Problem D. Triterminant

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Let $b_1, b_2, \ldots, b_n$ be a sequence of integers. A sequence of polynomials $A_1, A_2, \ldots, A_n$ is defined as

$$A_k(x) = \det \begin{bmatrix} x & b_1 & 0 & \ldots & 0 \\ 1 & x & b_2 & \ldots & 0 \\ 0 & 1 & x & \cdot & \vdots \\ \vdots & \vdots & \cdot & \ddots & b_k \\ 0 & 0 & \ldots & 1 & x \end{bmatrix}$$

We call $b_1, b_2, \ldots, b_n$ good if for all k, all coefficients of A_k do not exceed 1 by the absolute value.

You're given a sequence $c_1, c_2, \ldots, c_n$ such that $c_k \in \{-1, 1\}$. You can change any number c_k to $-c_k$.

What is the minimum numbers of the sequence elements you should change to get a good sequence?

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^5$). Description of the test cases follows.

The first line of each test case contains a single integer n ($1 \le n \le 10^5$).

The second line contains n integers $c_1, c_2, \ldots, c_n$ (c_k is either -1 or 1).

It is guaranteed that the sum of n over all test cases does not exceed 10^5.

Output

For each test case, output the minimum number of $c_1, c_2, \ldots, c_n$ elements that must be changed to obtain a good sequence.

If there is no valid way to obtain a good sequence from $c_1, c_2, \ldots, c_n$, output a single integer -1.

Example

standard input	standard output
3 4 1 1 1 1 2 1 -1 5 -1 1 1 1 -1	2 0 2

Note

$c = (1, -1, 1, -1)$ is a good sequence and can be obtained from $(1, 1, 1, 1)$ in 2 changes.