Ant Hills

If you have never seen the interior of an anthill, they can get really complex. There are usually multiple entrances, and many, MANY tunnels between their own little "rooms." These ants can travel through all of these tunnels carrying food and babies and all kinds of things. Ants are truly amazing creatures. However, the rainy season is coming up, and the ants need to have survival plans. Anthills always have a designated "rain leader" that keeps watch for rain. Rain leaders can be really good at their posts, giving ants plenty of time to scurry to safety. But others are really bad, and will alert the other ants after the storm is already on top of them. Either way, some ants probably won't make it through each rainfall, so the ants want to minimize their losses during each rainfall.

Every room in the anthill has a max capacity of ants it can hold, but tunnels are limitless (since the ants are always moving). If there are ants moving through a room, then they do not count towards the max capacity of ants.

When rain falls, it always travels downward as far as it can, killing all ants in every room it passes. When the rain can't travel downward anymore, then it soaks into the ground. There is always enough rainfall to travel every downward path available, and the rain will only enter at the given entrances (and only the entrances!)

When the rain leader spots rain, he will tell you where each ant currently lies, and the properties of the anthill itself (where the rooms lie, what tunnels connect them, etc.) You will tell him how many ants will survive this rainfall so he can worry about stocking up for the next storm!

Input
Input begins with a single number, S, the number of storms this season. For each storm, you are given the properties of an anthill (anthills change between storms!). This begins with four integers, R ($R \leq 1000$), T, E ($E \geq 1$), and P the number of rooms in the anthill, the number of tunnels that exist, the number of entrances, and the prowess of the rain leader. On each of the next R lines are the definitions for each room in the anthill. Each room is a single line with two integers, C and M, the current number of ants in the room and the maximum number of ants allowed in the room, respectively. Following this are T lines defining tunnels. Tunnels are never flat: one end is always higher than the other. Each tunnel has two numbers, A and B, denoting the endpoints of the tunnel. Assume that A is always higher than B, meaning ants can travel between A and B and from B to A, but water can only go from A to B. There will never be duplicates or cycles (an edge from A to B and another edge from B to A). Then, on each of the following E lines are a single room number meaning that this room is an entrance for the rain to come in. Assume that ants cannot go outside the anthill during a rainy situation. The prowess of a rain leader is directly related to the amount of seconds before the rainfall hits and kills all of the ants in its way. Assume an ant travels a tunnel every second. Rooms will be numbered starting with 1. The total number of ants will not exceed 2000.

Output
Output a single line per storm. If at least one ant survives, print "There will be X ants ready for the next storm." where X is the number of survivors. Otherwise, simply print "R.I.P." (always without the quotes).

Sample Input

```
2
3 2 1 1
5 5
0 5
0 5
3 2
2 1
3
3 2 1 1
0 3
5 5
0 5
3 2
1 2
3
```

Sample Output

```
R.I.P.
There will be 3 ants ready for the next storm.
```