Map Colouring

The **SCOPTTT** (**S**how your **C**ountry to **O**thers and **P**ersuade **T**hem to **T**ravel **T**here) international tourism exposition is coming up and Lea volunteered to represent her country. She ordered a set of maps to show off the exact location. But now the "copycat copyshop" has sent the maps in black and white! Of course, this bugs Lea very much and she wants them coloured. But ordering new maps is no option as the time is running out, so the only possible way to use her maps is to colour them by herself. It seems as if Lea has to stay up all night to finish colouring the maps until the next day, and she only has a limited number of colours available. Obviously, the maps should be aesthetically pleasing and easy to read, so no two countries on the maps that share a common border should be coloured in the same colour. Can you help Lea get as much sleep as possible tonight and finish her map colouring task as fast as possible?

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case starts with three integers n, m, and k, with n being the number of countries (indexed from 1 to n), m being the number of shared borders, and k being the number of colours available. m lines follow describing the borders, where line i consists of two integers a_i and b_i denoting a border between countries a_i and b_i. Note that there might be exclaves on the maps.

Output

For each test case, output one line containing "Case #i: x" where i is its number, starting at 1, and x is either: a k-colouring, i.e. a list of at most k colours assigned to the countries ordered by the increasing country index; or "impossible" if there is no possible k-colouring.

Throughout this problem, one of k "colours" refers to an integer between 1 and k.

Constraints

- $1 \le t \le 20$
- $1 \le n \le 50$
- $0 \le m \le 150$
- $1 \le k \le 10$
- $1 \le a_i, b_i \le n$ for all $1 \le i \le m$
- Each country shares a border with at most 10 other countries.
- The greatest number of countries that all share borders with each other is 8.

Sample Input 1

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

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

Sample Output 1

```
Case #1: 2 2 3 3 1
Case #2: 2 2 2 1 1 1
```

Sample Input 2

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

10 6 3
2 8
9 2
8 4
2 6
6 1
6 3

3 3 3
1 3
2 3
1 3

2 1 3
2 1

3 3 1
3 2
1 3
2 3

7 3 3
4 1
5 1
6 2
```

Sample Output 2

```
Case #1: impossible
Case #2: 1 1 1 1 1 2 1 2 2 1
Case #3: 1 1 2
Case #4: 1 2
Case #5: impossible
Case #6: 1 1 1 2 2 2 1
```