Problem F. Ugu

Time limit 1000 ms
Mem limit 262144 kB

A binary string is a string consisting only of the characters `0` and `1`. You are given a binary string $s_1 s_2 \ldots s_n$. It is necessary to make this string non-decreasing in the least number of operations. In other words, each character should be not less than the previous. In one operation, you can do the following:

- Select an arbitrary index $1 \leq i \leq n$ in the string;
- For all $j \geq i$, change the value in the j-th position to the opposite, that is, if $s_j = 1$, then make $s_j = 0$, and vice versa.

What is the minimum number of operations needed to make the string non-decreasing?

Input

Each test consists of multiple test cases. The first line contains an integer t ($1 \leq t \leq 10^4$) — the number of test cases. The description of test cases follows.

The first line of each test cases a single integer n ($1 \leq n \leq 10^5$) — the length of the string.

The second line of each test case contains a binary string s of length n.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output a single integer — the minimum number of operations that are needed to make the string non-decreasing.

Examples

Input	Output
8 1 1 2 10 3 101 4 1100 5 11001 6 100010 10 0000110000 7 0101010	0 1 2 1 2 3 1 5

Note

In the first test case, the string is already non-decreasing.

In the second test case, you can select $i = 1$ and then $s = \texttt{01}$.

In the third test case, you can select $i = 1$ and get $s = \texttt{010}$, and then select $i = 2$. As a result, we get $s = \texttt{001}$, that is, a non-decreasing string.

In the sixth test case, you can select $i = 5$ at the first iteration and get $s = \texttt{100001}$. Then choose $i = 2$, then $s = \texttt{111110}$. Then we select $i = 1$, getting the non-decreasing string $s = \texttt{000001}$.