Snakes and Ladders

Lea's favourite board game is "Snakes and Ladders", a simple but funny game. She wins most games when she plays with her family, but when she plays it with her neighbours, Lea always loses. Lea is sure that they are cheating since they always use separate dice for each player. This time, she wants revenge: Lea plans to take a manipulated die with her and win for the first time against the neighbours. She is able to manipulate her die in a way that it always shows the same number. But which number should she choose?

To help her, you will need some more information about the game. "Snakes and Ladders" is played on a board with several fields forming a long queue. All of them are labelled with an integer from 1 to n in order. When the game begins, everybody puts his piece on field 1. In each round every player rolls a six-sided die and moves his piece the according number of fields. It is possible that several pieces are on the same field.

To make it more interesting, there are snakes (most times pointing downwards) and ladders (most times pointing upwards) drawn on the board. If some piece steps on a field with the head of a snake, it will move to the snake's tail. On the other hand, if it steps on a piece with the beginning of a ladder, it may go to the field where the ladder ends. All players are allowed to choose whether they want to use ladders, but everybody must use snakes. Note that snakes and ladders are directed and that a player may use several of them in one turn.

The first one to reach field n wins (even if the move might need to be continued due to snakes). If some player has a higher number than needed to reach field n he wins, too.

Tell Lea which number her die should always show to win the game as fast as possible. Lea will always choose whether to use ladders or not in an optimal way. If there are several numbers with the same speed print all of them.

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 a single line containing three integers n, s and l. n is the number of fields on the board, s the number of snakes and l the number of ladders. s lines follow: the i-th line contains two integers a_i and b_i describing a snake having its head at field a_i and its tail at field b_i. Similarly, l lines follow them, line j containing two integers c_j and d_j describing a ladder starting at field c_j and ending at field d_j.

Output

For each test case, print a line containing "Case #i: x" where i is its number, starting at 1, and x is the number which lets Lea finish the game as fast as possible. If there are several fastest numbers, print each of them in increasing order separated by spaces. If Lea can't finish the game either way, print "impossible".

Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 10000$
- $0 \leq s, l \leq n$
- $1 < a_i, b_i < n$ for all $1 \leq i \leq s$
- $1 < c_j, d_j < n$ for all $1 \leq j \leq l$
- On each field, at most one snake or one ladder starts, but not both.

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16
100 0 0

13 0 1
2 12

200 1 0
121 61

5 0 0

6 0 1
2 3

10 1 2
9 5
2 4
8 7

9 1 1
5 7
6 4

4 0 0

7 0 1
5 2

2 0 0

6 1 1
3 5
2 4

8 0 0

10 2 1
5 7
2 6
4 9

10 0 2
9 4
5 6

6 1 0
5 4

9 1 0
2 6
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Case #1: 6
Case #2: 1 6
Case #3: impossible
Case #4: 4 5 6
Case #5: 5 6
Case #6: 5 6
Case #7: 4 5 6
Case #8: 3 4 5 6
Case #9: 6
Case #10: 1 2 3 4 5 6
Case #11: 5 6
Case #12: 4 5 6
Case #13: 3 4 5 6
Case #14: 4 5 6
Case #15: 5 6
Case #16: 4 5 6
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