Codility_

CodeCheck Report: trainingZPF852-V25

Test Name:

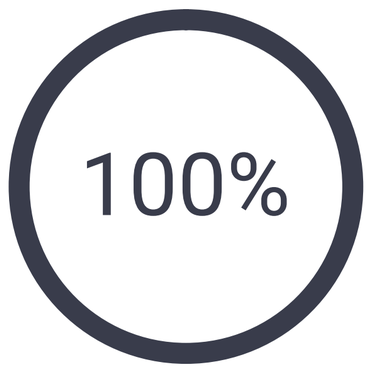
Check out Codility training tasks

Summary | Timeline

Tasks summary

Task	Time spent	Score
Dominator Python	2 min	100%

Total score



Tasks Details

Easy

1. Dominator

Find an index of an array such that its value occurs at more than half of indices in the array.

Task Score	Correctness	Performance
100%	100%	100%

Task description

An array A consisting of N integers is given. The *dominator* of array A is the value that occurs in more than half of the elements of A.

For example, consider array A such that

```
A[0] = 3    A[1] = 4    A[2] =  3
A[3] = 2    A[4] = 3    A[5] = -1
A[6] = 3    A[7] = 3
```

The dominator of A is 3 because it occurs in 5 out of 8 elements of A (namely in those with indices 0, 2, 4, 6 and 7) and 5 is more than a half of 8.

Write a function

```
def solution(A)
```

that, given an array A consisting of N integers, returns index of any element of array A in which the dominator of A occurs. The function should return −1 if array A does not have a dominator.

For example, given array A such that

```
A[0] = 3    A[1] = 4    A[2] =  3
A[3] = 2    A[4] = 3    A[5] = -1
A[6] = 3    A[7] = 3
```

the function may return 0, 2, 4, 6 or 7, as explained above.

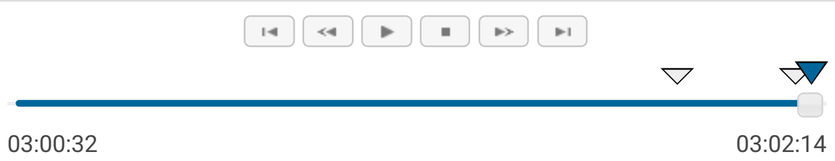
Write an **efficient** algorithm for the following assumptions:

- N is an integer within the range [0..100,000];
- each element of array A is an integer within the range [−2,147,483,648..2,147,483,647].

Solution

Programming language used:	Python
Total time used:	2 minutes
Effective time used:	2 minutes
Notes:	*not defined yet*

Task timeline



Code: 03:02:13 UTC, py, final, score: **100**

show code in pop-up

```python
# you can write to stdout for debugging purposes, e.g.
# print("this is a debug message")

def solution(A):
    # write your code in Python 3.6
    N = len(A)
    if not A:
        return -1
    if len(A) == 1:
        return 0
    if len(A) == 2:
        if A[0] == A[1]:
            return 0
        else:
            return -1

    dominator = {}
    max_ = 0
    val = 0
    for el in A:
        if el in dominator.keys():
            dominator[el] += 1
            tmp = max(max_, dominator[el])
            if tmp > max_:
                max_ = tmp
                val = el
        else:
            dominator[el] = 1
            tmp = max(max_, dominator[el])
            if tmp > max_:
                max_ = tmp
                val = el

    if max_ > N/2:
        for i in range(N):
            if val == A[i]:
                return i
    else:
        return -1
```

Analysis summary

The solution obtained perfect score.

Analysis

Detected time complexity: **O(N*log(N)) or O(N)**

expand all	Example tests	
▶	example example test	✔ OK
expand all	**Correctness tests**	
▶	small_nondominator all different and all the same elements	✔ OK
▶	small_half_positions half elements the same, and half + 1 elements the same	✔ OK
▶	small small test	✔ OK
▶	small_pyramid decreasing and plateau, small	✔ OK
▶	extreme_empty_and_single_item empty and single element arrays	✔ OK
▶	extreme_half1 array with exactly N/2 values 1, N even + [0,0,1,1,1]	✔ OK
▶	extreme_half2 array with exactly floor(N/2) values 1, N odd + [0,0,1,1,1]	✔ OK
▶	extreme_half3 array with exactly ceil(N/2) values 1 + [0,0,1,1,1]	✔ OK
expand all	**Performance tests**	
▶	medium_pyramid decreasing and plateau, medium	✔ OK
▶	large_pyramid decreasing and plateau, large	✔ OK
▶	medium_random random test with dominator, N = 10,000	✔ OK
▶	large_random random test with dominator, N = 100,000	✔ OK