

Task: NAJ

The Shortest Period

Bolivian ICPC Camp, contest #2. Source file naj.* Available memory: 128 MB.

A word t is called a period of the word s if it is not longer than s and there exists a natural number k such that s is a prefix of t^k (word t repeated k times). E.g., the periods of the word **entente** are: **ent**, **entent** and **entente**.

The teacher wrote a very long word on the whiteboard. Bytie was not really interested in what was the class about but he wrote down in his notebook all the words that can be obtained from the word on the whiteboard by removing exactly one letter. Now he would like to choose the word in his list with the shortest shortest period. Write a program that will help him with this problem.

Input

The first line of the standard input contains one integer d ($1 \leq d \leq 10$), the number of test cases. Next d lines follow, each of them contains one integer n_i ($2 \leq n_i \leq 200\,000$) that denotes the length of the word on the whiteboard and a n_i -letter word composed of small English letters.

Output

Your program should write d lines to the standard output. The i -th line should contain the answer for the i -th test case: one integer equal to the length of the shortest period among all the shortest periods of the words written in Bytie's notebook.

Example

For the input data:

```
1
8 ababcaba
```

the correct result is:

```
2
```

Explanation: Here are the words written by Bytie, together with the length of their shortest periods:

- **babcbaba** – 5,
- **aabcbaba** – 6,
- **abbcaba** – 6,
- **abacaba** – 4,
- **abababa** – 2,
- **ababcba** – 6,
- **ababcaa** – 6,
- **ababcab** – 5.

We see that removing the letter **c** at the fifth position of the word produces a word with the shortest period of length 2 and removing no other letter gives a word with a shorter shortest period.