Problem C
Cataloguing Chaos

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

At the Machine Learning and Bioinformatics Lab, researchers recently discovered a curious perspective on DNA sequences. Beyond carrying genetic information, each sequence can also be quantified by a kind of "sense of order." They call this measure the number of inversions, which describes how disordered a sequence is. An inversion occurs when a letter appears before another letter that is alphabetically smaller, forming an "out-of-order" pair.

To make this clearer, one researcher offered a few examples. In the sequence `DAABEC`, the letter `D` is greater than four letters that follow it, and `E` is greater than one that follows, giving a total of five inversions. Another sequence, `AACEDGG`, has only one inversion – `E` and `D` – so it is almost perfectly sorted. On the other hand, `ZWQM` represents the exact opposite of order: every letter is greater than the ones that follow, adding up to six inversions and making it as disordered as possible.

The lab now faces the task of cataloguing a large collection of DNA sequences, each consisting only of the four letters `A`, `C`, `G` and `T`, all of equal length. But unlike the usual alphabetical sorting, they intend to arrange these sequences by their number of inversions, from the most orderly to the most chaotic, creating a brand-new "catalog of order."

Input Format

The first line of the input is an integer M, then a blank line followed by M datasets. There is a blank line between datasets.

The first line of each dataset contains two integers: a positive integer $n(0 < n \leq 50)$ giving the length of the strings; and a positive integer $m(0 < m \leq 100)$ giving the number of strings. These are followed by m lines, each containing a string of length n. Each string consists only of the four uppercase letters `A`, `C`, `G` and `T`. Please see the sample input.

Output Format

For each dataset, output the list of input strings, arranged from "**most sorted**" to "**least sorted**". If two or more strings are equally sorted, list them in the same order they are in the input file.

Only output the strings themselves, do not print their inversion counts.

Print a blank line between two consecutive test cases. Please see the sample output.

Technical Specification

- $0 < n \leq 50$

- $0 < m \leq 100$

Sample Input 1

```
1

10 6
AACATGAAGG
TTTTGGCCAA
TTTGGCCAAA
GATCAGATTT
CCCGGGGGGA
ATCGATGCAT
```

Sample Output 1

```
CCCGGGGGGA
AACATGAAGG
GATCAGATTT
ATCGATGCAT
TTTTGGCCAA
TTTGGCCAAA
```