Programming Language Evaluation

Enes Salim Erdem
20160808033

Recai Kaan Kanatlı
20160808062

CSE 334
Programming Languages

Contents

JavaScript

Name of the language:

Javascript

Author: Brendan Eich

Born (July 4, 1961)

History of The Language

In 1990, Tim Berners-Lee developed the first web browser called WorldWideWeb (later renamed Nexus), around the same time he also developed the first web server. But in the meantime people weren't know about Internet.

In 1991, Al Gore, 45th Vice President of the United States, announced The Gore Bill (The High Performance Computing Act of 1991 (HPCA))[1] which provided funding for the first mainstream browser MOSAIC.

In 1992, Marc Andreessen was a part time assistant at the NCSA (National Center for Supercomputing Applications) beside his studentship at the University of Illinois in Computer Science. His works at the NCSA gave him a chance to get familiar with the Internet and WWW (World Wide Web).

There were several web browsers available then, but they were for Unix machines which were not highly reachable machines by common folk. Moreover, the user interfaces of all those browsers were not user friendly, which was also a reason on failure of spreading the WWW. Due to that facts, Marc Andreessen decided to develop a browser that was easier to use and more graphically rich.

[1] https://en.wikipedia.org/wiki/High_Performance_Computing_Act_of_1991 (Gore Bill)

In the same year, Andreessen started to work with one of his colleagues from NCSA and University of Illinois, Eric Bina (Master in Computer Science from the University of Illinois from 1988), to help him with his project. Eric Bina says that, they would work three to four days straight sometimes.

MOSAIC developed by Marc Andreessen and Eric Bina at the University of Illinois and released for the UNIX systems in January 1993. Later that year, There've been ports for Windows and Macintosh.

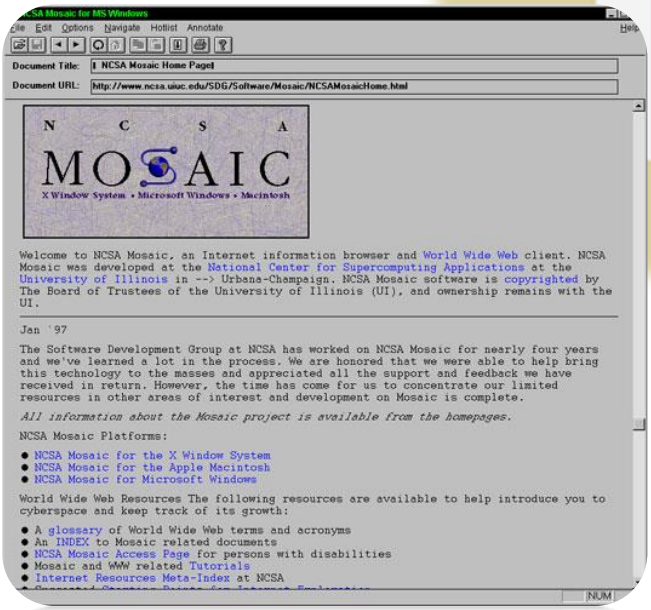


Figure 1

MOSAIC Beta

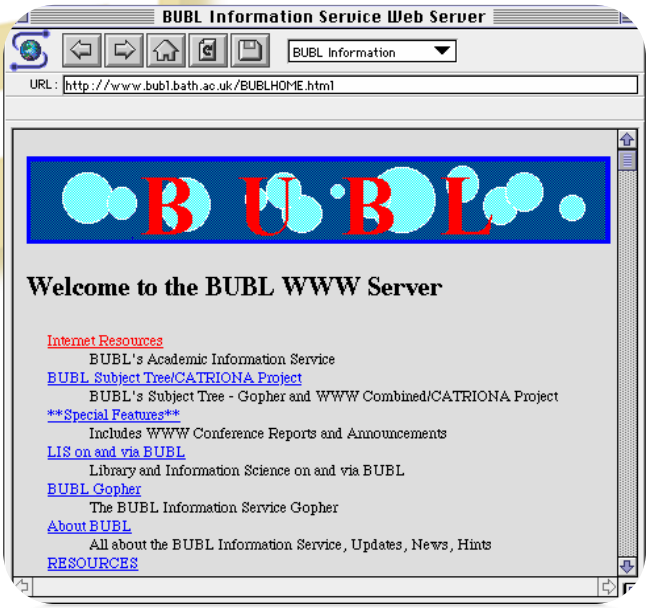


Figure 2

MOSAIC For Mac

MOSAIC was neither the first web browser nor the first graphical web browser but through it's clean, easy to understand user interface andreliability, It made Web more popular amongst the public. During this process, There wasn't javascript yet. They were using DOM (Document Object Model).[2]

