Program - BSc (Hons) Computer Systems Engineering (BSc.IT)

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MODULE CODE: CET138

MODULE TITLE: Full Stack Development

MODULE LEADER: David Grey

SUBMISSION DATE AND TIME: As stated in the assignment submission page on Canvas for this module

ASSIGNMENT: First Assignment

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- **Plagiarism** – where you use information from another information source (including your previously submitted work) and pass it off as your own. This can be through direct copying, poor paraphrasing and/or absence of citations.
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DECLARATION

- I understand that by submitting this piece of work I am declaring it to be my own work and in compliance with the university regulations on Academic Integrity.
- I confirm that I have done this work myself without external support or inappropriate use of resources.
- I understand that I am only permitted to use artificial intelligence tools in line with guidance provided by my Module Leader, and I have not used artificial intelligence tools outside this remit.
- I confirm that this piece of work has not been submitted for any other assignment at this or another institution prior to this point in time.
- I can confirm that all sources of information, including quotations, have been acknowledged by citing the source in the text, along with producing a full list of the sources used at the end of the assignment.
- I understand that academic misconduct is an offence and can result in formal disciplinary proceedings.
- I understand that by submitting this assignment, I declare myself fit to be able to complete the assignment and I accept the outcome of the assessment as valid and appropriate.

ANY OTHER COMMENTS FROM STUDENT:

JAVASCRIPT

What is JavaScript?

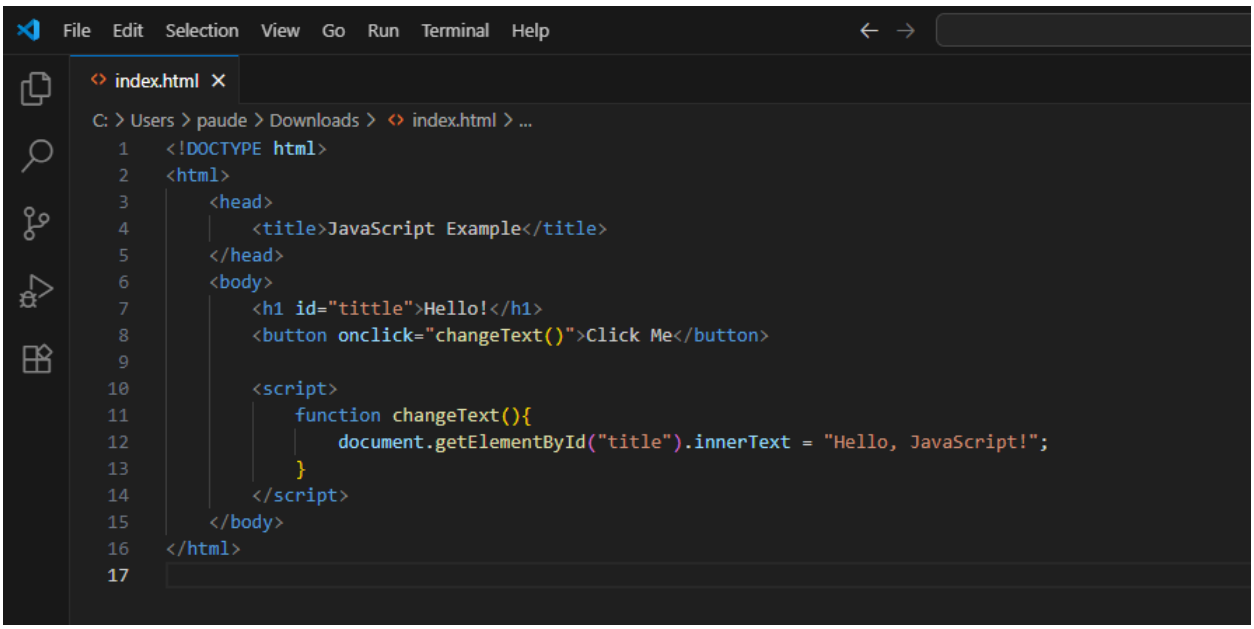
JavaScript(JS) is a high-level programming language used to add interactivity and dynamic behavior to a website.

