

Problem A - Desperate days for Jocas

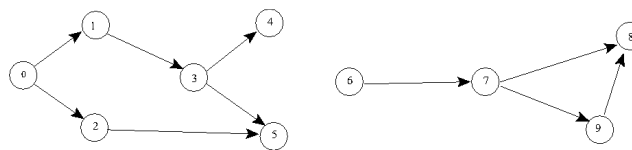
Description

Jocas is now starting the 2nd semester of the 3rd year on Informatics Engineering. He knows that this is not going to be an easy semester. Fortunately, he has access to the study notes of his roommate, who is now enrolled in the MSc in Informatics Engineering. So, he decided to organize himself very well..

He made a detailed plan of the topics that he will have to study during the 2nd semester. Obviously, there are precedence between topics of the same course, for instance, he cannot study branch-and-bound algorithms without knowing backtracking in LPA. Moreover, these precedences can also occur between different courses.

Of course, being at "Queima" without being worried about having topics to study is very important for Jocas. Therefore, given this study plan, he wants to shorten the overall study time, which means that each topic needs be studied as soon as possible. He assumes that he does not need more than one day for each topic. Moreover, if there is a precedence between topic a and topic b he prefers not to study both in the same day. Now, he wants to know if such plan is feasible, given his capacity of studying a given amount of topics per day.

An hypothetic plan is depicted in the following figure, with 10 topics of study. An arrow from topic a to topic b means that a has to be studied before b .



By following the rules above, the minimum number of days needed to study the 10 topics is 4, as shown in the table below. However, if the maximum number of topics that Jocas can study per day is 2, then, days 2 and 4 are going to be very tough for him.

Day	Topic
1	0, 6
2	1, 2, 7
3	3, 9
4	4, 5, 8

Task

Given a plan of topics to study (which includes precedences) and Joca's willingness of shortening the study time according to the rules mentioned above, you should implement an algorithm computes the study plan per day and returns:

- the maximum number of topics that he has to study in a single day
 - the number of days that he will be desperate, i.e. the number of topics to study in each of those days is more than the maximum he can handle.
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Input

The first line contains three integers: the number of topics (m), the number of precedences (n) and the maximum number of topics that Jocas can study in a single day. Then, n lines follow. Each line has two integers, a and b , where a is the topic that must be studied before topic b .

Output

For each test case, print the maximum number of topics that Jocas has to study in a single day and the number of days that he will be desperate, in a single line.

Constraints

- $1 \leq n \leq 300\,000$
 - $1 \leq m \leq 5\,000$
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Example

Example input:

```
10 10 2
0 1
0 2
1 3
2 5
3 5
3 4
6 7
7 8
7 9
9 8
```

Example output:

3 2
