Longest Lyndon Prefix

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

A word w is a lyndon word if and only if it is strictly smaller than all its proper suffixes. For example, `aab` is a lyndon word, while `aa` is not a lyndon word.

Chiaki has a string $s_1 s_2 \dots s_n$ of length n. She would like to know l_i, that is the length of the longest prefix of $s_i s_{i+1} \dots s_n$ which is a lyndon word.

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \leq T \leq 10^5$), indicating the number of test cases. For each test case:

The first line contains an integer n ($1 \leq n \leq 10^5$). The second line contains a string $s_1 s_2 \dots s_n$ consists of lowercase characters.

The sum of all n does not exceed 10^5.

Output

For each test case, output n integers denoting $l_1, l_2, \dots, l_n$.

Example

standard input	standard output
3 3 aaa 3 aab 3 cba	1 1 1 3 2 1 1 1 1