



**JSPM's**

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# **LAB MANUAL**

## **For**

## **JAVA SCRIPT**

### **B.E. (E&TC Engg.) 2019 Course**

### **Savitribai Phule Pune University, Pune**

## **Electronics and Telecommunication Engineering**



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**List of Experiments**

**Class: B.E.**

**Sub.: JAVA SCRIPT**

Sr. No.	Experiment
1	Write a JavaScript program to calculate area of triangle, area of rectangle and area of circle
2	Write a JavaScript program to generate the multiplication table of a given number.
3	Write a JavaScript program to following operations on a given string, i. Reverse string ii. Replace characters of a string iii. String is Palindrome
4	Write a JavaScript program to compare two strings using various methods.
5	Write a JavaScript program that will create a countdown timer.
6	Write a JavaScript program that will create an array and perform following operations i. To remove specific element from the array ii. Check if an array contains a specified value. iii. To empty an array
7	Write a JavaScript program to illustrate different Set operations like- a. Union b. Intersection c. Difference d. Set Difference
8	Write a JavaScript program to create a Home page of any website and change background color using i. On mouse over event ii. On focus event
9	Design and implement a simple calculator using Java script for operations like addition, multiplication, subtraction, division, square of a number etc. a. Design a calculator like text field for input and output, buttons for numbers and operations etc. b. Validate input values c. Prompt/ alerts for invalid values etc.



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### **Experiment No. 1**

**Title:** Write a JavaScript program to calculate area of triangle, area of rectangle and area of circle

**Date of Performance:**

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### Experiment No. 1

#### Calculate Area of Triangle, Rectangle, Circle

**Title:** calculate area of triangle, area of rectangle and area of circle using Java Script.

**Aim:** Write a JavaScript program to calculate area of triangle, area of rectangle and area of circle.

**Software:** Visual Studio code (VS code)

#### **Theory:**

- a) JavaScript variable: It is simply a name of storage location. There are two types of variables in JavaScript: local variable and global variable.

There are some rules while declaring a JavaScript variable (also known as identifiers).

1. Name must start with a letter (a to z or A to Z), underscore (\_), or dollar (\$) sign.
2. After first letter we can use digits (0 to 9), for example value1.
3. JavaScript variables are case sensitive, for example x and X are different variables.

- b) JavaScript functions: They are used to perform operations. We can call JavaScript function many times to reuse the code. It can have 0 or more arguments.

#### Advantage of JavaScript function

There are mainly two advantages of JavaScript functions.

1. Code reusability: We can call a function several times so it saves coding
2. Less coding: It makes our program compact. We don't need to write many lines of code each time to perform a common task.

The syntax of declaring function is given below.

```
function functionName([arg1, arg2, ...argN]){  
    //code to be executed  
}
```

#### JAVASCRIPT CODE

```
//index.html  
<!DOCTYPE html>  
<html lang="en">
```

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```
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Area js program</title>
</head>

<body>
  <select onchange="run(this)" name="" id="shape">
    <option value="" selected disabled>Select shape</option>
    <option value="triangle">Triangle</option>
    <option value="rectangle">Rectangle</option>
    <option value="circle">Circle</option>
  </select>
  <div id="input" class="input">

  </div>

  <div id="output">

  </div>
</body>
<script>
  const select = document.getElementById("shape");
  const input = document.getElementById("input");
  const output = document.getElementById("output");
  class Shape {
    areaRectangle(length, width) {
      return length * width;
    }

    areaTriangle(base, height) {
      return 0.5 * base * height;
    }

    areaCircle(r) {
      return Math.PI * (r * r);
    }
  }

  function run(ele){
    // console.log(ele.value);
    if(ele.value=="triangle"){
      input.innerHTML = `
```

```
<input id="base" placeholder="base" type="text">
  <input id="height" placeholder="height" type="text">
  <button onclick="calc('triangle')" >Calculate</button>
  `;
}
if(ele.value === "rectangle"){
  input.innerHTML = `
    <input id="length" type="text" placeholder="length">
    <input id="width" type="text" placeholder="width">
    <button onclick="calc('rectangle')" >Calculate</button>
    `;
}
if(ele.value === "circle"){
  input.innerHTML = `
    <input id="radius" type="text" placeholder="radius">
    <button onclick="calc('circle')" >Calculate</button>
    `;
}
}

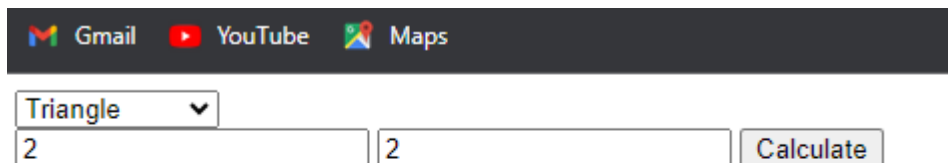
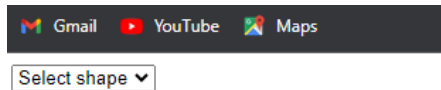
let area = new Shape();

function calc(shape){
  console.log(shape);
  if(shape === "triangle"){
    let base = document.getElementById("base");
    let height = document.getElementById("height");
    let ans = area.areaTriangle(base.value,height.value);
    output.innerHTML = `
      <h1>area of ${shape} is ${ans}</h1>
    `;
  }
  if(shape === "rectangle"){
    let length = document.getElementById("length");
    let width = document.getElementById("width");
    let ans = area.areaRectangle(length.value,width.value);
    output.innerHTML = `
      <h1>area of ${shape} is ${ans}</h1>
    `;
  }
  if(shape === "circle"){
    let radius = document.getElementById("radius");
    let ans = area.areaCircle(radius.value);
    output.innerHTML = `
      <h1>area of ${shape} is ${ans}</h1>
    `;
  }
}
```

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```
`;  
    }else{  
        console.log("error")  
    }  
}  
}  
  
</script>  
  
</html>
```

