Problem 5 - Pebble game (pebble)

R-Boy, bored by the long winter days, decides to challenge his friend and helper Zer0 to a turn-based game.

Given a direct graph with N nodes and M edges, R-Boy starts the game by placing a pebble in a node of his choice between 0 and $Z-1$, then Zer0 does the same on a node between Z and $N-1$.

In the following turns, R-Boy and Zer0 alternate by moving their pebble using an outgoing edge on a new free node.

The winner of a turn is the player with more nodes at a shorter distance from the other one, possibly neither of them two if both have the same number of nearest nodes.

The game ends with a winning of a player if one of the following two conditions occurs in a turn:

- The opposite player cannot move, that is, it has no valid next moves.
- The difference of winning turns between the player and his opponent reaches the value of 10^{100}.

If these two conditions never happen, the game continues indefinitely and there is a tie.

Write a program to count how many initial configuration ends with the winning of the first or the second player or with a tie, if both players play optimally.

Input data

The first line of the input file contains an integer **T**, the number of test cases to solve, followed by **T** testcases, numbered from **1** to **T**.

In each test case, the first line contains the three integers **N**, **M** and **Z**.

The next **M** lines contains two space-separated integers i j each, to indicate that there is a direct arc from i to j.

Output data

The output file must contains **t** lines. For each test case in the input file, the output file must contains a line with the words:

Case #t: r z n

where t is the test case number (from **1** to **T**) and the three space-separated integers numbers, respectively:

- r is the number of initial configurations where R-Boy wins.
- z is the number of initial configurations where Zer0 wins.
- n is the number of initial configurations where no player wins.

Constraints

- $1 \leq \mathbf{T} \leq 15$.
- $1 \leq \mathbf{N} \leq 50$.

- $1 \leq \mathbf{M} \leq (N-1)^2$.
- $0 < \mathbf{Z} <$ N-1.
- All the direct edges are distincts.
- There are not self-edge ($i \neq j$).
- R-Boy starts the game.
- At any time, the two players cannot have their pebbles on the same node.

Scoring

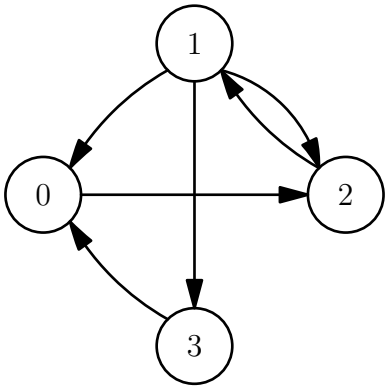
- **input 1** : $\mathbf{T} = 5$, $\mathbf{N} \leq 50$ and the graph is a circle.
- **input 2** : $\mathbf{T} = 5$, $\mathbf{N} \leq 50$ and the graph is acyclic.
- **input 3** : $\mathbf{T} = 5$, $\mathbf{N} = 4$.
- **input 4** : $\mathbf{T} = 10$, $\mathbf{N} \leq 15$.
- **input 5** : $\mathbf{T} = 15$, $\mathbf{N} \leq 50$.

Examples

input	output
1 4 6 2 3 0 0 2 2 1 1 3 1 0 1 2	Case #1: 1 1 2

Explanation

In the example the graph is the following one:



The 4 possible initial configurations are:

- R-Boy starts at 0 and Zer0 starts at 2, R-Boy loses immediately because it cannot move.
- R-Boy starts at 0 and Zer0 starts at 3, no one wins and the game will continue forever.
- R-Boy starts at 1 and Zer0 starts at 2, no one wins and the game will continue forever.
- R-Boy starts at 1 and Zer0 starts at 3, R-Boy moves to 0 and Zer0 loses as it cannot move.