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UNIVERSITY

CELEBRATING 50 YEARS

Web Design

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Web Design

Interactive UI and Managing website

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Web Design Javascript



JavaScript is one of the 3 languages all web developers must learn:

1. HTML to define the content of web pages
2. CSS to specify the layout of web pages
3. **JavaScript to program the behavior of web pages**

JavaScript is a high-level, dynamic typing, prototype-based object-orientation (Inheritance).

It is multi-paradigm: supporting event-driven, functional, and imperative programming styles (commands).

JavaScript was introduced by **Brenden Eich**.
Earlier it is called **Mocha**, but quickly renamed to **LiveScript**, and later renamed to **JavaScript**.



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Javascript



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Where JavaScript Is Used

Area

Description



Web Pages

To make buttons, forms, animations, pop-ups, sliders, etc. work.



Web Applications

Powering dynamic apps like Gmail, Google Maps, or Facebook.



How JavaScript Works

When you open a webpage:

1. The **browser** loads the HTML and CSS (page layout and design).

2. Then it runs **JavaScript** code, which:
 1. Responds to user actions (clicks, typing, scrolling).
 2. Updates content dynamically.
 3. Validates form input.
 4. Fetches data from servers (using APIs).

JavaScript runs **inside your browser** (Chrome, Edge, Firefox, etc.) using a built-in **JavaScript Engine** (like Google's *V8 engine*).



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Overview of JavaScript



JavaScript was originally named **LiveScript**, which was developed by Netscape.

In late 1995 **Netscape and Sun Microsystems** change it's name to JavaScript.

The standard for JavaScript is found in

<http://www.ecma-international.org/publications/standards/Ecma-262.htm>

<https://esprima.org/demo/validate.html>



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Introduction to JavaScript



JavaScript (JS) is a high-level, interpreted scripting language primarily used to add **interactivity, dynamic behavior, and logic** to web pages. Java Script is supported by all popular browsers.

Java script is divided into 3 parts:

Core: Heart of language include **operators, expression, statements, sub-programs**

Client side: Supports the objects that supports the browser.

E.g. **mouse event, keyboard input,**

Server side: Supports objects that make language useful in web server

E.g. *Communication with DBMS*



Web Design Features



1. **JavaScript** is a **text-based scripting language** primarily used to add interactivity and dynamic behavior to web pages.
2. It is an **interpreted language**, meaning code is executed directly by the browser without the need for prior compilation.
3. JavaScript **runs inside the web browser** using built-in **JavaScript engines** that interpret and execute the script.

Examples of JavaScript engines include:

V8 – used in Google Chrome and Node.js

SpiderMonkey – used in Mozilla Firefox (originally Netscape Navigator)

JScript – Microsoft's implementation

Rhino – Java-based engine by Mozilla

Nashorn – Java-based engine introduced in the JDK (replacing Rhino)



Web Design Features



1. It enhances **static HTML pages** by making them **dynamic, personalized, and interactive**, allowing web applications to respond to user actions and update content

Key Characteristics of JavaScript

1. JavaScript is dynamically typed
2. Computation capability for client side
3. Database access, networking for server side
4. User interactions through forms are easy
5. The Document Object Model makes it possible to support dynamic HTML documents with JavaScript



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Uses of JavaScript



1. Dynamically Typed Language:

JavaScript does not require variable types to be declared explicitly. The type is determined automatically at runtime, allowing greater flexibility in coding.

2. Client-Side Computation:

JavaScript can perform computations and validations directly in the user's browser, reducing the load on the server and improving performance.

3. Server-Side Capabilities:

With environments like **Node.js**, JavaScript can also handle **database access, networking, and file operations**, enabling full-stack web development.



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Uses of JavaScript



4. User Interaction through Forms:

JavaScript simplifies collecting and validating user inputs via HTML forms, providing instant feedback without reloading the page.

5. Dynamic HTML with DOM Manipulation:

The **Document Object Model (DOM)** allows JavaScript to dynamically modify the structure, style, and content of web pages, supporting **interactive and responsive** user interfaces



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HTML with JavaScript



- HTML document does not include embedded script, the browser reads the line of the document and display the output.
- When JavaScript is encountered in the document the browser use a JavaScript interpreter to execute the script.
- When end of the script reached , browsers goes back to HTML document and displaying its content.
- JavaScript Can appear in any of the part (Head/ Body) of HTML document depending on the purpose of the script



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HTML with JavaScript



```
<body>

<h2>Click the button to see JavaScript in action</h2>

    <!-- A paragraph where the message will appear -->
<p id="demo">Hello, welcome!</p>
    <!-- A button that runs the function when clicked -->
<button onclick="showMessage()">Click Me</button>

<script>
// This function changes the text inside the <p> tag
function showMessage()
{
    document.getElementById("demo").innerHTML = "You just clicked the button ";
    console.log("Button clicked successfully!");
}
</script>

</body>
```



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HTML with JavaScript



- <button onclick="showMessage()"> — when you click the button, it runs the function showMessage().
- Inside the function,
document.getElementById("demo").innerHTML = "..."
changes the text of the paragraph with id "demo".
- The message "Button clicked successfully!" appears in the **browser console** (press **F12** → **Console tab** to see it).



THANK YOU

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