**OUTPUT:**



**area of triangle is 2**

**Conclusion:**

-----

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## **Experiment No. 2**

**Title:** Write a JavaScript program to generate the multiplication table of a given number.

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## Experiment No. 2

### Generate the multiplication table of a given number

**Title:** Generate the multiplication table of a given number.

**Aim:** Write a JavaScript program to generate the multiplication table of a given number.

#### Theory:

How do you write a multiplication code in JavaScript?

Multiplication and division operators are also available in JavaScript, and are used to find the product and quotient of numerical values. An asterisk ( \* ) is used to represent the multiplication operator.

How do you create a multiplication table using HTML CSS and JavaScript?

JavaScript Multiplication Table Program with HTML CSS

1. Create a text box to get a number from user.
2. Create a button to submit value on button click.
3. Call the multiplicationTable() function.
4. Function will get value of text box.
5. Loop to generate multiplication table.
6. Print the data in html page.

How do you print a table in JavaScript?

Add Style to the Print getElementById('tab'); var style = "

"; var win = window.

How do you make a table in JavaScript?

```
function generateTableHead(table, data) { let thead = table. createTHead(); let row = thead.
insertRow(); for (let key of data) { let th = document. createElement("th"); let text = document.
```

How do you multiply in code?

```
Program to Multiply Two Numbers document.get ("Enter two numbers: "); console.log("%lf %lf",
&a,
&b);
```

Then, the product of a and b is evaluated and the result is stored in product . product = a \* b;

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Finally, product is displayed on the screen using document.get().

How do you multiply a function in JavaScript?

multiply function javascript

JavaScript - Function to Display Table of an entered Number

In this example we will learn how to print table of an integer number using JavaScript function. In this example we will take an integer value as input through text box and will display table of that number in a paragraph tag.

### JavaScript Code:-

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>js pract 2 multiplication table</title>
</head>
<body style="display: flex;flex-direction: column;align-items: center;">
  <input id="input" name="input" type="number" placeholder="enter the number ">
  <button onclick="calc()">Calculate</button>
  <ul style="list-style: none;" id="output">

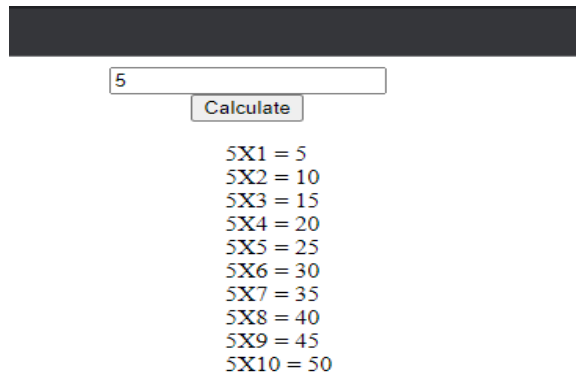
    <!-- <li>123</li> -->
  </ul>
</body>
<script>
  function calc(){
    let input = document.getElementById("input");
    let output = document.getElementById("output");
    let num = input.value;
    // console.log(num);
    output.innerHTML = "";
    for(let i=1;i<=10;i++){
      output.innerHTML += `
        <li>
          ${num}X${i} = ${num*i}
        </li>
      `
    }
  }
}
```

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```
function createTable(num){  
    for(let i=1;i<=10;i++){  
        console.log(num*i);  
        output.innerHTML += `  
            <li>  
                ${num}X${i} = ${num*i}  
            </li>  
        `;  
    }  
}
```

</script>  
</html>

**OUTPUT :**



5

Calculate

5X1 = 5  
5X2 = 10  
5X3 = 15  
5X4 = 20  
5X5 = 25  
5X6 = 30  
5X7 = 35  
5X8 = 40  
5X9 = 45  
5X10 = 50

**Conclusion:**

.....

.....

.....

.....

.....



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### **Experiment No. 3**

**Title:** Write a JavaScript program to following operations on a given string,

- i. Reverse string
- ii. Replace characters of a string
- iii. String is Palindrome

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### Experiment No. 3

---

#### Write a JavaScript program to perform operations on a given string.

---

**Title:** JavaScript program to

- i. Reverse string
- ii. Replace characters of a string
- iii. String is Palindrome

**Aim:** Write a JavaScript program to following operations on a given string,

- i. Reverse string
- ii. Replace characters of a string
- iii. String is Palindrome

**Theory:**

- The `reverse()` method reverses an array in place and returns the reference to the same array, the first array element now becoming the last, and the last array element becoming the first. In other words, elements order in the array will be turned towards the direction opposite to that previously stated.
- The `replace()` method returns a new string with one, some, or all matches of a pattern replaced by a replacement. The pattern can be a string or a `RegExp`, and the replacement can be a string or a function called for each match. If pattern is a string, only the first occurrence will be replaced. The original string is left unchanged.
- The `replaceAll()` method returns a new string with all matches of a pattern replaced by a replacement. The pattern can be a string or a `RegExp`, and the replacement can be a string or a function to be called for each match. The original string is left unchanged.

#### JAVASCRIPT CODE

```
//index.html
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>check reverse string check palindrome replace string char</title>
```

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```
</head>
<body>

<input type="text" id="input" placeholder="enter the string">
<button id="reverse" onclick="calc(this)">reverse string</button>

<button id="palindrome" onclick="calc(this)">palindrome string</button>
  <button id="replace" onclick="calc(this)">replace string</button>
  <div id="output">

    </div>
</body>
<script>
function calc(ele){
  let output = document.getElementById("output");
  let input = document.getElementById("input");
  let val = "";
  switch (ele.id){
    case "reverse":
      val = reverseString(input.value);
      output.innerHTML = val;
      break;
    case "palindrome":
      val = palindrome(input.value);
      output.innerHTML = val;
      break;
    case "replace":
      val = replace(input.value);
      output.innerHTML = val;
      break;
    default:
      output.innerHTML = "put proper input";
  }
}
function replace(str) {
  let newStr = str.replaceAll(" ", "_");
  return newStr;
  // console.log(newStr);
}
// replace("hello world");

function reverseString(str){
  let strArr = str.split("");
  let revArr = strArr.reverse();
```

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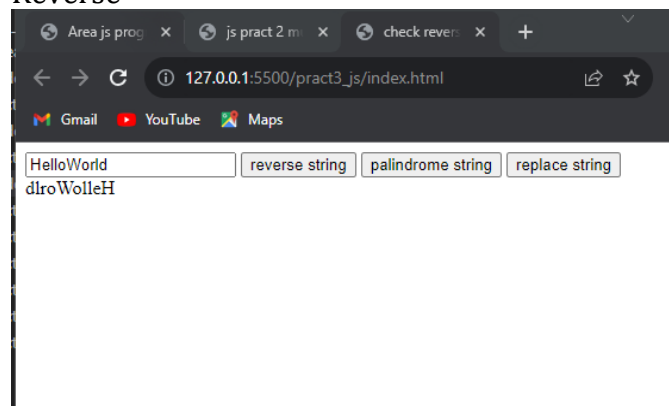
```
let revStr = revArr.join("");
return revStr;
// console.log(revStr);

}
// reverseString("hello");

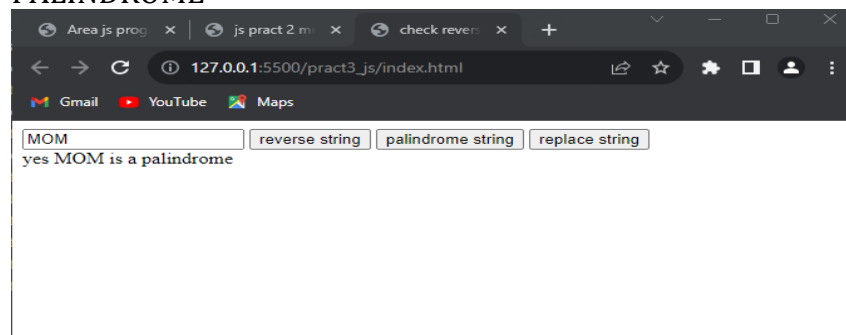
function palindrome(str){
    let revStr = reverseString(str);
    if(revStr===str){
        return "yes "+str+" is a palindrome";
    }else{
        return "No "+str+" is not a palindrome";
    }
}
</script>
</html>
```

## OUTPUT:

### Reverse -

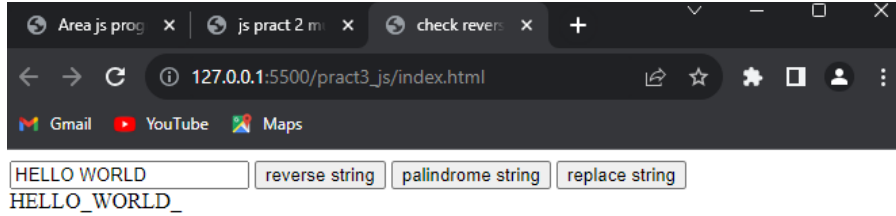


### PALINDROME-



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REPLACE WHITE SPACES -



**Conclusion:**

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### **Experiment No. 4**

**Title:** Write a JavaScript program to compare two strings using various methods.

**Date of Performance:**

**Roll No:**

**Date of Submission:**

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### Experiment No. 4

#### Compare two strings using various methods.

**Title:** Compare two strings using various methods.

**Aim:** Write a JavaScript program to compare two strings using various methods.

**Theory:**

The JavaScript string is an object that represents a sequence of characters. There are 2 ways to create string in JavaScript.

- By string literal
- By string object (using new keyword)

1) By string literal:

The string literal is created using double quotes. The syntax of creating string using string literal is given below:

```
var stringname="string value";
```

2) By string object (using new keyword):

The syntax of creating string object using new keyword is given below:

