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D - String Rotation

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

You are given a string $S = S_1 S_2 \dots S_N$ of length N consisting of lowercase English letters.

You will perform the following operation on S exactly once:

- Choose a contiguous substring of S with length at least 1 and cyclically shift it to the left by 1. That is, choose integers $1 \leq \ell \leq r \leq N$, insert S_ℓ to the right of the r -th character of S , and then delete the ℓ -th character of S .

Find the lexicographically smallest string among all possible strings that S can become after the operation.

You are given T test cases, so solve each of them.

Constraints

- $1 \leq T \leq 10^5$
- $1 \leq N \leq 10^5$
- S is a string of length N consisting of lowercase English letters.
- T and N are integers.
- The sum of N over all test cases in a single input file is at most 10^5 .

2026-01-02 (Fri)

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Input

The input is given from Standard Input in the following format:

```
 $T$   
case1  
case2  
⋮  
case $T$ 
```

Each test case case _{i} ($1 \leq i \leq T$) is given in the following format:

```
 $N$   
 $S$ 
```

Output

Output T lines. The i -th ($1 \leq i \leq T$) line should contain the answer for case _{i} .

Sample Input 1

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```
3  
7  
atcoder  
1  
x  
5  
snuke
```

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Sample Output 1

[Copy](#)

```
acodert  
x  
nsuke
```

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- In the first test case, cyclically shifting from the 2nd to the 7th character gives acodert, which is lexicographically smallest.
- In the second test case, no matter how you operate, you get x.
- In the third test case, cyclically shifting from the 1st to the 2nd character gives nsuke, which is lexicographically smallest.

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