Assignment 6

Question 1

Printing an array into Zigzag fashion. Suppose you were given an array of integers, and you are told to sort the integers in a zigzag pattern. In general, in a zigzag pattern, the first integer is less than the second integer, which is greater than the third integer, which is less than the fourth integer, and so on. Hence, the converted array should be in the form of $e1 < e2 > e3 < e4 > e5 < e6$.

Test cases:

```
Input 1:
    7
    4 3 7 8 6 2 1
Output 1:
    3 7 4 8 2 6 1
Input 2:
    4
    1 4 3 2
Output 2:
    1 4 2 3
```

Code

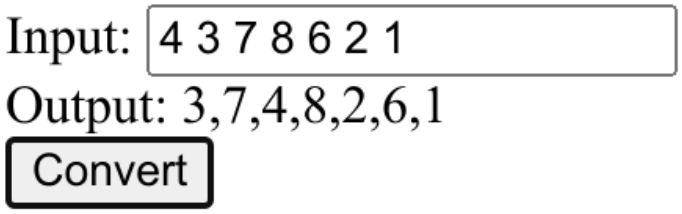
```
<!DOCTYPE html>
<html lang="en">

<head>
    <title>1</title>
    <script>
        function zigZag(arr) {
            flag = true;
            for (let i = 0; i <= arr.length - 2; i++) {
                if ((flag && arr[i] > arr[i + 1]) ||
                    (!flag && arr[i] < arr[i + 1])) {
                    temp = arr[i];
                    arr[i] = arr[i + 1];
                    arr[i + 1] = temp;
                }
                flag = !flag;
            }
        }
        function main() {
            arr = document.getElementById('inp').value.split(' ').map(x => Number(x));
            zigZag(arr);
            document.getElementById('output').innerHTML = arr.toString()
        }
    </script>
</head>

<body>
    Input: <input type="text" id="inp" placeholder="Enter space separated array"> <br>
    Output: <label id="output"></label> <br>
    <input type="button" onclick="main()" value="Convert">
</body>

</html>
```

Output



Question 2

The problem to rearrange positive and negative numbers in an array . Method: This approach moves all negative numbers to the beginning and positive numbers to the end but changes the order of appearance of the elements of the array. Steps:

1. Declare an array and input the array elements.
2. Start traversing the array and if the current element is negative, swap the current element with the first positive element and continue traversing until all the elements have been encountered.
3. Print the rearranged array.

Test case:

```
Input: 1 -1 2 -2 3 -3
Output: -1 -2 -3 1 3 2
```

Code

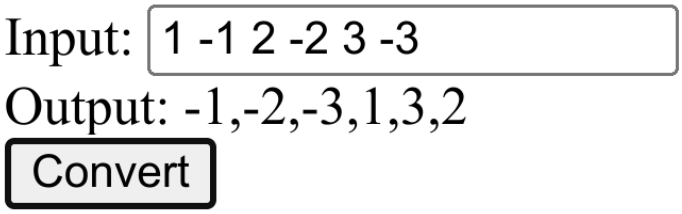
```
<!DOCTYPE html>
<html lang="en">

<head>
    <title>2</title>
    <script>
        function main() {
            var arr = document.getElementById('input').value.split(" ").map(x =>
    ↪ parseInt(x));
            let ptr = 0;
            for (let i = 0; i < arr.length; i++) {
                if (arr[i] < 0) {
                    var temp = arr[i];
                    arr[i] = arr[ptr];
                    arr[ptr] = temp;
                    ptr++;
                }
            }
            document.getElementById('output').innerHTML = arr.toString()
        }
    </script>
</head>

<body>
    Input: <input type="text" id="input" placeholder="Enter space separated array..."><
    ↪ br>
    Output: <label id="output"></label> <br>
    <input type="button" onclick="main()" value="Convert">
</body>

</html>
```

Output



Question 3

Q3: Program to find all the patterns of `0(1+)0` in the given string. Given a string containing 0's and 1's, find the total number of `0(1+)0` patterns in the string and output it. `0(1+)0` - There should be at least one '1' between the two 0's. For example, consider the following string.

```
Input: 01101111010
Output: 3
```

Explanation:

```
01101111010 - count = 1
01101111010 - count = 2
01101111010 - count = 3
```

Step to find all the patterns of `0(1+)0` in the given string

- Input the given string.
- Scan the string, character by character.
- If the given pattern is encountered, increment count.
- Print count.