```
var stringname=new String("string literal")
```

**Java script Code:**

```
//index.html -
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>String Comparison in JavaScript</title>
</head>
<body>
  <h2>String Comparison Demo</h2>
  <label>String 1: <input type="text" id="str1" value="Hello"></label><br><br>
  <label>String 2: <input type="text" id="str2" value="hello"></label><br><br>
  <button onclick="compareStrings()">Compare</button>
  <h3>Results:</h3>
  <pre id="result"></pre>
  <script>
    function compareStrings() {
      const str1 = document.getElementById('str1').value;
      const str2 = document.getElementById('str2').value;
      let result = "";
      // 1. Direct Comparison
      result += `1. Direct Comparison: ${str1 === str2 ? "Equal" : "Not Equal"}\n`;
    }
  </script>
```

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```
// 2. Case-insensitive Comparison using toUpperCase
result += `2. Case-insensitive Comparison (toUpperCase): ${str1.toUpperCase() ===
str2.toUpperCase()} ? "Equal" : "Not Equal"}\n`;
// 3. Regex Match (exact match, case-insensitive)
const regex = new RegExp(`^${str1}$`, "i"); // case-insensitive exact match
result += `3. Regex Match (case-insensitive): ${regex.test(str2) ? "Match" : "No Match"}\n`;
// 4. Locale Comparison
const localeResult = str1.localeCompare(str2);
let localeMsg = localeResult === 0 ? "Equal" : (localeResult < 0 ? "str1 comes before str2" : "str1 comes
after str2");
result += `4. Locale Comparison: ${localeMsg}\n`;
document.getElementById("result").textContent = result;
}
</script>
</body>
</html>
```

**OUTPUT:**

## String Comparison Demo

String 1:

String 2:

### Results:

1. Direct Comparison: Not Equal
2. Case-insensitive Comparison (toUpperCase): Not Equal
3. Regex Match (case-insensitive): No Match
4. Locale Comparison: str1 comes after str2

### Conclusion:

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### **Experiment No. 5**

**Title:** Write a JavaScript program that will create a countdown timer.

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### Experiment No. 5

#### Create a Countdown Timer.

**Title:** Create a Countdown Timer

**Aim:** Write a JavaScript program that will create a countdown timer.

**Theory:**

A countdown timer is an accurate timer that can be used for a website or blog to display the countdown to any special event, such as a birthday or anniversary. Basics of a countdown timer are :

1. Set a valid end date.
2. Calculate the time remaining.
3. Convert the time to a usable format.
4. Output the clock data as a reusable object.
5. Display the clock on the page, and stop the clock when it reaches zero.

**Java script Code:**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Countdown Timer</title>
  <style>
    body {
      font-family: Arial, sans-serif;
      text-align: center;
      margin-top: 50px;
    }
    #timer {
      font-size: 48px;
      color: #2c3e50;
    }
  </style>
</head>
<body>

  <h1>Countdown Timer</h1>
  <div id="timer">00:05:00</div>

  <script>
    // Set the countdown time in seconds (e.g., 5 minutes = 300 seconds)
    let countdownTime = 300;

    function formatTime(seconds) {
```

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```
const hrs = Math.floor(seconds / 3600);
const mins = Math.floor((seconds % 3600) / 60);
const secs = seconds % 60;
return `${hrs.toString().padStart(2, '0')}:${mins.toString().padStart(2,
'0')}:${secs.toString().padStart(2, '0')}`;
}
```

```
function startCountdown() {
  const timerElement = document.getElementById('timer');

  const interval = setInterval(() => {
    timerElement.textContent = formatTime(countdownTime);

    if (countdownTime <= 0) {
      clearInterval(interval);
      timerElement.textContent = "Time's up!";
    } else {
      countdownTime--;
    }
  }, 1000);
}
```

```
// Start the timer
startCountdown();
</script>
```

```
</body>
</html>
```

**OUTPUT:**

## Countdown Timer

00:01:09

**Conclusion:**

---

---

---

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### **Experiment No. 6**

**Title:** Write a JavaScript program that will create an array and perform following operations

- i. To remove specific element from the array
- ii. Check if an array contains a specified value.
- iii. To empty an array

**Date of Performance:**

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## Experiment No. 6

### Create an Array.

**Title:** Create an Array

**Aim:** Write a JavaScript program that will create an array and perform following operations

- i. To remove specific element from the array
- ii. Check if an array contains a specified value.
- iii. To empty an array

### Theory:

#### i. To remove specific element from the array

In this example, you will learn to write a JavaScript program that will remove a specific item from an array.

To understand this example, you should have the knowledge of the following JavaScript programming topics:

- JavaScript Array push()
- JavaScript Array splice()
- JavaScript for loop

### Java script Code:

#### *Using For Loop*

```
/ program to remove item from an array

function removeItemFromArray(array, n) {
    const newArray = [];

    for ( let i = 0; i < array.length; i++) {
        if(array[i] !== n) {
            newArray.push(array[i]);
        }
    }
    return newArray;
}
```





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```
const result = removeItemFromArray([1, 2, 3, 4, 5], 2);  
  
console.log(result);
```

### Output

```
[1,3,4,5]
```

In the above program, an item is removed from an array using a `for` loop.  
Here,

- The `for` loop is used to loop through all the elements of an array.
- While iterating through the elements of the array, if the item to remove does not match with the array element, that element is pushed to `newArray`.
- The `push()` method adds the element to `newArray`.

### ii. Check if an array contains a specified value.

In this example, you will learn to write a JavaScript program that will check if an array contains a specified value.

To understand this example, you should have the knowledge of the following JavaScript programming topics:

- JavaScript Array includes()
- JavaScript Array indexOf()
- JavaScript Arrays

### Java script Code:

#### Check Array Using `includes()`

