Coding problem — Longest Band problem — 22/Feb/2022

Given an array containing N integers, find length of longest band.

A band is defined as a subsequence which can be re-ordered in such a manner all elements appear consecutive (i.e, with absolute difference of 1 between neighbouring elements)

A longest band is the band (subsequence) which contains maximum integers.

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for ex. Input array: [1, 9, 3, 0, 18, 5, 2, 4, 10, 7, 12, 6]

output is : 8 (Ans)

Naive Approach or Brute force approach

↳ Sort the array [0, 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 18]

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forming band of length = 8.

So maximum length band is 8.

Time Complexity: $O(n \log n + n) \approx O(n \log n)$

Space Complexity: No extra space is required $O(1)$,

This is one of the solution. But can we do better than this?

So i am expecting something in $O(n)$ kind of is it possible?

Second Approach

Just Cache the all element into set and then

iterate your Element from your array

for ex: Input: [1, 9, 3, 0, 18, 5, 2, 4, 10, 7, 12, 6]

↑

we check, does immediate left exist in set?

There are two answer

Yes, len += 1 || increment length

So left side count may be 1

go right side Count

we also mark some flag which help us to re iterate the same value.

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now same way we proceed right side also

rightside count is 7

l = 1, r = 6, self = together makes 8