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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 s such that several (possibly one) copies of s 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 $c=\underbrace{k+\cdots+k}$ 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 ($1 \le t \le 10^3$) — the number of test cases.

The first line of each test case contains a single integer n ($1 \le n \le 2 \cdot 10^5$) — 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 \boldsymbol{k} satisfying the constraints in the statement.

Example



Note

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

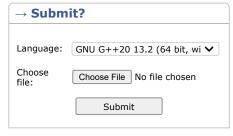
In the second test case, you cannot select k of length one or two. We can have $k=\mathtt{abba}$, which is equal to s.

Codeforces Round 937 (Div. 4) Finished Practice

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