JavaScripts

JavaScript is a lightweight and multipurpose programming language that is mainly used for creating dynamic and interactive content on websites. JavaScript is embedded with HTML to get structure and CSS to get style. It adds activities, read-time updates, user interaction and animation on a static HTML / CSS webpage without reloading. The code written in JS is browser-independent in nature and directly understood by the browser. It is used to manipulate DOM (Document Object Model), form validation, APIs integration and building a responsive interface. It is also used in backend development after being combined with Node.js. Its ease and support build a foundation in modern web technologies.

Roles of JavaScript:

- Activities (clicking, typing, scrolling) of the user are handled.
- Update and deploy the structure of HTML.
- Handles the verification and validation
- Update by connecting with the server without reloading the webpage.
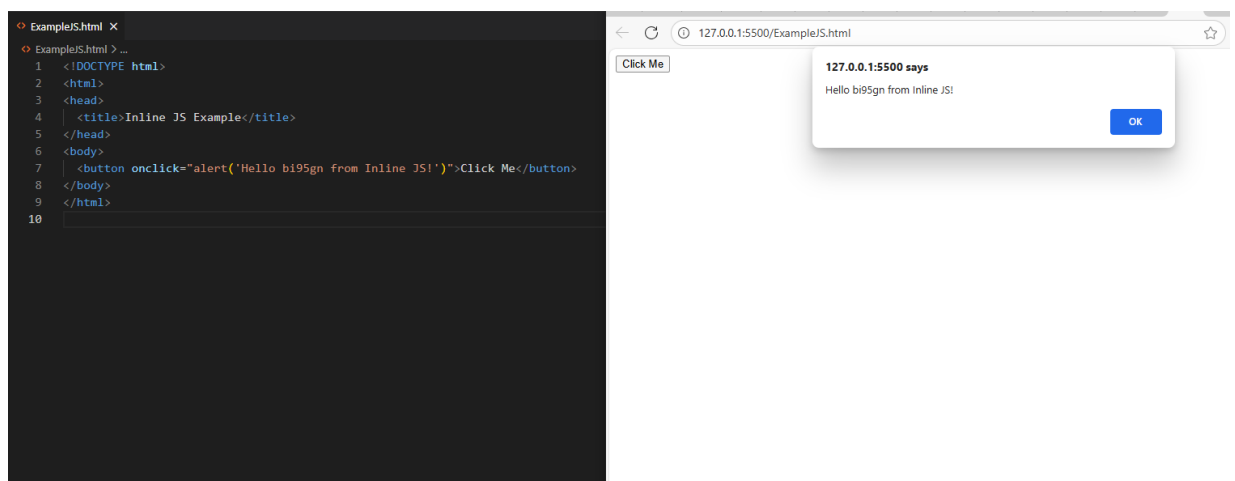- Provide dynamic content and animate it.

How does JavaScript work?

