

Problem DUNGEON: Dungeon

You want to finish the design of a map for a computer game. Both the dungeon with rooms and doors and the enemies are designed. The *start* and *target room* are determined. Your job is now to place the two big bosses in separate *boss rooms*.

The constraints for such a boss room are:

- The player must be able to reach the boss room from the start room
- The player must be able to reach the target room from the boss room
- The player must be able to decide which of the bosses he fights first and be able to fight the other boss afterwards.

The player might sneak around one boss, when he is in the room of the boss and visit this room later to fight him. It is already determined how awesome each of the bosses would be in one of the rooms. You have to pick the boss rooms in such a way, that the sum of awesomeness is maximized in order to make your game most awesome. Some doors can only be passed in one direction and some can be passed in both. Two rooms are connected by at most one door. The layout of the level may be impossible to draw (at least in two dimensions), because rooms may overlap. That is no problem in the computer game, because at most two rooms will be shown at once (when the door between these rooms is open).

Input

The input starts with the number of test cases on the first line (at most 10). On the first line of each test case the number R of rooms and the number D of doors is given ($2 \leq R \leq 50\,000$; $0 \leq D \leq 200\,000$). The second and third line contain R integers each. The i th number on the second line is the awesomeness gained, if you select the i th room as boss room for the first boss. The i th number on the third line gives the awesomeness for the second boss, if placed in the i th room, accordingly. The awesomeness is an integer between 0 and 9 000. D lines follows, each describing a door by two integers separated by the door type. The integers give the (zero based) indices of the two connected rooms. The door type is '-' for one-way and '=' for two-way doors. One way doors allow access from the first to the second room. The room with id 0 is the *start room* and the room with id 1 is the *target room*.

Output

Print one line of output, containing the maximal sum of awesomeness that can be reached for the given dungeon. If a assignment according to the above rules is not possible output "Impossible".

Sample Input 1

```
2
2 1
20 10
30 25
0 = 1
4 3
1 2 3 4
1 2 3 4
0 = 2
1 - 0
1 = 3
```

Sample Output 1

```
45
Impossible
```