Lab Cycle 2

style.css:

body{ background-color: skyblue; text-align: center; font-family: Calibri;}

input{ width: 25%; padding: 10px; margin-top: 5px; margin-bottom: 15px; border: 3px solid gray;

border-radius: 4px; box-sizing: border-box; font-size: 16px;}

input[type="submit"],input[type="reset"], button{ background-color: #4CAF50; color: #fff;

padding: 10px; border: none; border-radius: 4px; box-sizing: border-box; cursor: pointer;

font-size: 16px; margin-top: 10px; margin-bottom: 15px; width: 10%;}

input[type="submit"]:hover, input[type="reset"]:hover, button:hover{ background-color: #45a049;}

div{ margin-top: 50px; margin-bottom: 50px; box-sizing: border-box;}

.output{border:3px solid black; width:max-content; padding-right:20px; padding-left:20px;

box-sizing: border-box;}

span{ font-size: 25px; font-weight:bold;}

img{ width: 45%; border: 3px solid black;}

1a. Write a java script code to find the given year is leap year or not.

Program:

```
<html>
  <head>
    <title>Leap Year Calculator</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <script>
        function isLeapYear(year)
        {       if (year % 4 == 0 && year % 100 != 0 || year % 400 == 0)       return true;
                else      return false;}
        function getYear(){        let year = parseInt(document.getElementById("year").value);
                        let answer = ';
                if(year>0 && year<=9999)
                {       if(isLeapYear(year))       answer = year + " is a Leap Year";
```

```
                else    answer = year + " is not a Leap Year";}

            else    answer = "Invalid Year!";

            document.getElementById("output").innerHTML = answer;

        }

    </script>

</head>

<body>

    <div>

        <h1><u>Leap Year Calculator</u></h1>

        <span>Enter a year:</span>

        <input type="number" id="year"><br>

        <input type="submit" value="SUBMIT" onclick="getYear();"><br>

        <center><div class="output"><h1 id="output"></h1></div></center>

    </div>

</body>

</html>
```

1b. Write a java script code to compute the biggest of three numbers.

Program:

```
<html>

  <head>

    <title>Largest Among Three Numbers</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <script>

        function largestAmongThree(a, b, c){        let max = a;

                if(b > max)     max = b;

                if(c > max)     max = c;

                return max;}

        function getNum(){let n1 = parseFloat(document.getElementById("num1").value);
```

```
let n2 = parseFloat(document.getElementById("num2").value);

let n3 = parseFloat(document.getElementById("num3").value);

let answer = '';

if(Math.floor(n1%1) <= 0 && Math.floor(n2%1) <= 0 && Math.floor(n3%1) <= 0)

answer = "Largest Number Among "+n1+", "+n2+", "+n3+" = "+largestAmongThree(n1,n2,n3);

else      answer = "Invalid Number!";

document.getElementById("output").innerHTML = answer;

        }

    </script>

  </head>

  <body>

    <div>

        <span>Enter number 1:</span>

        <input type="number" id="num1"><br>

        <span>Enter number 2:</span>

        <input type="number" id="num2"><br>

        <span>Enter number 3:</span>

        <input type="number" id="num3"><br>

        <input type="submit" value="SUBMIT" onclick="getNum();">

        <center><div class="output"><h1 id="output"></h1></div></center>

    </div>

  </body>

</html>
```

1c. Write a java script code to perform the arithmetic operations using switch statement.

