Zoho Corporation - Incubation

Note: Try to write your own solution before moving to the solution then try to optimize it.
Solution: https://github.com/aashikm015/ZohoIncubation

Day1

1. Write a program to represent a number(positive integer) as the sum of one or more
distinct Fibonacci numbers in such a way that the sum does not include any two
consecutive Fibonacci numbers.

Example:

Input: 64
Output: 55+8+1
"55+5+3+1" is wrong since 5 and 3 are consecutive Fibonacci numbers.

Input: 50
Output: 34+13+3

2 . For the given number of rows, write a program to print the pattern mentioned in the
example without using arrays.

Example:
Input: 5
Output:
1
2 6
3 7 10
4 8 11 13
5 9 12 14 15

Input: 8
Output:
1
2 9
3 10 16
4 11 17 22
5 12 18 23 27
6 13 19 24 28 31
7 14 20 25 29 32 34
8 15 21 26 30 33 35 36

3. Given a String with numbers and operators. Perform the operation on the numbers in
their respective order. Operator precedence need not be considered. The input string will
have the numbers followed by the operators.

Input: "12345 * + - + "
Result: 6 [Explanation: 1 * 2 + 3 - 4 + 5 = 6]

Input: "374291 - - * + -"
Result: -8 [Explanation: 3 - 7 - 4 * 2 + 9 - 1 = -8]

Input: "67542 - / + -"
Result: 2

4 . You are given two sorted integer arrays A and B. The sort order can be ascending or
descending. Write a program to create an array C that contains integers from A and B. C should
be in ascending order and shouldn't have any duplicates.
Note: Removal of duplicates and ordering has to be done while adding elements to C. i.e. don't
write separate loops to sort and remove duplicates.

Examples:
Input: [3, 6, 9], [8, 7, 5]
Output: [3, 5, 6, 7, 8, 9]

Input: [9, 9, 6, 3], [5, 7, 8, 9]
Output: [3, 5, 6, 7, 8, 9]

Input: [9, 6], [5, 17, 21]
Output: [5, 6, 9, 17, 21
]

Day2

Question-1: Chess Board pattern without using any decision making statements.
Input: 4
Output:
1 0 1 0
0 1 0 1
1 0 1 0
0 1 0 1

Question-2:
Input: 4
Output:
10
9 8
7 6 5
4 3 2 1

Question 3: Method1: Suffle in order and Method 2: without changing elements position
Input: ABC
Output:
ABC
BCA
CAB

Question-4: Find Nth Arithmetic Progression (AP) and Geometric Progression without using any decision-making statements.
Input:
2 //start value
6 //end value
3 //n value
0 //choice.. If 0 return AP else if 1 return GP

Output: 10

Input:
2 //start value
8 //end value
6 //n value
1 //choice.. If 0 return AP else if 1 return GP
Output: 32

Day3

Write programs for the following methods.

1. Gauss Jordan method - Search in google and learn from your favorite site
2. Babylonian method - Click here
3. SiameseMethod - Click here

Day4

1 . Pattern printing
Input: 4
Output:
1 2 3 4
8 7 6 5
9 10 11 12
16 15 14 13

Input: 3
Output:
1 2 3
6 5 4
7 8 9

2. Given a two array A and B .Write a program to find union,intersection, subtraction and rotation of arrays.

a=[1,2,3,4,5]
b=[7,8,2,3,1]

A union B = [1,2,3,4,5,7,8]
A intersection B = [1,2,3]
A - B = [4, 5]
B - A = [7, 8]
Rotation:
1 element from A: [5,1,2,3,4]
2 element from A: [4,5,1,2,3]

1 element from A: [1,7,8,2,3]
2 element from A: [3,1,7,8,2]

3. Write a program to count vowels count in a given string.
Input: MADURAI

Output:
A 2
U 1
I 1

Input: ZOHO CORPORATION
Output:
O 5
A 1
I 1

4. Save the string “WELCOMETOZOHOCORPORATION” in a two-dimensional array and search for substring like “too” in the two-dimensional string both from left to right and from top to bottom.

W	E	L	C	O
M	E	T	O	Z
O	H	O	C	O
R	P	O	R	A
T	I	O	N	

Output: Start at <1,2> and end at <3,2>

5. Given a two-dimensional array of string like

<” luke”, “shaw”>
<” Wayne”, “Rooney”>
<” Rooney”, “Ronaldo”>
<” shaw”, “Rooney”>

Where the first string is “child”, the second string is “Father”. And given “Ronaldo” we have to find his no of grandchildren Here “Ronaldo” has 2 grandchildren. So our **output** should be 2.

6. Given an array **arr[]** of distinct integers of size **N** and a value **sum**, the task is to find the count of triplets **(i, j, k)**, having **(i<j<k)** with the sum of **(arr[i] + arr[j] + arr[k])** smaller than the given value sum.

Example 1:

Input: N = 4, sum = 2

arr[] = {-2, 0, 1, 3}

Output: 2

Explanation: Below are triplets with

sum less than 2 (-2, 0, 1) and (-2, 0, 3).

Example 2:

Input: N = 5, sum = 12

arr[] = {5, 1, 3, 4, 7}

Output: 4

Explanation: Below are triplets with

sum less than 12 (1, 3, 4), (1, 3, 5),

(1, 3, 7) and (1, 4, 5).

Expected Time Complexity: $O(N^2)$.

Expected Auxiliary Space: O(1).

Day5

Write a program to Create a 15 puzzle Game.

