Butchers

There are H butchers at a market, we know for each of them the types of meat they sell. We know that two butchers get their meat from the same supplier if and only if they sell the same types of meat.

Write a program that determines the following:

1. The total number of different types of meat sold by butchers.
2. A type of meat sold by only one butcher.
3. For every meat type, the number of butchers who sell it.
4. The butcher who sells the most types of meat.
5. How many suppliers provide meat to the butchers?

Input

The first line of the *standard input* contains the number of butchers ($1 \leq H \leq 1000$), and the number of data pairs ($1 \leq A \leq 2000$). In the next A*2 lines, there is a data pair in every two lines: the type of meat (a word with at most 10 letters of the English alphabet), and the identifier number of a butcher who sells it ($1 \leq B_i \leq H$). A butcher sells at most 20 types of meat, the number of different meats 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 types of meat on a single line.

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

Subtask 3 (20 points): Print a line for each type of meat (in any order). Every line should contain the name of a meat type and the count of butchers selling that meat.

Subtask 4 (15 points): Print the identifier of the butcher who sells the most types of meat. In case of multiple possible solutions, you must give the one with the smallest identifier.

Subtask 5 (30 points): Print the number of suppliers (that is: how many groups can be formed of butchers according to the types of meat they sell).

Example

Input	Output
4 6 beef 1 duck 2 duck 1 pork 3 beef 4 beef 2	# 3 # pork # beef 3 duck 2 pork 1 # 1 # 3

Explanation for subtask 5: butcher 1 and 2, who sell beef and duck, buy meat from the first supplier, butcher 3, who sells only pork, must buy it from a second supplier, and the supplier of butcher 4 must be different from the first one because he sells only beef, no duck.