**JavaScript**

Instruction:

~~A high-level definition~~

JavaScript is a scripting or programming language that allows you to implement complex features on web pages — every time a web page does more than just sit there and display static information for you to look at — displaying timely content updates, interactive maps, animated 2D/3D graphics, video , etc. — you can assume that JavaScript is probably involved. It is the third layer of the layer cake of standard web technologies.[1]

JavaScript ~~is a scripting language that~~ enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else. To be precise, not everything, but it enables you to achieve many things with a few lines of JavaScript code. [1]

JavaScript (or "JS") is ~~a programming language~~ used most often for dynamic client-side scripts on webpages, but it is also often used on the server-side. [1]

JavaScript should not be confused with the Java programming language. Although "Java" and "JavaScript" are trademarks (or registered trademarks) of Oracle in the U.S. and other countries, the two programming languages are significantly different in their semantics, and use cases.[1]

JavaScript is primarily used in the browser, enabling developers to manipulate webpage content, retrieve content from servers, store complex data, draw graphics, interact with the device running the browser through various APIs, and more. JavaScript is one of the world's most commonly-used languages, owing to the recent growth and performance improvement of APIs available in browsers.[1]

**-History**

Conceived as a server-side language by Brendan Eich[2] (then employed by the Netscape Corporation[3]), JavaScript soon came to Netscape Navigator 2.0 in September 1995. JavaScript enjoyed immediate success and Internet Explorer 3.0[4] introduced JavaScript support under the name JScript in August 1996.[5]

In November 1996, Netscape began working with Ecma International[6] to make JavaScript an industry standard. Since then, the standardized JavaScript is called ECMAScript and specified under ECMA-262, whose latest (fourteenth, ES2023) edition is available as of June 2023.[5]

Recently, JavaScript's popularity has expanded even further through the successful Node.js platform—the most popular cross-platform JavaScript runtime environment outside the browser. Node.js - built using Chrome's V8 JavaScript Engine [8]- allows developers to use JavaScript as a scripting language to automate things on a computer and build fully functional HTTP[9] and WebSockets[10] servers.[5]

The first popular web browser with a graphical user interface, Mosaic[11], was released in 1993. Accessible to non-technical people, it played a prominent role in the rapid growth of the early [World Wide Web](https://en.wikipedia.org/wiki/World_Wide_Web).The lead developers of Mosaic then founded the [Netscape](https://en.wikipedia.org/wiki/Netscape) corporation, which released a more polished browser, [Netscape Navigator](https://en.wikipedia.org/wiki/Netscape_Navigator), in 1994. This quickly became the most-used.[13]

During these formative years of the Web, web pages could only be static, lacking the capability for dynamic behavior after the page was loaded in the browser. There was a desire in the flourishing web development scene to remove this limitation, so in 1995, Netscape decided to add a programming language to Navigator. They pursued two routes to achieve this: collaborating with Sun Microsystems[14] to embed the [Java](https://en.wikipedia.org/wiki/Java_(programming_language)) language, while also hiring Brendan Eich to embed the Scheme language.[13]

The goal was a "language for the masses", "to help nonprogrammers create dynamic, interactive Web sites".Netscape management soon decided that the best option was for Eich to devise a new language, with syntax similar to Java and less like Scheme or other extant scripting languages.Although the new language and its interpreter [15] implementation were called LiveScript when first shipped as part of a Navigator beta in September 1995, the name was changed to JavaScript for the official release in December.[13]

The choice of the JavaScript name has caused confusion, implying that it is directly related to Java. At the time, the [dot-com boom](https://en.wikipedia.org/wiki/Dot-com_bubble) [16] had begun and Java was a popular new language, so Eich considered the JavaScript name a marketing ploy by Netscape.[13]

**How it works**

* **Interpreted Language**JavaScript code is executed by the browser or JavaScript engine rather than being compiled into machine language beforehand. This makes it highly portable across different platforms. Modern engines such as V8 utilize Just-In-Time (JIT) technology to compile code into directly executable machine code.[17]
* **Function is First-Class Citizen**In JavaScript, functions are treated as first-class citizens, meaning they can be stored in variables, passed as arguments to other functions, and returned from functions.[17]
* **Dynamic Typing**JavaScript is a loosely typed or dynamic language, meaning we don't have to declare a variable's type ahead of time, and the type can change at runtime.[17]
* **Client-Side Execution**JavaScript supports asynchronous programming, allowing operations like reading files, making HTTP requests, or querying databases to run in the background and trigger callbacks or promises when complete. This is particularly useful in web development for improving performance and user experience.[17]
* **Prototype-Based OOP**Unlike class-based object-oriented languages, JavaScript uses prototypes for inheritance. This means that objects can inherit properties and methods from other objects.[17]
* **Automatic Garbage Collection**Garbage collection in JavaScript is a form of automatic memory management. The primary goal of garbage collection is to reclaim memory occupied by objects that are no longer in use by the program, which helps prevent memory leaks and optimizes the performance of the application. [17]
* **Compared with Other Languages**JavaScript is special compared to programming languages like Python or Java because of its position as a major language for web development.  
    
  While Python is known to provide good code readability and versatility, and Java is known for its structure and robustness, JavaScript is an interpreted language that runs directly on the browser without compilation, emphasizing flexibility and dynamism.[17]
* **Relationship with Typescript**TypeScript is a superset of JavaScript, which means that it extends JavaScript by adding features to the language, most notably type annotations. This relationship allows any valid JavaScript code to also be considered valid TypeScript code.[17]
* **Popular Javascript Frameworks**React is known for its flexibility and large number of community-driven plugins, while Vue is clean and intuitive with highly integrated and responsive features. Angular, on the other hand, offers a strict set of development specifications for enterprise-level JS development.[17]

**Advantages of JavaScript**

1. Saves time and bandwidth: Regardless of where you host JavaScript, it always gets executed on the client environment to save lots of bandwidth and make the execution process fast.
2. Easily send HTTP requests: In JavaScript, XMLHttpRequest is an important object that was designed by Microsoft. The object calls made by XMLHttpRequest as an asynchronous HTTP request to the server to transfer the data to both sides without reloading the page
3. Compatible for all browsers: The biggest advantage of JavaScript having the ability to support all modern browsers and produce an equivalent result.
4. Community Support: Global companies support community development by creating important projects. An example is Google (created the Angular framework) or Facebook (created the React.js framework)
5. Vastly used: JavaScript is employed everywhere on the web. [18]

**Disadvantages of JavaScript**

* - Maybe difficult to develop large applications. This applies to larger front-end projects. The configuration is often a tedious task due to the number of tools that are required to figure together to make an environment for such a project. This is often directly associated with the library’s operation
* Code is always visible to everyone anyone can view JavaScript code
* No matter what proportion fast JavaScript interprets, JavaScript DOM (Document Object Model) is slow and can be a never-fast rendering with
* HTML
* If the error occurs in JavaScript, it can stop rendering the whole website, Browsers are extremely tolerant of JavaScript errors

-References

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[13]- wikipedia: History of JS

[14]- Britannica Money,Mark Hall: Sun Microsystems

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