Questions

20. Number of days in a given month of a given year
21. Convert Roman Numerals to Integers

Problem Description: Given a Roman numeral as input, your task is to find its corresponding integer value and output it. Roman Numerals are represented by combinations of letters from the Latin alphabet.

Example:
Input: XII
Output:12

Input: MIV
Output:1004

Before understanding the Solution let's first analyse Roman numerals. The following Latin alphabets are used to write Roman numerals till 3999→

ALPHABET	VALUE
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

Note: Please look at the following Roman representations
IV is **for** 4
IX is **for** 9
XL is **for** 40
XC is **for** 90
Similarly, Can you guess what CD and CM represents? (Yes! You are right 400 and 900 respectively)

22. Wave Array - You are given an unsorted array of integers(arr) of length n, write a program to sort it in wave form.

Example 1

Input: arr = [5, 2, 9, 3, 2]
Output: [2, 2, 5, 3, 9]
Explanation: In the above example, you can see 2 >= 2 <= 5 >= 3 <= 9. Thus we get, arr = [2, 2, 5, 3, 9] as output which is sorted in wave form.

Example 2

Input: arr = [3, 2, 9, 6, 4, 1]
Output: [2, 1, 4, 3, 9, 6]
Explanation: In the above example, you can see 2 >= 1 <= 4 >= 3 <= 9 >= 6. Thus we get, arr = [2, 1, 4, 3, 9, 6] as output which is sorted in wave form.

Example 3

Input: arr = [4, 2, 9, 1, 21, 43, 24]
Output: [2, 1, 9, 4, 24, 21, 43]
Explanation: In the above example, you can see 2 >= 1 <= 9 >= 4 <= 24 >= 21 <= 43. Thus we get, arr = [2, 1, 9, 4, 24, 21, 43] as output which is sorted in wave form.

23. Set Matrix Zeros

Problem Description: Given a matrix, A of size M x N of 0's and 1's. If an element is 0, set its entire row and column to 0.

For Example:

Input:

[[1, 0, 1],

[1, 1, 1],

[1, 1, 1]]

Output:

[[0, 0, 0],

[1, 0, 1],

[1, 0, 1]]

Input:

[[1, 0, 1],

[1, 1, 1],

[1, 0, 1]]

Output:

[[0, 0, 0],

[1, 0, 1],

[0, 0, 0]]

24. Move all the zeros to the end

   Problem Description: Given an array A[] of n elements filled with several integers, some of them being zeroes, you need to move all the zeros to the end.

   For example :

   Input: A[] = {1, 8, 3, 0, 2, 0, 1, 10, 13, 0}

   Output: {1, 8, 3, 2, 1, 10, 13, 0, 0, 0}

   Input: A[] = {0, 3, 5, 9, 0, 0, 23, 2}

   Output: {3, 5, 9, 23, 2, 0, 0, 0}

25. Given n non-negative integers a1, a2, …, an, where each represents a point at coordinate (i, ai). n vertical lines are drawn such that the two endpoints of line iis at (i, ai) and (i, 0). Find two lines, which together with x-axis forms a container, such that the container contains the most water.

   Problem Note: You may not slant the container and n is at least 2.

   Example:

   Input: [1,8,6,2,5,4,8,3,7]

   Output: 49
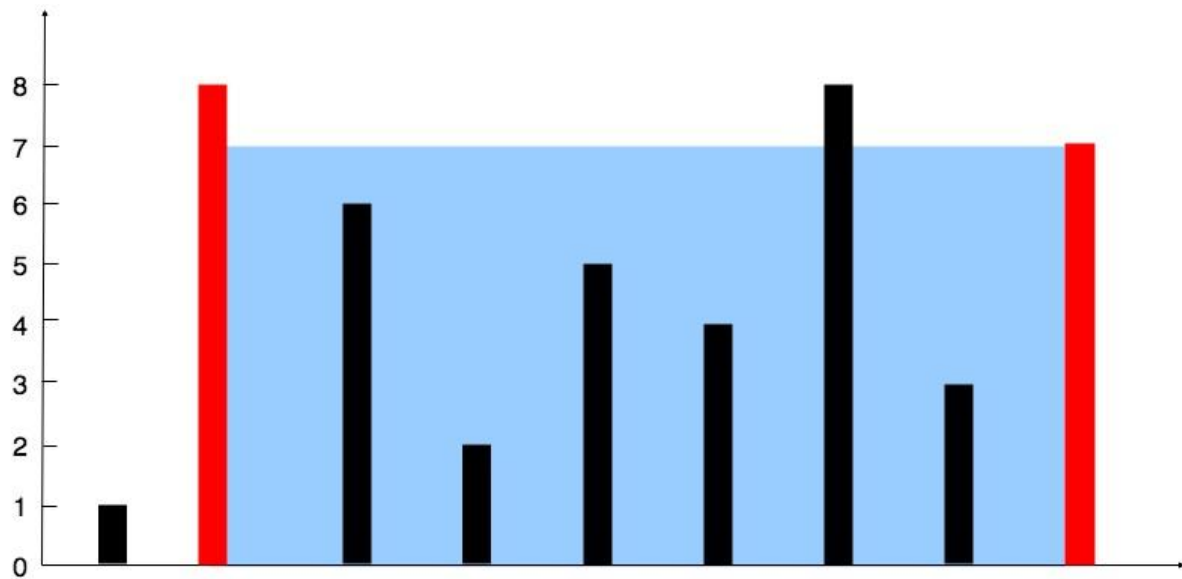
The above vertical lines are represented by an array [1,8,6,2,5,4,8,3,7]. In this case, the max area of water (blue section) the container can contain is 49.

Basically, for each pair of heights, we have to maximise the product of width between them and a minimum of both the heights. It will be the maximum possible area. In the above case, we choose the pair 8 (at 1st index) and 7 (at 8th index). The width between them is the difference of their index, i.e. 7 and minimum of heights 8 and 7 is 7. So the area is 7*7 = 49.

26. Given a sorted array that has some unique as well as some duplicate elements, your task is to remove all the duplicate elements from the given array and return the size of the new array that is not having any duplicate elements in it.

For example:

Input: A={2,3,3,4,5,7,7,9}
Output: 6

Explanation: All the duplicate elements have been removed and the new array is A={2,3,4,5,7,9} i.e. length 6.
Similarly,
Input: A={4,7,9,9,10,11,11}
Output: 5