- While **HTML** creates a web page's structure and **CSS** creates the design, **JavaScript** makes web pages interactive (e.g., dynamic results, animations, form validation, calculators, games, to-do lists).
- It's all being executed in the browser, making it interactive in real-time without needing to refresh.

Key Features of JavaScript

- **Dynamic Content** → Change website content on the fly (like show/hide sections).
- **Event Handling** → Reacts to user interactions such as clicks, keystrokes and whatnot.
- **DOM Manipulation** → It changes your HTML elements, styles, or attributes dynamically.
- **Built in Functions** → For math operations, manipulating strings, handling date/time.
- **Cross-Platform** → It works in all modern browsers.

Example: Simple JavaScript



How it Works

- When the button is clicked changeText() function is called.
- JavaScript uses document.getElementById() to find the <h1> element.
- The text content is changed from **Hello!** to **Hello, JavaScript!** dynamically.

My Task: JavaScript Projects

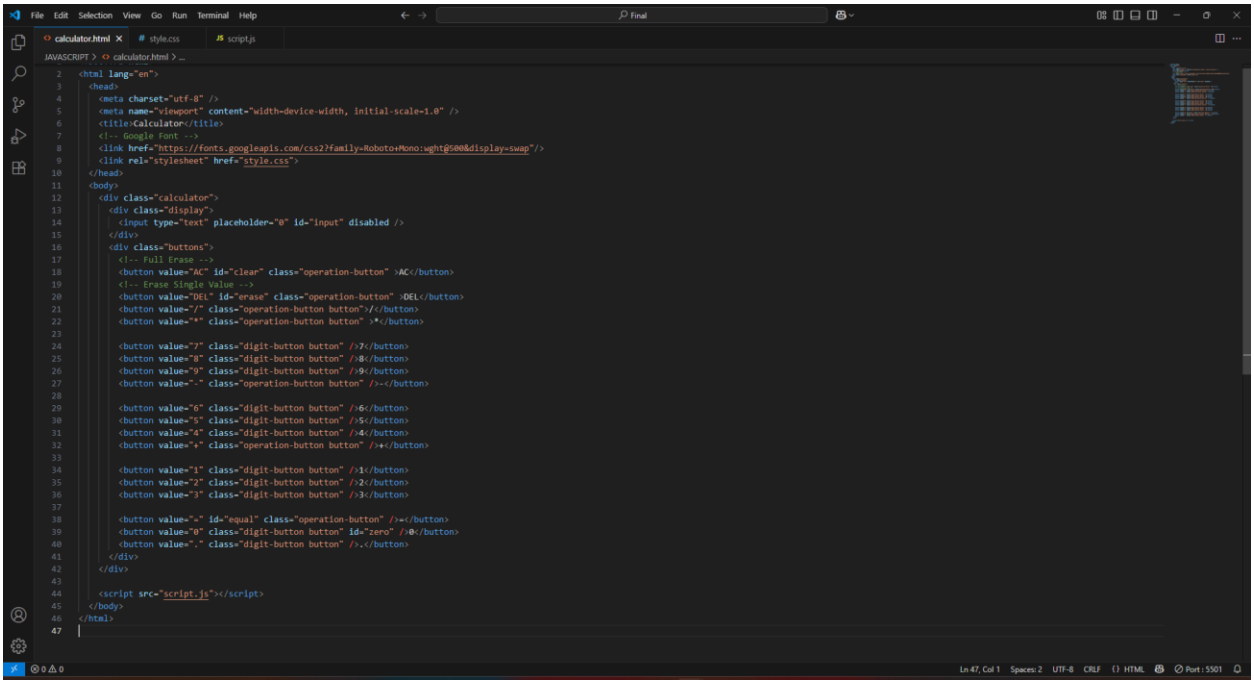
1. **Calculator**

Description:

- A Working calculator is built with use of HTML, CSS, JavaScript.
- It supports addition, subtraction, multiplication, division, decimal values, clear, and delete functions.

