

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

WEB TECHNOLOGY LAB

BCSL504

EXPERIMENT – 06

SIMPLE CALCULATOR

Using HTML, CSS and JavaScript

5th Semester

Sum • Difference • Product • Quotient
Remainder • Power • Square Root • Square

Prepared by Search Creators

Learn • Practice • Execute

1. Experiment 06

Aim

Develop a simple calculator using HTML, CSS and JavaScript to perform the following operations:

Sum, Product, Difference, Remainder, Quotient, Power, Square Root and Square

2. Requirements

- Search Creators Compiler / Code Studio (Recommended)

<https://searchcreators.org/compiler/>

- Modern web browser such as Chrome, Edge or Firefox
- Internet connection for accessing Search Creators Compiler
- Alternatively, VS Code, Notepad or another suitable HTML/CSS/JavaScript editor
- Basic knowledge of HTML, CSS and JavaScript

3. Search Creators Compiler

Run This Program on Search Creators

Practice this Web Technology Lab program using the **Search Creators Compiler / Code Studio**.

Open Search Creators Compiler

<https://searchcreators.org/compiler/>

Enter the HTML, CSS and JavaScript program and verify different calculator operations using the coding environment.

4. Problem Statement

Develop a web-based calculator using:

HTML + CSS + JavaScript

The calculator must perform:

1. Sum
2. Product
3. Difference
4. Remainder
5. Quotient
6. Power
7. Square Root
8. Square

5. Technologies Used

Technology	Purpose
HTML	Creates the calculator structure, input fields and buttons.
CSS	Provides colours, spacing, alignment and visual presentation.
JavaScript	Reads input values, performs calculations and displays the result.

6. Arithmetic Operations

Let the two input numbers be:

$$a \quad \text{and} \quad b$$

Then:

Operation	Expression
Sum	$a + b$
Product	$a \times b$
Difference	$a - b$
Remainder	$a \bmod b$
Quotient	$\frac{a}{b}$
Power	a^b
Square Root	$\sqrt{a}$
Square	a^2

Important**Note:**

Sum, product, difference, remainder, quotient and power use both input numbers.

Square root and square use the **first number**.

Division and remainder by zero are handled separately in the JavaScript program.

7. JavaScript Functions Used

JavaScript Feature	Purpose
<code>parseFloat()</code>	Converts the input value into a number.
<code>document.getElementById()</code>	Accesses an HTML element using its ID.
<code>Math.pow()</code>	Calculates power.
<code>Math.sqrt()</code>	Calculates square root.
<code>isNaN()</code>	Checks whether a value is not a valid number.

8. Complete Program

Important

Create an HTML file for the calculator and execute it using:

Search Creators Compiler / Code Studio

<https://searchcreators.org/compiler/>

The complete HTML, CSS and JavaScript code is given below.

```

1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5
6 <meta charset="UTF-8">
7
8 <title>Simple Calculator</title>
9
10 <style>
11
12 body {
13     font-family: Arial, sans-serif;
14     background-color: #f2f2f2;
15     text-align: center;
16 }
17
18 .calculator {

```

```
19     width: 420px;
20     margin: 50px auto;
21     padding: 25px;
22     background-color: white;
23     border: 2px solid darkgreen;
24     border-radius: 10px;
25 }
26
27 h2 {
28     color: darkgreen;
29 }
30
31 input {
32     width: 80%;
33     padding: 10px;
34     margin: 8px;
35     font-size: 16px;
36 }
37
38 button {
39     width: 130px;
40     padding: 10px;
41     margin: 6px;
42     font-size: 15px;
43     cursor: pointer;
44 }
45
46 #result {
47     margin-top: 20px;
48     padding: 12px;
49     background-color: lightyellow;
50     color: darkblue;
51     font-size: 20px;
52     font-weight: bold;
53 }
54
55 </style>
56
57 </head>
58
59 <body>
60
61 <div class="calculator">
62
63 <h2>Simple Calculator</h2>
64
65 <input
66     type="number"
```

```
67     id="num1"
68     placeholder="Enter First Number">
69
70 <br>
71
72 <input
73     type="number"
74     id="num2"
75     placeholder="Enter Second Number">
76
77 <br><br>
78
79 <button onclick="calculate('sum')">
80     Sum
81 </button>
82
83 <button onclick="calculate('product')">
84     Product
85 </button>
86
87 <button onclick="calculate('difference')">
88     Difference
89 </button>
90
91 <button onclick="calculate('remainder')">
92     Remainder
93 </button>
94
95 <button onclick="calculate('quotient')">
96     Quotient
97 </button>
98
99 <button onclick="calculate('power')">
100     Power
101 </button>
102
103 <button onclick="calculate('sqrt')">
104     Square Root
105 </button>
106
107 <button onclick="calculate('square')">
108     Square
109 </button>
110
111 <div id="result">
112     Result will appear here
113 </div>
114
```

```
115 </div>
116
117 <script>
118
119 function calculate(operation) {
120
121     let a = parseFloat(
122         document.getElementById("num1").value
123     );
124
125     let b = parseFloat(
126         document.getElementById("num2").value
127     );
128
129     let result;
130
131     /*
132     Square root and square require
133     only the first number.
134     */
135     if (operation === "sqrt" ||
136         operation === "square") {
137
138         if (isNaN(a)) {
139             document.getElementById("result").innerHTML =
140                 "Please enter the first number.";
141             return;
142         }
143
144     } else {
145
146         if (isNaN(a) || isNaN(b)) {
147             document.getElementById("result").innerHTML =
148                 "Please enter both numbers.";
149             return;
150         }
151     }
152
153     switch (operation) {
154
155         case "sum":
156
157             result = a + b;
158             break;
159
160         case "product":
161
162             result = a * b;
```

```
163         break;
164
165     case "difference":
166
167         result = a - b;
168         break;
169
170     case "remainder":
171
172         if (b === 0) {
173             result =
174                 "Remainder by zero is not allowed.";
175         } else {
176             result = a % b;
177         }
178
179         break;
180
181     case "quotient":
182
183         if (b === 0) {
184             result =
185                 "Division by zero is not allowed.";
186         } else {
187             result = a / b;
188         }
189
190         break;
191
192     case "power":
193
194         result = Math.pow(a, b);
195         break;
196
197     case "sqrt":
198
199         if (a < 0) {
200             result =
201                 "Square root of a negative number " +
202                 "is not a real number.";
203         } else {
204             result = Math.sqrt(a);
205         }
206
207         break;
208
209     case "square":
210
```

```
211         result = a * a;
212         break;
213
214     default:
215
216         result = "Invalid Operation";
217     }
218
219     document.getElementById("result").innerHTML =
220         "Result: " + result;
221 }
222
223 </script>
224
225 </body>
226
227 </html>
```

