

Lab Cycle 2

Style:

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

input
{
    width: 25%;
    padding: 10px;
    padding-right: 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-left: 10px;  
  
    padding-right: 10px;  
  
    border: none;  
  
    border-radius: 4px;  
  
    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;
}

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

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>

        <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>

<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>

        <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>

        <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>

        <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>
```

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

Program:

```
<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>
    <input type="submit" value="Print Numbers" onclick="printNums();">
  <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(max))
    {
        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>


  <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>

<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>

<u>Factorial:</u>

Enter a number:

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

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

<center>

<div class="output">

<h1 id="FactOutput"></h1>

</div>

</center>

</div>

<div>

<u>Fibonacci Numbers:</u>

Enter the count:

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

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

<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>

<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 = '';

    }

</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>

</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>

  <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>

</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>
```