Mastering Web Technologies: Designing and Implementing an
Online Calculator

HTML, CSS, JavaScript

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Agenda

- Project Overview
- Technologies Used
- Features of the Calculator
- Development Process
- Code Walkthrough
- Outputs
- Future Improvements
- Conclusion and References

Project Overview

- A *responsive* and *user-friendly* online calculator designed to perform *basic arithmetic operations* including addition, subtraction, multiplication, and division.
- The calculator is implemented using HTML, CSS, and JavaScript, providing a seamless and *interactive experience* for users across different devices.
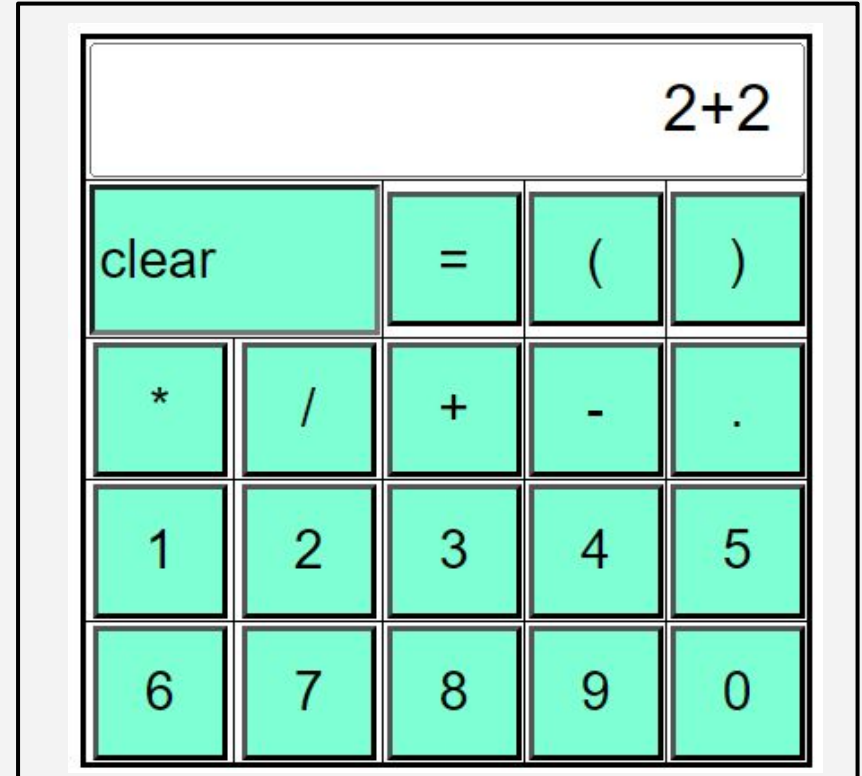
Technologies Used

HTML	CSS	JavaSCript

HTML (HyperText Markup Language) is a *markup language* that tells web browsers how to structure the web pages. It can be as complicated or as simple as the web developer wants it to be. It consists of a series of elements, which you use to enclose, wrap, or *mark up* different parts of content to make it appear or act in a certain way.

CSS stands for Cascading Style Sheets. It describes how HTML elements are to be displayed on screen, paper, or in other media.It can control the layout of multiple web pages all at once

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, scrolling video jukeboxes, etc. you can bet that JavaScript is probably involved.

Features of the Calculator

- Basic Arithmetic Operations
  - Addition
  - Subtraction
  - Division
  - Multiplication
- User Interface
  - Simple layout
  - Large, easy to click buttons
  - Clear display screen to show input and results.
- Responsive Design
  - Works well on different screen sizes
- Interactive Functionality
  - Immediate display of input and results.
  - Error handling for invalid operations (e.g., division by zero).

Development Process

- Planning and Design
  - Define the calculator's functionality and user interface design.
  - Create mockups to visualize the layout.
- Implementation
  - Developed the HTML structure for the calculator using the <table> tag
  - Style the calculator using CSS, ensuring a responsive design.
  - Implement the functionality using JavaScript, focusing on capturing input, performing calculations, and updating the UI with the help of eval() function.
- Testing
  - Test all arithmetic operations and edge cases to ensure accuracy and reliability.
- Deployment
  - Host the calculator on a web server.
  - Optimize for performance and accessibility

Code Walkthrough

- HTML tags used: <table>, <td>, <tr>, <input>
- HTML tag attributes used:
  - colspan=5 in <table> tag when defining the display of the calculator to take up the columns
  - colspan=2 in <table> tag for the clear button which takes up two columns
  - type=text in <input> tag for the display
  - type=clear in <input> tag for the clear button
  - type=button in <input> tag for all the remaining buttons
- CSS styling can be checked in the code snippets in the next slides
- JavaScript function
  - appendToDisplay(value): This function is appending to the display the value of the pressed buttons
  - clearDisplay(): This function is used to clear the display when clear button is pressed
  - calculate(): This function uses the eval() function to evaluate the result of the display values. It also uses a try ..catch to catch any errors.

