Problem A. Dominating Patterns

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

The archaeologists are going to decipher a very mysterious "language". Now, they know many language patterns; each pattern can be treated as a string on English letters (only lower case). As a sub string, these patterns may appear more than one times in a large text string (also only lower case English letters). What matters most is that which patterns are the dominating patterns. Dominating pattern is the pattern whose appearing times is not less than other patterns. It is your job to find the dominating pattern(s) and their appearing times.

Input

The entire input contains multi cases. The first line of each case is an integer, which is the number of patterns N, 1 <= N <= 150. Each of the following N lines contains one pattern, whose length is in range [1, 70]. The rest of the case is one line contains a large string as the text to lookup, whose length is up to 106 . At the end of the input file, number '0' indicates the end of input file.

Output

For each of the input cases, output the appearing times of the dominating pattern(s). If there are more than one dominating pattern, output them in separate lines; and keep their input order to the output.

Example

standard input	standard output
2 aba bab abababababac 6 beta alpha haha delta dede tata dedeltalphahahahototatalpha 0	4 aba 2 alpha haha

Note

You should solve this problem using Rabin-Karp algorithm

Problem B. Uragirimono no Requiem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You are given string $s(1 \leq |s| \leq 5 * 10^5)$ that consists of english lowercase letters, and a dictionary of size $m(1 \leq m \leq 5 * 10^5)$. Determine if it's possible to split into two non-empty strings s1 and s2, such that s1 + s2 = s and both s1 and s2 exist in dictionary.

Input

First line contains string s. Second line contains integer m - number of words in dictionary. The next m lines contain lowercase english letters - words in dictionary. It's guranteed that sum of sizes of words in dictionary $\leq 5 * 10^5$.

Output

Output 'YES' if answer exists and 'NO' otherwise.

Examples

standard input	standard output
goldenwind 2 golden wind	YES
goldenwind 2 goldenw wind	NO
jojoreference 5 jojo reference lol kek d	YES

Problem C. Modified "Towns"game

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

One day Olzhas was bored and he wanted to play the game "towns"with friends. But the game has been slightly modified. In this game, each participant in turn calls another real city of any country, the name of which begins with the maximum possible length of suffix, which ends with the name of the city of the previous participant. It was Olzhas' turn and he should choose the name of the city. Help him with the choice of the name of the city.

Input

Given string P ($1 \leq |P| \leq 400$) name of the city of previous participant. In next line given N ($1 \leq N \leq 10^3$) - numbers of city names which Olzhas know. Next N lines represent name a_i ($1 \leq |a_i| \leq 400$) of the cities. Each name of the city start with Upper case and other characters in the name are lowercase.

Output

First line should be M number of possible names of the cities which could say Olzhas. Next M lines should consist from this possible names of the cities in the order of their input.

Examples

standard input	standard output
Kokshetau 5 Astana Tauemel Tainan Almaty Budapest	1 Tauemel
Almaty 3 Yacuiba Yurga Moscow	2 Yacuiba Yurga

Problem D. String manipulation

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Have you ever tried to pronounce a word without vowels? Perhaps you also tried to pronounce it in the reversed order. Zhandos tries to do both actions at once on the same word. The input is given a string s of even length, which can contain letters and numbers. Remove all vowels from the first half of the word and reverse the second half of the word. Output the received string (the received string must begin with a capital letter).

Input

The line contains a non-empty string s of even length.

Output

Output the string after manipulations.

Examples

standard input	standard output
0VxrJXx7BM	0VxrJMB7xX
j1g9U1umMm	J1g9mMmu1
xDwSbKNPhk	XDwSbkhPNK
Z0UMi9Uees	Z0MseeU9

Note

In the English alphabet, the letter Y can be both a vowel and a consonant letter. In this task, you can only consider it as a vowel.