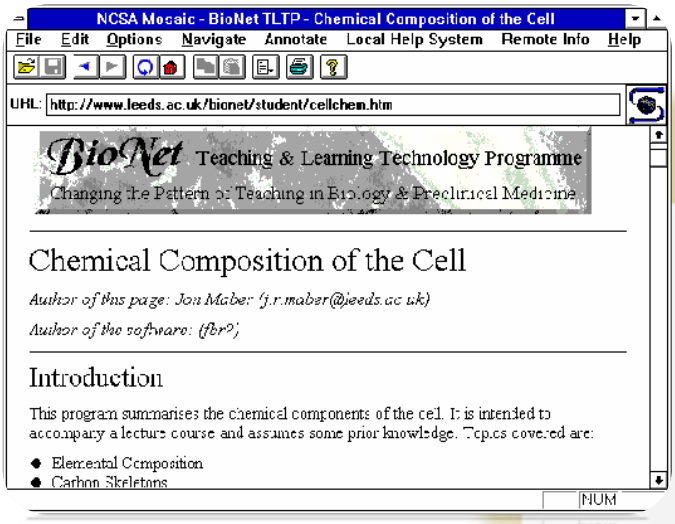


Figure 3

MOSAIC For Windows

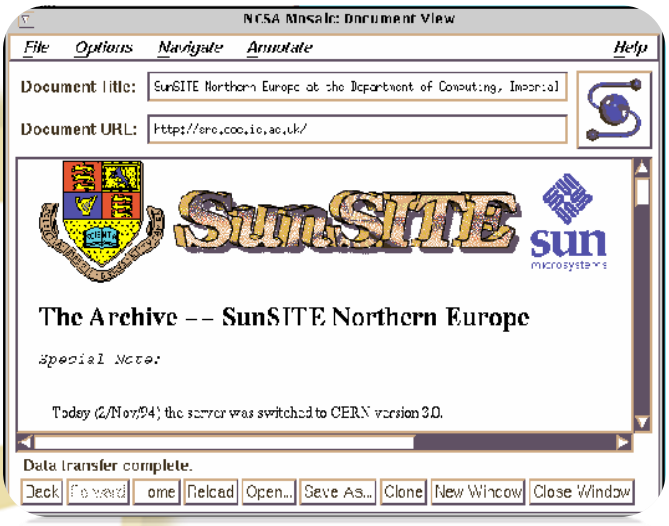


Figure 4

MOSAIC For UNIX

In 1993, after Andreessen graduated, he moved to Silicon Valley in California to co-found Netscape. Then in 1994 they released a new browser which named Netscape Navigator which was smoother and more advanced in Graphical Interface way. Within couple of years Navigator quickly became the most used browser.

[2] https://bitsofco.de/what-exactly-is-the-dom/

Figure 5

Eric Bina

Figure 6

Marc Andreessen

During this period of time, web pages could only be static. Andreeessen realized that browsers have to be more dynamic. Web designers needed sort of a glue language[3] to make their websites more interactive.