```
// program to check if an array contains a specified value  
  
const array = ['you', 'will', 'learn', 'javascript'];  
  
const hasValue = array.includes('javascript');
```



```
// check the condition
if(hasValue) {
    console.log('Array contains a value.');
```

```
} else {
    console.log('Array does not contain a value.');
```

```
}
```

### Output

Array contains a value.

In the above program, the `includes()` method is used to check if an array contains a specified value.

- The `includes()` method returns `true` if the value exists in the array.
- The `if...else` statement is used to display the result as per the condition.

### iii. To empty an array

In this example, you will learn to write a JavaScript program that will empty an array.

To understand this example, you should have the knowledge of the following JavaScript programming topics:

- JavaScript Function and Function Expressions
- JavaScript Array length
- JavaScript Array splice()

### Java script Code:

#### *Empty Array by Substituting New Array*

```
// program to empty an array

function emptyArray(arr) {
```



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```
// substituting new array
arr = [];

return arr;
}

const array = [1, 2 ,3];
console.log(array);

// call the function
const result = emptyArray(array);
console.log(result);
```

### Output

```
[1,2,3]
[]
```

In the above program, the value of `array` is substituted by a new empty array.

### Conclusion:

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### **Experiment No. 7**

**Title:** Write a JavaScript program to illustrate different Set operations like-

- a. Union
- b. Intersection
- c. Difference
- d. Set Subset

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### Experiment No. 7

### Illustrate Different Set Operations.

**Title:** illustrate Different Set Operations

**Aim:** Write a JavaScript program to illustrate different Set operations like-

- a. Union
- b. Intersection
- c. Difference
- d. Set Subset

**Theory:**

In this example, you will learn to write a JavaScript program that will illustrate different set operations.

To understand this example, you should have the knowledge of the following JavaScript programming topics:

- JavaScript Set and WeakSet
- JavaScript for... of Loop
- JavaScript Function and Function Expressions

#### a. Union

**Java script Code:**

#### *Set Union Operation*

```
// perform union operation
// contain elements of both sets
function union(a, b) {
  let unionSet = new Set(a);
  for (let i of b) {
    unionSet.add(i);
  }
}
```



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```
return unionSet
}

// two sets of fruits

const setA = new Set(['apple', 'mango', 'orange']);
const setB = new Set(['grapes', 'apple', 'banana']);
const result = union(setA, setB);
console.log(result);
```

## Output

```
Set {"apple", "mango", "orange", "grapes", "banana"}
```

The set union operation combines elements of both sets into one.

A new set `unionSet` is created using `new Set()`. The `unionSet` variable contains all the values of `setA`. Then, the `for...of` loop is used to iterate through all the elements of `setB` and add them to `unionSet` using the `add()` method.

The set does not contain duplicate values. Hence, if the set contains the same value, the latter value is discarded.

## b. Intersection

### Java script Code:

#### Set Intersection Operation

```
// perform intersection operation
// elements of set a that are also in set b
function intersection(setA, setB) {
  let intersectionSet = new Set();

  for (let i of setB) {
    if (setA.has(i)) {
```



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```
        intersectionSet.add(i);
    }
}
return intersectionSet;
}

// two sets of fruits
const setA = new Set(['apple', 'mango', 'orange']);
const setB = new Set(['grapes', 'apple', 'banana']);

const result = intersection(setA, setB);

console.log(result);
```

## Output

```
Set {"apple"}
```

The set intersection operation represents elements that are present in both `setA` and `setB`.

A new set `intersectionSet` is created using `new Set()`. Then, the `for...of` loop is used to iterate through the `setB`. For every element that is present in both `setA` and `setB`, they are added to the intersection set.

### c. Set Difference

#### Java script Code:

#### Set Difference Operation

```
// perform difference operation
// elements of set a that are not in set b
function difference(setA, setB) {
    let differenceSet = new Set(setA)
    for (let i of setB) {
        differenceSet.delete(i)
    }
}
```



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```
}  
  return differenceSet  
}  
  
// two sets of fruits  
const setA = new Set(['apple', 'mango', 'orange']);  
const setB = new Set(['grapes', 'apple', 'banana']);  
  
const result = difference(setA, setB);  
  
console.log(result);
```

## Output

```
Set {"mango", "orange"}
```

The set difference operation represents elements that are present in one set and not in another set.

The `differenceSet` contains all the elements of `setA`. Then, the `for...of` loop is used to iterate through all the elements of `setB`. If the element that is present in `setB` is also available in `setA`, that element is deleted using `delete()` method.

### d. Set Subset

#### Java script Code:

#### *Set Subset Operation*

```
// perform subset operation  
  
// true if all elements of set b is in set a  
  
function subset(setA, setB) {
```





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```
for (let i of setB) { if
    (!setA.has(i)) {
        return false
    }
}
return true
}

// two sets of fruits

const setA = new Set(['apple', 'mango', 'orange']); const
setB = new Set(['apple', 'orange']);

const result = subset(setA, setB);

console.log(result);
```

### Output

true

The set subset operation returns true if all the elements of `setB` are in `setA`.

