

**Time: 40 minutes**

A potato chips company is giving a sticker for free with each of their chips packets. But the sticker resides inside the packet, so there is no way to know which sticker you are getting while buying a potato chips. The chips company is putting  $m$  different stickers into their packets.

As a kid, you are obsessed with these stickers and you want to collect as many different stickers as possible. All of your  $n$  friends want the same as well.

One person can have duplicates of a certain sticker. Everyone trades duplicates for stickers he doesn't possess. Since all stickers have the same value, the exchange ratio is always 1:1.

As a clever kid, you have realized that in some cases it is good for you to trade one of your duplicate stickers for a sticker you already possess. This may seem counter-intuitive, as you will have more duplicate stickers after such exchange. But for future trades, these duplicates may come handy.

As your friends aren't as clever as you, you can assume that your friends will only exchange stickers with you and they will give away only duplicate stickers in exchange with different stickers they don't possess.

You have to print the maximum number of different stickers you can have by trading/exchanging (70%). Also print all the exchanges (30%).

Create a flow network using the following ideas.

The source node should represent you. Create a dummy sink node.

Create one node for each of  $m$  stickers and one node for each of  $n$  friends.

Create an edge from source to sticker with capacity = number of that sticker you have

Create an edge from sticker to friend with capacity = 1,  
if that friend doesn't have that sticker

Create an edge from friend to sticker with capacity = number of that sticker that friend has - 1 (if that friend has duplicates of that sticker)

Create an edge from each sticker to dummy sink with capacity = 1

The max flow in this network is the maximum different stickers you can have.

**Input format:**

First line should have  $n$  and  $m$ , separated by a space.

Second line should contain how many stickers you have now and then the numbers of those stickers separated by spaces.

Each of the next  $n$  lines should contain how many stickers your friend has now and then the numbers of those stickers separated by spaces.

Sample input	Corresponding output and explanation
1 5 6 1 1 1 1 1 1 3 1 2 2	1 No exchange is possible  Explanation: Friend 1 has stickers 1 and 2. You also have sticker 1, so your friend can't get any new sticker from you. You have only stickers numbered 1 at the end, so you have only 1 different sticker.
2 5 4 1 2 1 1 3 2 2 2 5 1 3 4 4 3	3 Exchange a sticker with number 1 against a sticker with number 2 of friend 1 Exchange a sticker with number 2 against a sticker with number 3 of friend 2  Explanation: Friend 1 has 3 stickers with number 2. When you exchange a sticker with number 1 against a sticker with number 2 of friend 1, your friend gets a sticker with number 1. Now you have the stickers (1,2,2,1). Friend 1 has the stickers (1,2,2). Now you exchange a sticker with number 2 against a sticker with number 3 of friend 2. Then you have the stickers (1,2,3,1). Friend 2 has the stickers (1,3,4,4,2). You have stickers numbered 1,2,3 at the end, so you have 3 different stickers.