Calculator code:

a. **HTML code:**



```html
<html lang="en">
  <head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>Calculator</title>
    <!-- Google Font -->
    <link href="https://fonts.googleapis.com/css2?family=Roboto+Mono:wght@500&display=swap"/>
    <link rel="stylesheet" href="style.css">
  </head>
  <body>
    <div class="calculator">
      <div class="display">
        <input type="text" placeholder="0" id="input" disabled />
      </div>
      <div class="buttons">
        <!-- Full Erase -->
        <button value="AC" id="clear" class="operation-button" >AC</button>
        <!-- Erase Single Value -->
        <button value="DEL" id="erase" class="operation-button" >DEL</button>
        <button value="/" class="operation-button button">/</button>
        <button value="*" class="operation-button button" >*</button>

        <button value="7" class="digit-button button" />7</button>
        <button value="8" class="digit-button button" />8</button>
        <button value="9" class="digit-button button" />9</button>
        <button value="-" class="operation-button button" />-</button>

        <button value="6" class="digit-button button" />6</button>
        <button value="5" class="digit-button button" />5</button>
        <button value="4" class="digit-button button" />4</button>
        <button value="+" class="operation-button button" />+</button>

        <button value="1" class="digit-button button" />1</button>
        <button value="2" class="digit-button button" />2</button>
        <button value="3" class="digit-button button" />3</button>

        <button value="=" id="equal" class="operation-button" />=</button>
        <button value="0" class="digit-button button" id="zero" />0</button>
        <button value="." class="digit-button button" />.</button>
      </div>
    </div>

    <script src="script.js"></script>
  </body>
</html>
```

b. CSS code:

File Edit Selection View Go Run Terminal Help

calculator.html | style.css | script.js

JAVASCRIPT > style.css > a:hover

```
* {
  padding: 0;
  margin: 0;
  box-sizing: border-box;
  font-family: "Roboto Mono", monospace;
}
body {
  height: 100vh;
  background-color: #dadff7;
}
.calculator {
  width: 400px;
  background-color: #071013;
  padding: 50px 30px 20px 30px;
  position: absolute;
  transform: translate(-50%, -50%);
  top: 50%;
  left: 50%;
  border-radius: 8px;
  box-shadow: 0 20px 50px rgba(0, 5, 24, 0.4);
}
.display {
  width: 100%;
}
.display input {
  width: 100%;
  padding: 15px 10px;
  text-align: right;
  border: none;
  background-color: transparent;
  color: #ffffff;
  font-size: 35px;
}
.display input::placeholder {
  color: #9490ac;
}
.buttons {
  display: grid;
  grid-template-columns: repeat(4, 1fr);
  grid-gap: 20px;
  margin-top: 40px;
}
```

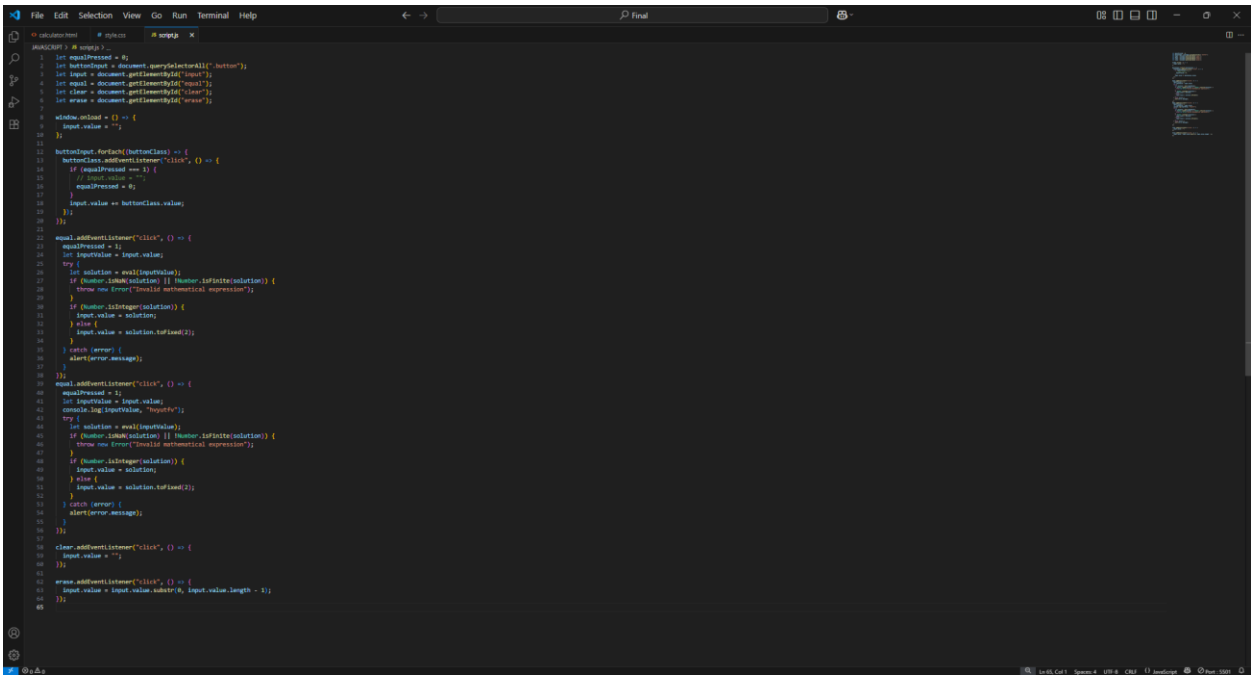
File Edit Selection View Go Run Terminal Help

