

Singapore Valley

Statement

Fluffy the Hamster has just arrived in Singapore Valley, the dreamland, as a software engineer for the government. In Singapore Valley, companies compete not by growing themselves but by buying their competitors. Since transactions happen every day, Fluffy is assigned a task to develop a program that manages all transactions.

Formally, there are M companies and N software engineers in Singapore Valley. These companies will be numbered from 0 to $M - 1$. All engineers are also numbered from 0 to $N - 1$. Initially, each engineer is employed by exactly one company. There can be companies that employs no engineers.

In total, Fluffy's program needs to handle T transactions. In each transaction, company u will take over company v . After the transaction, all engineers of company v will become employees of company u . Also, company v will be closed down and therefore will not be part of any future transaction.

After all transactions, Fluffy needs to report the list of all companies that are still operating (i.e: not closed down). Also, for each such company, he needs to list down all engineers currently employed by it.

Constraints

- $1 \leq N \leq 3 \cdot 10^5$
- $1 \leq M \leq 10^5$
- $0 \leq T < 10^5$

Input

The first line contains two integers N and M , the number of engineers and companies in the beginning.

Next, M lines follow, the i th line (where $0 \leq i < M$) contains a list of engineers employed by company i initially. It begins with an integer l , the number of engineers, followed by l integers – the identity of the engineers being employed by the company.

The next Q lines of input will contain one action each, in the format described above.

The next line is a single integer T - the number of transactions.

The next T lines will consists of two integers u, v each ($0 \leq u, v \leq M - 1, u \neq v$) indicating a transaction that the company u takes over the company v . It's guaranteed that both companies u and companies v is still operating before the transaction.

Output

The first line contains a single integer K , number of companies that are still operating

K lines follow, each contains information about one operating company. Each line begins with two integers ID and l - the company identity and the number of engineers that are currently employed by it, followed by l integers - the identity of the engineers being employed by the company, in ascending order.

You should also output the companies in ascending order of their numerical identities

Examples

Sample Input	Expected Output
<pre>6 4 3 0 1 2 1 3 1 4 1 5 2 2 3 0 2</pre>	<pre>2 0 5 0 1 2 4 5 1 1 3</pre>
<pre>5 2 5 0 1 2 3 4 0 0</pre>	<pre>2 0 5 0 1 2 3 4 1 0</pre>

The following is an explanation for the first example:

Event	Companies' Status
Initially	Company 0 employs engineers 0, 1, 2 Company 1 employs engineers 3 Company 2 employs engineers 4 Company 3 employs engineers 5
After Company 2 buys Company 3	Company 0 employs engineers 0, 1, 2 Company 1 employs engineers 3 Company 2 employs engineers 4, 5 Company 3 no longer exists
After Company 0 buys Company 2	Company 0 employs engineers 0, 1, 2, 4, 5 Company 1 employs engineers 3 Company 2 no longer exists Company 3 no longer exists

Notes

1. A skeleton file has been given to help you. You should not create a new file or rename the file provided. You should develop your program using this skeleton file.
2. You are free to define your own helper methods and classes (or remove existing ones) if it is suitable but you must put all the new classes, if any, in the same skeleton file provided.

Skeleton File

You are given the skeleton file `Valley.java`. You should see the following contents when you open the file:

```
/**
 * Name      :
 * Matric. No :
 */

import java.util.*;

public class Valley {
    private void run() {
        // implement your "main" method here
    }

    public static void main(String args[]) {
        Valley runner = new Valley();
        runner.run();
    }
}
```