D - Flip to Gather   Editorial (/contests/abc408/tasks/abc408_d/editorial)   ● / 🇬🇧

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

You are given a string S of length N consisting of 0 and 1.

You can perform the following operation any number of times (possibly zero):

- Choose an integer i satisfying $1 \le i \le N$, and change S_i from 0 to 1, or from 1 to 0.

Your goal is to make the 1s in S form **at most one** interval. Find the minimum number of operations required to achieve the goal.

More precisely, the goal is to make S such that there exists a pair of integers (l, r) satisfying both of the following conditions. Find the minimum number of operations required to achieve the goal.

- $1 \le l \le r \le N + 1$.
- $S_i = 1$ and $l \le i < r$ are equivalent for each integer i satisfying $1 \le i \le N$.

It can be proved that the goal can always be achieved with a finite number of operations.

T test cases are given, so solve each.

Constraints

- $1 \le T \le 20000$
- $1 \le N \le 2 \times 10^5$

- S is a string of length N consisting of 0 and 1.
- For each input file, the sum of N over all test cases is at most 2×10^5.
- T, N are integers.

Input

The input is given from Standard Input in the following format:

```
T
case₁
case₂
⋮
case_T
```

case_i represents the i-th test case and is given in the following format:

```
N
S
```

Output

Output T lines. The i-th line $(1 \le i \le T)$ should contain the answer for the i-th test case.

Sample Input 1 Copy

Copy

```
3
5
10011
10
1111111111
7
0000000
```

Sample Output 1 Copy

Copy

```
1
0
0
```

In the first test case, if we perform the operation to change S_1 to 0, the 1s will form one interval. Also, the initial S does not satisfy the condition. Therefore, the answer is 1.

In the second test case, there are no 0s in S, so no operations need to be performed. Therefore, the answer is 0.

In the third test case, there are no 1s in S, so no operations need to be performed. Therefore, the answer is 0.

Sample Input 2 [Copy]

```
5
2
01
10
1000010011
12
111100010011
3
111
8
00010101
```

Sample Output 2 [Copy]

```
0
2
3
0
2
```

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