forms are used to collect user input and are created using the <form> tag. Form elements include text fields (<input type="text">), radio buttons (<input type="radio">), checkboxes (<input type="checkbox">), submit buttons (<input type="submit">), and others

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Cascading Style Sheets(CSS):

- CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation and layout of HTML documents.
- While HTML provides the structure of a web page, CSS defines its visual style, including layout, colors, fonts, and other design aspects.

Features of CSS:

Selectors:

- **Element Selector:** Targets HTML elements by their tag name, e.g., p for paragraphs.
- **Class Selector:** Targets elements with a specific class attribute, e.g., .classname.
- **ID Selector:** Targets a single element with a specific id attribute, e.g., #idname.
- **Attribute Selector:** Targets elements based on their attributes, e.g., input[type="text"].

Box Model:

- **Padding:** The space between the content and the border.
- **Border:** The border surrounding the padding (if any).
- **Margin:** The space outside the border, separating the element from others.

Layout Control:

- **Display:** Determines how an element is displayed, e.g., block, inline, flex, grid, none.
- **Flexbox:** A layout model for arranging elements in a one-dimensional space, either as a row or column.
- **Grid:** A powerful layout system for creating complex, responsive web designs using a two-dimensional grid-based layout.

Responsive Design:

- **Media Queries:** Allows the application of different styles based on the device's characteristics, such as width, height, orientation, and resolution.
- **Viewport:** Controls how a web page is displayed on different devices, often using the <meta name="viewport" content="width=device-width, initial-scale=1"> tag.

Colors and Backgrounds:

- **Color:** Defines the color of text and elements, e.g., color, background-color.

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- **Background Properties:** Controls background images, gradients, position, size, and repeat, e.g., background-image, background-position, background-size, background-repeat.

JavaScript:

- JavaScript is a versatile, high-level programming language primarily used for adding interactivity and dynamic behavior to websites.
- It is a core technology of the World Wide Web, alongside HTML and CSS. JavaScript enables developers to create interactive elements such as forms, animations, and complex user interfaces.

Features of javascript:

Dynamic Typing: Variables in JavaScript are not bound to any specific data type, and types can change at runtime. This flexibility allows for more dynamic and flexible code.

Event-driven programming: JavaScript is designed to handle events, making it ideal for developing interactive web applications. Event handlers can respond to user actions like clicks, key presses, and mouse movements.

Asynchronous programming: JavaScript supports asynchronous programming through callbacks, Promises, and async/await. This allows for non-blocking operations, which is crucial for improving the performance of web applications, especially for I/O operations.

Closures: Closures are a powerful feature in JavaScript, allowing functions to access variables from an outer function even after the outer function has returned. This is useful for creating private variables and functions.

DOM Manipulation: JavaScript provides extensive capabilities for interacting with and manipulating the Document Object Model (DOM), allowing developers to dynamically update the content, structure, and style of web pages.

Error Handling: JavaScript provides robust error handling capabilities using try, catch, throw, and finally blocks, allowing developers to manage and respond to runtime errors effectively.

Standard Libraries and API: JavaScript comes with a rich set of built-in libraries and APIs for tasks such as working with arrays, objects, dates, regular expressions, and more. The browser environment also provides additional APIs like the Fetch API, Web Storage API, and more.

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Front-End Libraries:

- Front-end libraries are collections of pre-written JavaScript code that developers can use to simplify the process of building user interfaces and adding interactive elements to web applications.
- These libraries typically focus on providing ready-made solutions for common front-end development tasks, such as DOM manipulation, state management, routing, form handling, and user interface design.

Popular front-end libraries:

React js:

- React.js is an open-source JavaScript library developed by Facebook for building user interfaces, particularly for single-page applications.
- React.js promotes a component-based approach to building UIs, where the user interface is broken down into independent and reusable components. Each component manages its own state and can be composed together to create complex UIs.

Features of React:

Component based architecture: React applications are built using reusable components, which encapsulate the UI elements and their behavior. Components can be composed together to create complex UIs, promoting code reusability and maintainability.

JSX (Javascript XML): □ JSX is a syntax extension for JavaScript that allows developers to write HTML-like code within JavaScript. It enables the creation of React elements in a more concise and intuitive manner, combining HTML structure with JavaScript logic.

State Management: React allows components to have internal state, which can be managed using the useState hook (in functional components) or the setState method (in class components). State allows components to manage dynamic data and re-render in response to changes.

React Hooks: Hooks are functions that allow developers to use state and other React features in functional components without writing a class. Hooks like useState, useEffect, useContext, and useReducer enable better code organization and reusability in functional components.

React Router:

React Router is a popular library for handling routing in React applications. It allows developers to define routes, navigate between different views, and pass parameters to components based on the URL.

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Angular js:

- AngularJS, is an open-source JavaScript framework maintained by Google. Gained popularity for its innovative approach to building dynamic web applications.
- It extends HTML with new attributes and binds data to HTML with expressions, making it an ideal choice for building single-page applications (SPAs) and dynamic web interfaces.

Vue js:

- Vue.js, often referred to as Vue, is an open-source JavaScript framework for building user interfaces and single-page applications (SPAs).
- It is designed to be incrementally adoptable, meaning that it can be integrated into existing projects or used to build new applications from scratch.

Feature	React	Angular	Vue
Language	Javascript	Typescript	Javascript
Rendering	Client side	Server side & client side	Client side
Template	JSX Based	HTML Based	HTML Based
Performance	Fast	Slower than react & Faster than Vue	Slow
Usecases	Single page applications and component based UI	Large scale enterprise applications with complex requirement.	Small to medium sized applications and small projects