Code Snippets HTML

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Online Calculator</title>
    <link rel="stylesheet" href="online_calculator.css">
</head>
<body>
    <h1>Online Calculator</h1>
    <table>
        <tr>
            <td colspan="5"><input type="text" id="display" readonly></td>
        </tr>
        <tr>
            <td colspan="2"><input type="clear" value="clear" onclick="clearDisplay()"></td>
            <td><input type="button" value="=" onclick="calculate()"></td>
            <td><input type="button" value="(" onclick="appendToDisplay('(')"></td>
            <td><input type="button" value=")" onclick="appendToDisplay(')')"></td>
        </tr>
```

Code Snippet HTML continued

```html
21          <tr>
22              <td><input type="button" value="*" onclick="appendToDisplay('*')"></td>
23              <td><input type="button" value="/" onclick="appendToDisplay('/')"></td>
24              <td><input type="button" value="+" onclick="appendToDisplay('+')"></td>
25              <td><input type="button" value="-" onclick="appendToDisplay('-')"></td>
26              <td><input type="button" value="." onclick="appendToDisplay('.')"></td>
27          </tr>
28          <tr>
29              <td><input type="button" value="1" onclick="appendToDisplay('1')"></td>
30              <td><input type="button" value="2" onclick="appendToDisplay('2')"></td>
31              <td><input type="button" value="3" onclick="appendToDisplay('3')"></td>
32              <td><input type="button" value="4" onclick="appendToDisplay('4')"></td>
33              <td><input type="button" value="5" onclick="appendToDisplay('5')"></td>
34          </tr>
35          <tr>
36              <td><input type="button" value="6" onclick="appendToDisplay('6')"></td>
37              <td><input type="button" value="7" onclick="appendToDisplay('7')"></td>
38              <td><input type="button" value="8" onclick="appendToDisplay('8')"></td>
39              <td><input type="button" value="9" onclick="appendToDisplay('9')"></td>
40              <td><input type="button" value="0" onclick="appendToDisplay('0')"></td>
41          </tr>
42      </table>
43      <script src="online_calculator.js"></script>
44  </body>
45  </html>
46
```

Code Snippet CSS

```css
# online_calculator.css > input[type="clear"]
1   body {
2       margin-left: 40%;
3       margin-right: 40%;
4       text-align: center;
5   }
6
7   input[type="button"] {
8       height: 50px;
9       width: 50px;
10      background-color: aquamarine;
11      color: black;
12      font-size: 20px;
13      cursor: pointer;
14  }
15
```

```css
16  input[type="clear"] {
17      height: 50px;
18      width: 100px;
19      background-color: aquamarine;
20      color: black;
21      font-size: 20px;
22      cursor: pointer;
23  }
24
25  table {
26      border: 2px solid black;
27      border-collapse: collapse;
28      width: 100%;
29      margin-top: 20px;
30  }
```

Code Snippet CSS continued

```css
32  td, th {
33      border: 1px solid █black;
34      text-align: center;
35  }
36
37  input[type="text"] {
38      width: 100%;
39      height: 50px;
40      font-size: 24px;
41      text-align: right;
42      padding-right: 10px;
43      box-sizing: border-box;
44  }
45
```

Code Snippet JavaScript

```js
online_calculator.js > ...
1    function appendToDisplay(value) {
2        document.getElementById('display').value += value;
3    }
4
5    function clearDisplay() {
6        document.getElementById('display').value = '';
7    }
8
9    function calculate() {
10       try {
11           document.getElementById('display').value = eval(document.getElementById('display').value);
12       } catch (error) {
13           document.getElementById('display').value = 'Error';
14       }
15   }
```

Output for arithmetic calculations

Output for decimal calculations

Output for division by zero

Online Calculator

	45/0

clear		=	(	)
*	/	+	-	.
1	2	3	4	5
6	7	8	9	0

Online Calculator

	Infinity

clear		=	(	)
*	/	+	-	.
1	2	3	4	5
6	7	8	9	0

Future Improvements

- Addition of more advanced mathematical functions (e.g., square roots, exponents).
- Support for keyboard input.
- Theme customization options for users.
- Localization for different languages.
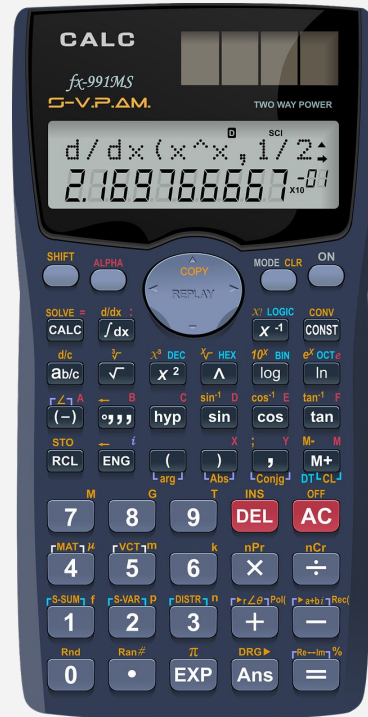
Conclusion

- The online calculator aims to provide a straightforward and efficient tool for everyday arithmetic needs, demonstrating the power and versatility of web technologies in creating interactive applications.

References and GitHub Links

https://github.com/ShrutiK02/JavaScript/tree/3895687555fb4dbf711c38e9656a855a8e9576e0/Online%20Calculator