Program:

```
<html>

  <head>

    <title>Simple Calculator</title>
```

```html
<link rel="stylesheet" type="text/css" href="style.css">
<script>
    function calculate(n1, oper, n2)
    {       switch(oper)
            {       case '+':  return n1 + n2;
                    case '-':  return n1 - n2;
                    case '*': return n1 * n2;
                    case '/': return n1 / n2;
                    case '//': return Math.floor(n1/n2);
                    case '%': return n1 % n2;
                    case '**': return n1 ** n2;
                    default: return "Invalid Operator!";}
    }
    function getData()
    {       let n1 = parseFloat(document.getElementById("num1").value);
            let oper = document.getElementById("oper").value;
            let n2 = parseFloat(document.getElementById("num2").value);
            let answer = ";
            if(Math.floor(n1%1) <= 0 && Math.floor(n2%1) <= 0)
            {       answer = calculate(n1, oper, n2);
                    if(answer != "Invalid Operator!")
                            answer = "The Expression: " + n1 + " " + oper + " " + n2 + " = " + answer;
            }
            else    answer = "Invalid Number!";
            document.getElementById("output").innerHTML = answer;
    }
</script>
</head>
<body>
```

```
<div>

    <h1><u>Simple Calculator</u></h1>

        <span>Enter 1st Operand:</span>

        <input type="number" id="num1"><br>

        <span>Enter Operator:</span>

        <input type="text" id="oper"><br>

        <span>Enter 2nd Operand:</span>

        <input type="number" id="num2"><br>

        <input type="submit" value="SUBMIT" onclick="getData();">

        <center><div class="output"><h1 id="output"></h1></div></center>

    </div>

  </body>

</html>
```

2a. Write a java script code to calculate the sum of the digits of a give number.

Program:

```
<html>

  <head>

        <title>Sum Of Digits of a Number</title>

        <link rel="stylesheet" type="text/css" href="style.css">

        <script>

                function sumOfDigits(number) {

                        let sum = 0;

                        let rem = 0;

                        if(number < 0)     number *= -1;

                        while(number>0) {

                                rem = number % 10;

                                sum += rem;

                                number = Math.floor(number/10); }
```

```
                                    return sum;}

                        function getNum()

                    {           let number = parseInt(document.getElementById("num").value);

                                let answer = '';

                                if(Number.isInteger(number))

                                        answer = "Sum of Digits of " + number + " = " + sumOfDigits(number);

                                else      answer = "Invalid Number!"

                                document.getElementById("output").innerHTML = answer;}

            </script>

    </head>

    <body>

        <div>

            <h1><u>Sum of Digits of a Number</u></h1>

            <span>Enter a number:</span>

            <input type="number" id="num"><br>

            <input type="submit" value="SUBMIT" onclick="getNum();">

            <center><div class="output"><h1 id="output"></h1></div></center>

        </div>

    </body>

</html>
```

2b. Write a java script code to reverse a given number.

Program:

```
<html>

    <head>

        <title>Reverse of a Number</title>

        <link rel="stylesheet" type="text/css" href="style.css">

        <script>

            function reverseNum(number)
```

```
{       let rev = '';

        let rem = 0;

        if(number < 0)     number *= -1;

        while(number>0) {

                rem = number%10;

                rev += rem;

                number = Math.floor(number/10);}

        return rev; }

function getNum()

{       let number = parseInt(document.getElementById("num").value);

        let answer = '';

        if(Number.isInteger(number))

                answer = "Reverse of " + number + " = " + reverseNum(number);

        else    answer = "Invalid Number!";

        document.getElementById("output").innerHTML = answer;}
    </script>
  </head>
  <body>
    <div>
        <h1><u>Reverse of a Number</u></h1>
        <span>Enter a number:</span>
        <input type="number" id="num"><br>
        <input type="submit" value="SUBIMT" onclick="getNum();">
        <center><div class="output"><h1 id="output"></h1></div></center>
    </div>
  </body>
</html>
```

2c. Write a java script code to print the first 10 natural numbers except 5.

Program:

```html
<html>
  <head>
    <title>1 to 10 Numbers Except 5</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <script>
      function printNums()
      {        for(let num=1; num<=10; num++)
          {        if(num === 5)      continue;
                  document.getElementById("output").innerHTML += " " + num;}
      }
    </script>
  </head>
  <body>
    <div>
      <h1><u>1 to 10 Numbers Except 5</u></h1>
      <button onclick="printNums();">Print Numbers</button>
      <center>
        <div class="output"><h1 id="output"></h1></div>
      </center>
    </div>
  </body>
</html>
```

3a. Write functions in java script for GCD, Reversing a Number, Random Numbers.

