

## Problem 2

The Tower of Brahma is a kind of puzzle game which consists of three sticks (numbered 1, 2, and 3, from the left) and a number of disks of all different size. Initially, all disks are at the leftmost stick and you want to move all the disks to the second stick. The conditions are: a larger disk cannot be on a smaller disk at any time, only one disk can be moved from one stick to another in one step, and all the disks should be at one of the sticks except when they are being moved. See the figure below for a real-life Tower of Brahma.



Charles has been watching his baby brother play this puzzle for three days. Charles is sure that his brother is keeping the above rules. On the first day, the puzzle was at its initial state. On the second day, the puzzle was in a different state from the state on the first day. On the third day, the puzzle was in a state different from the states on the first two days. It takes so much time to complete the puzzle, so Charles wants to make sure that his brother is going about it in the fastest manner possible.

Write a program, given the states on the second and the third days, determines if Charles' brother is on the right track or not. (The brother does not need to be in the *middle* of the solution on the third day. It is allowed that he is in the final state.)

[Input]

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The first line of the input file contains the number T of test cases in the file. In each test case, the first line has an integer N ( $2 \leq N \leq 100,000$ ), the number of disks. The disks are numbered from 1 to N by the increasing order of their sizes. The next N lines each contain the stick number on which each disk is located on the second day, starting from disk number N and ending at disk number 1. The next N lines contain the state of the puzzle on the third day in the same format.

There are two kinds of inputs listed as follows.

- Small Set:  $2 \leq N \leq 30$
- Large Set:  $2 \leq N \leq 100,000$

[Output]

For each test case given, print one line an integer 1 if the puzzle is being solved in the fastest way, 0 if not.

[I/O Example]

Input

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

Output

```
1
0
```

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