Array

Question 1

Given two arrays a[] and b[] of size n and m respectively. The task is to find union between these two arrays.

Union of the two arrays can be defined as the set containing distinct elements from both the arrays. If there are repetitions, then only one occurrence of element should be printed in the union.

Example 1:

Input:
5 3
1 2 3 4 5
1 2 3
Output:
5
Explanation:
1, 2, 3, 4 and 5 are the
elements which comes in the union set
of both arrays. So count is 5.
Example 2:

Input:
6 2
85 25 1 32 54 6
85 2
Output:
7
Explanation:
85, 25, 1, 32, 54, 6, and
2 are the elements which comes in the
union set of both arrays. So count is 7.

Question 2

Given an unsorted array arr[] of size N having both negative and positive integers. The task is place all negative element at the end of array without changing the order of positive element and negative element.

Example 1:

Input :

N = 8
arr = [1, -1, 3, 2, -7, -5, 11, 6]
Output :
1 3 2 11 6 -1 -7 -5

Example 2:

Input :
N=8
arr =[-5, 7, -3, -4, 9, 10, -1, 11]
Output :
7 9 10 11 -5 -3 -4 -1

Question 3

Given an unsorted array A of size N that contains only non-negative integers, find a continuous sub-array which adds to a given number S.

In case of multiple subarrays, return the subarray which comes first on moving from left to right.

Example 1:

Input:
N = 5, S = 12
A = [1,2,3,7,5]
Output: 2 4
Explanation: The sum of elements
from 2nd position to 4th position
is 12.

Example 2:

Input:
N = 10, S = 15
A = [1,2,3,4,5,6,7,8,9,10]
Output: 1 5
Explanation: The sum of elements
from 1st position to 5th position
is 15.

Question 4

Given an array of N positive integers and an integer X. The task is to find the frequency of X in the array.

Example 1:

Input:
N = 5
arr = [1, 1, 1, 1, 1]
X = 1
Output:
5
Explanation: The frequency of 1 is 5.

Question 5

Given an array arr and an integer K where K is smaller than size of array, the task is to find the Kth smallest element in the given array. It is given that all array elements are distinct.

Example 1:

Input:
N = 6
arr = [7, 10, 4, 3, 20, 15]
K = 3
Output : 7
Explanation :
3rd smallest element in the given
array is 7.
Example 2:

Input:
N = 5
arr = [7, 10, 4, 20, 15]
K = 4
Output : 15
Explanation :
4th smallest element in the given
array is 15.

Question 6

Given an array of size N containing only 0s, 1s, and 2s; sort the array in ascending order.

Example 1:

Input:
N = 5
arr = [0, 2, 1, 2, 0]
Output:
0 0 1 2 2
Explanation:
0s 1s and 2s are segregated
into ascending order.
Example 2:

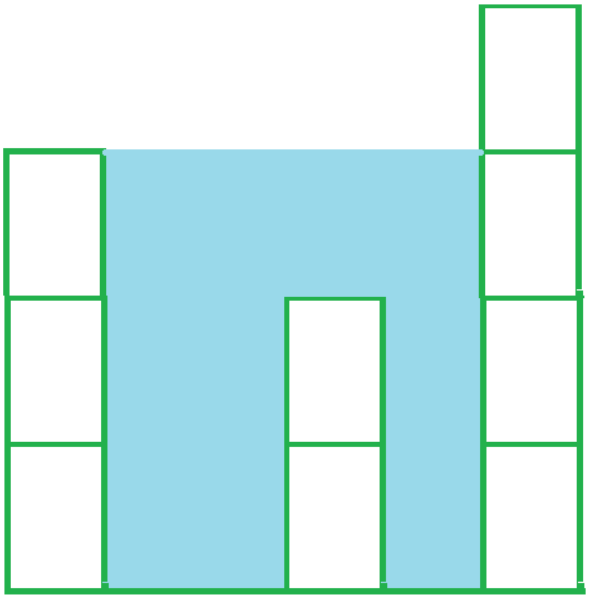
Input:
N = 3
arr = [0, 1, 0]
Output:
0 0 1
Explanation:
0s 1s and 2s are segregated
into ascending order.

Question - 07

Given an array arr of N non-negative integers representing the height of blocks. If the width of each block is 1, compute how much water can be trapped between the blocks during the rainy season.

Example 1:
Input:
N = 6
arr = [3,0,0,2,0,4]
Output:
10

Explanation:



Bars for input {3, 0, 0, 2, 0, 4}
Total trapped water = 3 + 3 + 1 + 3 = 10

Example 2:
Input:
N = 4
arr = [7,4,0,9]
Output:
10
Explanation:
Water trapped by above
block of height 4 is 3 units and above
block of height 0 is 7 units. So, the
total unit of water trapped is 10 units.

Example 3:
Input:
N = 3
arr = [6,9,9]
Output:
0
Explanation:
No water will be trapped.

Question - 08

Given a sorted array arr of distinct integers. Sort the array into a wave-like array(In Place).
In other words, arrange the elements into a sequence such that arr[1] >= arr[2] <= arr[3] >= arr[4] <= arr[5].....

If there are multiple solutions, find the lexicographically smallest one.

Example 1:
Input:
n = 5
arr = [1,2,3,4,5]
Output: 2 1 4 3 5
Explanation: Array elements after
sorting it in wave form are
2 1 4 3 5.

Example 2:
Input:
n = 6
arr = [2,4,7,8,9,10]
Output: 4 2 8 7 10 9
Explanation: Array elements after
sorting it in wave form are
4 2 8 7 10 9.

Question - 09

Given an array A of N elements. Find the majority element in the array. A majority element in an array A of size N is an element that appears more than N/2 times in the array.