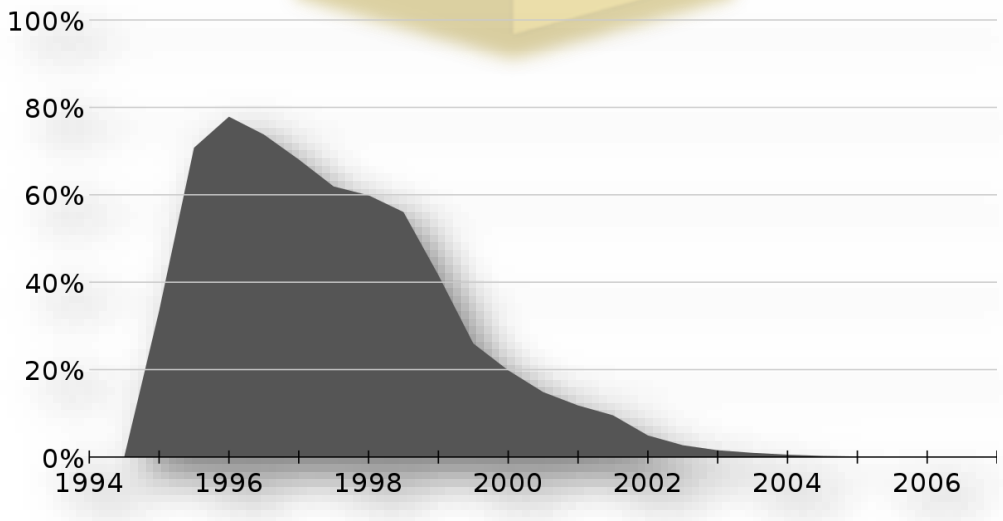


Figure 7: Navigator Market Share

[3] https://whatis.techtarget.com/definition/glue-code

Eventually, they ended up with trying to use Java Programming Language from Sun Microsystems which was very popular in those days. Subsequently, they decided that the idea was not going to work. In addition to that work, they hired a Programmer whose name is Brendan Eich.

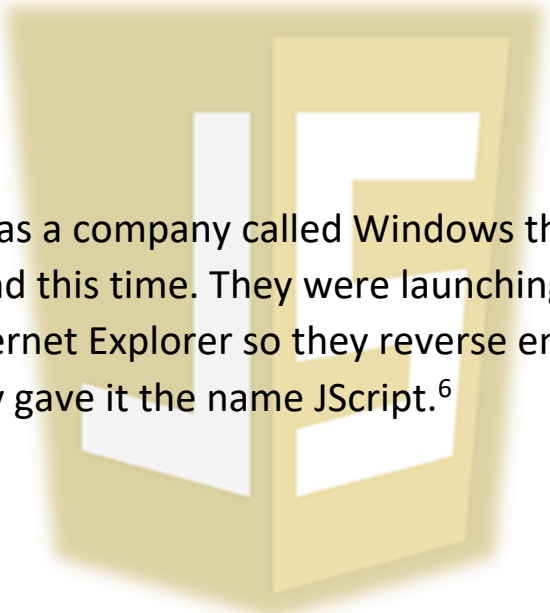
Brendan Eich's job was to embed the Scheme Programming Language [4]into the browser but maintain a syntax that is still similar to Java. After 10 days of hardworking, Eich developed the first version of Javascript[5].

Initially it has been named as Mocha. It was a curly-bracket language like Java or C but it also contained many of the features that we know from the modern Javascript. For instance; First-Class Functions, Dynamic Typing, Prototypes etc.

Furthermore, Brendan Eich knew that writing a comprehensive programming language in 10 days is not possible. So he didn't try to design a highly specialized programming language. He wrote a flexible language that developers could use their own language patterns.

[4] https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/s/Scheme_programming_language.htm
[5] https://thenewstack.io/brendan-eich-on-creating-javascript-in-10-days-and-what-hed-do-differently-today/

By September of 1995 it's name changed from Mocha to Livescript and in the first beta releases of Netscape Navigator 2.0 they used Livescript. A few months later, they decided to rename the language as Javascript. Since the Java was very popular, this choice considered as a marketing strategy by Netscape.



Also, there was a company called Windows that was becoming very popular around this time. They were launching their own browser called Internet Explorer so they reverse engineered the Javascript and they gave it the name JScript.[6]

In November 1996, Netscape submitted JavaScript to ECMA[7], ECMAScript released in June 1997. The standards process continued for a few years, with the release of ECMAScript 2 in June 1998 and ECMAScript 3 in December 1999. Work on ECMAScript 4 began in 2000.

In the early 2000's Internet explorer controlled nearly 90% of the market share and Microsoft implemented it's own extensions for JavaScript.

[6] https://en.wikipedia.org/wiki/JScript
[7] https://en.wikipedia.org/wiki/Ecma_International

What Javascript Can Do
And It is Advantages

Javascript known as a language that is mostly designed for front-end web development. Ofcourse, there are a lot more areas you can work with Javascript. Javascript can be used in gaming, mobile apps, web and server apps, robotics, virtual reality, etc.

The reason why it is used so much more for the web development is because it brought dynamic features to the web. Autocomplete, loading new content or data onto the same page without reloading, Rollover and dropdown menus, animating page elements, playing audio or video, show or hide more information with the click of a button, zooming in or out on an image are some of them you can see in any popular web pages.

Javascript is a scripting language that can be insterted directly to the HTML of a page. Browsers can read, interpret and run it which creates powerful client-side experiences.

Javascript also is compatible with other languages. This feature is really important for web servers which runs on different languages whether PHP, Phython, Java, Ruby because Javascript running in the browser is fully decoupled from how HTML web pages generated.

