Badge Progress (Details)

Points: 126   Rank: 270094

The Story of a Tree 🔖

by bertho_coder

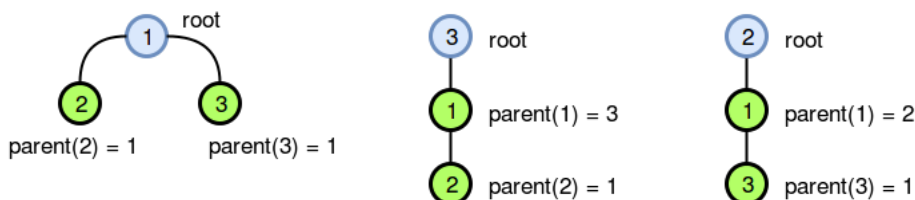| Problem | Submissions | Leaderboard | Discussions | Editorial 🔒 |

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 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

- $1 \le q \le 5$

- $1 \le n \le 10^5$

- $1 \le u, v \le n$

- $1 \le g, k \le 10^5$

- The sum of n over all test cases won't exceed 2×10^5.

- No two guesses will be identical.

Scoring

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

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

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

```
2
4
1 2
1 3
3 4
2 2
1 2
3 4
3
1 2
1 3
2 2
1 2
1 3
```
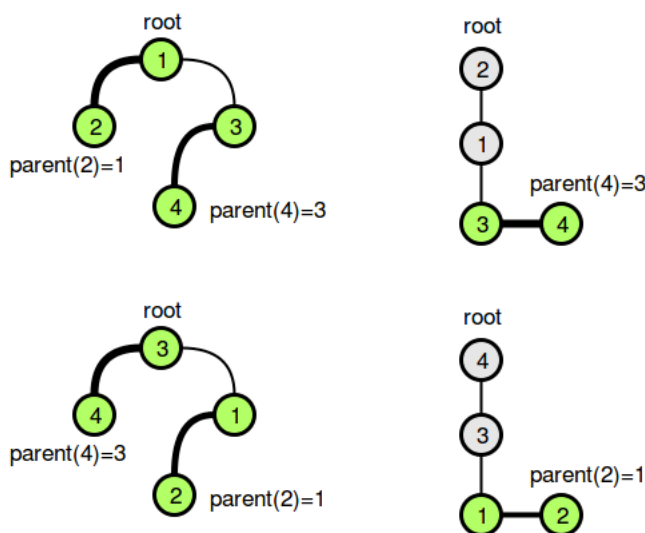
Sample Output 0

```
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 $\frac{1}{3}$.

Max Score:50
Difficulty: Medium

Rate This Challenge:

☆ ☆ ☆ ☆ ☆

More

Current Buffer (saved locally, editable)   ⑂ 🕓   Java 7   ⌄   ⤢ ⚙

```java
1  import java.io.*;
2  import java.util.*;
3  import java.text.*;
4  import java.math.*;
5  import java.util.regex.*;
6
7  public class Solution {
8
9      public static void main(String[] args) {
10         Scanner in = new Scanner(System.in);
11         int q = in.nextInt();
12         for(int a0 = 0; a0 < q; a0++){
13             int n = in.nextInt();
14             for(int a1 = 0; a1 < n-1; a1++){
15                 int u = in.nextInt();
16                 int v = in.nextInt();
17             }
18             int g = in.nextInt();
19             int k = in.nextInt();
20             for(int a1 = 0; a1 < g; a1++){
21                 int u = in.nextInt();
22                 int v = in.nextInt();
23             }
24         }
25     }
26 }
27
```

Line: 1 Col: 1

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

---

Join us on IRC at #hackerrank on freenode for hugs or bugs.

Contest Calendar | Blog | Scoring | Environment | FAQ | About Us | Support | Careers | Terms Of Service | Privacy Policy | Request a Feature