Program:

```
<html>

  <head>

    <title>GCD, Reverse Number, Random Number</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <script>

        function GCD(a, b) {

                if (b === 0)        return Math.abs(a);

                else      return Math.abs(GCD(b, a%b));}

        function reverseNum(number) {

                let rev = '';

                 let rem = 0;

                if(number < 0)    number *= -1;

                while(number>0){

                        rem = number%10;

                        rev += rem;

                        number = Math.floor(number/10); }

                return rev;}

        function genRandNum(min ,max)

        {       return Math.floor(Math.random()*(max - min) + min);}

        function getGcdNum(){

                let num1 = parseInt(document.getElementById("gcdNum1").value);

                let num2 = parseInt(document.getElementById("gcdNum2").value);

                let answer = '';

                if(Number.isInteger(num1) && Number.isInteger(num2))

                        answer = "GCD of " + num1 + " and " + num2 + " = " + GCD(num1, num2);

                else      answer = "Invalid Number!";
```

```
                document.getElementById("GcdOutput").innerHTML = answer;}
        function getRevNum(){
                let number = parseInt(document.getElementById("revNum").value);
                let answer = '';
                if(Number.isInteger(number))
                        answer = "Reverse of " + number + " = " + reverseNum(number);
                else     answer = "Invalid Number!";
                document.getElementById("ReverseOutput").innerHTML = answer;}
        function getRandRange(){
                let min = parseInt(document.getElementById("min").value);
                let max = parseInt(document.getElementById("max").value);
                let answer = '';
                 if(Number.isInteger(min) && Number.isInteger(min))
                {        if(min < max-1)
                                answer = "A Random Number in the range (" + min + ", " + max + "): " +
                                genRandNum(min, max);
                        else     answer = "min should be less than max!";}
                else     answer = "Invalid Number!";
                document.getElementById("RandomOutput").innerHTML = answer;}
    </script>
</head>
<body>
  <div>
    <span><u>GCD:</u></span><br>
    <span>Enter number 1:</span>
    <input type="number" id="gcdNum1"><br>
    <span>Enter number 2:</span>
    <input type="number" id="gcdNum2"><br>
    <input type="submit" value="SUBMIT" onclick="getGcdNum();"><br>
```

```html
<center><div class="output"><h1 id="GcdOutput"></h1></div></center>

    </div>

    <div>

      <span><u>Reverse Number:</u></span><br>

      <span>Enter the number:</span>

      <input type="number" id="revNum"><br>

      <input type="submit" value="SUBMIT" onclick="getRevNum();"><br>

      <center><div class="output"><h1 id="ReverseOutput"></h1></div></center>

    </div>

    <div>

      <span><u>Random Number:</u></span><br>

      <span>Enter the range(max exclusive):</span><br>

      <input type="number" id="min" placeholder="min">

      <span>to</span>

      <input type="number" id="max" placeholder="max"><br>

      <input type="submit" value="SUBMIT" onclick="getRandRange()">

      <center><div class="output"><h1 id="RandomOutput"></h1></div></center>

    </div>

  </body>

</html>
```

3b. Write Recursive functions in java script for Factorial, Fibonacci, Power.

