4/17/2021 E - Level K Palindrome

Contest Duration: 2021-04-17(Sat) 12:40 (http://www.timeanddate.com/worldclock/fixedtime.html? iso=20210417T1610&p1=248) - 2021-04-17(Sat) 14:40 (http://www.timeanddate.com/worldclock/fixedtime.html? Back to Home (/home) iso=20210417T1810&p1=248) (local time) (120 minutes)

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# E - Level K Palindrome

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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 rev(s) denote the reversal of a string s.
- A string s is said to be a palindrome when s = 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, 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, 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.
- $0 < K < 5 \times 10^5$
- S consists of lowercase English letters.
- $1 \le |S| \le 5 \times 10^5$

**Remaining Time** 

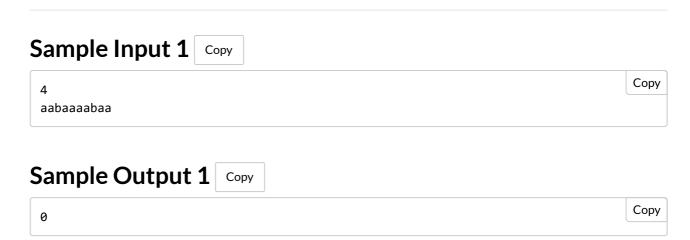
### Input

Input is given from Standard Input in the following format:

```
egin{array}{c} K \ S \end{array}
```

## **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.



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;
- ullet aabaaaabaa is a concatenation of aabaa, aabaa in this order, so it is a level-4 palindrome.

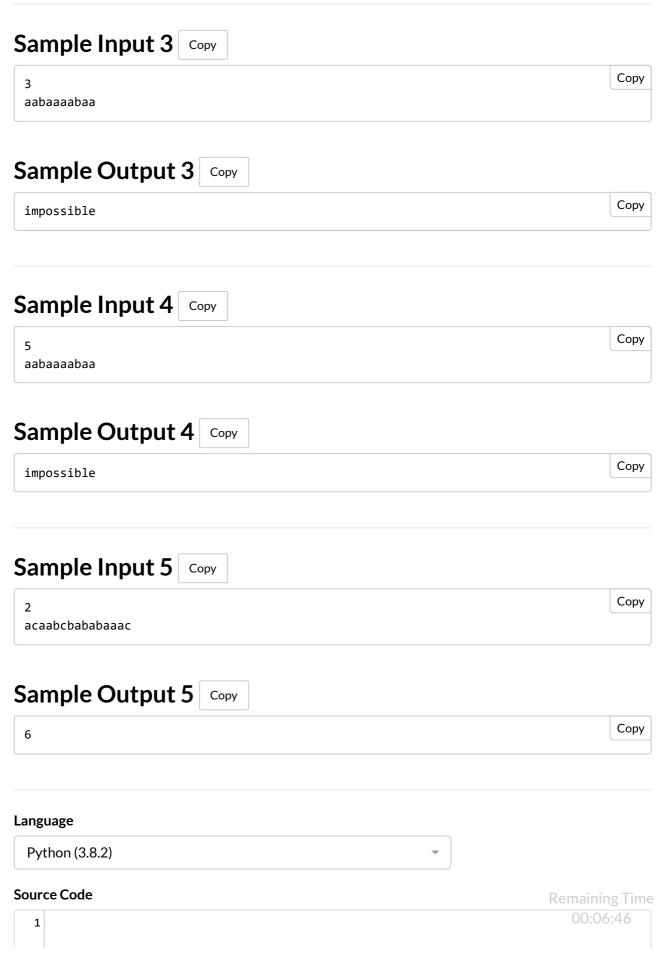
Thus, aabaaaabaa is already a level-4 palindrome and needs no changes.



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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.



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