9. Program Explanation

9.1 Input Fields

Two input fields are provided:

```
1 <input type="number"
2     id="num1"
3     placeholder="Enter First Number">
4
5 <input type="number"
6     id="num2"
7     placeholder="Enter Second Number">
```

The first value is identified by:

num1

and the second value by:

num2

9.2 Buttons

Each operation has a separate button.

Example:

```
1 <button onclick="calculate('sum')">
2   Sum
3 </button>
```

When the button is clicked, the JavaScript function:

calculate()

is called.

The operation name is passed as an argument.

9.3 Reading Input Values

The values are read using:

```
1 let a = parseFloat(
2   document.getElementById("num1").value
3 );
4
5 let b = parseFloat(
6   document.getElementById("num2").value
7 );
```

`document.getElementById()` finds the required HTML element.

`parseFloat()` converts the input text into a numeric value.

10. Sum Operation

The sum is calculated using:

```
1 result = a + b;
```

Formula:

$$a + b$$

Example:

$$10 + 5 = 15$$

11. Product Operation

The product is calculated using:

```
1 result = a * b;
```

Formula:

$$a \times b$$

Example:

$$10 \times 5 = 50$$

12. Difference Operation

The difference is calculated using:

```
1 result = a - b;
```

Formula:

$$a - b$$

Example:

$$10 - 5 = 5$$

13. Remainder Operation

The remainder operator in JavaScript is:

$$\%$$

Code:

```
1 result = a % b;
```

Example:

$$10 \bmod 3 = 1$$

The program also checks whether the second number is zero before performing the operation.

14. Quotient Operation

Division is performed using:

```
1 result = a / b;
```

Formula:

$$\frac{a}{b}$$

Example:

$$10/5 = 2$$

Important

The program checks whether the second number is zero.

If:

$$b = 0$$

the calculator displays:

Division by zero is not allowed.

15. Power Operation

Power is calculated using:

```
1 result = Math.pow(a, b);
```

Formula:

$$a^b$$

Example:

$$2^3 = 8$$

16. Square Root Operation

Square root is calculated using:

```
1 result = Math.sqrt(a);
```

Formula:

$$\sqrt{a}$$

Example:

$$\sqrt{25} = 5$$

This operation uses the **first number only**.

If the first number is negative, the program reports that its square root is not a real number.

17. Square Operation

The square is calculated using:

```
1 result = a * a;
```

Formula:

$$a^2$$

Example:

$$5^2 = 25$$

This operation also uses the **first number only**.

18. Displaying the Result

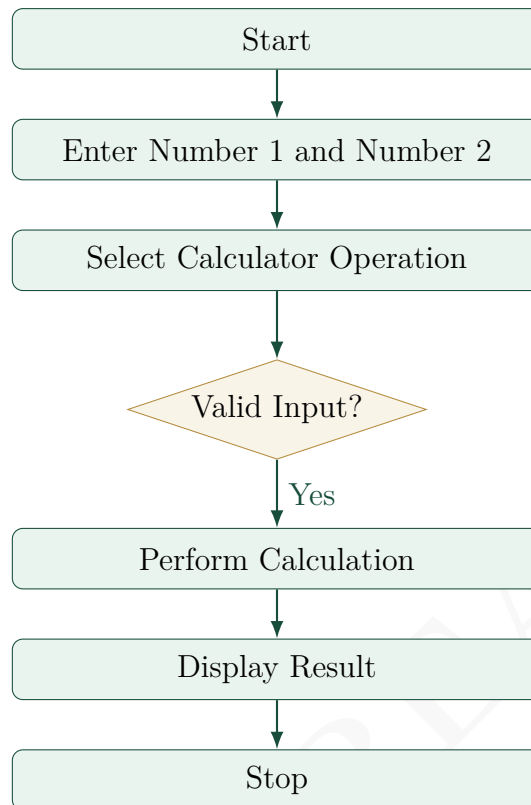
The result is displayed inside:

```
1 <div id="result">
2   Result will appear here
3 </div>
```