Program:

```html
<html>

  <head>

    <title>Recursive Functions</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <script>

        function Factorial(number){
```

```
        if(number <= 1)   return 1;

        return number * Factorial(number-1);}

function Fibonacci(number){

        if(number === 1)            return 0;

        if(number === 2 || number === 3)            return 1;

        return Fibonacci(number-1) + Fibonacci(number-2);}

function Power(base, power){

        if(power === 0)   return 1;

        if(power === 1)   return base;

        if(power < 0)       return 1/Power(base, -power);

        if(base<0 && power%2 == 0)        return Power(-base, power);

        if(base<0 && power%2 == 1)        return -Power(-base, power);

        if(power%1 !== 0)        return base ** power

        return base * Power(base, power-1)}

function getFactNum(){

        let num = parseInt(document.getElementById("FactNum").value);

        let answer = '';

        if(Number.isInteger(num)){

                if(num >= 0)      answer = "Factorial of " + num + " = " + Factorial(num);

                else      answer = "Factorial of " + num + " = Undefined";}

        else answer = "Invalid Number!";

        document.getElementById("FactOutput").innerHTML = answer;}

function getFibCount(){

        let count = parseInt(document.getElementById("FibCount").value);

        let answer = '';

        if(Number.isInteger(count)){

                if(count > 0) {

                        if(count > 40)

                        answer = "Stack Overflow!<br>Cannot print " + count + " Fibonacci Numbers";
```

```
                        else{

                                let i;

                                answer = "The First " + count + " Fibonacci Numbers are:<br>";

                                for(i=1; i<count; i++)

                                        answer += Fibonacci(i) + ", ";

                                answer += Fibonacci(i); }

                        }

                        else    answer = "Invalid Count!"; }

                else    answer = "Invalid Number!";

                document.getElementById("FibOutput").innerHTML = answer; }

        function getBaseExp(){

                let base = parseFloat(document.getElementById("BaseNum").value);

                let exp = parseFloat(document.getElementById("ExpNum").value);

                let answer = "The Expression: " + base + " ** " + exp + " = ";

                if(Math.floor(base%1) <= 0 && Math.floor(exp%1) <= 0) {

                        if(base < 0 && exp%1 !== 0)        answer += "Complex Number";

                        else    answer +=  Power(base, exp); }

                else    answer = "Invalid Number!";

                document.getElementById("PowerOutput").innerHTML = answer; }

    </script>

</head>

<body>

    <div>

        <span><u>Factorial:</u><br>

        Enter a number:</span>

        <input type="number" id="FactNum"><br>

        <input type="submit" value="SUBMIT" onclick="getFactNum();"><br>

        <center><div class="output"><h1 id="FactOutput"></h1></div></center>

    </div>
```

13

```html
    <div>

       <span><u>Fibonacci Numbers:</u><br>

       Enter the count:</span>

       <input type="number" id="FibCount"><br>

       <input type="submit" value="SUBMIT" onclick="getFibCount();"><br>

       <center><div class="output"><h1 id="FibOutput"></h1></div></center>

    </div>

    <div>

       <span><u>Power:</u><br>

       Enter the Base:</span>

       <input type="number" id="BaseNum"><br>

       <span>Enter the Power:</span>

       <input type="number" id="ExpNum"><br>

       <input type="submit" value="SUBMIT" onclick="getBaseExp()">

       <center><div class="output"><h1 id="PowerOutput"></h1></div></center>

    </div>

  </body>

</html>
```

3c. Write a java script code for Random image generator.

Program:

```html
<html>

  <head>

    <title>Random Image Generator</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <script>

        let CarImg = new Array(10);

        CarImg[0] = "img1.jpg";

        CarImg[1] = "img2.jpg";
```

```
        CarImg[2] = "img3.jpg";

        CarImg[3] = "img4.jpg";

        CarImg[4] = "img5.jpg";

        CarImg[5] = "img6.jpg";

        CarImg[6] = "img7.jpg";

        CarImg[7] = "img8.jpg";

        CarImg[8] = "img9.jpg";

        function genImg(){

                let number = Math.floor(Math.random()*(CarImg.length - 1));

                document.getElementById("ImgOutput").innerHTML =

                        '<img src="'+CarImg[number]+'" alt="Car Image '+number+'">';}

    </script>

  </head>

  <body>

    <div>

      <h1><u>Random Car Images</u></h1>

      <input type="submit" value="Generate Image" onclick="genImg();">

      <center id="ImgOutput"></center>

    </div>

  </body>

</html>
```

4a. Write a java script code to sort the array element using bubble sort technique.