calculator.html | # style.css | JS script.js

JAVASCRIPT > # style.css > a:hover

```
43  button {
44    font-size: 20px;
45    padding: 17px;
46    border: none;
47    color: #ffffff;
48    cursor: pointer;
49    border-radius: 5px;
50    border-radius: 10px;
51  }
52  button#equal {
53    grid-row: span 2;
54  }
55  button#zero {
56    grid-column: span 2;
57  }
58  .operation-button {
59    background-color: #f69906;
60  }
61  .operation-button:hover {
62    background-color: #eef606db;
63  }
64  .digit-button {
65    background-color: #313131;
66  }
67  .digit-button:hover {
68    background-color: #313131a8;
69  }
70  .main {
71    margin-top: 10%;
72  }
73  .brand {
74    text-align: center;
75    color: white;
76  }
77  a {
78    color: white;
79    font-weight: 800;
80  }
81  a:hover {
82    color: #f69906;
83  }
84
```

c. **JavaScript code:**



```javascript
let equalPressed = 0;
let buttonInput = document.querySelectorAll(".button");
let input = document.getElementById("input");
let equal = document.getElementById("equal");
let clear = document.getElementById("clear");
let erase = document.getElementById("erase");

window.onload = () => {
  input.value = "";
};

buttonInput.forEach(buttonClass) => {
  buttonClass.addEventListener("click", () => {
    if (equalPressed === 1) {
      // input.value = "";
      equalPressed = 0;
    }
    input.value += buttonClass.value;
  });
});

equal.addEventListener("click", () => {
  equalPressed = 1;
  let inputValue = input.value;
  try {
    let solution = eval(inputValue);
    if (Number.isNaN(solution) || !Number.isFinite(solution)) {
      throw new Error("Invalid mathematical expression");
    }
    if (Number.isInteger(solution)) {
      input.value = solution;
    } else {
      input.value = solution.toFixed(2);
    }
  } catch (error) {
    alert(error.message);
  }
});
equal.addEventListener("click", () => {
  equalPressed = 1;
  let inputValue = input.value;
  console.log(inputValue, "hsyutfv");
  try {
    let solution = eval(inputValue);
    if (Number.isNaN(solution) || !Number.isFinite(solution)) {
      throw new Error("Invalid mathematical expression");
    }
    if (Number.isInteger(solution)) {
      input.value = solution;
    } else {
      input.value = solution.toFixed(2);
    }
  } catch (error) {
    alert(error.message);
  }
});

clear.addEventListener("click", () => {
  input.value = "";
});

erase.addEventListener("click", () => {
  input.value = input.value.substr(0, input.value.length - 1);
});
```

How it works:

