Codility_

Candidate Report: trainingVMFMYM-ND7

Check out Codility training tasks

Test Name:

Summary Timeline

Tasks summary

Task	Time spent	Score
LeaderSliceInc Go	3 min	100%

Total score

100%

Tasks Details

Hard

1. LeaderSliceInc

Given an array, find all its elements that can become a leader, after increasing by 1 all of the numbers in some segment of a given length.

Task Score	Correctness	Performance
100%	100%	100%

Task description

Integers K, M and a non-empty array A consisting of N integers, not bigger than M, are given.

The leader of the array is a value that occurs in more than half of the elements of the array, and the segment of the array is a sequence of consecutive elements of the array.

You can modify A by choosing exactly one segment of length K and increasing by 1 every element within that segment.

The goal is to find all of the numbers that may become a leader after performing exactly one array modification as described above.

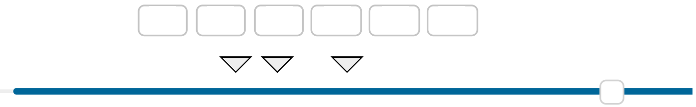
Write a function:

```
    func Solution(K int, M int, A []int) []int
```

Solution

Programming language used:	Go
Total time used:	3 minutes
Effective time used:	3 minutes
Notes:	*not defined yet*

Task timeline



that, given integers K and M and an array A consisting of N integers, returns an array of all numbers that can become a leader, after increasing by 1 every element of exactly one segment of A of length K. The returned array should be sorted in ascending order, and if there is no number that can become a leader, you should return an empty array. Moreover, if there are multiple ways of choosing a segment to turn some number into a leader, then this particular number should appear in an output array only once.

For example, given integers K = 3, M = 5 and the following array A:

```
A[0] = 2
A[1] = 1
A[2] = 3
A[3] = 1
A[4] = 2
A[5] = 2
A[6] = 3
```

the function should return [2, 3]. If we choose segment A[1], A[2], A[3] then we get the following array A:

```
A[0] = 2
A[1] = 2
A[2] = 4
A[3] = 2
A[4] = 2
A[5] = 2
A[6] = 3
```

and 2 is the leader of this array. If we choose A[3], A[4], A[5] then A will appear as follows:

```
A[0] = 2
A[1] = 1
A[2] = 3
A[3] = 2
A[4] = 3
A[5] = 3
A[6] = 3
```

and 3 will be the leader.

And, for example, given integers K = 4, M = 2 and the following array:

```
A[0] = 1
A[1] = 2
A[2] = 2
A[3] = 1
A[4] = 2
```

the function should return [2, 3], because choosing a segment A[0], A[1], A[2], A[3] and A[1], A[2], A[3], A[4] turns 2 and 3 into the leaders, respectively.

Write an **efficient** algorithm for the following assumptions:

- N and M are integers within the range [1..100,000];
- K is an integer within the range [1..N];
- each element of array A is an integer within the range [1..M].

11:37:01 11:39:31

Code: 11:39:31 UTC, go, final, score: **100**

show code in pop-up

```
package solution

import (
    "sort"
)

func computeLeader(
    kChunkCount map[int]int, numCount map[int
    halfCount int, leader int) {
    leaderCount := 0
    leaderCount += kChunkCount[leader-1]
    leaderCount += numCount[leader]
    if leaderCount >= halfCount {
        previousKAns[leader] = true
    } else if _, ok := previousKAns[leader]; o
        delete(previousKAns, leader)
    }
}

func Solution(k int, m int, arr []int) []int
    // fmt.Println(arr)
    n := len(arr)

    numCount := make(map[int]int)
    var num int
    // Process arr entried k..n-1 as we'll sta
    // 0..k-1
    for i := k; i < n; i++ {
        num = arr[i]
        if _, ok := numCount[num]; !ok {
            numCount[num] = 0
        }
        numCount[num]++
    }

    // Process the first k-chunk starting fro
    kChunkCount := make(map[int]int)
    previousKAns := make(map[int]bool)
    // var leaderCount int
    halfCount := n/2 + 1
    for i := 0; i < k; i++ {
        num = arr[i]
        if _, ok := kChunkCount[num]; !ok {
            kChunkCount[num] = 0
        }
        kChunkCount[num]++

        // dump(kChunkCount, numCount, 0, k-1,
        computeLeader(kChunkCount, numCount, p
    }

    ans := make(map[int]bool)
    if len(previousKAns) == 1 {
        for ansKey := range previousKAns {
            // fmt.Printf("Leader %d for range
            ans[ansKey] = true
        }
    }

    // Now start evaluating each k-chunk for
    // answer. For each chunk, we discard the
    // chunk and add it back to the global cou
    // entry of the current chunk from the gl
    // k-chunk count.
    for begin := 1; begin <= n-k; begin++ {
        // Discard previous beginning.
        kChunkCount[arr[begin-1]]--
        numCount[arr[begin-1]]++
        // Add new end.
        kChunkCount[arr[begin+k-1]]++
        numCount[arr[begin+k-1]]--

        // Recompute the two ends for the cur
        // previous beginning.
        num = arr[begin-1]
        //dump(kChunkCount, numCount, begin, 
        computeLeader(kChunkCount, numCount, 
        computeLeader(kChunkCount, numCount, 

        // Then the new end.
        num = arr[begin+k-1]
        // dump(kChunkCount, numCount, begin,
        computeLeader(kChunkCount, numCount, 
        computeLeader(kChunkCount, numCount, 

        // // Also check if num - 1 was in th
        // if _, ok := previousKAns[num-1]; o
        //  leaderCount = kChunkCount[num-1]
        //  leaderCount += numCount[num]
        //  dump(kChunkCount, numCount, begin
        //  if leaderCount < halfCount {
        //      delete(previousKAns, num-1)
        //  }
        // }

        if len(previousKAns) == 1 {
            for ansKey := range previousKAns 
                // fmt.Printf("Leader %d for 
                ans[ansKey] = true
            }
        }
    }

    keys := make([]int, 0, len(ans))
    for ansKey := range ans {
        keys = append(keys, ansKey)
    }
    sort.Ints(keys)

    return keys
}
```

Analysis summary

The solution obtained perfect score.

Analysis

Detected time complexity: O(M)

expand all Example tests

▶ example1 ✔ OK
first example test

▶ example2 ✔ OK
second example test

expand all Correctness tests

▶ corner_cases ✔ OK
corner cases

▶ one_leader only one leader is possible	✔ OK
▶ occurs_in_half value occurs in exactly half of elements	✔ OK
▶ two_leaders there are 2 possible leaders	✔ OK
▶ no_leaders no possible leader	✔ OK
expand all Performance tests	
▶ medium_tests1 medium tests (N = 10000, M = 100)	✔ OK
▶ medium_tests2 medium tests(N >= 20000, M=30000)	✔ OK
▶ max_tests1 max possible N, small K	✔ OK
▶ max_tests2 max possible N, big K	✔ OK

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