The `for...of` loop is used to loop through the elements of `setB`. If any element that is present in `setB` is not present in `setA`, `false` is returned.

### Conclusion:

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### **Experiment No. 8**

**Title:** Write a JavaScript program to create a Home page of any website and change background color using

- i. On mouse over event
- ii. On focus event

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### Experiment No. 8

### Create Home Page of Any Website.

**Title:** Create Home page of Any Website

**Aim:** Write a JavaScript program to create a Home page of any website and change background color using

- i. On mouse over event
- ii. On focus event

#### **Theory:**

In this practical, we will learn how to change background color in javascript. The background color of our website describes the overall theme of our website. Depending upon background color, we choose different color palettes for buttons, inputs, and other elements. We must have seen websites where they give you the option to choose between light and dark themes. As soon as you pick a theme, the background color of the website, as well as background color of other elements gets changed.

- We have use two event for changing the background color.

#### **1. On mouse over event**

#### **2. On focus event**

#### **1. On mouse over event**

The onmouseover event occurs when the mouse pointer is moved onto an element, or onto one of its children.

This event is often used together with the onmouseout event, which occurs when a user moves the mouse pointer out of an element.

#### **Syntax**

##### **1. In HTML:**

`<element onmouseover="myScript">`

##### **2. In JavaScript:**

`object.onmouseover = function(){myScript};`

#### **2. On focus event**

The onfocus event occurs when an element gets focus.

The onfocus event is most often used with `<input>`, `<select>`, and `<a>`.

#### **Syntax**

##### **1. In HTML:**



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`<element onfocus="myScript">`

2. In JavaScript:

`object.onfocus = function(){myScript};`

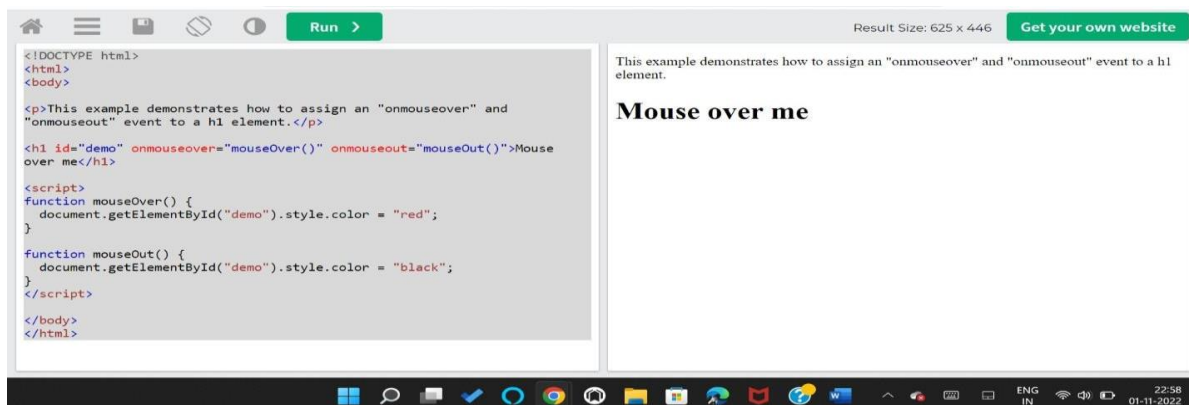
## JAVASCRIPT CODE:

