Football Champion

Lea likes to chat a lot with her colleagues and friends. A good topic to talk about is usually the latest football match. So this Sunday she sat down and looked at the past and scheduled matches to decide which upcoming matches she wants to watch. To keep it interesting, she only wants to watch matches of teams that still have a chance to win the current tournament. Help her to find out which teams could still win and which cannot.

The tournament consists of a series of matches some of which have already occured. Each match has a winner, there is no draw. In the end, there is either a single team that has the most wins or there will be playoffs between all teams with the (identical) maximal number of wins. Lea considers it possible for a team i to win the tournament if it is possible to assign a winner to each match such that team i has at least as many wins as any other team at the end of the tournament (thus this team reaches the playoffs, if any, or is directly declared winner).

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 two integers, n and m, the number of teams n indexed from 1 to n and the number of matches m that are scheduled to be played. The next line contains n space separated integers w_i, where w_i is the number of wins team i already has. m lines follow describing the matches that are to be played. Line i contains two distinct integers a_i and b_i, the two teams that play each other in match i.

Output

For each test case, output one line containing "Case #i: x" where i is its number, starting at 1, and x is a space separated list that contains n items, each either "yes" if team i can still win or "no" if not. Each line of the output should end with a line break.

Note: This tournament is not like any real life tournament. In particular there may be teams that play a lot more matches than others.

Constraints

- $1 \leq t \leq 20$
- $2 \leq n \leq 30$
- $0 \leq m \leq 300$
- $0 \leq w_i \leq 1000$ for all $1 \leq i \leq n$
- $1 \leq a_i, b_i \leq n$ for all $1 \leq i \leq n$
- $a_i \neq b_i$ for all $1 \leq i \leq n$

Sample Input 1	Sample Output 1
2 3 1 1 1 1 1 2 2 2 2 1 1 2 1 2	Case #1: yes yes no Case #2: yes yes

Sample Input 2

```
9
3 3
1 0 1
3 2
3 2
1 3

4 2
1 0 0 1
2 1
4 2

2 1
1 1
2 1

6 3
0 1 0 1 0 1
3 4
6 3
1 3

3 4
0 1 3
1 3
1 2
1 3
2 3

3 0
0 0 0

3 4
2 0 2
2 1
1 2
3 1
2 1

4 3
1 0 2 2
2 3
4 2
4 1

4 2
1 0 0 0
1 4
4 3
```

Sample Output 2

```
Case #1: yes yes yes
Case #2: yes yes no yes
Case #3: yes yes
Case #4: no no yes yes no yes
Case #5: yes yes yes
Case #6: yes yes yes
Case #7: yes yes yes
Case #8: yes yes yes yes
Case #9: yes no yes yes
```