- One of it’s advantages is, it brings faster user experiences with the client-side execution. Since the code running direct in the browser, the need for server call is abstracted.

- Javascript has brough the user interface activity to the web. Now, it also helps applications to develop the most engaging UX (User Experience).

- Javascript is really good on responsive web design. Developers adapt their design with multiple browsers and devices by combining HTML5, CSS3, and Javascript.

- Javascript syntax is easy and flexible for newcomers. Javascript also makes it easy to work on the development of complex applications by enabling developers to simplify the app’s structure.

- Since the javascript is really popular, you can find solution to your any problem within the community.

- Javascript can load content into the document without reloading the entire page. This is commonly referred as Ajax.

- Javascript can test for what is possible in your browser and how your browser reacts accordingly. This is mostly referred as defensive scripting.

How to use it?

In order to work with JavaScript, you need 2 main tools;

1) Editor
2) Browser

1) Editor

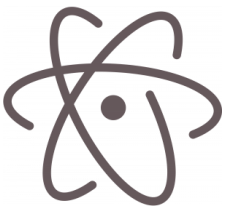
You can write JavaScript code by using simple editors or you can also use an IDE which helps on identifying syntax errors with highlighters etc.

Some of most frequently used editors;

- Visual Studio Code

Price: Free
Platforms: Mac, Linux, Windows
Type: Source Code Editor (Open-source)
Download: https://code.visualstudio.com/download

- Atom



Price: Free
Platforms: Mac, Linux, Windows
Type: Source Code Editor (Open-source)
Download: https://github.com/atom/atom/releases/latest

- Eclipse

Price: Free
Platforms: Mac, Linux, Windows
Type: Java-specific IDE (Open-source)
Download: https://www.eclipse.org/downloads/packages/

- Sublime Text

Price: Free
Platforms: Mac, Linux, Windows
Type: Source Code Editor
Download: https://www.sublimetext.com/3

- Online Editors

There are also different types of online editors on the web.

http://jsbin.com/?html,output

https://jsfiddle.net

http://plnkr.co

https://js.do

2) Browser

You can install any kind of browser as per your preference. JavaScript works on any OS and Browser.

Mozilla Firefox: https://www.mozilla.org/en-US/firefox/new/

Google Chrome: https://support.google.com/chrome/answer/95346?hl=en

Apple Safari: https://support.apple.com/downloads/safari

Opera Browser: https://www.opera.com/tr/computer

Some Commonly Used Javascript Examples

1) **Dialog box:** This is both common and easy example for Javascript. There are 3 types of dialog boxex and I'll show an example about the alert dialog box.

```
<!DOCTYPE html>
<html>
<title>JavaScript Dialog Box</title>
<head></head>
<body>
<script language="javascript">
    alert("Hello");
</script>
</body>
```

This dialog box is mostly used for validation. It displays a message in the dialog box and it will block the browser. User cannot do anything in the browser without closing the dialog box.

2) **Dropdown menu:** Example for how to create a simple drop down menu that allows user to choose one value from a predefined list.

```
<!DOCTYPE html>
<html>
<head>
<style>
#container ul{
list-style:none;
}
```

```
8) #container ul li{
9) background-color:#3C3E94;
10)width:150px;
11)border:1px solid White;
12)height:50px;
13)line-height:50px;
14)text-align:center;
15)float:left;
16)color:white;
17)font-size:18px;
18)}
19)#container ul li:hover{
20)</style>
21)<meta charset=”utf-8”>
22)<title>Untitled Document</title>
23)</head>
24)
25)<body>
26)<div id=”container”>
27)<ul>
28)    <li>Home</li>
29)    <li>About</li>
30)    <li>Entertainment</li>
31)    <li>Contact</li>
32)</ul>
33)</div>
34)</body>
35)</html>
```