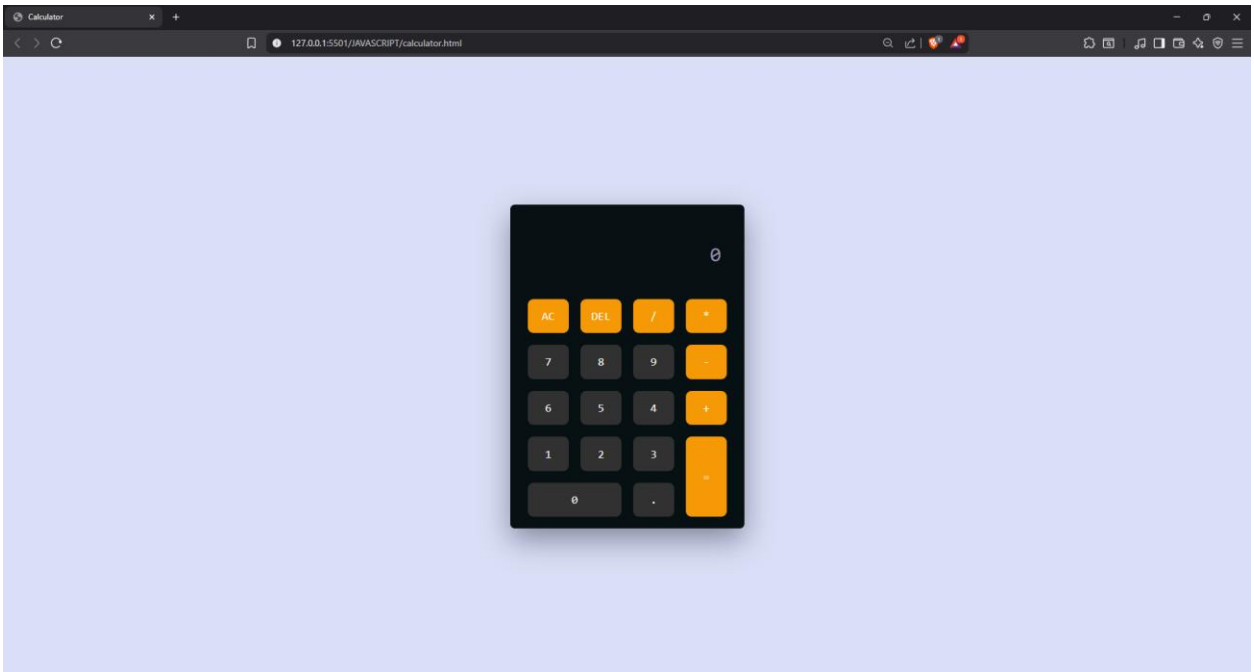
HTML: provides a solid structure with places for buttons and display screens

CSS: meanwhile has buttons arrangement layouts that inherit color properties from other buttons so they can be cut down on later adjustments

JavaScript should handle logic:

- Captures the button clicks.
- Parsing the entire transaction using eval().
- Displays result on input screen.
- The AC key clears all input.
- DEL removes that item from the last section if there is one present.
- Handling errors are also possible (e.g., invalid expressions that don't match anything expected).

Result:



What it demonstrates:

- Ability to handle events (button clicks).
- DOM manipulation in use (document.getElementById).
- Mathematical operations implementations are done dynamically.