JavaScript updates this element using:

```
1 document.getElementById("result").innerHTML =
2   "Result: " + result;
```

19. Program Flow



20. Sample Calculations

Consider:

$$a = 10, \quad b = 5$$

Then:

Operation	Calculation	Result
Sum	$10 + 5$	15
Product	10×5	50
Difference	$10 - 5$	5
Remainder	$10 \bmod 5$	0
Quotient	$10/5$	2
Power	10^5	100000
Square Root	$\sqrt{10}$	Approximately 3.1623
Square	10^2	100

21. How to Execute the Program

Run This Program on Search Creators

Recommended Method – Search Creators Compiler

Open:

Search Creators Compiler / Code Studio

<https://searchcreators.org/compiler/>

Enter the complete HTML, CSS and JavaScript program.

Run or preview the webpage, enter two numbers and test all eight calculator operations.

22. Procedure

1. Open the **Search Creators Compiler / Code Studio**:

<https://searchcreators.org/compiler/>

2. Create a new HTML file or web project.
3. Enter the complete HTML, CSS and JavaScript program.
4. Create two number input fields.
5. Create buttons for: Sum, Product, Difference, Remainder, Quotient, Power, Square Root and Square.
6. Define the JavaScript `calculate()` function.
7. Read the input values using `document.getElementById()`.
8. Convert the input values using `parseFloat()`.
9. Use the `switch` statement to perform the selected operation.
10. Use `Math.pow()` for power.
11. Use `Math.sqrt()` for square root.
12. Handle division and remainder by zero.
13. Handle negative input for real-number square root.
14. Display the answer inside the result area.
15. Save the program.
16. Run or preview the webpage using the Search Creators coding environment.

17. Enter two sample numbers.
18. Click each operation button and verify the corresponding result.
19. For Square Root and Square, observe that the first input number is used.
20. If required, the same program can alternatively be executed using VS Code, Notepad or another suitable HTML/CSS/JavaScript editor and browser.

23. Expected Output

The webpage displays a simple calculator similar to:

Expected Browser Output

Simple Calculator

Enter First Number: 10

Enter Second Number: 5

Sum

Product

Difference

Remainder

Quotient

Power

Square Root

Square

Result: 15

24. Important Viva Questions

Viva Questions

1. **What technologies are used in this calculator?**
HTML, CSS and JavaScript.
2. **What is the role of HTML?**
HTML creates the structure, input fields and buttons.
3. **What is the role of CSS?**
CSS controls the appearance and presentation of the calculator.
4. **What is the role of JavaScript?**
JavaScript reads input values, performs calculations and displays the result.

5. What is onclick?

It is an event attribute that executes JavaScript when an element is clicked.

6. What does document.getElementById() do?

It accesses an HTML element using its ID.

7. Why is parseFloat() used?

It converts an input value into a floating-point number.

8. Which operator is used for addition?

+

9. Which operator is used for multiplication?

*

10. Which operator is used for subtraction?

-

11. Which operator gives the remainder?

%

12. Which operator is used for division?

/

13. Which JavaScript function is used for power in this program?

Math.pow()

14. Which JavaScript function is used for square root?

Math.sqrt()

15. How is square calculated?

The first number is multiplied by itself.

16. What is isNaN() used for?

It checks whether a value is not a valid number.

17. Why is division by zero checked?

Division by zero does not produce a valid finite arithmetic result for this calculator.

18. Which operations use only the first number?

Square Root and Square.

19. Which online coding platform can be used to practice this experiment?

Search Creators Compiler / Code Studio:

<https://searchcreators.org/compiler/>

25. Quick Revision

Concept	Remember
Structure	HTML
Presentation	CSS
Calculation	JavaScript
Addition	$a + b$
Product	$a * b$
Difference	$a - b$
Remainder	$a \% b$
Quotient	a / b
Power	<code>Math.pow(a,b)</code>
Square Root	<code>Math.sqrt(a)</code>
Square	$a * a$
Read HTML Element	<code>document.getElementById()</code>
Convert Input	<code>parseFloat()</code>
Validate Number	<code>isNaN()</code>
Practice Platform	Search Creators Compiler
Website	searchcreators.org/compiler/

26. Result

Result

A simple calculator was successfully developed using HTML, CSS and JavaScript. The calculator successfully demonstrates the required operations:

Sum, Product, Difference, Remainder, Quotient, Power, Square Root and Square.

The experiment can be practised and executed using the **Search Creators Compiler / Code Studio**.

<https://searchcreators.org/compiler/>

END OF EXPERIMENT – 06

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Practice Online: searchcreators.org/compiler/
