Problem A. 111498. Substring of a Repeated String

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

Given two strings `A` and `B`. Your task is to find the minimum number of times `A` has to be repeated such that `B` is a substring of it. If `B` cannot be found in `A` after it's extension, return -1. If `A` already contains `B`, the number of repetitions is equal to one by default.

Input

Input contains two lines, where the first line denotes the string `A`, and the second line - string `B`. Input strings contain either lowercase or uppercase letters. Lengths of `A` and `B` are between 1 and 10^5.

Output

Print the minimum number of repetitions of `A`, such that `B` is a substring of `A`.

Examples

standard input	standard output
abcd cdabcdab	3
aaa a	1

Note

For the first test case, answer is 3, because by repeating `A` three times ('*abcdabcdabcd*'), `B` is a substring of it. For the second case, we do not extend the string `A` and `B` is a substring of `A`. Number of repetitions of `A` is 1.

Problem B. 111539. Password

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

Thomas received a new password from his employee. Since Thomas always checks the information, he asks you to check if the password is correct.

It is known that the password is correct only if it occurs *at least* K times on a piece of paper that the Bank Director gave to Thomas.

Input

The first line contains a string s and an integer K ($3 \leqslant |s| \leqslant 10^5$, $1 \leqslant K \leqslant 10000$), where s is a new password. The second line contains a string T ($3 \leqslant |T| \leqslant 10^5$), a string on a piece of paper.

Output

Print `YES` if password is correct, otherwise print `NO`

Examples

standard input	standard output
hello 2 helloThomashelloArthurhelloJohnhello	YES
kbtu 4 kbtuIsTheBestPlaceInTheWorld	NO

Problem C. Cyclic Shift

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

Tamerlan once wrote on a piece of paper a line consisting of large and small Latin letters, and then went to help Askar. When he returned, he found that his friend Alikhan had written another line of the same length under his line. Alikhan claims that he got his line by cyclic shift of Tamerlan's line a few steps to the right (cyclic shift of qwerty line for 2 positions to the right will give ertyqw line). However, Alikhan is known for the fact that he can accidentally make a mistake in a large number of calculations, so Tamerlan is at a loss – whether to believe Alikhan? Help him! From given line, print the minimum possible shift size or -1 if Alikhan is wrong.

Input

The first two lines of input data contain Tamerlan and Alikhan lines, respectively. The line lengths are the same, do not exceed 10000 and are not equal to 0.

Output

Print the single number - the answer to the problem question.

Examples

standard input	standard output
zabcd abcdz	4
abcde decba	-1

Problem D. 109553. 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 his 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 the turn of Olzhas and he should choose the name of the city. Help him with the choice of the name of the city.

Input

Given string P ($1 \leqslant |P| \leqslant 400$) - the name of the city of the previous participant.

In the next line given N ($1 \leqslant N \leqslant 10^3$) - the number of city names that Olzhas know.

Next N lines represent name a_i ($1 \leqslant |a_i| \leqslant 400$) of the cities. Each city name starts with an uppercase letter and other letters are lowercase.

Output

The first line should contain integer M - the number of possible names of the cities which could say Olzhas.

Each of the next M lines should consist of the 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 E. 198309. Chainsaw Man: 13th generation

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

After endterm Makima decided to do the problems for the final exam. Do you know what is the hardest thing in making a problem? It is the name of the task.

Makima has a task name draft s. The name of the task must contain a given string as a substring at least k times. But she has a limitation: the name of the task cannot be very long, and she wants to find the shortest one. Help Makima to find the length of the shortest task name satisfying desired condition.

Input

The first line contains a single integer t — the number of testcases. Each of the next t lines contains string s consisting of only lowercase letters and a number $k(1 \leq k \leq 10^6)$. The sum of lengths of strings over all testcases will not exceed $5 \cdot 10^5$

Output

For each test case print answer in separate line.

Examples

standard input	standard output
3 asas 3 aaa 1 b 2	8 3 2
5 anime 666 violetevergarden 898 mononoke 24 evangelion 4 nugman 7	3330 14368 192 40 36

Problem F. 147131. Simple KMP

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

Given two strings s_1 and s_2, find whether s_1 is a substring of s_2 and print indices of occurrences.

Input

Next two lines contain strings s_1 ($1 \leqslant |s_1| \leqslant 10^5$) and s_2 ($1 \leqslant |s_2| \leqslant 10^5$).

Output

In the first line print a single integer - the number of occurrences of string s_1 in string s_2. In the second line print indices of occurrences.

Example

standard input	standard output
abacaba aba	2 1 5

Note

Solve this task using Knuth-Morris-Pratt algorithm.

Problem G. 147128. Another one prefix function problem

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

The string s was written many times in a row, after which a substring was taken from the resulting string and given to you. Your task is to determine the minimum possible length of the original string s.

Input

The only line contains string S ($0 \leqslant |s| \leqslant 50000$).

Output

The solution of the task.

Examples

standard input	standard output
zzz	1
bcabcab	3

Problem H. 147775. Splitting

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

Given a string s, calculate the number of ways to divide s into 3 non-empty strings a, b, c such that:

$$a + b + c = S \text{ and } a + c = b + c$$

Input

You are given the string s ($1 \leqslant |s| \leqslant 5 \cdot 10^6$), consisting of small Latin letters.

Output

Print the number of ways to partite string.

Example

standard input	standard output
abababababcx	2

Note

String from the first testcase can be partitioned in two ways:
1. $ab + ab + ababcx$
2. $abab + abab + cx$