

- A. Zombie Smash
- B. Upstairs/Downstairs
- C. Xeno-archaeology
- D. Twirling Towards Freedom
- E. Shifting Paths

Contest Analysis  
Questions asked

| Submissions              |   |
|--------------------------|---|
| Zombie Smash             |   |
| 7pt                      | Not attempted<br>25/25 users correct (100%) |
| 18pt                     | Not attempted<br>21/25 users correct (84%)  |
| Upstairs/Downstairs      |   |
| 13pt                     | Not attempted<br>21/24 users correct (88%)  |
| 17pt                     | Not attempted<br>16/21 users correct (76%)  |
| Xeno-archaeology         |   |
| 12pt                     | Not attempted<br>22/23 users correct (96%)  |
| 33pt                     | Not attempted<br>9/13 users correct (69%)   |
| Twirling Towards Freedom |   |
| 10pt                     | Not attempted<br>18/22 users correct (82%)  |
| 39pt                     | Not attempted<br>3/8 users correct (38%)    |
| Shifting Paths           |   |
| 5pt                      | Not attempted<br>25/25 users correct (100%) |
| 46pt                     | Not attempted<br>0/4 users correct (0%)     |

| Top Scores |     |
|------------|-----|
| meret      | 121 |
| neal.wu    | 121 |
| misof      | 115 |
| vepifanov  | 115 |
| hos.lyric  | 115 |
| bmerry     | 109 |
| watashi    | 105 |
| SnapDragon | 98  |
| dzhulgakov | 97  |
| eatmore    | 85  |

Problem E. Shifting Paths

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input  
5 points

Solve E-small

Large input  
46 points

Solve E-large

Problem

You have been walking in the woods for hours, and you want to go home.

The woods contain **N** clearings labeled 1, 2, ..., **N**. You are now at clearing 1, and you must reach clearing **N** in order to leave the woods. Each clearing from 1 to **N**-1 has a left path and a right path leading out to other clearings, as well as some number of one-way paths leading in. Unfortunately, the woods are haunted, and any time you enter a clearing, one of the two outgoing paths will be blocked by shiftY trees. More precisely, on your *k*<sup>th</sup> visit to any single clearing:

- You must leave along the left path if *k* is odd.
- You must leave along the right path if *k* is even.
- All paths are one-way, so you have no choice at each step: you must go forward through the one unblocked outgoing path.

So the first time you are in clearing #1, you will leave along the left path. If you ever come back to clearing #1 for a second time, you would leave along the right path; the third time, you'd leave along the left path again; and so on.

You begin at clearing #1, and when you get to clearing #**N**, you can leave the woods. How many paths do you need to follow before you get out?

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow, each beginning with a line containing a single integer **N**.

**N**-1 lines follow, each containing two integers **L<sub>i</sub>** and **R<sub>i</sub>**. Here, **L<sub>i</sub>** represents the clearing you would end up at if you follow the left path out of clearing *i*, and **R<sub>i</sub>** represents the clearing you would end up at if you follow the right path out of clearing *i*.

No paths are specified for clearing **N** because once you get there, you are finished.

Output

For each test case, output one line containing "Case #*x*: *y*", where *x* is the case number (starting from 1) and *y* is the number of paths you need to follow to get to clearing **N**. If you will never get to clearing **N**, output "Infinity" instead.

Limits

1 ≤ **T** ≤ 30.  
1 ≤ **L<sub>i</sub>**, **R<sub>i</sub>** ≤ **N** for all *i*.

Small dataset

2 ≤ **N** ≤ 10.

Large dataset

2 ≤ **N** ≤ 40.

Sample

| Input | Output            |
|-------|-------------------|
| 2     | Case #1: 8        |
| 4     | Case #2: Infinity |
| 2 1   |                   |
| 3 1   |                   |
| 2 4   |                   |
| 3     |                   |
| 2 2   |                   |
| 1 2   |                   |

### Sample Explanation

In the first sample case, your route through the woods will be as shown below:

| Paths followed | Clearing | Path direction |
|----------------|----------|----------------|
| 0              | 1        | Left           |
| 1              | 2        | Left           |
| 2              | 3        | Left           |
| 3              | 2        | Right          |
| 4              | 1        | Right          |
| 5              | 1        | Left           |
| 6              | 2        | Left           |
| 7              | 3        | Right          |
| 8              | 4        | -              |

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