Game link: https://lorecioni.github.io/fifteen-puzzle-game/

Play a game. Understand the logic and write a program.

Day6

1. Merge two arrays .

Example 1:
a=[1,2,3,4,5]
b=[5,6,3,4]

Merged array c=[1,5,2,6,3,3,4,4,5,0]

Example 2:
a=[1]
b=[10,24,30,42]

c=[1,10,0,24,0,30,0,42]

Example 3:
a=[10,24,30,42]
b=[1]

c=[10,1,24,0,30,0,42,0]

Explanation: merge two array according to index. If the index not found in any array replace with 0.

2. Print Characters

Input: a1b2c3
Output: abbccc

Input a0b5o3
Output: bbbbbooo

Input: d11c12
Output: ddddddddddddccccccccccc

Day7

1. Look and say problem:

Input: 5

Output:

1

1 1

1 2

1 1 2 1

1 2 2 1 1 1

Input: 7

Output

1

1 1

2 1

1 2 1 1

1 1 1 2 2 1

3 1 2 2 1 1

1 3 1 1 2 2 2 1

2. Celebrity problem: refer

*In a party of N people, only one person is known to everyone. Such a person **may be present** in the party, if yes, (s)he doesn't know anyone in*

*the party. We can only ask questions like "**does A know B?** ". Find the stranger (celebrity) in the minimum number of questions.*

We can describe the problem input as an array of numbers/characters representing persons in the party. We also have a hypothetical function *HaveAcquaintance(A, B)* which returns *true* if A knows B, *false* otherwise. How can we solve the problem.

Input:

MATRIX = { {0, 0, 1, 0},

{0, 0, 1, 0},

{0, 0, 0, 0},

{0, 0, 1, 0} }

Output:id = 2

Explanation: The person with ID 2 does not

know anyone but everyone knows him

Input:

MATRIX = { {0, 0, 1, 0},

{0, 0, 1, 0},

{0, 1, 0, 0},

{0, 0, 1, 0} }

Output: No celebrity

Explanation: There is no celebrity.

3. Find how many I forms in matrix:

Example 1:

1 1 1

0 1 0

1 1 1

In the above matrix ,1 formed in pattern capital i pattern.

And there are only 1 I pattern in matrix.

Output: 1

Example 2:

1 1 1 1

0 1 1 0

1 1 1 1

Output: 2

3. Sliding window:

Given an array arr[] of size N and an integer K. Find the maximum for each and every contiguous subarray of size K.

Example 1:

Input:

N = 9, K = 3

arr[] = 1 2 3 1 4 5 2 3 6

Output:

3 3 4 5 5 5 6

Explanation:

1st contiguous subarray = {1 2 3} Max = 3

2nd contiguous subarray = {2 3 1} Max = 3

3rd contiguous subarray = {3 1 4} Max = 4

4th contiguous subarray = {1 4 5} Max = 5

5th contiguous subarray = {4 5 2} Max = 5

6th contiguous subarray = {5 2 3} Max = 5

7th contiguous subarray = {2 3 6} Max = 6

Example 2:

Input:

N = 10, K = 4

arr[] = 8 5 10 7 9 4 15 12 90 13

Output:

10 10 10 15 15 90 90

Explanation:

1st contiguous subarray = {8 5 10 7}, Max = 10

2nd contiguous subarray = {5 10 7 9}, Max = 10

3rd contiguous subarray = {10 7 9 4}, Max = 10

4th contiguous subarray = {7 9 4 15}, Max = 15

5th contiguous subarray = {9 4 15 12},

Max = 15

6th contiguous subarray = {4 15 12 90},

Max = 90

7th contiguous subarray = {15 12 90 13},

Max = 90

Day8

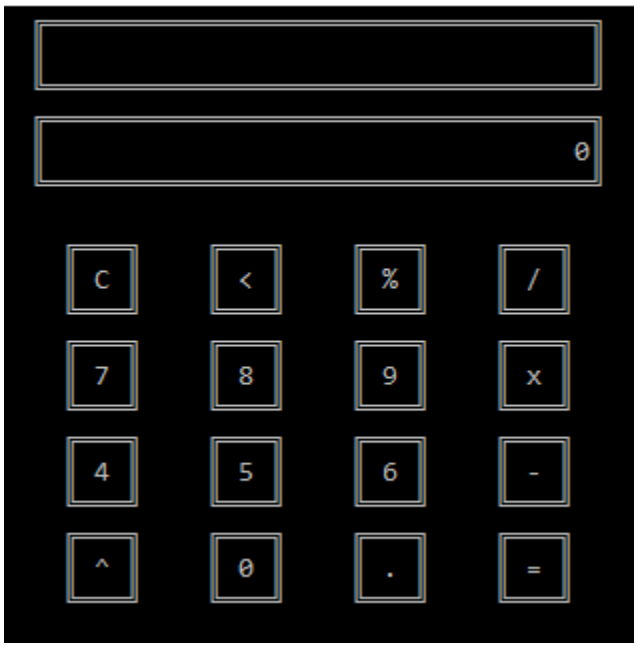
Write a program to Create a Minesweeper Game.

Game link: Click here

Play a game. Understand the logic and write a program.

Day9

Write a program to create a calculator like this.



Day10

Write a program to Create a Tic Tac Toe Game.

Game link: Click here

Play a game. Understand the logic and write a program.

Day11

Final evaluation: (Level 3)

Write a program to create a command-line interpreter.