Vocational schools

As part of an educational reform, the government plans to merge vocational schools. The goal is to merge all the vocational schools into one, which train for exactly the same professions. We know the current professions for every school (the data is given with pairs: school identifier, name of the profession). Multiple data pairs are given for schools that teach more than one profession.

Write a program that determines the following:

1. The total number of different professions.
2. A profession that can be learned only in one school.
3. For every profession, the number of schools teaching it.
4. The school that trains for the most professions.
5. How many schools will there be after merging them?

Input

The first line of the *standard input* contains the number of schools ($1 \leq K \leq 1000$), and the number of data pairs ($1 \leq T \leq 2000$). In the next T*2 lines, there is a data pair in every two lines: a profession (a word with at most 20 letters of the English alphabet), and the identifier number of a school that trains for it ($1 \leq S_i \leq K$). A school can teach at most 10 professions, the number of different professions does not exceed 1000.

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 total number of different professions on a single line.

Subtask 2 (20 points): A single line should contain a profession that is taught in only one school. In case of multiple possible answers, you can print any of them. If there is no such profession, then print the word NONE.

Subtask 3 (20 points): Print a line for each profession (in any order). Every line should contain a profession and the count of schools teaching that profession.

Subtask 4 (15 points): Print the identifier of the school that trains for the most professions. In case of multiple possible solutions, you must give the one with the smallest identifier.

Subtask 5 (30 points): Print how many schools will there be, after the government merges the schools teaching exactly the same set of professions.

Example

Input	Output
4 6 carpenter 1 locksmith 2 locksmith 1 hairdresser 3 carpenter 4 carpenter 2	# 3 # hairdresser # carpenter 3 locksmith 2 hairdresser 1 # 1 # 3

Explanation for subtask 5: schools 1 and 2 will be merged into one school because both of them train carpenters and locksmiths. School 3 only trains hairdressers, and school 4 only trains carpenters, so they cannot be merged with any others. (School 4 cannot be merged with 1 and 2 because it does not train locksmiths.)