

Vacations

For every student of a school, we know the places where they traveled during the holidays (the data is given with pairs: student number, place of travel). The students who have been in more than one place give more data pairs about themselves. We form groups of students who vacationed in exactly the same places (each of these groups should have the largest possible size).

Write a program that determines the following:

1. The total number of places where the students traveled.
2. The number of visited places for each student.
3. The place where most students were.
4. A student who did not travel anywhere.
5. How many groups of students can be made according to the principle in the task description?

Input

The first line of the *standard input* contains the number of students ($1 \leq N \leq 1000$), and the number of data pairs ($1 \leq M \leq 2000$). In the next $M \cdot 2$ lines, there is a data pair in every two lines: the identifier number of a student ($1 \leq S_i \leq N$), and a place of travel (a word with at most 10 letters of the English alphabet). Every student has been to at most 10 places, the total number of places does not exceed 1000. Nobody visited a place twice.

Output

The *standard output* should contain a line with a single **# character** before the solution of **each subtask**. This # character line is followed by as many lines as needed for the output of a subtask. If you cannot solve a subtask, you should output only the line containing the # character. If the output format is not correct (less/more # characters are in the output), you will get “Output format error”, even if you have correct solutions for some subtasks.

Subtask 1 (15 points): Print the number of different places that were visited by at least one student.

Subtask 2 (20 points): Print a line for each person who traveled at least once (in any order). Every line should contain a student identifier and the count of places visited by that person.

Subtask 3 (20 points): Print the place visited by most students. In case of multiple possible solutions, you must give the one that occurs first in the input.

Subtask 4 (15 points): A single line should contain the identifier of a student who has not traveled anywhere. In case of multiple possible answers, you can print any of them. If there is no such student, then print -1.

Subtask 5 (30 points): Print how many groups can be formed of students who visited exactly the same places. The students who have not traveled anywhere are not put into any group.

Example

Input	Output
5 6	#
1	3
Hawaii	#
2	1 2
Cyprus	2 2
1	3 1
Cyprus	4 1
3	#
Tahiti	Hawaii
4	#
Hawaii	5
2	#
Hawaii	3

Explanation for subtask 5: the first group contains students 1 and 2 who went to both Hawaii and Cyprus, in the second group there is only student 3 who went to Tahiti, and student 4 traveled only to Hawaii so she must make a separate third group.