

3. Elemental Writing (elem)

1 sec / 3 sec

40 points

It is sometimes fun to write words or names using the symbols of chemical elements. For example, one can write **ArGeNTiNa** or **TaRtU** in this way. Fictitious elements may also be used in this task: the list of allowed symbols is provided in the input.

Each symbol consists of either a single uppercase Latin letter or an uppercase Latin letter followed by a lowercase Latin letter. A symbol may be used any number of times. Case is ignored when comparing the word with the symbols.

For each given word, find a representation using the minimum number of symbols, or report that the word cannot be written using the given symbols.

Input. The first line contains two integers N and M : the number of symbols ($1 \leq N \leq 702$) and the number of words ($1 \leq M \leq 10\,000$).

Each of the following N lines contains a single symbol. All symbols are distinct.

This is followed by M lines, each containing a word consisting of lowercase Latin letters ‘a’ through ‘z’. Each word has a length of 1 to 100 000 letters, and the sum of the lengths of all words does not exceed 200 000.

Output. Output one line for each word, in the order given in the input.

If it is not possible to represent the word, output -1 .

Otherwise, output the minimum number of symbols required, followed by a space and the word’s representation as a sequence of symbols. Write the symbols exactly as they appear in the input, without spaces between them. If there are multiple representations with the minimum number of symbols, output any one of them.

Example.	Input	Output
	3 3	2 ABa
	A	2 AbBa
	Ab	-1
	Ba	
	aba	
	abba	
	ac	

The word ‘aba’ can be written as either ‘ABa’ or ‘AbA’: in both cases, two symbols are used. The word ‘abba’ also requires two symbols, but the word ‘ac’ cannot be written.

Example.	Input	Output
	3 4	2 ABc
	A	1 Ab
	Ab	1 Bc
	Bc	-1
	abc	
	ab	
	bc	
	b	

If the symbol ‘Ab’ is used for the beginning of the word ‘abc’, the remaining letter ‘c’ cannot be represented. However, the representation ‘ABc’ is possible.

Grading. In this task, each test case is graded separately. The test cases are divided into groups where the following additional conditions hold:

0. (0 points) The examples from the task statement.
1. (8 points) Each symbol consists of one letter.
2. (10 points) Each word consists of at most 20 letters and there are at most 100 words.
3. (22 points) No additional constraints.

You may submit several solutions. Each solution you submit may target one or more test groups (possibly all of them).