- Web Browser loads the HTML file and creates a Document Object Model.
- JS code is loaded.
- JS engine in the browser starts to run and execute code.
- JS engine changes the DOM (like image/text/style) and responds to user action (like click/scroll)
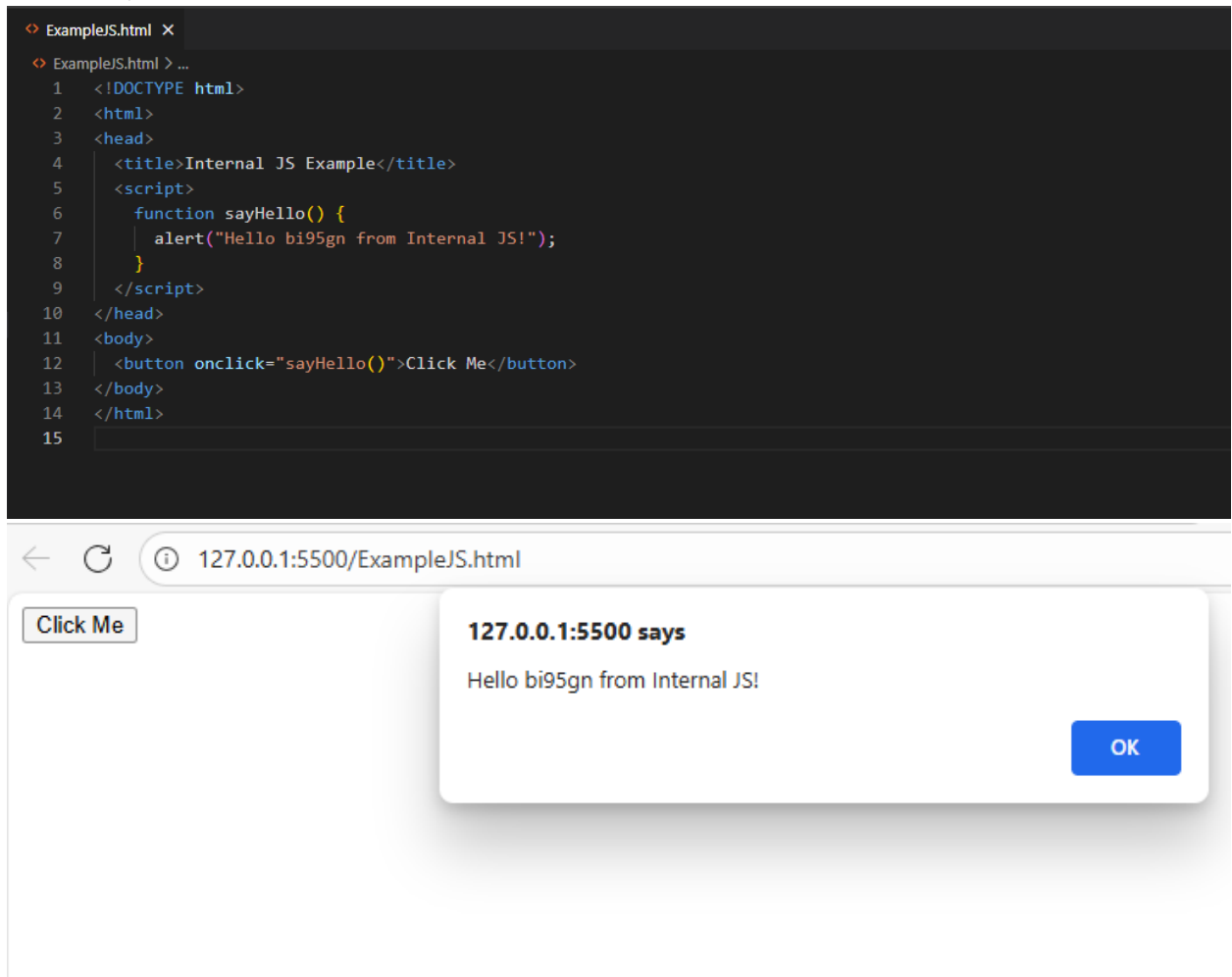
Structure of JavaScript:

JavaScript is added in HTML file in three ways:

