

Contest Duration: 2025-10-04(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251004T2100&p1=248>) - 2025-10-04(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251004T2240&p1=248>) (local time) (100 minutes)

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D - Pop and Insert

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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 on S any number of times (possibly zero):

- Delete the first or last character, flip it (change 0 to 1 or 1 to 0), and insert it back at any position. More formally, let $r(0) = 1$ and $r(1) = 0$, and perform one of the following: (Here, S_i denotes the i -th character of S .)
 - Choose any i ($1 \leq i \leq N$) and change S to $S_2 \dots S_i r(S_1) S_{i+1} \dots S_N$.
 - Choose any i ($0 \leq i \leq N - 1$) and change S to $S_1 \dots S_i r(S_N) S_{i+1} \dots S_{N-1}$.

Find the minimum number of operations required to make all characters of S the same. It can be proved that such a sequence of operations always exists.

You are given T test cases, so solve each of them.

Constraints

- $1 \leq T \leq 2 \times 10^5$
- $2 \leq N \leq 5 \times 10^5$
- T and N are integers.
- S is a string of length N consisting of 0 and 1.

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- The sum of N over all test cases is at most 5×10^5 .
-

Input

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

```
T  
case1  
case2  
:  
caseT
```

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

```
N  
S
```

Output

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

Sample Input 1

Copy

```
3  
5  
01001  
3  
000  
15  
110010111100101
```

Copy

Sample Output 1

Copy

```
4  
0  
16
```

Copy

For the first test case, for example, you can make all characters of S into 0 with four operations as follows. It is impossible to make all characters of S the same with three or fewer operations, so the answer is 4.

- Delete the first character 0, and insert 1 between the 1st and 2nd characters (in S after deletion). S becomes 11001.
- Delete the first character 1, and insert 0 between the 2nd and 3rd characters (in S after deletion). S becomes 10001.
- Delete the last character 1, and insert 0 at the end (in S after deletion). S becomes 10000.
- Delete the first character 1, and insert 0 at the beginning (in S after deletion). S becomes 00000.

For the second test case, all characters of S are the same from the beginning, so no operation is needed.

#telegram)

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