D. Mahmoud and a Dictionary

Mahmoud wants to write a new dictionary that contains n words and relations between them. There are two types of relations: synonymy (i. e. the two words mean the same) and antonymy (i. e. the two words mean the opposite). From time to time he discovers a new relation between two words.

He know that if two words have a relation between them, then each of them has relations with the words that has relations with the other. For example, if `like` means `love` and `love` is the opposite of `hate`, then `like` is also the opposite of `hate`. One more example: if `love` is the opposite of `hate` and `hate` is the opposite of `like`, then `love` means `like`, and so on.

Sometimes Mahmoud discovers a wrong relation. A wrong relation is a relation that makes two words equal and opposite at the same time. For example if he knows that `love` means `like` and `like` is the opposite of `hate`, and then he figures out that `hate` means `like`, the last relation is absolutely wrong because it makes `hate` and `like` opposite and have the same meaning at the same time.

After Mahmoud figured out many relations, he was worried that some of them were wrong so that they will make other relations also wrong, so he decided to tell every relation he figured out to his coder friend Ehab and for every relation he wanted to know is it correct or wrong, basing on the previously discovered relations. If it is wrong he ignores it, and doesn't check with following relations.

After adding all relations, Mahmoud asked Ehab about relations between some words based on the information he had given to him. Ehab is busy making a Codeforces round so he asked you for help.

Input

The first line of input contains three integers n, m and q ($2 \leq n \leq 10^5$, $1 \leq m, q \leq 10^5$) where n is the number of words in the dictionary, m is the number of relations Mahmoud figured out and q is the number of questions Mahmoud asked after telling all relations.

The second line contains n distinct words $a_1, a_2, ..., a_n$ consisting of small English letters with length not exceeding 20, which are the words in the dictionary.

Then m lines follow, each of them contains an integer t ($1 \leq t \leq 2$) followed by two different words x_i and y_i which has appeared in the dictionary words. If $t = 1$, that means x_i has a synonymy relation with y_i, otherwise x_i has an antonymy relation with y_i.

Then q lines follow, each of them contains two different words which has appeared in the dictionary. That are the pairs of words Mahmoud wants to know the relation between basing on the relations he had discovered.

All words in input contain only lowercase English letters and their lengths don't exceed 20 characters. In all relations and in all questions the two words are different.

Output

First, print m lines, one per each relation. If some relation is wrong (makes two words opposite and have the same meaning at the same time) you should print "NO" (without quotes) and ignore it, otherwise print "YES" (without quotes).

After that print q lines, one per each question. If the two words have the same meaning, output 1. If they are opposites, output 2. If there is no relation between them, output 3.

See the samples for better understanding.

Examples

input

```
3 3 4
hate love like
1 love like
2 love hate
1 hate like
love like
love hate
like hate
hate like
```

output

```
YES
YES
NO
1
2
2
2
```

input

```
8 6 5
hi welcome hello ihateyou goaway dog cat rat
1 hi welcome
1 ihateyou goaway
2 hello ihateyou
2 hi goaway
2 hi hello
1 hi hello
dog cat
dog hi
hi hello
ihateyou goaway
welcome ihateyou
```

output

```
YES
YES
YES
YES
NO
YES
3
3
1
1
2
```