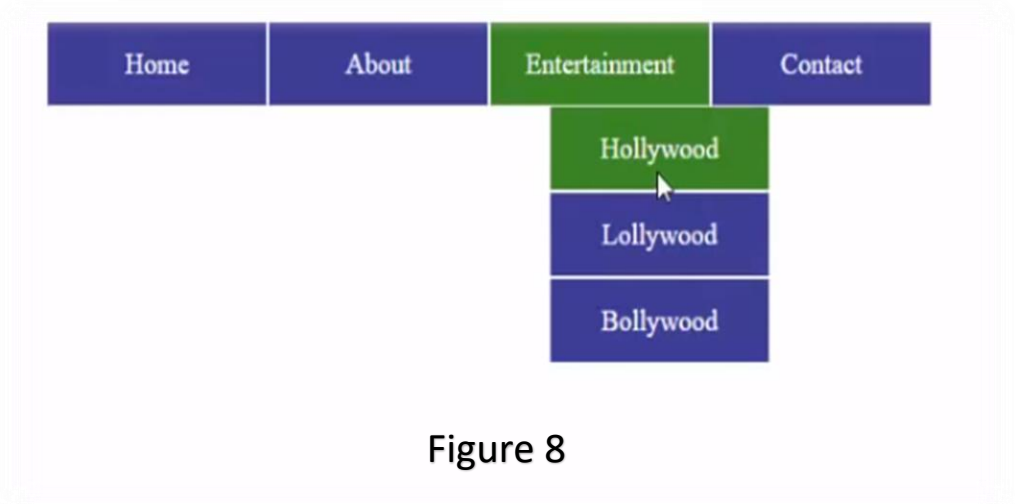


Figure 8

Dropdown Menu

3) **Color flip button:** This is another example which is more useless but fun to show couple of it’s functions. Main idea is to change the background color with a button.

```
1) <body>
2)     <button>Switch Colour</button>
3)     <script type=”text/javascript”>
4)         var color = [“#222f3e”, “#f368e0”, “#ee5253”, “#abde3”];
5)
6)         var i = 0;
7)         document.querySelector(“button”).addEventListener(“click”,
8)             function(){
9)             i = i < color.length ? ++i : 0;
10)        document.querySelector(“body”).style.background = color[i]
11)        }]
12)</script>
13)</body>
```

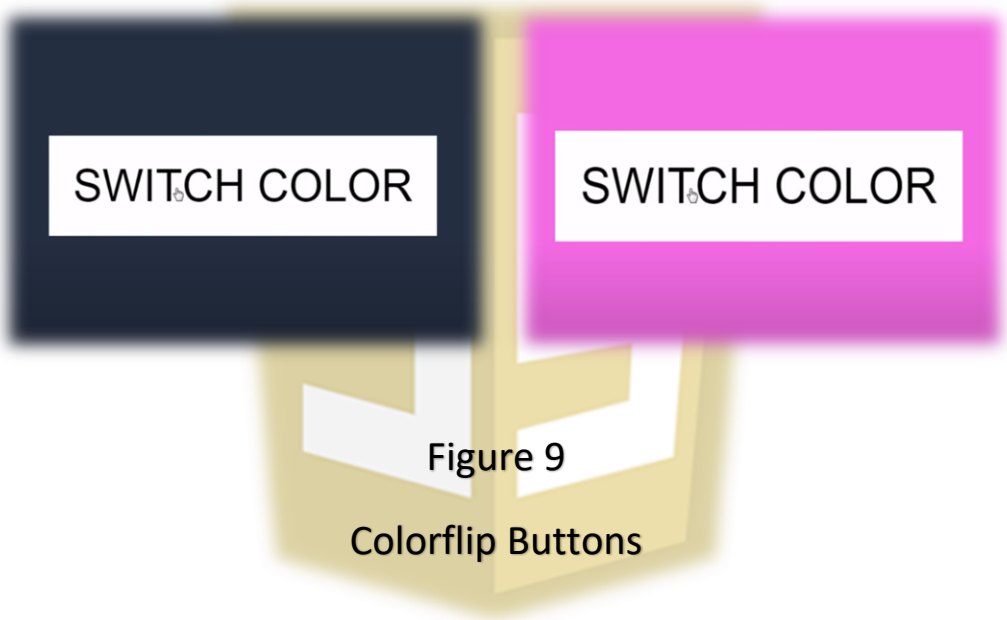


Figure 9

Colorflip Buttons

What is AJAX?

Ajax (Asynchronous Javascript And Xml) is a technique for creating fast and dynamic web pages. It allows web pages to be updated asynchronously which means it makes it possible to update parts of a web page, without reloading the whole page.

Asynchronously, in which the script allows the page to continue to be processed and handles the reply if and when it arrives.

How AJAX Works?

