

The coded lock (30 min., 20 points)

To unlock the coded lock one has to enter a special (encoded) sequence of words. This sequence is built in such way that each following word begins with a letter which ends the previous word, and this sequence is unique. Each word from the given list of words must be obligatory used in an encoded sequence and only once. If some word repeats in the list several times it must be used in an encoded sequence exactly the same times.

The task is to develop the program to read the list of words and determine the possibility of constructing from them the encoded sequence of words to unlock the lock. If it is possible to make the encoded sequence from the words of the list, the program must output this encoded sequence, otherwise – report the impossibility of it.

Input file

The input file *input.txt* consists of $N+1$ of lines. The first line contains the decimal integer N for the number of words in the list ($1 \leq N \leq 10000$). Each of the following N lines comprises one word only. Each word consists of the lower-case Latin letters. The length of the word is from 2 to 1000 letters.

Output file

The output file *output.txt* has the following form.

If an encoded sequence is impossible, file must contain a line with the message “The door cannot be opened.”. Otherwise it consists of N lines containing exactly one word each. The order of words determines an encoded sequence. The last line must be completed with a new line symbol (new line symbol is 0D0Ah).

Example

<i>input.txt</i>	<i>output.txt</i>
<pre>4 asm expert me extra</pre>	<pre>extra asm me expert</pre>