Program:

```
<html>

  <head>

        <title>Bubble Sort</title>

        <link rel="stylesheet" type="text/css" href="style.css">

        <script>
```

```
let arr = new Array(3,2,1,5,4,6,8,9,7);
function bubbleSort(arr){
        for(var i=0; i<arr.length; i++){
                let flag = false;
                for(var j=0; j<arr.length-i-1; j++){
                        if(arr[j]>arr[j+1]) {
                                [arr[j], arr[j+1]] = [arr[j+1], arr[j]];
                                flag = true; }
                }
                if(flag === false)  break;
        }
        document.getElementById("SortedArrayOutput").innerHTML =
                "Elements After Sorting:<br>["+arr+"]<br>";}
function getArray(){
        document.getElementById("UnsortedArrayOutput").innerHTML =
                "Elements Before Sorting:<br>["+arr+"]<br>";}
</script>
<style>h1 { margin-top: 50px; }</style>
</head>
<body>
  <h1><u>Bubble Sort</u></h1>
  <input type="submit" value="Show Elements" onclick="getArray();"><br>
  <span id="UnsortedArrayOutput"></span><br>
  <input type="submit" value="Sort Elements" onclick="bubbleSort(arr);"><br>
  <span id="SortedArrayOutput"></span><br>
</body>
</html>
```

4b. Write a java script code to search an element in the given set of elements using binary search technique.

Program:

```html
<html>

  <head>

    <title>Binary Search</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <script>

        let arr = new Array(1,2,3,4,5,6,7,8,9);

        function binarySearch(arr, ele)

        {       let low = 0;

                let high = arr.length - 1;

                let mid;

                while(low <= high)

                {       mid = Math.floor((low+high)/2);

                        if(ele === arr[mid])          return true;

                        else if(ele < arr[mid])              high = mid - 1;

                        else     low = mid + 1;}

                return false;}

        function getArray()

        {       document.getElementById("ArrayOutput").innerHTML =

                        "The Sorted Elements are:<br>["+arr+"]<br>";}

        function getElement()

        {       let ele = parseInt(document.getElementById("element").value);

                if(binarySearch(arr, ele))

                        document.getElementById("ElementOutput").innerHTML = "Element Found!";

                else     document.getElementById("ElementOutput").innerHTML = "Element Not Found!";}

    </script>

        <style>h1 { margin-top: 50px; }</style>
```

```
    </head>

    <body>

        <h1><u>Binary Search</u></h1>

        <input type="submit" value="Show Elements" onclick="getArray();"><br>

        <span id="ArrayOutput"></span><br>

        <span>Enter the element to search:</span>

        <input type="number" id="element"><br>

        <input type="submit" value="Search Element" onclick="getElement();"><br>

        <span id="ElementOutput"></span><br>

    </body>

</html>
```

4c. Write a java script code to perform:

i)   addition of two matrices.
ii)   multiplication of two matrices.

Program:

```
<html>

    <head>

        <title>Matrix Addition and Multiplication</title>

        <link rel="stylesheet" type="text/css" href="style.css">

        <script>

            const mat1 = [[1,2,3],[4,5,6],[7,8,9]];

            const mat2 = [[10,11,12],[13,14,15],[16,17,18]]

            function showMatrices(){ let output1 = print(mat1);

                    let output2 = print(mat2);

                    document.getElementById("Matrix1").innerHTML = output1;

                    document.getElementById("Matrix2").innerHTML = output2;}

            function print(mat)

            {       let output = "";

                    for (let i=0; i<mat.length; i++)
```

```
{           output += "<tr>";

                    for (let j=0; j<mat[i].length; j++)

                            output += "<td>"+mat[i][j]+"</td>";

                    output += "</tr>";}

            return output;}

    function add()

    {           let mat3 = [];

            for(let i=0; i<mat1.length; i++)

            {           let temp = []

                    for(let  j =0; j < mat1[i].length; j++)

                            temp.push(mat1[i][j]+mat2[i][j]);

                    mat3.push(temp);}

            let output = print(mat3);

            document.getElementById("AdditionOutput").innerHTML = output;}

    function multiply()

    {           let mat3 = [];

            for (let i=0; i<mat1.length; i++)

            {           let temp = [];

                    for (let j=0; j<mat1[i].length; j++)

                    {           let res = 0;

                            for (let k = 0; k < mat2.length; ++k)

                                    res += mat1[i][j] * mat2[j][i]

                            temp.push(res)

                    }

                    mat3.push(temp)

            }

            let output = print(mat3);

            document.getElementById("MultiplicationOutput").innerHTML = output;}

</script>
```

```html
    <style>
      .Matrix{    border: 3px solid black;

                  padding: 10px;

                  width: max-content;}
      button, div, table{  margin-top: 10px; margin-bottom: 10px;}
      td{          text-align: center;

                  width: 35px; height: 35px;}
    </style>
  </head>
  <body>
    <center>
      <button onclick="showMatrices();">Show Matrices</button><br>
      <span>Matrix 1:</span>
      <table class="Matrix" id="Matrix1"></table>
      <span>Matrix 2:</span>
      <table class="Matrix" id="Matrix2"></table>
      <h1><u>Addition</u></h1><br>
      <button onclick="add();">ADD</button><br>
      <span>Matrix 1 + Matrix 2:</span>
      <table class="Matrix" id="AdditionOutput"></table>
      <h1><u>Multiplication</u></h1><br>
      <button onclick="multiply();">MULTIPLY</button><br>
      <span>Matrix 1 * Matrix 2:</span>
      <table class="Matrix" id="MultiplicationOutput"></table>
    </center>
  </body>
</html>
```