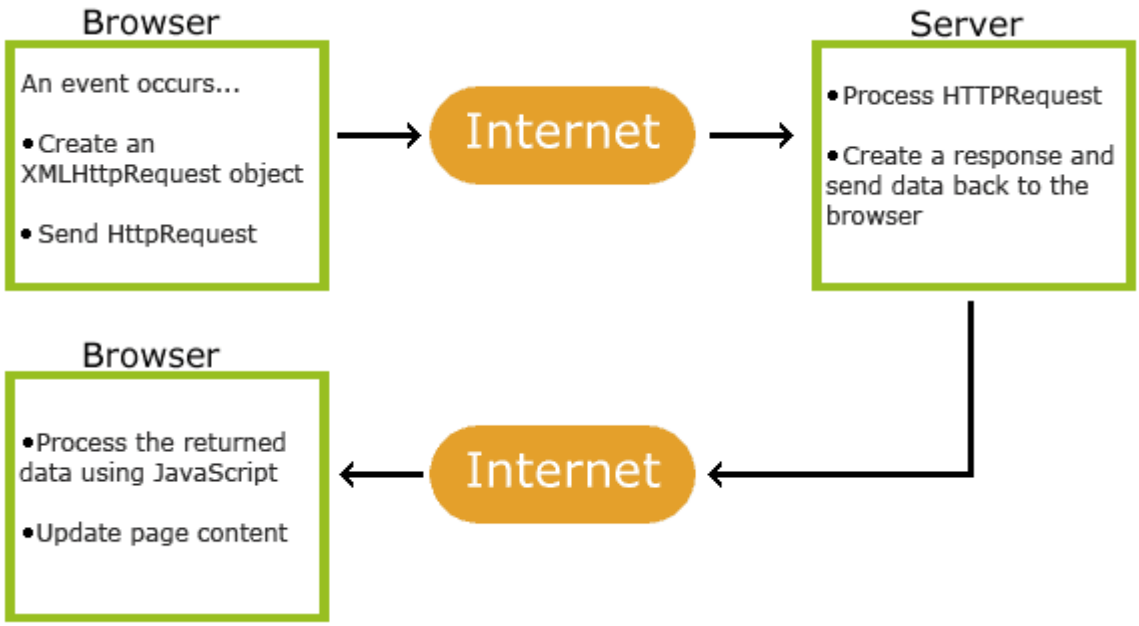


Figure 10

The user sends a request that executes an action and the action's response is showed into a layer, identify by an ID, without reload the full page.

AJAX is based on internet standards, and uses a combination of:

- XMLHttpRequest object (to exchange data asynchronously with a server),
- JavaScript/DOM (to display/interact with the information)
- CSS (to style the data),
- XML (often used as the format for transferring data)

References

https://developer.mozilla.org/en-US/docs/Learn/JavaScript/First_steps/What_is_JavaScript

https://en.wikipedia.org/wiki/JavaScript#History

https://en.wikipedia.org/wiki/Ecma_International

https://en.wikipedia.org/wiki/Brendan_Eich

https://www.w3schools.com/whatis/whatis_js.asp

https://javascript.info/intro

https://medium.com/@benastontweet/lesson-1a-the-history-of-javascript-8c1ce3bffb17

https://auth0.com/blog/a-brief-history-of-javascript/

https://thenewstack.io/brendan-eich-on-creating-javascript-in-10-days-and-what-hed-do-differently-today/

https://www.coursereport.com/blog/history-of-javascript

https://www.quora.com/Who-invented-javascript-and-what-was-it-originally-used-for

https://www.quora.com/What-is-the-history-of-JavaScript

https://www.quora.com/Why-was-JavaScript-made

https://medium.com/@mindfiresolutions.usa/how-important-is-javascript-for-modern-web-developers-2854309b9f52

https://www.bigcommerce.com/ecommerce-answers/what-javascript-and-why-it-important/

https://snipcart.com/blog/why-javascript-benefits

https://www.linkedin.com/pulse/8-reasons-why-javascript-most-important-language-your-bence-a-tóth

https://www.springboard.com/blog/history-of-javascript/

https://en.wikipedia.org/wiki/History_of_the_web_browser

https://en.wikipedia.org/wiki/JScript

https://medium.com/javascript-non-grata/the-five-top-reasons-to-use-javascript-bd0c0917cf49

https://snipcart.com/blog/why-javascript-benefits

https://www.hackreactor.com/blog/what-is-javascript-used-for

https://www.educba.com/uses-of-javascript/

https://www.bigcommerce.com/ecommerce-answers/what-javascript-and-why-it-important/

https://webplatform.github.io/docs/concepts/programming/the_purpose_of_javascript/

https://www.thoughtco.com/use-asynchronous-or-synchronous-ajax-2037228

https://www.webdesignerdepot.com/2008/11/how-ajax-works/

https://www.tutorialrepublic.com/javascript-tutorial/javascript-ajax.php