ARRAYS

1. Given a number n, write and efficient function to print all prime factors of n. For example if the input number is 12 output should “2 2 3”. And if the input number is 315, then output should be “3 3 5 7”.
2. Find out unique elements in the matrix and print them.
3. Given an unsorted array of integers, find a continuous subarray which adds to a given number.
   Examples: Input arr[] = {1 ,4, 20 , 3, 10, 5}, sum =33
   Output: Sum found between indexes 2 and 4.
4. Given two arrays X[] and Y[] of positive integers, find number of pairs such that **x^y>y^x** where x is an element from X[] and y is an element from Y[].
5. Given an integer array and a positive integer k, count all distinct pairs with difference equal to k.
6. Consider an array of integers where the elements are 0 or 1. We are interested in finding the first occurrence of a 1 in the array. Design a function such that if the if the array contains only zeroes it return -1; if an element other than 0 or 1 is found before finding the first 1, it return -2; otherwise , it returns the index of the first occurrence of 1. The array and its size should be passed as a parameter to the function.
7. You are given a read only array of n integers from 1 to n. Each integer appears exactly once except A which appears twice and B which is missing. Return A and B. Note your algorithm should have a linear runtime complexity. Could you implement it without using extra memory? Note that in your output A should precede B. **[INMOBI]**
   Example: Input: [3 1 2 5 3]
   Output: [3 4], A= 3, B=4.
8. A hotel manager has to process N advance bookings of rooms for the next season. His hotel has K rooms. Bookings contain arrival date and a departure date. He wants to find out whether there are enough rooms in the hotel to satisfy the demand. Write a program that solves this problem in O(N log N).
   Input: First list for arrival time of booking.
   Second list for departure time of booking.
   Third is K which denotes count of rooms.
   Arrivals: [1 3 5]
   Departure: [2 6 8]
   K: 1
   Return: False/0
   At day =5, there are two guests in the hotel. But I have only one room.
9. You are in an infinite 2D grid where you can move in any of the 8 directions. You are given a sequence of points and the order in which you need to cover the points. Give the minimum number of steps in which you can achieve it. You start from the first point. **[DIRECTI]**
   Example: INPUT : [(0,0), (1,1), (1,2)]
   OUTPUT : 2
10. Given a set of non-overlapping intervals, insert a new interval into the intervals (merge if necessary). You may assume that the intervals were initially sorted according to their start times. **[GOOGLE]**
    Example: Given interval [1, 3],[6, 9] insert and merge [2, 5] would result in [1, 5], [6, 9].
    Example: Given [1, 2], [3, 5], [6, 7], [8, 10], [12, 16] insert and merge [4, 9] would result in [1, 2],[3, 10],[12, 16]. This is because the new interval [4, 9] overlaps with [3, 5], [6, 7], [8, 10]. Make sure the returned intervals are also sorted.
11. Given a non-negative number represented as an array of digits, add 1 to the number (increment he number represented by the digits). The digits are stored such that the most significant digit is at the head of the list. [**AMAZON**]
    Example: if the vector has [1, 2, 3] the returned vector should be [1, 2, 4]
    Test case: [0 1 2 3]

12. Find out the maximum sub array of non-negative numbers from an array. The sub array should be continuous. That is, a sub array created by choosing the second and fourth element and skipping the third element is invalid. Maximum sub-array is defined in terms of the sum of the elements in the sub-array. Sub-array A is greater than sub-array B if sum(A)>sum(b).

Example: A [1, 2, 5, -7, 2, 3] **[GOOGLE] [MICROSOFT]**

The two sub arrays are [1, 2, 5] [2, 3]

The answer is [1, 2, 5] as its sum is larger than [2, 3]

NOTE1: if there is a tie, then compare with segment's length and return segment which has maximum length

NOTE2: if there is still a tie, then return the segment with minimum starting index.

13. Given a boolean matrix mat[M][N] of size M X N, modify it such that if a matrix cell mat[i][j] is 1 (or true) then make all the cells of ith row and jth column as 1.

14. You are standing at the point (*n*,*m*) of the grid of positive integers and want to go to origin (0,0) by taking steps either to left or down: that is, from each point (*n*,*m*) you are allowed to move either to the point (*n*-1,*m*) or the point (*n*,*m*-1). Write a method *intcountPaths(int n, int m)* that counts the number of different paths from the point (*n*,*m*) to the origin.

15. Given an integer array, find if an integer P exists in the array such that the number of integers greater than p in the array equals to P. If such an integer is found return 1 else return -1. **[MICROSOFT]**

Test case: repetition of number should be considered as one.

16. Given a list of non-negative integers, arrange them such that they form the largest number.

For example: [3, 30, 34, 5, 9], the largest found number is 9534330 **[AMAZON]**

Note the result may be very large, so you need to return a string instead of an integer.

17. Given an array of integers, sort the array into wave like array and return it. In other words, arrange the elements into a sequence such that a1 >= a2 <= a3 >= a4 <= a5 . . . **[GOOGLE]**

Example [1, 2, 3, 4]

One possible answer: [2, 1, 4, 3]. Another possible answer: [4, 1, 3, 2]

Note: if there are multiple answers possible, return the one that's lexicographically smallest. So in example case you will return [2, 1, 4, 3].

Given a read only array of n+1 integers between 1 and n, find one number that repeats in linear time using less than O(n) space and traversing the stream sequentially O(1) times. **[VMWARE]**

Sample input: [3 4 1 4 1] Sample output: 1

If there are multiple possible answers output any one. If there is no duplicate output -1.

Given an array A of integers, find the maximum of j-I subjected to the constraint of A[i] < =A [j]. If there is no solution return -1. Example: A [3, 5, 4, 2] **[GOOGLE]**

Output: 2

For the pair (3, 4)

18. Given an m x n matrix of 0's and 1's, if an element is 0, set its entire row and column to 0.

Do it in place. Example: array A: **[ORACLE]**

	1	0	1
	1	1	1
	1	1	1
On returning the array A should be:	0	0	0
	1	0	1
	1	0	1