5a. Write a java script code to implement string operations using String object.

Program:

```
<html>
  <head>
    <title>String Object</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <style>
        div{       border: 3px solid black; width: max-content; padding: 25px; text-align: left;}
        </style>
  </head>
  <body>
        <center><div>
                <h1><center><u>String Object</u></center></h1>
                <span id="StringOutput"></span>
          </div></center>
  <script>
        let Output = document.getElementById("StringOutput");
        let str = new String("Hello, My Name is Tayyab.");
        Output.innerHTML = "<u>Original String:</u> " + str + "<br><u>String Operations:<u><br>";
        Output.innerHTML += "1. String Length: " + str.length + "<br>";
        Output.innerHTML += "2. Character at index 18: " + str.charAt(18) + "<br>";
        Output.innerHTML += "3. Substring from index 0 to 4: " + str.substring(0, 5) + "<br>";
        let newStr = str.concat(" Welcome to JavaScript!");
        Output.innerHTML += "4. Concatenated string: " + newStr + "<br>";
        Output.innerHTML += "5. Uppercase: " + str.toUpperCase() + "<br>";
        Output.innerHTML += "6. Lowercase: " + str.toLowerCase() + "<br>";
        Output.innerHTML += "7. Starts with 'Hello': " + str.startsWith("Hello") + "<br>";
        Output.innerHTML += "8. Ends with 'Tayyab.': " + str.endsWith("Tayyab.") + "<br>";
```

```
Output.innerHTML += "9. Index of 'Tayyab': " + str.indexOf("Tayyab") + "<br>";

let replacedStr = str.replace("Hello", "Hi");

Output.innerHTML += "10. Replaced string: " + replacedStr + "<br>";

let splitStr = str.split(",");

Output.innerHTML += "11. Split string: " + splitStr + "<br>";
    </script>
    </body>
</html>
```

5b. Write a java script code to implement mathematical operations using Math object.

