



Problem A. North and South

Input file: standard input
Output file: standard output

Yuki has a sequence a of length n .

Yuki defines an operation as follows:

- Choose an interval $[l, r]$ of **even length**. For every integer i such that $l \leq i \leq r$:
 - If $i - l$ is odd, the value of a_i decreases by 1, i.e., $a_i \leftarrow a_i - 1$.
 - If $i - l$ is even, the value of a_i increases by 1, i.e., $a_i \leftarrow a_i + 1$.

Now, Yuki wants to perform some number of operations such that all numbers in the sequence a are equal. You need to help Yuki find the minimum number of operations required to make all numbers in the sequence a equal, or report if it is impossible.

Input

This problem contains multiple test cases.

The first line contains a positive integer t ($1 \leq t \leq 10^5$), representing the number of test cases.

For each test case:

- The first line contains a positive integer n ($1 \leq n \leq 10^6$).
- The second line contains n integers a_1, \dots, a_n ($0 \leq a_i \leq 10^{12}$).

It is guaranteed that the sum of n over all test cases does not exceed 10^6 .

Output

For each test case, output one line:

- If it is impossible, output -1 .
- If it is possible, output an integer representing the minimum number of operations to make all numbers in the sequence a equal.

Example

standard input	standard output
3	1
2	2
1 3	-1
4	
1 5 1 5	
5	
1 3 1 3 1	

Note

For the first test case:

- Perform the operation on the interval $[1, 2]$. The sequence becomes $2, 2$, where all numbers are equal.



- It can be proven that no solution with fewer operations exists, so the answer is 1.

For the second test case:

- Perform the operation on the interval $[1, 4]$. The sequence becomes 2, 4, 2, 4.
- Perform the operation on the interval $[1, 4]$. The sequence becomes 3, 3, 3, 3, where all numbers are equal.
- It can be proven that no solution with fewer operations exists, so the answer is 2.

For the third test case:

- It is easy to prove that it is impossible to make all numbers equal regardless of the number of operations, so the answer is -1 .