Task Description: Lecturer

There are several lecturers in SoC and there are several offices in SoC. Each lecturer and each office has a unique name. Each lecturer will be allocated to zero or more offices. Each lecturer may be active or not. You want to develop a program to maintain the database of SoC lecturer. Your program must be able to implement several queries, each of the query is either one of the following:

1. Toggle a status of a lecturer. If the lecturer is active, then the status of the lecturer become not active, and vice versa. Initially, all lecturers are active
2. Allocate an office to a lecturer. If the office is already allocated to that lecturer, then you must ignore this query.
3. Print the name of an office that a lecturer has been allocated to. If the lecturer does not have any office, print "NONE". If the lecturer has more than one office, print the name of the lexicographically smallest office that he has been allocated to.
4. Print the name of the office that has the most number of **ACTIVE** lecturers. If there is a tie, print the name with the most active lecturers and lexicographically smallest.

Input

The first line of the input contains three integers N, M, and Q, representing the number of lecturers, the number of offices, and the number of queries respectively.
N lines follow, each line consists of a single string representing the name of a lecturer.
M lines follow, each line consists of a single string representing the name of an office.
Q lines follow, each line is either one of the following:

1. "1 X" means that you have to do query 1 on lecturer X.
2. "2 X Y" means that you have to do query 2 on lecturer X with office Y.
3. "3 X" means that you have to do query 3 on lecturer X.
4. "4" means that you have to do query 4.

It is guaranteed that the lecturer and the office mentioned in the query exists.

Output

For every query 3 and query 4, you have to output one line as the problem requested.

Sample Input

```
3 2 6
sunteck
aaron
stevenhalim
acmlab
databaselab
3 sunteck
2 sunteck databaselab
3 sunteck
4
1 sunteck
4
```

Sample Output

```
NONE
databaselab
databaselab
acmlab
```

Constraint

N, M, Q will be between 1 and 30 inclusive.

Q will be between 1000 inclusive.

Name of a lecturer and office will be between 1 and 20 characters inclusive, and will be consist of lowercase alphabet.

You are advised to implement two classes: Lecturer and Office for this task.