### Code for mouseover event:

```
<!DOCTYPE html>
<html>
<body>
<p>This example demonstrates how to assign an "onmouseover" and "onmouseout"
event to a h1 element.</p>
<h1 id="demo" onmouseover="mouseOver()" onmouseout="mouseOut()">Mouse
over me</h1>
<script>
function mouseOver() {
document.getElementById("demo").style.color = "red";
}
function mouseOut() {
document.getElementById("demo").style.color = "black";
}
</script>
</body>

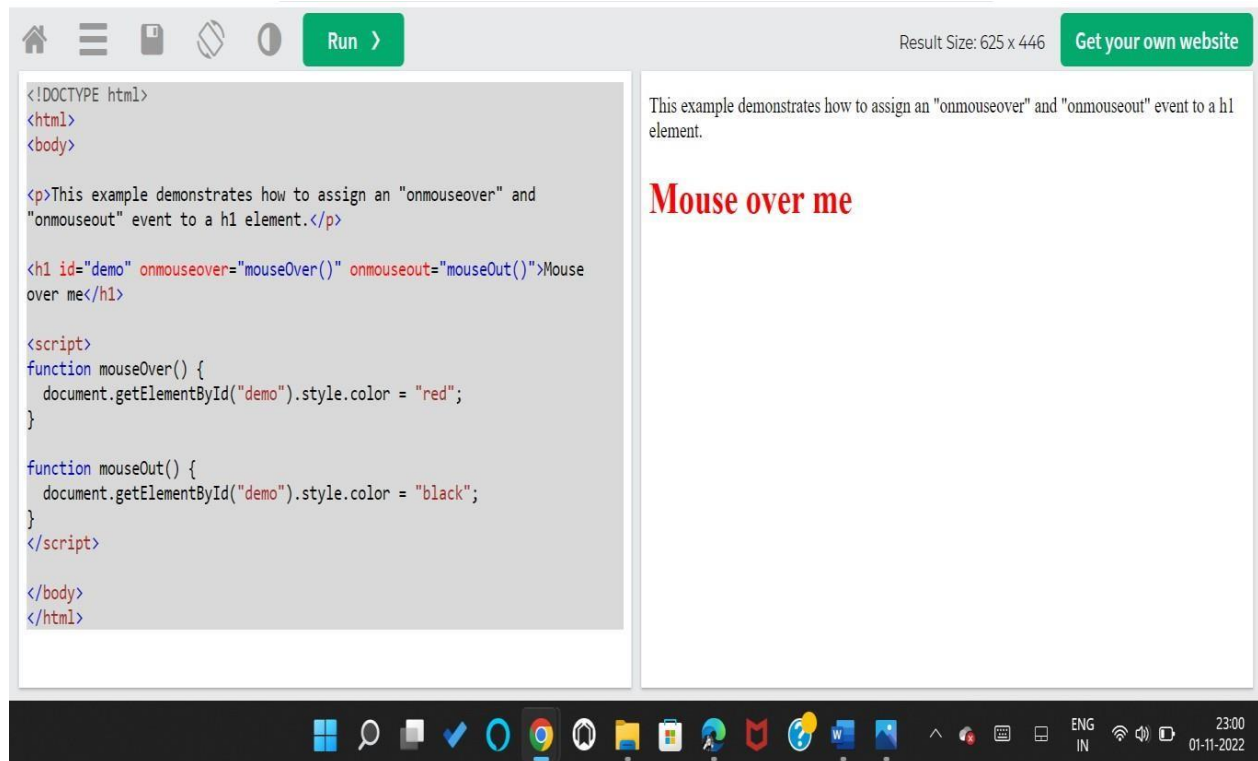
</html>
```

### OUTPUT OF MOUSEOVER:





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### Code for On focus event:

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
Enter your name: <input type="text" onfocus="myFunction(this)">
```

```
<p>When the input field gets focus, a function is triggered which changes the background-color.</p>
```

```
<script>
```

```
function myFunction(x) {  
  x.style.background = "yellow";  
}
```

```
</script>
```

```
</body>
```

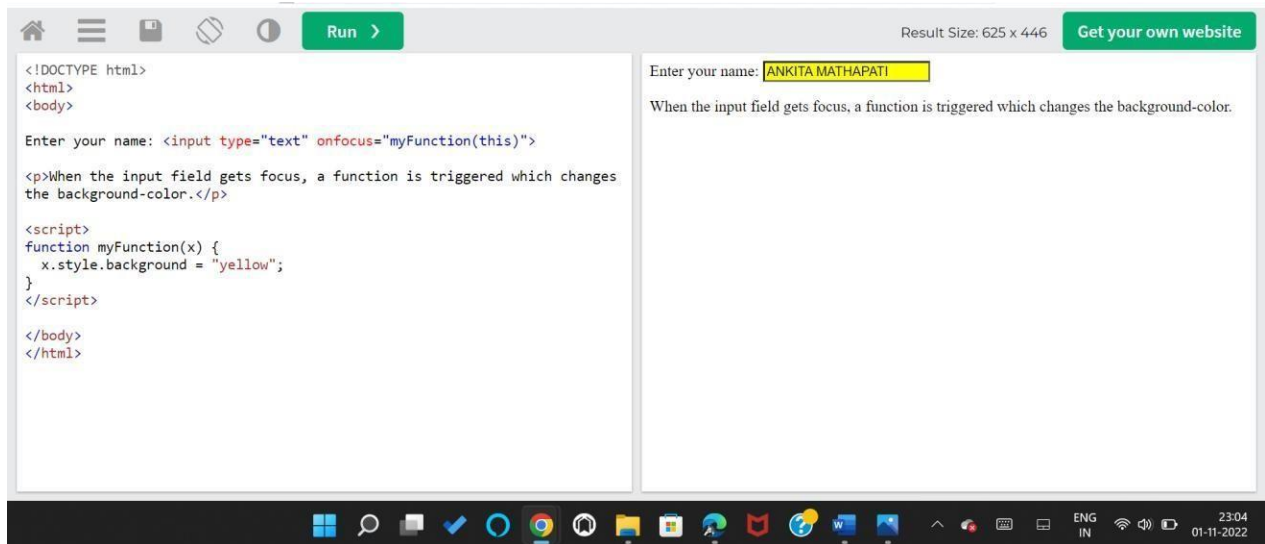
```
</html>
```



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## OUTPUT OF ON FOCUS EVENT:



## Conclusion:

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### **Experiment No. 9**

**Title:** Design and implement a simple calculator using Java script for operations like addition multiplication, subtraction, division, square of a number etc:

- Design a calculator like text field for input and output, buttons for numbers and operations etc.
- Validate input values
- Prompt / Alerts for invalid values etc.

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### Experiment No. 9

### Implement a Simple Calculator.

**Title:** Implement a Simple Calculator .

**Aim:**

Design and implement a simple calculator using Java script for operations like addition multiplication, subtraction, division, square of a number etc:

- Design a calculator like text field for input and output, buttons for numbers and operations etc.
- Validate input values
- Prompt / Alerts for invalid values etc.

**Theory:**

**Event handling in JavaScript :**

1. The **addEventListener()** method is used to attach an event handler to a particular element. It does not override the existing event handlers.
2. Events are said to be an essential part of the JavaScript. A web page responds according to the event that occurred. Events can be user-generated or generated by API's.
3. An event listener is a JavaScript's procedure that waits for the occurrence of an event.
4. The **addEventListener()** method is an inbuilt function of JavaScript
5. We can add multiple event handlers to a particular element without overwriting the existing event handlers.

**Syntax:**

**Element.addEventListener(event, function, useCapture);**

- The **addEventListener()** method attaches an event handler to the specified element.
- The **addEventListener()** method attaches an event handler to an element without overwriting existing event handlers.
- You can add many event handlers to one element.
- You can add many event handlers of the same type to one element, i.e two "click" events.
- You can add event listeners to any DOM object not only HTML elements. i.e the window object.
- The **addEventListener()** method makes it easier to control how the event reacts to bubbling.





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- When using the `addEventListener()` method, the JavaScript is separated from the HTML markup, for better readability and allows you to add event listeners even when you do not control the HTML markup.
- You can easily remove an event listener by using the `removeEventListener()` method.

### JavaScript if else statement:

Since we are using if else statement in our code, we will be discussing if else only. It evaluates the content whether condition is true or false. The syntax of JavaScript if-else statement is given below.

#### Syntax :

