Homework - 6

IC100 Introduction To Programming

Question 1

In this problem implement a search algorithm similar to binary search. Instead of splitting the array into two parts, split the array into three parts, find which part the element may belong to and then make a recursive call for searching the element in that part. The details of the function are left for you to figure out. The input/output format is as in the previous question.

Question 2

Given an array A containing distinct integers and an integer x present in the array A, design and implement an algorithm that rearranges the elements of the array such that the following properties hold (after rearrangement):-
All the elements that are smaller than x are placed before x which is followed by all the elements that are larger than x. Note that the final array need not be sorted.
You are not allowed to define any additional arrays (other than the given array) for this question.
The first line of the input is the size of the array, followed by the array elements in the next line. The third line gives the element x in the array.
Example
Input
7
77 4 34 12 9 45 1
12
Output
1 9 4 12 77 45 34
Please note that the solution may not be unique. There may be various correct outputs.

Question 3

Two friends like to pool their money and go to the ice cream parlor. They always choose two distinct flavors and they try to spend all of their money. Given

an array A containing prices for different flavors of ice cream, select the two that will cost all the money they have. Print the indices of the flavors of ice-cream that they will choose. Following constraints are applicable -

It is guaranteed that they will be able to spend all their money

Nested loops are not allowed

Input Format: Take integer m as input which denotes total money both friends will have. Take integer n as input which denotes total flavors of ice-cream present. Take elements of Array A as an input denoting prices for different flavors of ice cream.

Output Format : Print the indices of the flavors of ice-cream that they will choose. In case of multiple pair, print anyone of them.

Example 1:

Input:

4

5

1 4 5 3 2

Output:

0 3

Explanation: A[0] + A[3] = 4

Example 2:

Input:

4

4

2 2 4 3

Output:

0 1

Explanation: A[0] + A[1] = 4

Question 4

Dothraki are planning an attack to usurp King Robert's throne. King Robert learns of this conspir- acy from Raven and plans to lock the single door through which the enemy can enter his kingdom. But to lock the door he needs a key that is an anagram of a palindrome. He starts to go through his box of strings, checking to see if they can be rearranged into a palindrome.

You are given a string, write a function possiblePal(char str[ ]) which takes string as an input and returns YES if the string can be rearranged into a palindrome else NO. String will contain lowercase character only.

Example 1:

Input:

aaabbbb

Output:

YES

Explanation: The rearranged palindrome for the given string is bbaaabb

Example 2:
Input:
cdcdcdcdeeeef
Output:
YES
Explanation: The rearranged palindrome for the given string is ccddeefeeddcc

Question 5

You are given an array prices where prices[i] is the price of a given stock on i^{th} day. You want to maximize your profit by choosing a single day to buy one stock and choosing a different day in the future to sell that stock.

Write a function maxProfit(int prices[ ], int n) that takes array prices and integer n as input and returns the maximum profit you can achieve from the transaction mentioned above. If you cannot achieve any profit return 0.

Example 1:
Input:
6
7 1 5 3 6 4
Output:
5
Explanation: Buy on day 2 (price = 1) and sell on day 5 (price = 6), profit = 6-1 = 5. Note that buying on day 2 and selling on day 1 is not allowed because you must buy before you sell.

Example 2:
Input:
5
7 6 4 3 1
Output:
0
Explanation: In this case, no transactions are done and the max profit = 0.

Submission

Please submit your homework in piazza under hw6 folder and make it a private submission to the instructors. Zip all the codes and name the zip as yourname_rollno
Submission deadline is 8:00pm Jan 20.