Example 1:
Input:
N = 3
A = [1,2,3]
Output:
-1
Explanation:
Since, each element in
[1,2,3] appears only once so there
is no majority element.

Example 2:
Input:
N = 5
A = [3,1,3,3,2]
Output:
3
Explanation:
Since, 3 is present more
than N/2 times, so it is
the majority element.

Question - 10

Given an array of N integers arr where each element represents the max length of the jump that can be made forward from that element. Find the minimum number of jumps to reach the end of the array (starting from the first element). If an element is 0, then you cannot move through that element.

Note: Return -1 if you can't reach the end of the array.

Example 1:
Input:
N = 11
arr = [1, 3, 5, 8, 9, 2, 6, 7, 6, 8, 9]
Output: 3
Explanation:
First jump from 1st element to 2nd
element with value 3. Now, from here
we jump to 5th element with value 9,
and from here we will jump to the last.

Example 2:
Input :
N = 6
arr = [1, 4, 3, 2, 6, 7]
Output: 2
Explanation:
First we jump from the 1st to 2nd element
and then jump to the last element.

Question - 11

Given an array arr denoting heights of N towers and a positive integer K.

For each tower, you must perform exactly one of the following operations exactly once.

- Increase the height of the tower by K
- Decrease the height of the tower by K

Find out the minimum possible difference between the height of the shortest and tallest towers after you have modified each tower.

Note: It is compulsory to increase or decrease the height by K for each tower. After the operation, the resultant array should not contain any negative integers.

Example 1:
Input:
K = 2, N = 4
Arr = [1, 5, 8, 10]
Output:
5
Explanation:
The array can be modified as
[3, 3, 6, 8]. The difference between
the largest and the smallest is 8-3 = 5.

Example 2:
Input:
K = 3, N = 5
Arr = [3, 9, 12, 16, 20]
Output:
11
Explanation:
The array can be modified as
[6, 12, 9, 13, 17]. The difference between
the largest and the smallest is 17-6 = 11.

Question - 12

Given arrival and departure times of all trains that reach a railway station. Find the minimum number of platforms required for the railway station so that no train is kept waiting.
Consider that all the trains arrive on the same day and leave on the same day. Arrival and departure time can never be the same for a train but we can have arrival time of one train equal to departure time of the other. At any given instance of time, same platform can not be used for both departure of a train and arrival of another train. In such cases, we need different platforms.

Note: Time intervals are in the 24-hour format(HHMM) , where the first two characters represent hour (between 00 to 23) and the last two characters represent minutes (this may be > 59).

Example 1:
Input: n = 6
arr = [0900, 0940, 0950, 1100, 1500, 1800]
dep = [0910, 1200, 1120, 1130, 1900, 2000]
Output: 3
Explanation:
Minimum 3 platforms are required to
safely arrive and depart all trains.

Example 2:
Input: n = 3
arr = [0900, 1100, 1235]
dep = [1000, 1200, 1240]
Output: 1
Explanation: Only 1 platform is required to
safely manage the arrival and departure
of all trains.

Question - 13

Given an array A of positive integers of size N, where each value represents the number of chocolates in a packet. Each packet can have a variable number of chocolates. There are M students, the task is to distribute chocolate packets among M students such that :
1. Each student gets exactly one packet.
2. The difference between maximum number of chocolates given to a student and minimum number of chocolates given to a student is minimum.

Example 1:
Input:
N = 8, M = 5
A = [3, 4, 1, 9, 56, 7, 9, 12]
Output: 6
Explanation: The minimum difference between maximum chocolates and minimum chocolates is 9 - 3 = 6 by choosing following M packets : [3, 4, 9, 7, 9].

Example 2:
Input:
N = 7, M = 3
A = [7, 3, 2, 4, 9, 12, 56]
Output: 2
Explanation: The minimum difference between maximum chocolates and minimum chocolates is 4 - 2 = 2 by choosing following M packets : [3, 2, 4].

Question - 14

Given an array of positive integers. Find the length of the longest sub-sequence such that elements in the subsequence are consecutive integers, the consecutive numbers can be in any order.

Example 1:
Input:
N = 7
a = [2,6,1,9,4,5,3]
Output:
6
Explanation:
The consecutive numbers here are 1, 2, 3, 4, 5, 6. These 6 numbers form the longest consecutive subsquence.

Example 2:
Input:
N = 7
a = [1,9,3,10,4,20,2]
Output:
4
Explanation:
1, 2, 3, 4 is the longest
consecutive subsequence.

Question - 15

Given two sorted arrays nums1 and nums2 of size m and n respectively, print the median of the two sorted arrays.

Example 1:
Input: nums1 = [1,3], nums2 = [2]
Output: 2.00000
Explanation: merged array = [1,2,3] and median is 2.

Example 2:
Input: nums1 = [1,2], nums2 = [3,4]
Output: 2.50000
Explanation: merged array = [1,2,3,4] and median is (2 + 3) / 2 = 2.5.

Reference:

1. https://www.geeksforgeeks.org/top-50-array-coding-problems-for-interviews/
2. https://www.csinfo360.com/p/array-practice-problems.html
3. https://www.hackerearth.com/problem/algorithm/circular-nge/
4. https://www.codingninjas.com/codestudio/problem-details/ninja-s-circular-array_2221409
5. https://leetcode.com/problems/circular-array-loop/ (Special problem. Interesting but can not provide it due to graph knowledge limitation)
6. https://codeforces.com/contest/1334/problem/C
7. https://codeforces.com/contest/1392/problem/D
8. https://codeforces.com/contest/1328/problem/D
9. https://leetcode.com/problems/median-of-two-sorted-arrays/