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https://codility.com/demo/take-sample-test/tape_equilibrium/

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# *Demo ticket*

## Session

**ID:** demo5NY8V3-WAF
**Time limit:** 120 min.

## Status: closed

**Created on:** 2015-03-20 04:26 UTC
**Started on:** 2015-03-20 04:39 UTC
**Finished on:** 2015-03-20 05:19 UTC

| Tasks in test | Correctness | Performance | Task score |
|---|---|---|---|
| 1 TapeEquilibrium | 66% | 100% | 83% |

**Test score**

83%

83 out of 100 points

EASY

### 1. TapeEquilibrium

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

**score: 83 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:

```
    class Solution { public int solution(int[] 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
```

**Solution**

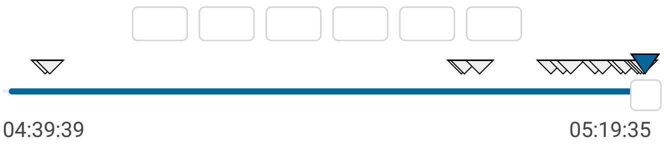
**Programming language used:** Java

**Total time used: 40 minutes**

**Effective time used: 40 minutes**

**Notes:** *not defined yet*

**Task timeline**



04:39:39

05:19:35

Code: 05:19:35 UTC, java, final, score: **83.00**
show code in pop-up

```
// you can also use imports, for example:
// import java.util.*;
import java.lang.*;

// you can use System.out.println for debugging purpose
// System.out.println("this is a debug message");

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

```
  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.

```
        // write your code in Java SE 8

        int[] P = new int[A.length+1]; //skip P[0]
        int[] B = new int[A.length +1];
        int[] C = new int[A.length +1];
        B[0] = A[0];
        C[A.length-1] = A[A.length-1];
        for(int i = 1; i < A.length; i ++){
            B[i] = A[i] + B[i-1];
            C[A.length-1-i] = A[A.length-1-i] + C[A.len
        }

        for (int i = 0; i < A.length; i++){
            P[i+1] = Math.abs(B[i] - C[i+1]);
        }
        int min = P[1];
        for(int i = 2; i < P.length; i++){
            if(P[i] < min)
                min = P[i];
        }
        return min;
    }
}
```

## Analysis

**Detected time complexity:**

**O(N)**

| test | time | result |
|---|---|---|
| **Example tests** | | |
| example<br>example test | 1.056 s | **OK** |
| **Correctness tests** | | |
| double<br>two elements | 1.048 s | **WRONG ANSWER**<br>got 0 expected 2000 |
| simple_positive<br>simple test with positive numbers, length = 5 | 1.048 s | **OK** |
| simple_negative<br>simple test with negative numbers, length = 5 | 1.068 s | **OK** |
| small_random<br>random small, length = 100 | 1.056 s | **OK** |
| small_range<br>range sequence, length = ~1,000 | 1.060 s | **OK** |
| small<br>small elements | 1.052 s | **WRONG ANSWER**<br>got 0 expected 20 |
| **Performance tests** | | |
| medium_random1<br>random medium, numbers from 0 to 100, length = ~10,000 | 1.088 s | **OK** |
| medium_random2<br>random medium, numbers from -1,000 to 50, length = ~10,000 | 1.084 s | **OK** |
| large_ones<br>large sequence, numbers from -1 to 1, length = ~100,000 | 1.224 s | **OK** |
| large_random<br>random large, length = ~100,000 | 1.260 s | **OK** |
| large_sequence<br>large sequence, length = ~100,000 | 1.164 s | **OK** |
| large_extreme<br>large test with maximal and minimal values, length = ~100,000 | 1.260 s | **OK** |

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