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Training ticket

Session

ID: trainingGDJXFG-NJ5
Time limit: 120 min.

Status: closed

Created on: 2016-06-22 18:30 UTC
Started on: 2016-06-22 18:30 UTC
Finished on: 2016-06-22 18:30 UTC

Tasks in test	Correctness	Performance	Task score
1 MinAvgTwoSlice Submitted in: Java	100%	100%	100%

Test score

100%

100 out of 100 points

MEDIUM

1. MinAvgTwoSlice

Find the minimal average of any slice containing at least two elements.

score: 100 of 100

Task description

A non-empty zero-indexed array A consisting of N integers is given. A pair of integers (P, Q), such that 0 ≤ P < Q < N, is called a *slice* of array A (notice that the slice contains at least two elements). The *average* of a slice (P, Q) is the sum of A[P] + A[P + 1] + ... + A[Q] divided by the length of the slice. To be precise, the average equals (A[P] + A[P + 1] + ... + A[Q]) / (Q − P + 1).

For example, array A such that:

```
A[0] = 4
A[1] = 2
A[2] = 2
A[3] = 5
A[4] = 1
A[5] = 5
A[6] = 8
```

contains the following example slices:

- slice (1, 2), whose average is (2 + 2) / 2 = 2;
- slice (3, 4), whose average is (5 + 1) / 2 = 3;
- slice (1, 4), whose average is (2 + 2 + 5 + 1) / 4 = 2.5.

The goal is to find the starting position of a slice whose average is minimal.

Write a function:

```
class Solution { public int solution(int[] A); }
```

Solution

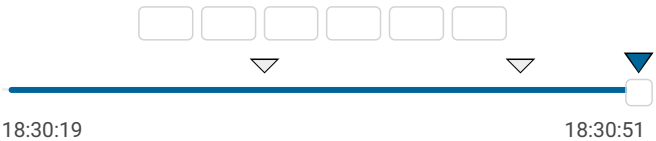
Programming language used: Java

Total time used: 1 minutes

Effective time used: 1 minutes

Notes: *not defined yet*

Task timeline



Code: 18:30:51 UTC, java, final, score: **100**

show code in pop-up

```
1  class Solution {
2          int[] values;
3      double min = Double.MAX_VALUE;
4      int minId = -1;
5
6      public int solution(int[] A) {
7          this.values = A;
8          for (int id = 0; id < values.length - 2; id++)
```

that, given a non-empty zero-indexed array A consisting of N integers, returns the starting position of the slice with the minimal average. If there is more than one slice with a minimal average, you should return the smallest starting position of such a slice.

For example, given array A such that:

```
A[0] = 4
A[1] = 2
A[2] = 2
A[3] = 5
A[4] = 1
A[5] = 5
A[6] = 8
```

the function should return 1, as explained above.

Assume that:

- N is an integer within the range [2..100,000];
- each element of array A is an integer within the range [−10,000..10,000].

Complexity:

- expected worst-case time complexity is O(N);
- expected worst-case space complexity is O(N), beyond input storage (not counting the storage required for input arguments).

Elements of input arrays can be modified.

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```
 9            double twoSlice = countAvg(id, id+1);
10            double threeSlice = countAvg(id, id+2);
11            checkMin(twoSlice, id);
12            checkMin(threeSlice, id);
13        }
14        checkMin(countAvg(values.length-2, values.lengt
15        return minId;
16    }
17
18    private void checkMin(double value, int id) {
19        if (value < min) {
20            min = value;
21            minId = id;
22        }
23    }
24
25    private double countAvg(int from, int to){
26        int sum = 0;
27        for(int i = from; i<=to; i++){
28            sum += values[i];
29        }
30        return (double) sum / (to-from+1);
31    }
32 }
```

Analysis summary

The solution obtained perfect score.

Analysis

Detected time complexity:
O(N)

expand all	Example tests	
▶	example example test	✔ OK
expand all	Correctness tests	
▶	double_quadruple two or four elements	✔ OK
▶	simple1 simple test, the best slice has length 3	✔ OK
▶	simple2 simple test, the best slice has length 3	✔ OK
▶	small_random random, length = 100	✔ OK
▶	medium_range increasing, decreasing (legth = ~100) and small functional	✔ OK
expand all	Performance tests	
▶	medium_random random, N = ~700	✔ OK
▶	large_ones numbers from -1 to 1, N = ~100,000	✔ OK
▶	large_random random, N = ~100,000	✔ OK
▶	extreme_values all maximal values, N = ~100,000	✔ OK
▶	large_sequence many seqeneces, N = ~100,000	✔ OK

Training center