



## USACO 2022 JANUARY CONTEST, SILVER PROBLEM 3. CEREAL 2

[Return to Problem List](#)

Contest has ended.

[Log in to allow submissions in analysis mode](#)

English (en) ▼

Farmer John's cows like nothing more than cereal for breakfast! In fact, the cows have such large appetites that they will each eat an entire box of cereal for a single meal.

The farm has recently received a shipment with  $M$  different types of cereal ( $2 \leq M \leq 10^5$ ). Unfortunately, there is only one box of each cereal! Each of the  $N$  cows ( $1 \leq N \leq 10^5$ ) has a favorite cereal and a second favorite cereal. When given a selection of cereals to choose from, a cow performs the following process:

1. If the box of her favorite cereal is still available, take it and leave.
2. Otherwise, if the box of her second-favorite cereal is still available, take it and leave.
3. Otherwise, she will moo with disappointment and leave without taking any cereal.

Find the minimum number of cows that go hungry if you permute them optimally. Also, find any permutation of the  $N$  cows that achieves this minimum.

### INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains two space-separated integers  $N$  and  $M$ .

For each  $1 \leq i \leq N$ , the  $i$ -th line contains two space-separated integers  $f_i$  and  $s_i$  ( $1 \leq f_i, s_i \leq M$  and  $f_i \neq s_i$ ) denoting the favorite and second-favorite cereals of the  $i$ -th cow.

### OUTPUT FORMAT (print output to the terminal / stdout):

Print the minimum number of cows that go hungry, followed by any permutation of  $1 \dots N$  that achieves this minimum. If there are multiple permutations, any one will be accepted.

### SAMPLE INPUT:

```
8 10
2 1
3 4
2 3
6 5
7 8
6 7
7 5
5 8
```

### SAMPLE OUTPUT:

```
1
1
3
2
8
4
6

5
7
```

In this example, there are 8 cows and 10 types of cereal.

Note that we can effectively solve for the first three cows independently of the last five, since they share no favorite cereals in common.

common.

If the first three cows choose in the order  $[1, 2, 3]$ , then cow 1 will choose cereal 2, cow 2 will choose cereal 3, and cow 3 will go hungry.

If the first three cows choose in the order  $[1, 3, 2]$ , then cow 1 will choose cereal 2, cow 3 will choose cereal 3, and cow 2 will choose cereal 4; none of these cows will go hungry.

Of course, there are other permutations that result in none of the first three cows going hungry. For example, if the first three cows choose in the order  $[3, 1, 2]$  then cow 3 will choose cereal 2, cow 1 will choose cereal 1, and cow 2 will choose cereal 3; again, none of cows  $[1, 2, 3]$  will go hungry.

It can be shown that out of the last five cows, at least one must go hungry.

**SCORING:**

- In 4 out of 14 test cases,  $N, M \leq 100$ .
- In 10 out of 14 test cases, no additional constraints.

Problem credits: Dhruv Rohatgi

Contest has ended. No further submissions allowed.

---