Codeforces Beta Round #86 (Div. 2 Only)

A. Cifera

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

When Petya went to school, he got interested in large numbers and what they were called in ancient times. For instance, he learned that the Russian word "tma" (which now means "too much to be counted") used to stand for a thousand and "tma tmyschaya" (which literally means "the tma of tmas") used to stand for a million.

Petya wanted to modernize the words we use for numbers and invented a word `petricium` that represents number k. Moreover, `petricium la petricium` stands for number k^2, `petricium la petricium la petricium` stands for k^3 and so on. All numbers of this form are called `petriciumus cifera`, and the number's importance is the number of articles `la` in its title.

Petya's invention brought on a challenge that needed to be solved quickly: does some number l belong to the set `petriciumus cifera`? As Petya is a very busy schoolboy he needs to automate the process, he asked you to solve it.

Input

The first input line contains integer number k, the second line contains integer number l ($2 \le k, l \le 2^{31} - 1$).

Output

You should print in the first line of the output "YES", if the number belongs to the set `petriciumus cifera` and otherwise print "NO". If the number belongs to the set, then print on the seconds line the only number — the importance of number l.

Examples

input
5 25
output
YES 1

input
3 8
output
NO

B. PFAST Inc.

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

When little Petya grew up and entered the university, he started to take part in ACM contests. Later he realized that he doesn't like how the ACM contests are organised: the team could only have three members (and he couldn't take all his friends to the competitions and distribute the tasks between the team members efficiently), so he decided to organize his own contests PFAST Inc. — Petr and Friends Are Solving Tasks Corporation. PFAST Inc. rules allow a team to have unlimited number of members.

To make this format of contests popular he organised his own tournament. To create the team he will prepare for the contest organised by the PFAST Inc. rules, he chose several volunteers (up to 16 people) and decided to compile a team from them. Petya understands perfectly that if a team has two people that don't get on well, then the team will perform poorly. Put together a team with as many players as possible given that all players should get on well with each other.

Input

The first line contains two integer numbers n ($1 \le n \le 16$) — the number of volunteers, and m ($0 \le m \le \frac{n \cdot (n-1)}{2}$) — the number of pairs that do not get on. Next n lines contain the volunteers' names (each name is a non-empty string consisting of no more than 10 uppercase and/or lowercase Latin letters). Next m lines contain two names — the names of the volunteers who do not get on. The names in pair are separated with a single space. Each pair of volunteers who do not get on occurs exactly once. The strings are case-sensitive. All n names are distinct.

Output

The first output line should contain the single number k — the number of people in the sought team. Next k lines should contain the names of the sought team's participants in the lexicographical order. If there are several variants to solve the problem, print any of them. Petya might not be a member of the sought team.

Examples

input
3 1 Petya Vasya Masha Petya Vasya
output
2 Masha Petya

input
3 0 Pasha Lesha Vanya
output
3 Lesha Pasha Vanya

C. Grammar Lessons

time limit per test: 5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Petya got interested in grammar on his third year in school. He invented his own language called Petya's. Petya wanted to create a maximally simple language that would be enough to chat with friends, that's why all the language's grammar can be described with the following set of rules:

- There are three parts of speech: the adjective, the noun, the verb. Each word in his language is an adjective, noun or verb.
- There are two genders: masculine and feminine. Each word in his language has gender either masculine or feminine.
- Masculine adjectives end with `-lios`, and feminine adjectives end with `-liala`.
- Masculine nouns end with `-etr`, and feminime nouns end with `-etra`.
- Masculine verbs end with `-initis`, and feminime verbs end with `-inites`.
- Thus, each word in the Petya's language has one of the six endings, given above. There are no other endings in Petya's language.
- It is accepted that the whole word consists of an ending. That is, words "`lios`", "`liala`", "`etr`" and so on belong to the Petya's language.
- There aren't any punctuation marks, grammatical tenses, singular/plural forms or other language complications.
- A sentence is either exactly one valid language word or exactly one *statement*.

Statement is any sequence of the Petya's language, that satisfy both conditions:

- Words in statement follow in the following order (from the left to the right): zero or more adjectives followed by exactly one noun followed by zero or more verbs.
- All words in the statement should have the same gender.

After Petya's friend Vasya wrote instant messenger (an instant messaging program) that supported the Petya's language, Petya wanted to add spelling and grammar checking to the program. As Vasya was in the country and Petya didn't feel like waiting, he asked you to help him with this problem. Your task is to define by a given sequence of words, whether it is true that the given text represents exactly one sentence in Petya's language.

Input

The first line contains one or more words consisting of lowercase Latin letters. The overall number of characters (including letters and spaces) does not exceed 10^5.

It is guaranteed that any two consecutive words are separated by exactly one space and the input data do not contain any other spaces. It is possible that given words do not belong to the Petya's language.

Output

If some word of the given text does not belong to the Petya's language or if the text contains more that one sentence, print "`NO`" (without the quotes). Otherwise, print "YES" (without the quotes).

Examples

input
petr
output
YES

input
etis atis animatis etis atis amatis
output
NO

input
nataliala kataliala vetra feinites
output
YES

D. Petr#

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Long ago, when Petya was a schoolboy, he was very much interested in the Petr# language grammar. During one lesson Petya got interested in the following question: how many different continuous substrings starting with the s_{begin} and ending with the s_{end} (it is possible $s_{begin} = s_{end}$), the given string t has. Substrings are different if and only if their contents aren't equal, their positions of occurence don't matter. Petya wasn't quite good at math, that's why he couldn't count this number. Help him!

Input

The input file consists of three lines. The first line contains string t. The second and the third lines contain the s_{begin} and s_{end} identificators, correspondingly. All three lines are non-empty strings consisting of lowercase Latin letters. The length of each string doesn't exceed 2000 characters.

Output

Output the only number — the amount of different substrings of t that start with s_{begin} and end with s_{end}.

Examples

input
round ro ou
output
1

input
codeforces code forca
output
0

input
abababab a b
output
4

input
aba ab ba
output
1

Note

In the third sample there are four appropriate different substrings. They are: ab, abab, ababab, abababab.

In the fourth sample identificators intersect.

E. Double Happiness

time limit per test: 3 seconds
memory limit per test: 128 megabytes
input: standard input
output: standard output

On the math lesson a teacher asked each pupil to come up with his own lucky numbers. As a fan of number theory Peter chose prime numbers. Bob was more original. He said that number t is his lucky number, if it can be represented as:

$$t = a^2 + b^2,$$

where a, b are arbitrary positive integers.

Now, the boys decided to find out how many days of the interval $[l, r]$ ($l \le r$) are suitable for pair programming. They decided that the day i ($l \le i \le r$) is suitable for pair programming if and only if the number i is lucky for Peter and lucky for Bob at the same time. Help the boys to find the number of such days.

Input

The first line of the input contains integer numbers l, r ($1 \le l, r \le 3 \cdot 10^8$).

Output

In the only line print the number of days on the segment $[l, r]$, which are lucky for Peter and Bob at the same time.

Examples

input
3 5
output
1

input
6 66
output
7