Program:

```
<html>
  <head>
    <title>Math Object</title>
        <link rel="stylesheet" type="text/css" href="style.css">
        <style>
        div{      border: 3px solid black; width: max-content; padding: 25px; text-align: left;}
        </style>
  </head>
  <body>
        <center><div>
                <h1><center><u>Math Object</u></center></h1>
                <span id="MathOutput"></span>
          </div><center>
  <script>
        let Output = document.getElementById("MathOutput");
        Output.innerHTML = "<u>Math Properties:</u><br>";
        Output.innerHTML += "1. Pi Value: " + Math.PI + "<br>";
        Output.innerHTML += "2. Eulers Number(E): " + Math.E + "<br>";
```

```
Output.innerHTML += "3. Natural Logarithm of 2: " + Math.LN2 + "<br>";

Output.innerHTML += "4. Natural Logarithm of 10: " + Math.LN10 + "<br>";

Output.innerHTML += "5. Base 2 Logarithm of e: " + Math.LOG2E + "<br>";

Output.innerHTML += "6. Base 10 Logarithm of e: " + Math.LOG10E + "<br><br>";

Output.innerHTML += "<u>Math Methods:</u><br>";

Output.innerHTML += "1. Round off value of 3.454: " + Math.round(3.454) + "<br>";

Output.innerHTML += "2. Ceil of 4.3: " + Math.ceil(4.3) + "<br>";

Output.innerHTML += "3. Floor of 4.3: " + Math.floor(4.3) + "<br>";

Output.innerHTML += "4. Absolute value of -3.24: " + Math.abs(-3.24) + "<br>";

Output.innerHTML += "5. Maximum of (8,12,23): " + Math.max(8,12,23) + "<br>";

Output.innerHTML += "6. Minimum of (8,12,23): " + Math.min(8,12,23) + "<br>";

Output.innerHTML += "7. 2 to the power 3: " + Math.pow(2, 3) + "<br>";

Output.innerHTML += "8. Square root of 16: " + Math.sqrt(16) + "<br>";

Output.innerHTML += "9. Sine of 30 degrees: " + Math.sin(Math.PI / 6) + "<br>";

Output.innerHTML += "10. Cosine of 60 degrees: " + Math.cos(Math.PI / 3) + "<br>";

Output.innerHTML += "11. Tangent of 45 degrees: " + Math.tan(Math.PI / 4) + "<br>";

Output.innerHTML += "12. Random number between 0 and 1: " + Math.random() + "<br>";

Output.innerHTML += "13. Random integer from 1 and 10: " + Math.floor(Math.random()*10 + 1);

    </script>

    </body>

</html>
```

5c. Write a java script code to display greeting messages using Date object.

Program:

```
<html>

  <head>

    <title>Greeting Message</title>

    <link rel="stylesheet" type="text/css" href="style.css">

    <style>       h1 { margin-top: 50px; }
```

```
        div {       border: 3px solid black; width: max-content; padding: 5px; font-size: 30px; text-align: center;

                    margin-top: 50px;}

        #greeting{          font-weight: bold; padding: 30px;}

        </style>

    </head>

    <body>

        <center>

          <h1><u>Greeting Message</u></h1>

          <div id="time"></div>

          <div id="greeting"></div>

        </center>

        <script>

                let timeELement = document.getElementById("time");

                let greetingElement = document.getElementById("greeting");

                let currentDate = new Date();

                let currentHours = currentDate.getHours();

                let currentMinutes = currentDate.getMinutes();

                let greetingMessage = "Good Night!";

                if(currentHours < 22)      greetingMessage = "Good Evening!";

                if(currentHours < 16)      greetingMessage = "Good Afternoon!";

                if(currentHours < 12)      greetingMessage = "Good Morning!";

                let formattedHours = currentHours.toString().padStart(2, '0');

                let formattedMinutes = currentMinutes.toString().padStart(2, '0');

                let timeMessage = "Time: " + formattedHours + ":" + formattedMinutes;

                timeELement.innerHTML = timeMessage;

                greetingElement.innerHTML = greetingMessage;

        </script>

    </body>

</html>
```

6a. Write a java script code to demonstate Form events.

Program:

```html
<html>
  <head>
    <title>Form Events</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <style>
        h1 { margin-top: 50px; }
        div{      text-align: left; width: max-content; border: 3px solid black; padding: 10px;}
        .color-sample{    display: inline-block; width: 30px; height: 30px; border-radius: 100%;
                          margin-right: 10px;}
          .yellow { background-color: yellow; }
          .orange { background-color: orange; }
    </style>
  </head>
  <body>
    <h1><u>Student Details</u></h1>
    <form action="post" autocomplete="off">
      <span>Enter your Name:</span>
      <input type="text" id="Name">
      <span>Enter your Regd. no:</span>
      <input type="text" id="Regdno">
      <span>Enter your Section:</span>
      <input type="text" id="Section">
    </form>
    <center>
      <div>
        <span class="color-sample yellow"></span>
```

```
            <span>Focus given</span><br>

            <span class="color-sample orange"></span>

            <span>Focus removed</span><br>

        </div>

    </center>

    <script>

        function NameChange(){  window.alert("Name is changed.")}

        function NameFocus(){     Name.style.background = "yellow";}

        function NameBlur(){      Name.style.background = "orange";}

        function RegdnoFocus(){  Regdno.style.background = "yellow"; }

        function RegdnoBlur(){    Regdno.style.background = "orange"; }

        function SectionFocus(){  Section.style.background = "yellow"; }

        function SectionBlur(){    Section.style.background = "orange"; }

        Name = document.getElementById("Name");

        Regdno = document.getElementById("Regdno");

        Section = document.getElementById("Section");

        Name.addEventListener('change', NameChange);

        Name.addEventListener('focus', NameFocus);

        Name.addEventListener('blur', NameBlur);

        Regdno.addEventListener('focus', RegdnoFocus);

        Regdno.addEventListener('blur', RegdnoBlur);

        Section.addEventListener('focus', SectionFocus);

        Section.addEventListener('blur', SectionBlur);

    </script>

  </body>

</html>
```

