

Demo ticket

Session

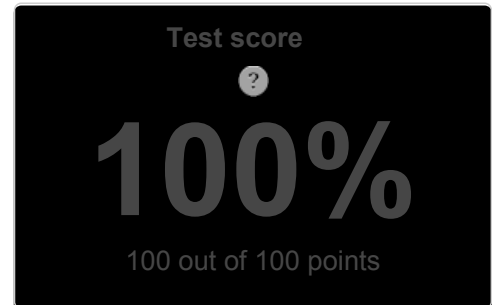
ID: demoJ6Z4JS-69F
Time limit: 120 min.

Status: closed

Created on: 2014-03-15 19:44 UTC
Started on: 2014-03-15 19:44 UTC
Finished on: 2014-03-15 19:54 UTC

Tasks in test

Task score



EASY

1. EquiLeader

Find the index S such that the leaders of the sequences $A[0], A[1], \dots, A[S]$ and $A[S+1], A[S+2], \dots, A[N-1]$ are the same.

score: 100 of 100



Task description

A non-empty zero-indexed array A consisting of N integers is given. The *leader* of this array is the value that occurs in more than half of the elements of A . An *equi_leader* is an index S such that $0 \leq S < N - 1$ and two sequences $A[0], A[1], \dots, A[S]$ and $A[S+1], A[S+2], \dots, A[N-1]$ have leaders of the same value. For example, given array A such that:

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

we can find two *equi_leaders*:

- 0, because sequences: (4) and (3, 4, 4, 2) have the same leader, whose value is 4.
- 2, because sequences: (4, 3, 4) and (4, 4, 2) have the same leader, whose value is 4.

The goal is to count the number of *equi_leaders*. Write a function:

```
def solution(A)
```

that, given a non-empty zero-indexed array A consisting of N integers, returns the number of *equi_leaders*. For example, given:

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

the function should return 2, as explained above. Assume that:

Solution

Programming language used: Python

Total time used: 10 minutes

Effective time used: 10 minutes

Notes: correct functionality and scalability

Task timeline



19:44:25

19:54:00

Code: 19:54:00 UTC, py, final, score: 100.00

```
01. def solution(A):
02.     # write your code in Python 2.6
03.     size = len(A)
04.     front = [0]*size
05.     dic = {}
06.     candidate = -1
07.     count = 0
08.     for i, a in enumerate(A):
09.         if a in dic:
10.             dic[a] += 1
11.         else:
12.             dic[a] = 1
13.         if a == candidate:
14.             count += 1
15.         else:
16.             if count > 0:
17.                 count -= 1
18.             else:
19.                 candidate = a
20.                 count = 1
21.         if dic[candidate] > (i + 1)/2:
```

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

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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Codility

```
22.         front[i] = candidate
23.     else:
24.         front[i] = -1
25.
26.     back = [0]*size
27.     dic = {}
28.     candidate = -1
29.     count = 0
30.     for i in xrange(size-1, -1, -1):
31.         a = A[i]
32.         if a in dic:
33.             dic[a] += 1
34.         else:
35.             dic[a] = 1
36.         if a == candidate:
37.             count += 1
38.         else:
39.             if count > 0:
40.                 count -= 1
41.             else:
42.                 candidate = a
43.                 count = 1
44.             if dic[candidate] > (size - i) / 2:
45.                 back[i] = candidate
46.             else:
47.                 back[i] = -1
48.
49.     total = 0
50.     for i in xrange(1, size):
51.         if front[i-1] != -1 and front[i-1] == back[i]:
52.             total += 1
53.     return total
54.
55.
```

Analysis

Detected time complexity:
O(N)

test	time	result
example example test	0.050 s.	OK
single single element	0.050 s.	OK
double two elements	0.050 s.	OK
simple simple test	0.050 s.	OK
small_random small random test with two values, length = ~100	0.050 s.	OK
small random + 200 * [MIN_INT] + random ,length = ~300	0.050 s.	OK
large_random large random test with two values, length = ~50,000	0.220 s.	OK
large random(0,1) + 50000 * [0] + random(0, 1), length = ~100,000	0.360 s.	OK
large_range 1, 2, ..., N, length = ~100,000	0.050 s.	OK
extreme_large all the same values	0.400 s.	OK

Training center