

Assignment No: 01

Data Structure and Algorithms

July 25, 2023

1 Bribed Queue

You have a queue where people are waiting with respect to the token number they are assigned. Some people have bribed the people standing in front of them and have taken their place. Your job is to count how many bribes took place in the queue.

Example

Suppose the array is [1, 2, 3, 4, 5, 8, 6, 7].

Original Array

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

8 bribed 7 and took his place

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

8 again bribed 6 and pushes 6 back.

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

So, you will return **2** as there are only two bribes occurred in the queue.

Constraints

1. You have to read the input from a **.txt**.
2. The first line contains the length of the array and the line after that contains the elements of the array in **comma separated** format.
3. The file won't contain any duplicate numbers.
4. Write a function by the name **BribedQueue** which must return an integer stating the number of bribes.

2 Going Off The Charts

Bob is a talented employee in a big IT firm who doesn't shy from giving extra hours in his job. Managers are keeping a close eye on Bob and they want to give him a raise because of his performance. You have to help managers by calculating the highest consecutive days Bob has extended his working hours.

His normal working hours are 6 per day.

Example 01

Bob working hours

[7, 6, 6, 7, 8, 6]

Here, Bob has extended his working hours thrice at index 0, 3 and 4 respectively.

He consecutively did that twice, so 2 will be your answer.

Example 02

Bob working hours

[7, 8, 8, 6, 6, 6, 8, 7, 7]

Here, Bob has extended his working hours thrice consecutively in the starting and in the end of array.

He did that twice, one from index 0 to 2 and second from 6 to 8. Both times he did it for three consecutive days, so 3 will be answer.

Constraints

1. You have to read the input from a **.txt**.
2. The first line contains the length of the array and the line after that contains the elements of the array in **comma separated** format.
3. The array will only contain integers.
4. Write a function by the name **GoingOffTheCharts** that will accept an array and the length of array if necessary. The function must return an integer stating the highest number of consecutive extended working hours.
5. Array will be **unsorted**.

3 Fixing The Code In Production

Buzz Systems ran into high priority problem where their system crashed. The problem can be fixed if they can verify that the element exists and then find out the index of an specific item in a **sorted** array. You are now hired and your job is to find that specific index the fastest way possible.

Example

The sequence causing issue

[2, 4, 8, 16, 32, 64, 128, 256, 512]

Number to find: 128

128 is present in 6th index, so 6 will be your answer.

Constraints

1. You have to read the input from a **.txt**.
2. The first line contains the number to find in the array.
3. The second line contains the length of the array and the line after that contains the elements of the array in **comma separated** format.
4. Array can contain duplicates.
5. If the number doesn't exist then -1 will be returned.
6. You will create a function by the name of **FixingCodeInProduction** that will accept array and size of array if necessary. The function must return an integer.

4 Selecting The Median

Martin finalized the marking of his papers and now he wants to find out the median so that he can present that in presentation. You need to help Martin to find the median.

Example

Marks of students

[98, 88, 67, 82, 76, 80, 64, 55, 76]

After sorting the marks

[55, 64, 67, 76, 76, 80, 82, 88, 98]

Middle index is 4th, so 76 will be the answer.

Constraints

1. You have to read the input from a **.txt**.
2. The first line contains the number to find in the array and the line after that contains the elements of the array in **comma separated** format.
3. Numbers will always be odd.
4. Array can be sorted or unsorted.
5. Array won't be empty.
6. Create a function by the name **SelectingTheMedian** which will take array as an argument and size of array if necessary. The function must return the median value.
7. Marks will be in integer.

5 Disclaimer

1. Don't try to copy assignment.
2. Try to perform assignment on your own.
3. If you need any sort of help do reach out to me.
4. Will recommend Visual Studio Code as your IDE and feel free to install all the useful extensions as you may please.
5. Try to name your variable wisely that reflects their purpose.
6. You are free to take help from the internet or from other students, but you have to code the solution yourself.
7. Try to add informative comments into your code.

HAPPY HUNTING!