6b. Write a java script code to demonstate Mouse events.

Program:

```
<html>
  <head>
    <title>Mouse Events</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <style>
        h1 { margin-top: 50px; }
        div{     border: 3px solid black; width: max-content; padding: 25px; text-align: left; }
        #emoji{   border: 0px; width: 40px; height: 32px; }
    </style>
  </head>
  <body>
    <h1><u>Mouse Events</u></h1>
    <center>
      <div>
        <h2><u>1. OnClick: </u></h2>
        <button id="OnClickButton">Click</button><br>
        <span id="OnClickText"></span>
        <h2><u>2. OnMouseDown and OnMouseUp: </u></h2>
        <span id="OnMouseDownText">Click on this text.</span>
        <h2><u>3. OnMouseEnter and OnMouseLeave: </u></h2>
        <img id="emoji" src="smiley emoji.png" alt="smiley emoji">
        <h2><u>4. OnMouseOver and OnMouseOut: </u></h2>
        <span id="MouseOverText">Move the cursor Over this text.</span>
      </div>
    </center>
    <script>
```

```
function Click()

{document.getElementById("OnClickText").innerHTML = "You Clicked the Button!" }

function MouseDown()

{OnMouseDownText.style.color = 'red'; }

function MouseUp()

{OnMouseDownText.style.color = 'black'; }

function MouseEnter()

{        image.style.width = '80px';

         image.style.height = '64px';}

function MouseLeave()

{        image.style.width = '40px';

         image.style.height = '32px';

}

function MouseOver(){MouseOverText.style.color = 'red';}

function MouseOut(){MouseOverText.style.color = 'black'; }

let OnClickButton = document.getElementById('OnClickButton');

OnClickButton.addEventListener('click', Click);

let OnMouseDownText = document.getElementById("OnMouseDownText");

OnMouseDownText.addEventListener('mousedown', MouseDown);

OnMouseDownText.addEventListener('mouseup', MouseUp);

let image = document.getElementById("emoji");

image.addEventListener('mouseenter', MouseEnter);

image.addEventListener('mouseleave', MouseLeave)

let MouseOverText = document.getElementById("MouseOverText");

MouseOverText.addEventListener('mouseover',MouseOver);

MouseOverText.addEventListener('mouseout',MouseOut);

    </script>

  </body>

</html>
```

6c. Write a java script code to demonstate Event Bubbling.

Program:

```
<html>
  <head>
    <title>Event Bubbling</title>
    <link rel="stylesheet" type="text/css" href="style.css">
  </head>
  <body>
    <div id="parent">
      <button id="child">
        Child Button
      </button><br>
      <span id="output1"></span><br>
      <span id="output2"></span><br>
    </div>
    <script>
        let parent = document.getElementById('parent')
        let child = document.getElementById('child')
        let output1 = document.getElementById('output1')
        let output2 = document.getElementById('output2')
        parent.addEventListener('click',function(){output1.innerHTML = "Parent is Invoked.";})
        child.addEventListener('click',function(){output2.innerHTML = "Child is Invoked.";})
    </script>
  </body>
</html>
```