```
if(expression){  
  //content to be evaluated if condition is true  
}  
else{  
  //content to be evaluated if condition is false
```

#### JAVASCRIPT CODE

```
<!DOCTYPE html>  
<html lang="en">  
<head>  
  <meta charset="UTF-8">  
  <title>Simple Calculator</title>  
  <style>  
    body {  
      font-family: Arial, sans-serif;  
      background: #f0f0f0;  
      display: flex;  
      justify-content: center;  
      align-items: center;  
      height: 100vh;  
    }  
  
    .calculator {  
      background: #fff;  
      padding: 30px;  
      border-radius: 10px;  
      box-shadow: 0 0 10px rgba(0,0,0,0.2);  
      text-align: center;  
    }  
  
    #display {  
      width: 100%;
```

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```
font-size: 24px;
padding: 10px;
margin-bottom: 20px;
border-radius: 5px;
border: 1px solid #ccc;
}
.buttons {
  display: grid;
  grid-template-columns: repeat(4, 70px);
  gap: 10px;
  justify-content: center;
}
button {
  font-size: 18px;
  padding: 15px;
  border: none;
  border-radius: 8px;
  background: #3498db;
  color: white;
  cursor: pointer;
  transition: 0.3s;
}

button:hover {
  background: #2980b9;
}

.wide {
  grid-column: span 2;
}

.danger {
  background: #e74c3c;
}
.danger:hover {
  background: #c0392b;
}
</style>
</head>
<body>

<div class="calculator">
  <h2>Simple Calculator</h2>
  <input type="text" id="display" readonly />
  <div class="buttons">
    <button onclick="append('7')">7</button>
    <button onclick="append('8')">8</button>
```

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```
<button onclick="append('9')">9</button>
<button onclick="append('/')">/</button>

<button onclick="append('4')">4</button>
<button onclick="append('5')">5</button>
<button onclick="append('6')">6</button>
<button onclick="append('*')">*</button>

<button onclick="append('1')">1</button>
<button onclick="append('2')">2</button>
<button onclick="append('3')">3</button>
<button onclick="append('-')">-</button>

<button onclick="append('0')">0</button>
<button onclick="append('.')">.</button>
<button onclick="calculate()">=</button>
<button onclick="append('+')">+</button>

<button onclick="clearDisplay()" class="danger wide">C</button>
<button onclick="square()">x2</button>
</div>
</div>
<script>
const display = document.getElementById('display');

function append(value) {
  const lastChar = display.value.slice(-1);
  const operators = ['+', '-', '*', '/'];

  // Prevent two operators in a row
  if (operators.includes(lastChar) && operators.includes(value)) {
    alert("Cannot enter two operators consecutively!");
    return;
  }
  display.value += value;
}

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

function square() {
  try {
    const result = eval(display.value);
    if (isNaN(result)) {
      alert("Invalid input for squaring.");
      return;
    }
  }
}
```

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```
}
display.value = result * result;
} catch {
  alert("Invalid expression!");
}
}

function calculate() {
  try {
    if (display.value === "") {
      alert("Please enter a valid expression.");
      return;
    }

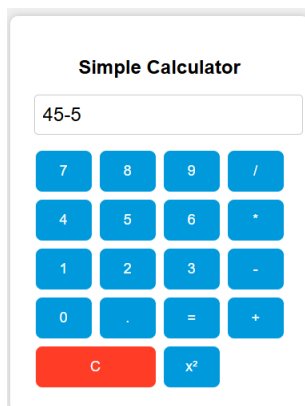
    const result = eval(display.value);

    if (isNaN(result)) {
      alert("Invalid result!");
      return;
    }

    display.value = result;
  } catch {
    alert("Invalid expression!");
  }
}
</script>

</body>
</html>
```

**OUTPUT: -**





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**Simple Calculator**

40

7	8	9	/
4	5	6	*
1	2	3	-
0	.	=	+
C		x <sup>2</sup>	

**Conclusion:**