- Inline JS:
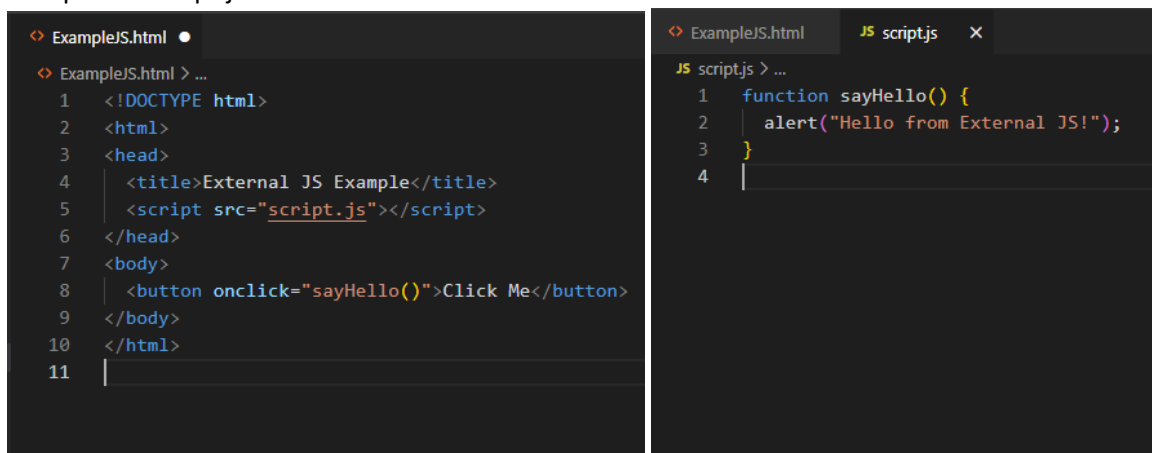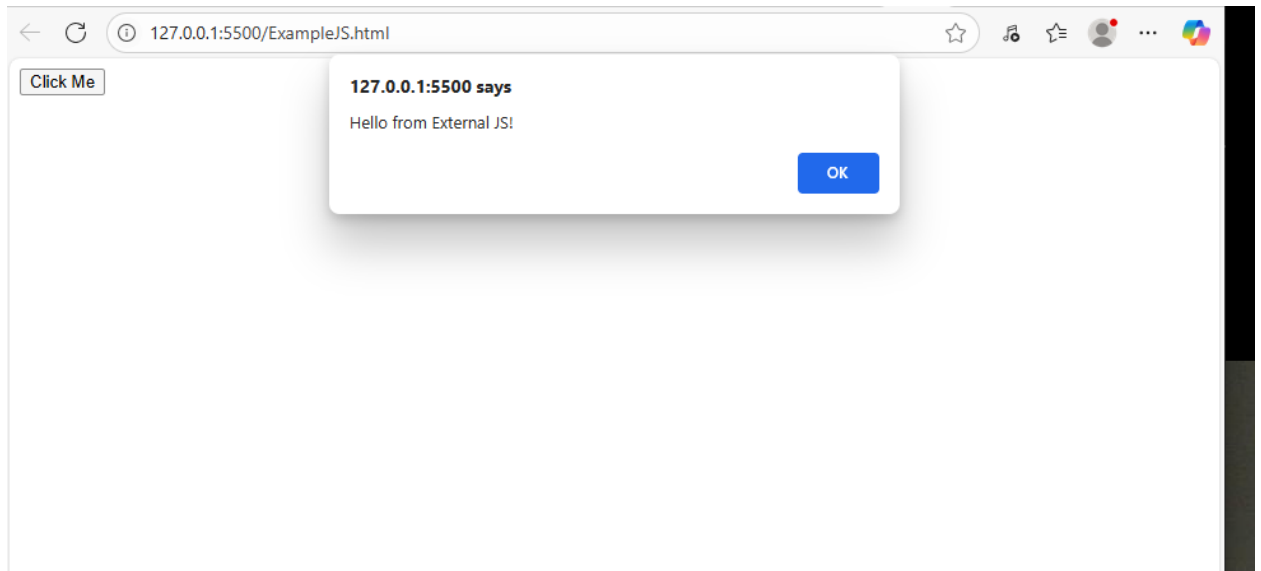 Inline JS is the process of adding JavaScript code inside an element's attributes.

- Internal JS

Internal CSS is the process of adding JavaScript code inside the same HTML file in <head>…</head> section.

```
<> ExampleJS.html ×
<> ExampleJS.html > ...
 1    <!DOCTYPE html>
 2    <html>
 3    <head>
 4      <title>Internal JS Example</title>
 5      <script>
 6        function sayHello() {
 7          alert("Hello bi95gn from Internal JS!");
 8        }
 9      </script>
10    </head>
11    <body>
12      <button onclick="sayHello()">Click Me</button>
13    </body>
14    </html>
15
```

← C   ⓘ 127.0.0.1:5500/ExampleJS.html

Click Me

127.0.0.1:5500 says

Hello bi95gn from Internal JS!

