

E. Nearly Shortest Repeating Substring

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

You are given a string s of length n consisting of lowercase Latin characters. Find the length of the shortest string k such that several (possibly one) copies of k can be concatenated together to form a string with the same length as s and, at most, one different character.

More formally, find the length of the shortest string k such that $c = \underbrace{k + \dots + k}_{x \text{ times}}$ for some positive integer x , strings s and c has the same length and $c_i \neq s_i$ for at most one i (i.e. there exist 0 or 1 such positions).

Input

The first line contains a single integer t ($1 \leq t \leq 10^3$) — the number of test cases.

The first line of each test case contains a single integer n ($1 \leq n \leq 2 \cdot 10^5$) — the length of string s .

The second line of each test case contains the string s , consisting of lowercase Latin characters.

The sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, print the length of the shortest string k satisfying the constraints in the statement.

Example

input	Copy
5	
4	
abaa	
4	
abba	
13	
slavicslavic	
8	
hshahaha	
20	
stormflamestormflame	
output	Copy
1	
4	
13	
2	
10	

Note

In the first test case, you can select $k = a$ and $k + k + k + k = aaaa$, which only differs from s in the second position.

In the second test case, you cannot select k of length one or two. We can have $k = abba$, which is equal to s .

Codeforces Round 937 (Div. 4)

Finished

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implementation

number theory

strings

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