Program to find all the patterns of `0(1+)0`W

Code

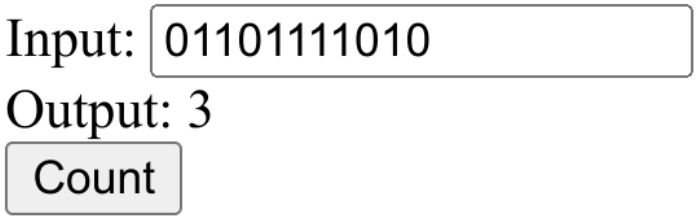
```
<!DOCTYPE html>
<html lang="en">

<head>
    <title>3</title>
    <script>
        function main() {
            n = document.getElementById('input').value
            flag = false;
            count = 0;
            for (i = 0; i < n.length; i++) {
                if (!flag && n[i] == '0') flag = true;
                else if (flag && n[i] == '0' && n[i - 1] == '1') count++;
            }
            document.getElementById('output').innerHTML = count;
        }
    </script>
</head>

<body>
    Input: <input type="text" id="input" placeholder="Enter binary string here"> <br>
    Output: <label id="output"></label> <br>
    <input type="button" value="Count" onclick="main()">
</body>

</html>
```

Output



Question 4

Write a Java script program to o find all pairs of elements in an Array whose sum is equal to a given number.

```
Array numbers= [4, 6, 5, -10, 8, 5, 20], target=10
Output :
Pairs of elements whose sum is 10 are:
4 + 6 = 10
5 + 5 = 10
-10 + 20 = 10
```

Code

```
<!DOCTYPE html>
<html lang="en">

<head>
    <title>4</title>
    <script>
        function main() {
            var arr = document.getElementById('inp').value.split(" ").map(x => parseInt
    ↪ (x));
            var target = Number(document.getElementById('target').value);
            map = {}
            arr.forEach(x => {
                if (x in map) map[x]++;
                else map[x] = 1;
            });
            ans = ""
            for (var key in map) {
                y = target - key;
                if (y in map) {
                    temp = "(" + key.toString() + "," + y.toString() + ")";
                    ans = ans + temp;
                }
                delete map[key];
            }
            document.getElementById('output').innerHTML = ans;
        }
    </script>
</head>

<body>
    Input: <br>
    Array: <input type="text" id="inp" placeholder="Enter space separated array here">
    ↪ <br>
    Target: <input type="number" id="target" placeholder="Enter target sum here"> <br>
    Output: <label id="output"></label> <br>
    <input type="button" onclick="main()" value="Solve">
</body>

</html>
```

Output

Input:
Array: 4 6 5 -10 8 5 20
Target: 10
Output: (4,6)(5,5)(20,-10)
Solve

Question 5

Given two sorted arrays A and B of size p and q to merge elements of A with B by maintaining the sorted order i.e. fill A with first p smallest elements and fill B with remaining elements. **Example:**

```
Input :
    int[] A = { 1, 5, 6, 7, 8, 10 }
    int[] B = { 2, 4, 9 }
Output:
Sorted Arrays:
    A: [1, 2, 4, 5, 6, 7]
    B: [8, 9, 10]
```

Code

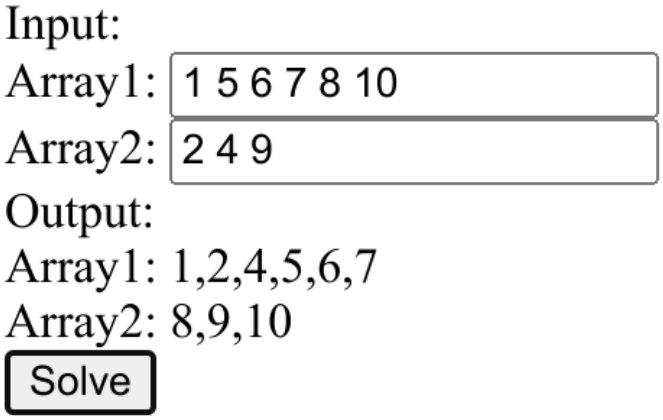
```
<!DOCTYPE html>
<html lang="en">

<head>
    <title>5</title>
    <script>
        function main() {
            var arr1 = document.getElementById("input1").value.split(" ").map(x =>
    ↪ parseInt(x));
            var arr2 = document.getElementById("input2").value.split(" ").map(x =>
    ↪ parseInt(x));
            var arr3 = []
            var i = 0, j = 0;
            while (i < arr1.length && j < arr2.length) {
                if (arr1[i] < arr2[j]) arr3.push(arr1[i++]);
                else arr3.push(arr2[j++]);
            }
            while (i < arr1.length) arr3.push(arr1[i++]);
            while (j < arr2.length) arr3.push(arr2[j++]);
            arr1 = arr3.slice(0, arr1.length);
            arr2 = arr3.slice(arr1.length);
            document.getElementById('arr1').innerHTML = arr1.toString();
            document.getElementById('arr2').innerHTML = arr2.toString();
        }
    </script>
</head>

<body>
    Input: <br />
    Array1: <input type="text" id="input1"> <br />
    Array2: <input type="text" id="input2"> <br />
    Output: <br />
    Array1: <label id="arr1"></label> <br />
    Array2: <label id="arr2"></label> <br />
    <input type="button" onclick="main()" value="Solve">
</body>

</html>
```

Output


Input:
Array1: 1 5 6 7 8 10
Array2: 2 4 9
Output:
Array1: 1,2,4,5,6,7
Array2: 8,9,10
Solve