

Freddy

SEASON 2021/2022 – FORTH ROUND



The fifth-grader Sashka is called “Cringe”, because she stays all day long on TikTok. She got sick from the **enormous** amount of videos with Freddy Fazbear and Vanessa, so she decided to refresh herself with the following informatics task:

You’re given a string $s_1, s_2, s_3, \dots, s_N$, of N symbols. You can choose a substring of consecutive elements $s_l, s_{l+1}, s_{l+2}, \dots, s_r$ ($1 \leq l \leq r \leq N$) and „flip“ the values of the elements in it. More precisely, for each $l \leq i \leq r$, $s_i := 1 - s_i$. You should find the minimum amount of operations necessary to sort the string in ascending order. A string s is sorted in ascending order, when $2 \leq i \leq N$, $s_{i-1} \leq s_i$.

After much torment, she managed to solve the problem elegantly (even her brother was impressed!). Now it is your turn to write the program `freddy.cpp`, which solves the mentioned task.

Input

On the first line of `freddy.in` is given the number N . The second line of the file contains N symbols, the i -th from them is s_i .

Output

On one line in `freddy.out` you should print one number – the minimum operations needed for sorting. If sorting isn’t possible, print -1 .

Constraints

$$1 \leq N \leq 10^5$$

$$0 \leq s_i \leq 1$$

Time Limit: 0.2 sec.

Memory Limit: 256 MB.

Sample testcases

Input (<code>freddy.in</code>)	Output (<code>freddy.out</code>)
5 11111	0
5 10011	1
10 0101101011	3
20 01010001100010011010	6