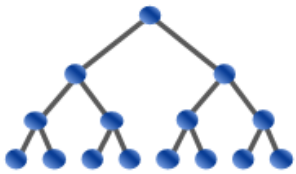

USACO 2022 JANUARY CONTEST, SILVER
PROBLEM 3. CEREAL 2

Return to Problem List

Contest has ended.

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 $1 \ldots N$ 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

Language: C

Source File: Choose File No file chosen

Submit Solution

Note: Many issues (e.g., uninitialized variables, out-of-bounds memory access) can cause a program to produce different output when run multiple times; if your program behaves in a manner inconsistent with the official contest results, you should probably look for one of these issues. Timing can also differ slightly from run to run, so it is possible for a program timing out in the official results to occasionally run just under the time limit in analysis mode, and vice versa. Note also that we have recently changed grading servers, and since our new servers run at different speeds from the servers used during older contests, timing results for older contest problems may be slightly off until we manage to re-calibrate everything properly.

Previous In-Contest Submissions:

Mon, Jan 31, 2022 20:40:38 EST (C++17)
Mon, Jan 31, 2022 20:46:09 EST (C++17)
Mon, Jan 31, 2022 21:10:45 EST (C++17)
Mon, Jan 31, 2022 21:20:47 EST (C++17)