

Company Macrohard has released its new version of editor Nottoobad, which can understand a few voice commands. Unfortunately, there are only two voice commands that it can understand — “repeat the last word”, “delete the last symbol”. However, when one uses “repeat the last word” the editor inserts a blank that separates the words. But the company claims that it is possible to type much faster — simply by less number of presses. For example, such a phrase like “this thin thing” requires only 6 presses of the keyboard.

Action	Number of presses	Content of the document
Press “this”	4	This
Say “repeat the last word”	0	this this
Say “delete the last symbol”	0	this thi
Press “n”	1	this thin
Say “repeat the last word”	0	this thin thin
Press “g”	1	this thin thing

In order to increase the popularity of its product the company decided to organize a contest where the winner will be a person who types a given number of words with minimum number of presses. Moreover, the first word must be typed first, and all the others can be typed in arbitrary order. So, if words “apple”, “plum” and “apricote” must be typed, the word “apple” must be typed first, and the words “plum” and “apricote” can be switched. And the most important for you — you are going to take part in the contest and you have a good friend in the company, who told you the word which will be used in the contest. You want to be a winner, so you have to write a program which finds the order of the words, where the number of presses will be minimum.

Input

The first line of the input contains the T ($1 \leq T \leq 15$) the number of test cases. Then T test cases follow. The first line of each test contains a number N ($1 \leq N \leq 100$) — the number of words that must be pressed. Next N lines contain words — sequences of small Latin letters, not longer than 100 symbols. Remember that the first word must be pressed first!

Output

The first line of the output contains number X — the minimum number of presses, which one has to do in order to type all the words using editor *Nottoobad*. Next N lines contain the words in that minimum order.

If there are several solutions, you can output one of them.

Sample Input

```
3
3
this
thin
thing
4
popcorn
apple
apricote
plum
2
hello
hello
```

Sample Output

```
6
this
thin
thing
21
popcorn
plum
apricote
apple
5
hello
hello
```