January 2023 CSE 208
Practice on Graph Traversal

Time: 45 minutes

Subsection : A2

Suppose you are hired by a software company. In your company you have many departments, and each department has **exactly** one GM. Each GM has a rank of 0 and they don't have a boss to report to. An employee other than GM has **exactly one** boss to whom he has to report, and his rank is 1 lower than his boss's.

For example, suppose in a department there are two employees who work directly under the GM. So their rank is 1. Again, three more people work under the rank 1 employee, so these three employees have a rank of 2, and so on.

You have to find out the ids of the GM from each department and print their subordinates' ranks (sorted based on ranks). Please see the sample I/O for clarification.

Note, use topological sort for finding the ids of the GM from each department.

Input

You have to take input from a file named *input.txt*.

The first line of the input contains one integers n, m ($1 \leq n \leq 1E5$, $0 \leq m \leq n-1$) — the # of employees, the # of boss employee relation.

Next m lines of the input contains two integers x, y ($0 \leq x \leq n-1$, $0 \leq y \leq n-1$) and ($x \neq y$) — x is the boss of y.

Output

You have to print department by department.

For each department, print 2 integers p and q where p is the id of the GM of the department and q is the # of his subordinate.
In the next q line, print l and r where l is the employee id and r is the rank.
Print two blank lines.

Do it until all departments are iterated.

Sample I/O

Case # 1

Input File

```
10 7
1 2
1 3
2 4
2 6
4 5
7 8
8 9
```

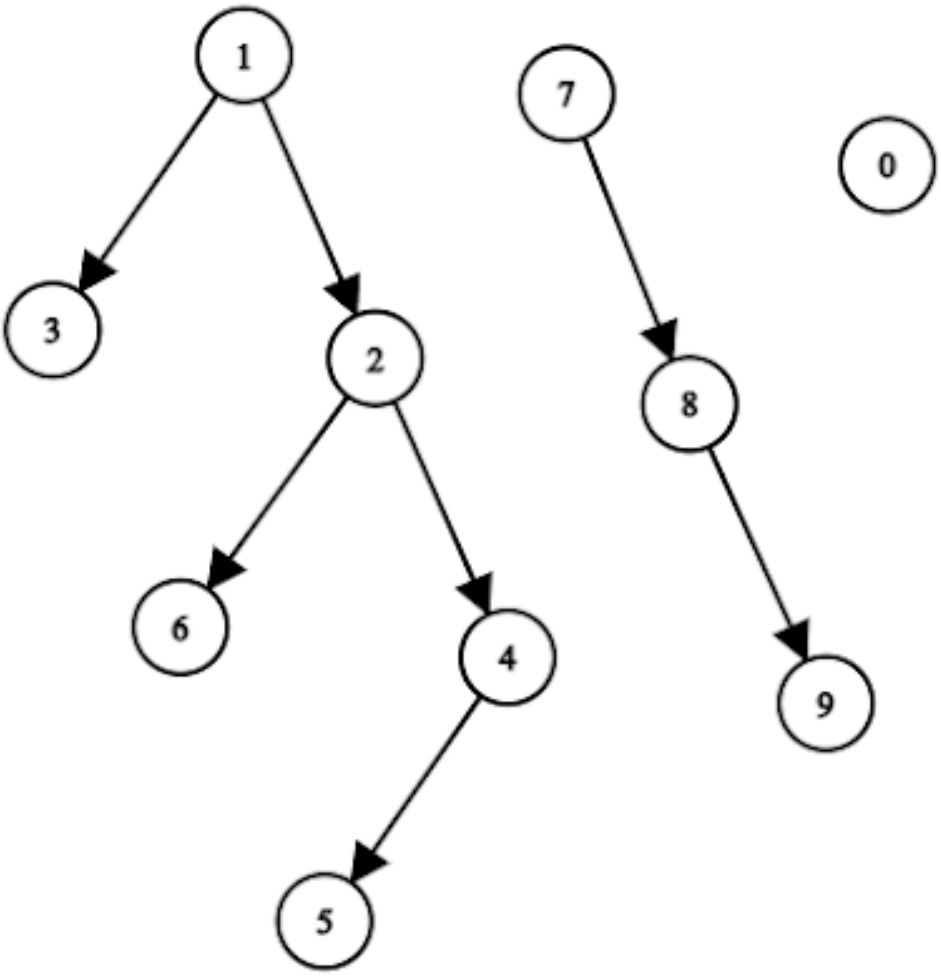
Output

```
1 5
2 1
3 1
4 2
6 2
5 3

7 2
8 1
9 2

0 0
```

Explanation of case # 1



Submission

1. Create a directory with your 7-digit student id as its name.
2. Put all the source files only into the directory created in step 1.
3. Zip the directory (compress in .zip format. Any other format like .rar, .7z etc. are not acceptable).
4. Upload the .zip file in moodle.

Special Instructions

Please note that any usage of the internet is strictly prohibited during the assignment. Usage of any unfair means will be duly punished.