OK

- External JS

External JS is the process of adding JavaScript code linking an external JS file to HTML using <script src="script.js"> inside head section.

```
<> ExampleJS.html ●
<> ExampleJS.html > ...
 1    <!DOCTYPE html>
 2    <html>
 3    <head>
 4      <title>External JS Example</title>
 5      <script src="script.js"></script>
 6    </head>
 7    <body>
 8      <button onclick="sayHello()">Click Me</button>
 9    </body>
10    </html>
11
```

```
<> ExampleJS.html      JS script.js    ×
JS script.js > ...
 1    function sayHello() {
 2      alert("Hello from External JS!");
 3    }
 4
```

Key element of JS:

- Variable: To store data
- Functions: Provide reusable logic
- Event: detect the action of the user
- DOM Manipulation: document.getElementById(), innerHTML, querySelector()
- Control Structure: (if, for, while) control flow of execution
- Object and Array: Data organization
- APIs: Get data from backend

Example / Evidence:


```html
<html lang="en">
<head>
</style>
</head>
<body>
<div class="calculator">
    <input type="text" id="display" disabled>
    <div>
        <button onclick="addValue('7')">7</button>
        <button onclick="addValue('8')">8</button>
        <button onclick="addValue('9')">9</button>
        <button class="operator" onclick="addValue('/')">/</button>
    </div>
    <div>
        <button onclick="addValue('4')">4</button>
        <button onclick="addValue('5')">5</button>
        <button onclick="addValue('6')">6</button>
        <button class="operator" onclick="addValue('*')">*</button>
    </div>
    <div>
        <button onclick="addValue('1')">1</button>
        <button onclick="addValue('2')">2</button>
        <button onclick="addValue('3')">3</button>
        <button class="operator" onclick="addValue('-')">-</button>
    </div>
    <div>
        <button onclick="addValue('0')">0</button>
        <button onclick="addValue('.')">.</button>
        <button class="equal" style="width: 135px;"onclick="calculate()">=</button>
    </div>
    <div>
        <button class="clear" onclick="clearDisplay()">C</button>
        <button class="operator" style="width: 140px;" onclick="addValue('+')">+</button>
    </div>
</div>

<script>
    const display = document.getElementById('display');

    function addValue(value) {
        display.value += value;
    }

    function clearDisplay() {
        display.value = '';
    }

    function calculate() {
        try {
            display.value = eval(display.value);
        } catch {
            display.value = 'Error';
        }
    }
</script>
</body>
</html>
```



```html
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Simple Calculator</title>
<style>
    body {
        display: flex;
        justify-content: center;
        align-items: center;
        height: 100vh;
        font-family: Arial, sans-serif;
        background-color: #f5f5f5;
    }
    .calculator {
        background-color: #736e81;
        padding: 20px;
        border-radius: 10px;
        box-shadow: 0 4px 15px rgba(0,0,0,0.3);
    }
    input {
        width: 100%;
        height: 50px;
        margin-bottom: 10px;
        font-size: 24px;
        text-align: right;
        padding: 5px;
        border-radius: 5px;
        border: none;
        background-color: beige;
    }
    button {
        width: 60px;
        height: 60px;
        margin: 5px;
        font-size: 18px;
        border: none;
        border-radius: 5px;
        cursor: pointer;
    }
    button.operator {
        background-color: #f39c12;
        color: white;
    }
    button.equal {
        background-color: #e74c3c;
        color: white;
        width: 130px;
    }
    button.clear {
        background-color: #95a5a6;
        color: white;
        width: 130px;
    }
</style>
</head>
<body>
```