Program 3 (CIS 350)

Expanded Explanation of Test Case 1

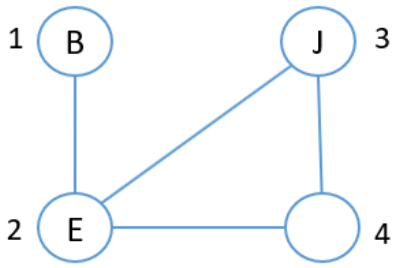
Test Case 1 Introduction

Values for test case 1

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

The first line, 4 1 3 2 indicates the following:

- There are **4** caves
- Bella is in cave **1**
- Jacob is in cave **3**
- Edward is in cave **2**



Although not included in the *data* explicitly, the cave's allergen information and adjacency lists are included in the original data. The cave number is implied by the line just beyond the first line in the test case:

Implied	4 1 3 2
Cave 1	0 1 2
Cave 2	0 3 1 3 4
Cave 3	0 2 2 4
Cave 4	0 2 2 3

The first number in each cave's line represents the **allergen presence.**

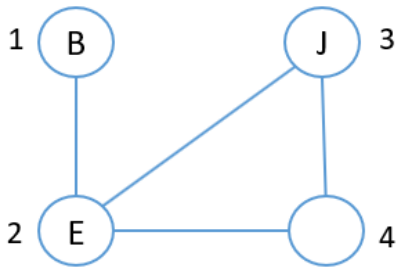
- 0 means there is no allergen.
- -1 means garlic
    - Vampires are allergic to garlic, so Edward can't enter those caves
- 1 means wolfsbane
    - Werewolves are allergic to wolfsbane, so Jacob can't enter those caves

Since all caves in this test case are 0 for the allergen, none have any allergens in them.

The second number in each cave's line represents the **degree of that cave's vertex** (in other words, how many other caves are connected to that vertex / cave. This is designated d_i.

After the second number in each cave's line, there is a list of *i* cave numbers indicating the caves to which the current cave under consideration is adjacent.

The Moves: An Explanation



Original Cave

In turn 1 Edward heads to 4 and Jacob moves to 2 In turn 2 Edward heads to 3 and Jacob moves to 4 In turn 3 Edward heads to 2 and Jacob moves to 3 In turn 4 Edward heads to 1 and Jacob moves to 2 and the simulation ends.

In the original cave (at the beginning):

Jacob

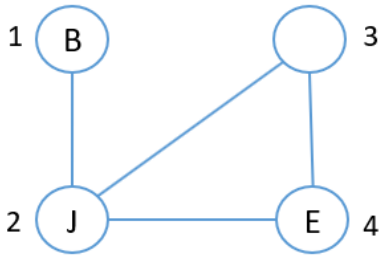
Came from		Currently in
	Can go to	3
2, 4		

Edward

Came from		Currently in
	Can go to	2
1, 3, 4		

The instructions say that **at the beginning,** Edward moves to the highest adjacent cave number, and Jacob moves to the lowest adjacent cave number. **For Edward, that's 4, and for Jacob that's 2.**

Turn 1



Implied	4 1 3 2
Cave 1	0 1 2
Cave 2	0 3 1 3 4
Cave 3	0 2 2 4
Cave 4	0 2 2 3

Jacob

Came from		Currently in
3	Can go to	2
1, 3, 4		

Edward

Came from		Currently in
2	Can go to	4
2, 3		

Since Jacob is currently in 2, and goes clockwise, you might *think* he should go to 3 (because clockwise, if he's in 2, 3 is next: 1 (2) 3 4 [currently in 2, so go to 3, right?]

However, **he just came from 3**. So, he shouldn't re-enter where he just arrived from. So he skips that, and continues clockwise, going to **cave 4**.

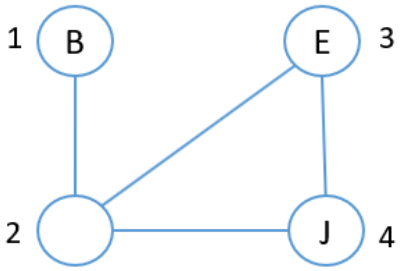
Edward goes counter-clockwise, and is currently in 4, so if that were part of his sequence 2, 3, (4), counter-clockwise would mean going to the left in that sequence, so he'd land on 3.

So:

Jacob will go to 4

Edward will go to 3.

Turn 2



Implied	4 1 3 2
Cave 1	0 1 2
Cave 2	0 3 1 3 4
Cave 3	0 2 2 4
Cave 4	0 2 2 3

Jacob

Came from		Currently in
2	Can go to	4
2, 3		

Edward

Came from		Currently in
4	Can go to	3
2, 4		

Since Jacob is in 4, and goes clockwise, you might *think* he should go to 2 – but that's where he just **came from**. So, we skip that, and keep going clockwise. So, that leaves us with cave 3.

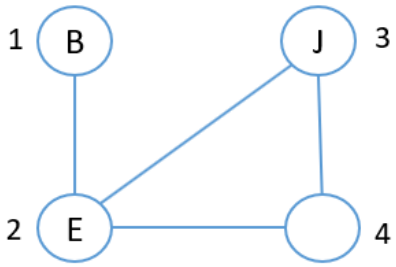
Since Edward is in cave 3, and goes counter-clockwise, look at his sequence: 2, 4 and let's put our current cave in this sequence briefly: 2, (3), 4. Counter-clockwise means we go to the left, so that's cave 2.

So:

Jacob will go to cave 3.

Edward will go to cave 2.

Turn 3



Implied	4 1 3 2
Cave 1	0 1 2
Cave 2	0 3 1 3 4
Cave 3	0 2 2 4
Cave 4	0 2 2 3

Jacob

Came from		Currently in
4	Can go to	3
2, 4		

Edward

Came from		Currently in
3	Can go to	2
1, 3, 4		

Jacob is currently in cave 3, and goes clockwise. Again, you'd think that since the order is: 2, (3), 4, and clockwise implies that we go to the right in the sequence that we'd go to 4. However, Jacob **just came from 4.** So we skip 4, and wrap around to the beginning of the sequence, and we're left with 2. Thus, Jacob will go to cave 2 in the next turn.

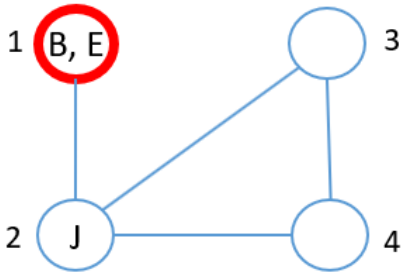
Edward is currently in cave 2, which fits in the sequence thusly: 1, (2), 3, 4. Since he moves counter-clockwise, this implies he will move to the left. And, he does in fact do so. Thus, Edward will go to cave 1 in the next turn.

So:

Jacob will go to cave 2.

Edward will go to cave 1.

Turn 4



Implied	4 1 3 2
Cave 1	0 1 2
Cave 2	0 3 1 3 4
Cave 3	0 2 2 4
Cave 4	0 2 2 3

Jacob

Came from		Currently in
3	Can go to	2
1, 3, 4		

Edward

Came from		Currently in
2	Can go to	1
2		

Jacob came from cave 3 and is in cave 2. So, if he were to move again, he would skip over 3 since he just came from there, and go to 4.

However, **Edward has entered cave 1**. This means that he marries Bella, so the simulation ceases.