# 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

- $1 \leq \mathbf{T} \leq 15$.
- $1 \leq \mathbf{N} \leq 40$.

- $1 \leq \mathbf{M} \leq (N-1)^2$.
- $0 < \mathbf{Z} <$ 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

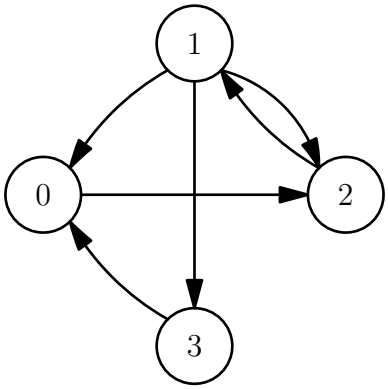
- **input 1** : $\mathbf{T} = 5$, $\mathbf{N} \leq 10$ and the graph is a circle ($0 \to 1 \to \ldots \to N-1$).
- **input 2** : $\mathbf{T} = 5$, $\mathbf{N} \leq 100$ and the graph is acyclic.
- **input 3** : $\mathbf{T} = 5$, $\mathbf{N} = 4$.
- **input 4** : $\mathbf{T} = 10$, $\mathbf{N} \leq 15$.
- **input 5** : $\mathbf{T} = 15$, $\mathbf{N} \leq 40$.

## Examples

| input | output |
|---|---|
| 1<br>4 6 2<br>3 0<br>0 2<br>2 1<br>1 3<br>1 0<br>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.