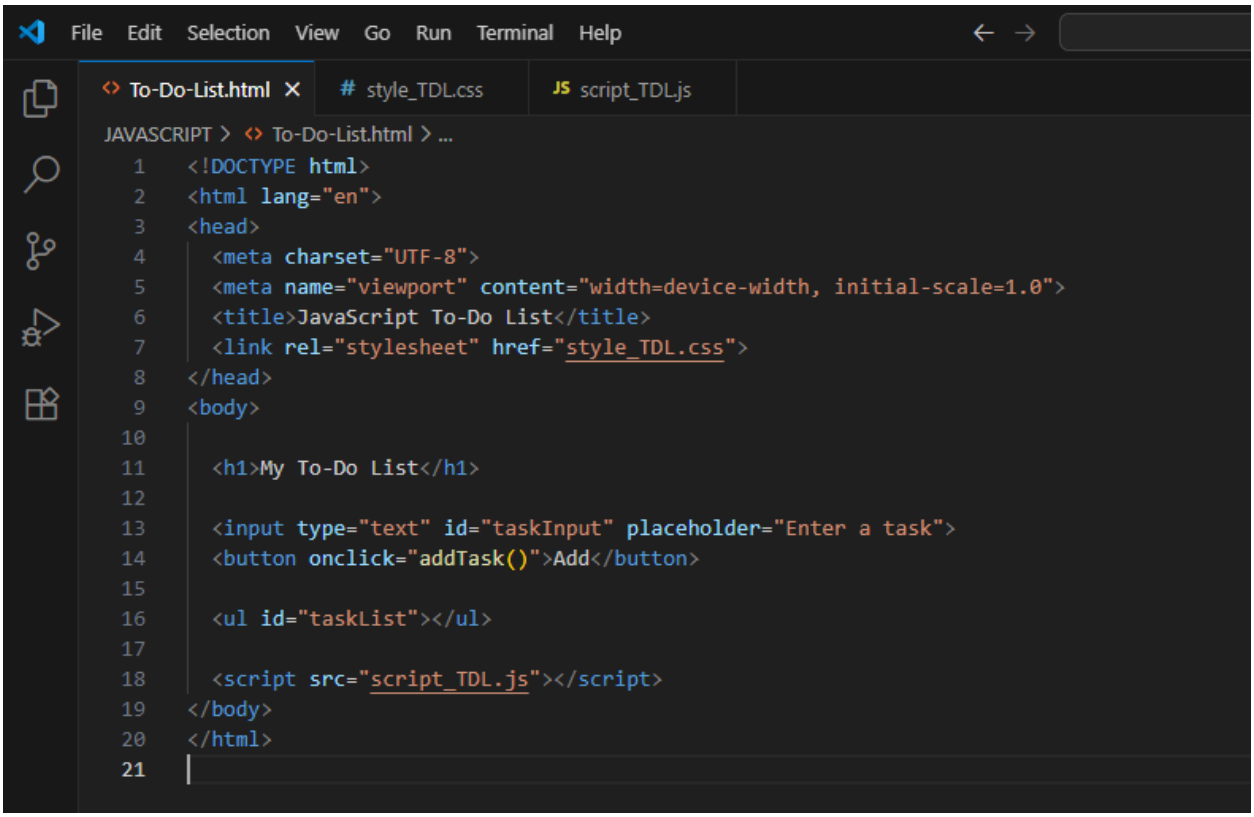
2. To-Do List

Description:

To-Do List with Add, Complete, and Delete Mechanics.

To-Do-List Code:

a. HTML code:




```html
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>JavaScript To-Do List</title>
  <link rel="stylesheet" href="style_TDL.css">
</head>
<body>

  <h1>My To-Do List</h1>

  <input type="text" id="taskInput" placeholder="Enter a task">
  <button onclick="addTask()">Add</button>

  <ul id="taskList"></ul>

  <script src="script_TDL.js"></script>
</body>
</html>
```

b. CSS code:

File Edit Selection View Go Run Terminal Help

To-Do-List.html | style_TDL.css | script_TDL.js

JAVASCRIPT > style_TDL.css > .delete-btn

```
body {
  font-family: Arial, sans-serif;
  text-align: center;
  background: #f4f4f4;
  padding: 40px;
}
input {
  padding: 10px;
  width: 200px;
}
button {
  padding: 10px;
  margin-left: 5px;
}
ul {
  list-style-type: none;
  padding: 0;
  margin-top: 20px;
}
li {
  margin: 8px auto;
  padding: 10px;
  background: #fff;
  width: 300px;
  display: flex;
  justify-content: space-between;
  align-items: center;
  border-radius: 5px;
  box-shadow: 2px 2px 6px rgba(0,0,0,0.1);
}
.done {
  text-decoration: line-through;
  color: grey;
}
.delete-btn {
  background: #e74c3c;
  color: white;
  border: none;
  padding: 5px 10px;
  border-radius: 3px;
  cursor: pointer;
}
```

