

Problem 1 - Mikado (mikado)

The game of Mikado is a famous pop-up sticks game played with a set of sticks.

In our case, N different sticks are bundled and thrown on a table to create a messy pile of sticks, where they are placed on top of each other. The goal is to remove all the sticks, one at a time, without moving any other sticks as you remove each one.

You are given the number of sticks N and a set of M different rules $x\ y$, meaning that the stick x is positioned over the stick y . In this case, you can remove the stick y only after removing all the sticks positioned over it.

For this task, your goal for this task is to find one of the possible order to remove all the N sticks by following the M precedence rules.

Input data

The first line of the input file contains an integer T , the number of test cases to solve.

For each test case, the first line of the input file contains the integers:

- N , the number of sticks
- M , the number precedence rules

The next M lines will contain two different space-separated integer numbers x and y , meaning that the stick x is placed above the stick y .

Output data

The output file must contains T lines.

For each test case in the input file, the output file must contain a line with the characters:

Case $\#t$: $s_0\ s_1\ \dots\ s_{N-1}$

Where t is the test case number, from 1 to T , and $s_0\ s_1\ \dots\ s_{N-1}$ is the order of the removed sticks following the problem statement.

Constraints

- $5 \leq N \leq 10000$
- $5 \leq M \leq 10000$
- Sticks are numbered starting from 0
- It is always possible to find a solution
- In case of multiple solutions, you only need to print only one of them

Scoring

- **input 1** : $T = 1, N \leq 10, M \leq 15$
- **input 2** : $T = 5, N \leq 500, M \leq 500$
- **input 3** : $T = 10, N \leq 1\,000, M \leq 1\,000$
- **input 4** : $T = 15, N \leq 2\,000, M \leq 2\,000$
- **input 5** : $T = 20, N \leq 10\,000, M \leq 10\,000$

Examples

input	output
2 10 6 8 5 4 8 3 8 2 7 6 8 3 7 8 14 0 4 3 7 2 6 4 3 5 7 4 5 1 7 6 3 2 3 4 7 6 7 1 2 2 7 0 7	Case #1: 0 1 2 3 4 6 7 8 9 5 Case #2: 0 1 2 4 5 6 3 7

Explanation

In the *first example*, we have that:

- Stick with id 8 is positioned over the stick with id 5.
- Stick with id 4 is positioned over the stick with id 8.
- Stick with id 3 is positioned over the stick with id 8.
- Stick with id 2 is positioned over the stick with id 7.
- Stick with id 6 is positioned over the stick with id 8.
- Stick with id 3 is positioned over the stick with id 7.

In this testcase a possible solution is to remove first the sticks 0, 1, 2, 3 and 4.

The stick 5 cannot be removed at this point as the stick 8 is positioned over it, so we will remove the sticks 6, 7, 8, 9 and finally the stick 5.