Marry Rich

Lea has a new game to play: *The Fugger Family IV*. In this game, Lea plays Jakob Fugger "the Rich", one of the richest persons of all time, and tries to grow his family's wealth and influence. At the time that Jakob Fugger lived, 1459 - 1525, one of the main ways to achieve this was marrying into a family having both. In real life, Jakob Fugger married Sibylla Artzt, Grand Burgheress to Augsburg, but Lea wants to do better in that game.

Lea compiled a list of all notable people in the world, the amount of money they have, and a list of all relations and marriages between them. To increase her influence, she wants Jakob to marry somebody who is not already connected to his family via relations or marriages, also via several steps. For example, she does not want Jakob to marry relatives of his uncle's wife. Also, it is not possible to marry someone who is already married.

As the game's publisher Moonflowers does not want to be criticized by activists, Lea may make Jakob marry any person in the game, including males. Among the possible candidates, she wants Jakob to marry the one with the most money. But who is this?

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 line containing three space-separated integers a, b and c, where a is the number of notable people in the world labelled from 1 to a with person a being Jakob Fugger, b is the number of family relations and c the number of marriages.

One line follows containing $a - 1$ space-separated integers $m_1, \ldots, m_{a-1}$ where m_i denotes the amount of money person i owns.

b lines follow describing the family relations. Each of these lines contains two space-separated integers d and e meaning that d is related to e. Note that relations that are given as a transition of other relations may be omitted.

c lines follow describing the marriages. Each of these lines contains two space-separated integers f and g meaning that f is married to g. Everybody is married at most once.

Output

For each test case, output one line containing "Case #i: x" where i is its number, starting at 1, and x is the biggest amount of money Lea can get into the family by marrying or "impossible" if there is nobody to marry satisfying her constraints.

Constraints

- $1 \leq t \leq 20$
- $1 \leq a \leq 10^4$
- $0 \leq b, c \leq 10^4$
- $0 \leq m_i \leq 10^6$ for all $1 \leq i \leq a - 1$
- $1 \leq d, e \leq a$
- $1 \leq f, g \leq a - 1$

Sample Input 1

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

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

Sample Output 1

```
Case #1: 4
Case #2: 3
```

Sample Input 2

```
5
3 1 0
105872 333624
1 1

4 3 0
819471 664525 500888
2 2
2 4
2 1

5 4 0
619991 362808 274506 846462
3 2
3 2
4 1
2 5

4 1 0
303800 2463 655780
3 2

4 1 0
454076 114316 1256
4 2
```

Sample Output 2

```
Case #1: 333624
Case #2: 500888
Case #3: 846462
Case #4: 655780
Case #5: 454076
```