Lab Cycle 2

Style:

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>

<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="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>

<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(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>

</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>

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">

<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> <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>

</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>

<button onclick="add();">ADD</button><br>

<span>Matrix 1 + Matrix 2:</span>

<table class="Matrix" id="AdditionOutput"></table>

<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:

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

Program:

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

Program: