The Story of a Tree

HackerRank

One day Bob drew a tree, T, with n nodes and n-1 edges on a piece of paper. He soon discovered that parent of a node depends on the root of the tree. The following images shows an example of that:



Learning the fact, Bob invented an exciting new game and decided to play it with Alice. The rules of the game is described below:

- 1. Bob picks a random node to be the tree's *root* and keeps the identity of the chosen node a secret from Alice. Each node has an equal probability of being picked as the root.
- 2. Alice then makes a list of g guesses, where each guess is in the form $u \vee v$ and means Alice guesses that parent(v) = u is *true*. It's guaranteed that an undirected edge connecting u and v exists in the tree.
- 3. For each correct guess, Alice earns one point. Alice wins the game if she earns at least k points (i.e., at least k of her guesses were *true*).

Alice and Bob play q games. Given the tree, Alice's guesses, and the value of k for each game, find the probability that Alice will win the game and print it on a new line as a reduced fraction in the format p/q.

Input Format

The first line contains an integer, q, denoting the number of different games. The subsequent lines describe each game in the following format:

- 1. The first line contains an integer, n, denoting the number of nodes in the tree.
- 2. The n-1 subsequent lines contain two space-separated integers, u and v, defining an undirected edge between nodes u and v.
- 3. The next line contains two space-separated integers describing the respective values of g (the number of guesses) and k (the minimum score needed to win).
- 4. Each of the g subsequent lines contains two space-separated integers, u and v, indicating Alice guesses parent(v) = u.

Constraints

- $1 \leq q \leq 5$
- $1 \le n \le 10^5$
- $1 \leq u, v \leq n$
- $1\leq g,k\leq 10^5$

- The sum of n over all test cases won't exceed $2 imes 10^5$.
- No two guesses will be identical.

Scoring

- For 25% of the maximum score, $1 \le n \le 10^3$.
- For 100% of the maximum score, $1 \le n \le 10^5$.

Output Format

Print the probability as a reduced fraction in the format p/q.

Note: Print 0/1 if the probability is **0** and print 1/1 if the probability is **1**.

Sample Input 0

Sample Output 0

1/2 1/3

Explanation 0

Alice and Bob play the following g=2 games:

1. Alice makes two guesses, $(1\ 2)$ and $(3\ 4)$, meaning she guessed that parent(2) = 1 and parent(4) = 3. To win the game, at least k = 2 of her guesses must be *true*.

In the diagrams below, you can see that at least 2 guesses are *true* if the root of the tree is either node 1 or 3:



There are 4 nodes in total and the probability of picking node 1 or 3 as the root is $\frac{2}{4}$, which reduces to $\frac{1}{2}$.

2. In this game, Alice only wins if node 1 is the root of the tree. There are 3 nodes in total, and the probability of picking node 1 as the root is $\frac{1}{3}$.