A. Entertainment in MAC

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Congratulations, you have been accepted to the Master's Assistance Center! However, you were extremely bored in class and got tired of doing nothing, so you came up with a game for yourself.

You are given a string s and an **even** integer n. There are two types of operations that you can apply to it:

1. Add the reversed string s to the end of the string s (for example, if $s = \texttt{cpm}$, then after applying the operation $s = \texttt{cpmmpc}$).
2. Reverse the current string s (for example, if $s = \texttt{cpm}$, then after applying the operation $s = \texttt{mpc}$).

It is required to determine the lexicographically smallest[†] string that can be obtained after applying **exactly** n operations. Note that you can apply operations of different types in any order, but you must apply exactly n operations in total.

[†]A string a is lexicographically smaller than a string b if and only if one of the following holds:

- a is a prefix of b, but $a \neq b$;
- in the first position where a and b differ, the string a has a letter that appears earlier in the alphabet than the corresponding letter in b.

Input

Each test consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 500$) — the number of test cases. The description of the test cases follows.

The first line of each test case contains a single **even** integer n ($2 \le n \le 10^9$) — the number of operations applied to the string s.

The second line of each test case contains a single string s ($1 \le |s| \le 100$), consisting of lowercase English letters, — the string to which the operations are applied.

Output

For each test case, output a single line — the lexicographically smallest string that can be obtained after applying exactly n operations.

Example

input

```
5
4
cpm
2
grib
10
kupitimilablodarbuz
1000000000
capybara
6
abacaba
```

output

```
cpm
birggrib
kupitimilablodarbuz
arabypaccapybara
abacaba
```

Note

In the first test case, you can apply the operation of the second type (i.e., reverse the string s) 4 times. Then the string s will remain equal to `cpm`.

In the second test case, you can do the following:

- Apply the operation of the second type, after which s will become equal to `birg`.
- Apply operation of the first type (i.e., add the reversed string s to the end of the string s), after which s will become equal to `birggrib`.