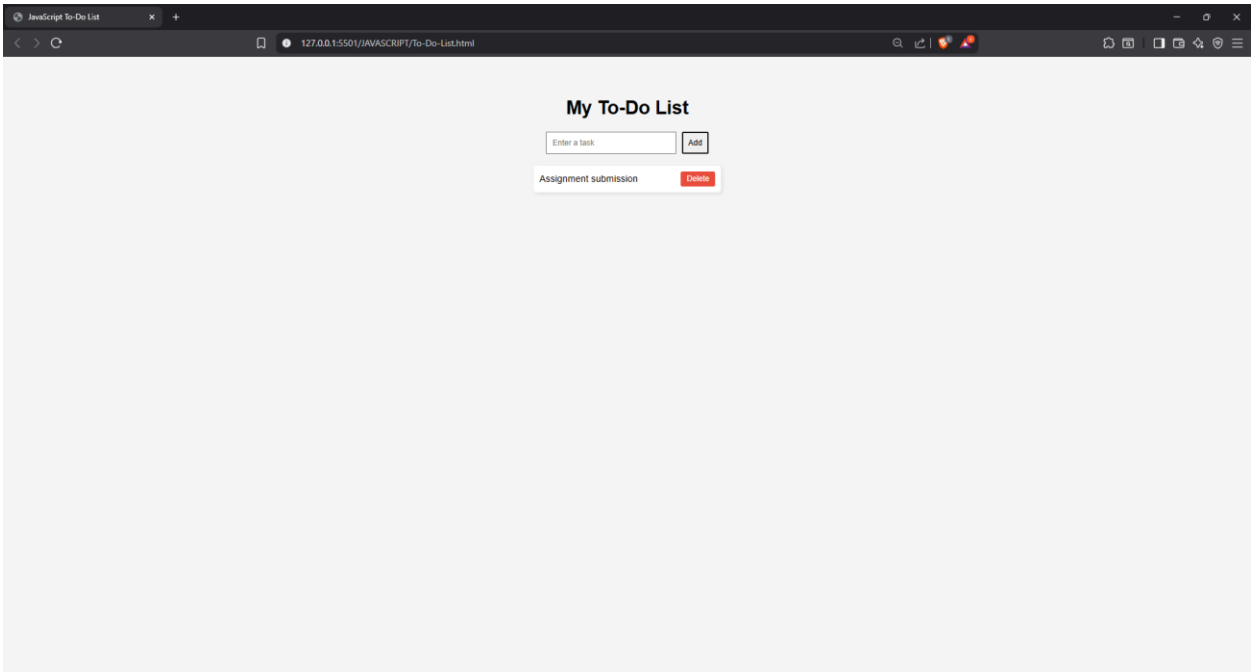
c. sJavaScript Code:

```javascript
function addTask() {
    const input = document.getElementById("taskInput");
    const task = input.value.trim();

    if (task === "") return; // ignore empty tasks

    // Create new list item
    const li = document.createElement("li");

    // Create span for task text
    const span = document.createElement("span");
    span.textContent = task;
    span.onclick = function() {
      span.classList.toggle("done"); // toggle completed
    };

    // Create delete button
    const deleteBtn = document.createElement("button");
    deleteBtn.textContent = "Delete";
    deleteBtn.className = "delete-btn";
    deleteBtn.onclick = function() {
      li.remove(); // remove task
    };

    // Append everything
    li.appendChild(span);
    li.appendChild(deleteBtn);
    document.getElementById("taskList").appendChild(li);

    // Clear input
    input.value = "";
  }
```

How it Works:

- **HTML** → Input field, Add button, and list of items(ul).
- **CSS** → Styles the task list with some shadows, spacing and a “done” effect via text-decoration: line-through.
- **JavaScript** → Adds interactivity:
    - addTask() makes a new <li> with the task test.
    - It toggles the “done” class (Completed) on clicking on the task.
    - The task is removed via delete button with .remove().
    - Prevents adding empty tasks with the following if (task === "") return;.

Result:



What it demonstrates:

- DOM Manipulation (Some dynamic element creation).
- Handling (Click to add or remove items).
- Conditionals and Functions in JavaScript.