E - Level K Palindrome

Time Limit: 2 sec / Memory Limit: 1024 MB

Score : 500 points

Problem Statement

As a token of his gratitude, Takahashi has decided to give Snuke a level-K palindrome. A level-L palindrome, where L is a non-negative integer, is defined as follows:

- Let $\mathrm{rev}(s)$ denote the reversal of a string s.
- A string s is said to be a palindrome when $s = \mathrm{rev}(s)$.
- The empty string and a string that is not a palindrome are level-0 palindromes.
- For any **non-empty** level-$(L-1)$ palindrome t, the concatenation of t, $\mathrm{rev}(t)$ in this order is a level-L palindrome.
- For any level-$(L-1)$ palindrome t and any character c, the concatenation of t, c, $\mathrm{rev}(t)$ in this order is a level-L palindrome.

Now, Takahashi has a string S. Determine whether it is possible to make S an exactly level-K palindrome by doing the following action zero or more times: choose a character in S and change it to another lowercase English letter. If it is possible, find the minimum number of changes needed to make S a level-K palindrome.

Constraints

- K is an integer.
- $0 \leq K \leq 5 \times 10^5$
- S consists of lowercase English letters.
- $1 \leq |S| \leq 5 \times 10^5$

Input

Input is given from Standard Input in the following format:

K
S

Output

If it is possible to get an exactly level-K palindrome, print the minimum number of changes needed. If it is impossible, print `impossible`.

Sample Input 1 Copy

```
4
aabaaaabaa
```

Copy

Sample Output 1 Copy

```
0
```

Copy

We can find the level of aabaaaabaa as follows:

- the empty string is a level-0 palindrome;
- a is a concatenation of (empty string), a, (empty string) in this order, so it is a level-1 palindrome;
- aa is a concatenation of a, a in this order, so it is a level-2 palindrome;
- aabaa is a concatenation of aa, b, aa in this order, so it is a level-3 palindrome;
- aabaaaabaa is a concatenation of aabaa, aabaa in this order, so it is a level-4 palindrome.

Thus, aabaaaabaa is already a level-4 palindrome and needs no changes.

Sample Input 2 Copy

```
2
aabaaaabaa
```

Copy

Sample Output 2 Copy

```
4
```

Copy

Remaining Time
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We can, for example, change aabaaaabaa to acbcaacbca to get a level-2 palindrome.

Note that aabaaaabaa is not a level-2 palindrome.

Sample Input 3 Copy

```
3
aabaaaabaa
```

Sample Output 3 Copy

```
impossible
```

Sample Input 4 Copy

```
5
aabaaaabaa
```

Sample Output 4 Copy

```
impossible
```

Sample Input 5 Copy

```
2
acaabcbababaaac
```

Sample Output 5 Copy

```
6
```

Language

Python (3.8.2)

Source Code

Remaining Time
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```
1
```

* at most 512 KiB

* Your source code will be saved as Main.*extension*.

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