658. Find K Closest Elements

Description HintsSubmissionsDiscussSolution

DiscussPick One

Given a sorted array, two integers k and x, find the k closest elements to x in the array. The result should also be sorted in ascending order. If there is a tie, the smaller elements are always preferred.

Example 1:

```
Input: [1,2,3,4,5], k=4, x=3

Output: [1,2,3,4]
```

Example 2:

```
Input: [1,2,3,4,5], k=4, x=-1

Output: [1,2,3,4]
```

Note:

1. The value k is positive and will always be smaller than the length of the sorted array.
2. Length of the given array is positive and will not exceed 10^4
3. Absolute value of elements in the array and x will not exceed 10^4

The idea is to find the first number which is equal to or greater than x in arr. Then, we determine the indices of the start and the end of a subarray in arr, where the subarray is our result. The time complexity is O(logn + k).

In the following code, arr[index] is the first number which is euqal to or geater than x (if all numbers are less than x, index is arr.size()), and the result is arr[i+1, i+2, ... j].

```
class Solution {
public:
int binarySearch(vector<int> &nums, int k)
{
    int left = 0, right = nums.size()-1;
    while(left<=right)
    {
```

```
        int mid = (left+right)/2;
        if(nums[mid]==k) return mid;
        if(nums[mid]>k)
        {
            right = mid-1;
        }else{
            left = mid+1;
        }
    }
    return left;
}

    vector<int> findClosestElements(vector<int>& arr, int k, int x) {
        sort(arr.begin(),arr.end());
        int index = binarySearch(arr,x);
        int i=index-1; int j=index;
        while(k--)
        {
            if(i<0||(j<arr.size() && abs(arr[j]-x)<abs(arr[i]-x))) j++;
            else i--;
        }
        return vector<int>(arr.begin()+i+1,arr.begin()+j);
    }
};
```