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Demo ticket

Session

ID: demo349895-5N4 Time limit: 120 min.

Status: closed

Created on: 2014-04-23 04:12 UTC Started on: 2014-04-23 04:13 UTC Finished on: 2014-04-23 04:24 UTC

Tasks in test

1 | {} TapeEquilibrium

Correctness Performance

100%

100%

Task score

100%

Test score 0 100 out of 100 points

Training center

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1. TapeEquilibrium

Minimize the value |(A[0] + ... + A[P-1]) - (A[P] + ... + A[N-1])|

score: 100 of 100



Task description

A non-empty zero-indexed array A consisting of N integers is given. Array A represents numbers on a tape.

Any integer P, such that 0 < P < N, splits this tape into two non-empty parts: A[0], A[1], ..., A[P-1] and A[P], A[P+1], ..., A[N-1].

The difference between the two parts is the value of: |(A[0] + A[1] + ... + A[P - 1]) - (A[P] + A[P + 1] + ... + A[N - 1])

In other words, it is the absolute difference between the sum of the first part and the sum of the second part.

For example, consider array A such that:

A[0] = 3

A[1] = 1

A[2] = 2

A[3] = 4

A[4] = 3

We can split this tape in four places:

• P = 1, difference = |3 - 10| = 7

• P = 2, difference = |4 - 9| = 5

• P = 3, difference = |6 - 7| = 1

• P = 4, difference = |10 - 3| = 7

Write a function:

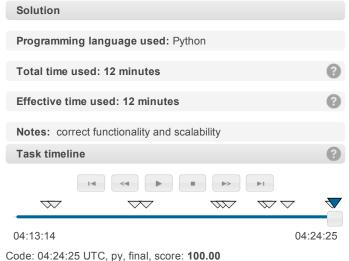
def solution(A)

that, given a non-empty zero-indexed array A of N integers, returns the minimal difference that can be achieved. For example, given:

A[0] = 3

A[1] = 1

A[2] = 2



```
def solution(A):
            left = A[0]
right = sum(A[1:])
02.
03.
            min = abs(left-right)
04.
05.
06.
             for i in range(1, len(A)-1):
                  left += A[i]
right -= A[i]
07
08.
09.
                  diff = abs(left-right)
if diff < min:</pre>
10.
12.
13.
             return min
```

$$A[3] = 4$$

 $A[4] = 3$

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 [-1,000..1,000].

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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Analysis



Detected time complexity: O(N)

test	time	result
Example tests		
example example test	0.050 s.	ок
Correctness tests		
double two elements	0.050 s.	ок
simple_positive simple test with positive numbers, length = 5	0.050 s.	ок
simple_negative simple test with negative numbers, length = 5	0.050 s.	ок
small_random random small, length = 100	0.050 s.	ок
small_range range sequence, length = ~1,000	0.050 s.	ок
small small elements	0.050 s.	ок
Performance tests		
medium_random1 random medium, numbers from 0 to 100, length = ~10,000	0.070 s.	ок
medium_random2 random medium, numbers from -1,000 to 50, length = \sim 10,000	0.070 s.	ок
large_ones large sequence, numbers from -1 to 1, length = ~100,000	0.250 s.	ок
large_random random large, length = ~100,000	0.270 s.	ок
large_sequence large sequence, length = ~100,000	0.150 s.	ок
large_extreme large test with maximal and minimal values, length = ~100,000	0.220 s.	ок

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