

Round 1A 2008

[A. Minimum Scalar Product](#)**B. Milkshakes**[C. Numbers](#)[Contest Analysis](#)[Questions asked](#) 3

- Submissions

Minimum Scalar Product

5pt Not attempted
2352/2567 users
correct (92%)

10pt Not attempted
1048/2336 users
correct (45%)

Milkshakes

10pt Not attempted
655/1042 users correct
(63%)

25pt Not attempted
312/432 users correct
(72%)

Numbers

15pt Not attempted
577/1925 users correct
(30%)

35pt Not attempted
96/364 users correct
(26%)

- Top Scores

Bohua	100
yuhch123	100
neal.wu	100
newman	100
Plagapong	100
Ahyangyi	100
Reid	100
Qingchun	100
ploh	100
kubus	100

Problem B. Milkshakes

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input
10 points

Solve B-small

Large input
25 points

Solve B-large

Problem

You own a milkshake shop. There are N different flavors that you can prepare, and each flavor can be prepared "malted" or "unmalted". So, you can make $2N$ different types of milkshakes.

Each of your customers has a set of milkshake types that they like, and they will be satisfied if you have at least one of those types prepared. At most one of the types a customer likes will be a "malted" flavor.

You want to make N batches of milkshakes, so that:

- There is exactly one batch for each flavor of milkshake, and it is either malted or unmalted.
- For each customer, you make at least one milkshake type that they like.
- The minimum possible number of batches are malted.

Find whether it is possible to satisfy all your customers given these constraints, and if it is, what milkshake types you should make.

If it is possible to satisfy all your customers, there will be only one answer which minimizes the number of malted batches.

Input

- One line containing an integer C , the number of test cases in the input file.

For each test case, there will be:

- One line containing the integer N , the number of milkshake flavors.
- One line containing the integer M , the number of customers.
- M lines, one for each customer, each containing:
 - An integer $T \geq 1$, the number of milkshake types the customer likes, followed by
 - T pairs of integers " X Y ", one for each type the customer likes, where X is the milkshake flavor between 1 and N inclusive, and Y is either 0 to indicate unmalted, or 1 to indicate malted. Note that:
 - No pair will occur more than once for a single customer.
 - Each customer will have at least one flavor that they like ($T \geq 1$).
 - Each customer will like at most one malted flavor. (At most one pair for each customer has $Y = 1$).

All of these numbers are separated by single spaces.

Output

- **C** lines, one for each test case in the order they occur in the input file, each containing the string "Case #X: " where **X** is the number of the test case, starting from 1, followed by:
 - The string "**IMPOSSIBLE**", if the customers' preferences cannot be satisfied; **OR**
 - **N** space-separated integers, one for each flavor from **1** to **N**, which are 0 if the corresponding flavor should be prepared unmalted, and 1 if it should be malted.

Limits

Small dataset

$C = 100$
 $1 \leq N \leq 10$
 $1 \leq M \leq 100$

Large dataset

$C = 5$
 $1 \leq N \leq 2000$
 $1 \leq M \leq 2000$

The sum of all the **T** values for the customers in a test case will not exceed 3000.

Sample

Input	Output
2	Case #1: 1 0 0 0 0
5	Case #2: IMPOSSIBLE
3	
1 1 1	
2 1 0 2 0	
1 5 0	
1	
2	
1 1 0	
1 1 1	

In the first case, you must make flavor #1 malted, to satisfy the first customer. Every other flavor can be unmalted. The second customer is satisfied by getting flavor #2 unmalted, and the third customer is satisfied by getting flavor #5 unmalted.

In the second case, there is only one flavor. One of your customers wants it malted and one wants it unmalted. You cannot satisfy them both.

