**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>**

**<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>**

**<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>**

**<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>**

**<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>**

**<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>**

**<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>**

**<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:**

1. **addition of two matrices.**
2. **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>**

**<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>**

**<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>**