Problem F. /*About blank*/

Time limit 1000 ms
Memory limit 256MB

Problem Description

There are k snakes on a tree with n nodes. Each snake starts at a different node. Then there will be h apples appear one by one. When the apple appears, all k snakes will move from their current positions towards the apple simultaneously. The snakes move according to the following rules:

- There is exactly one path between any two nodes on this tree, and all the snakes will follow the unique path towards the node where the apple is located.
- Once a snake reaches the apple, the apple is immediately eaten.
- If one snake encounters another snake on its way to the apple, the snake farther from the apple will stop and stay at its current position.
- If multiple snakes attempt to move to the same node, only the snake with the smallest index can enter, and the others will stop at their current positions.
- The snake that eats the apple will remain at the apple's location.
- After the apple is eaten, it will reappear at another node on the tree. At this point, all the snakes will once again try to reach the apple. For simplicity, we assume it takes one unit of time to move from one node to an adjacent node.

Now, here is a question for you. What are the final position of every snake and the number of times that every snake has eaten the food.

Input format

The first line contains 3 integer n ($1 \leq n \leq 5000$), k ($1 \leq k \leq 1000$), h ($1 \leq h \leq 500$), representing the number of nodes in the tree, the number of snakes, and the number of apples.

For the following $n-1$ lines, each line contains 2 integers u and v ($1 \leq u, v \leq n$), meaning that there is an undirected edge between node u and node v.

The $(n+1)$-th line contains k integers s_i ($1 \leq s_i \leq n$), representing the starting position of the i-th snake. It's guaranteed that the starting positions of any two snakes are different.

The $(n+2)$-th line contains h integers a_i ($1 \leq a_i \leq n$), representing the position where the apple appears in sequence.

Output format

The output contains h lines. The i-th line has two integers l_i and e_i, representing the final position of the i-th snake and the number of times that the snake has eaten the food.

Subtask score

Subtask	Score	Additional Constraints
1	5	$k = 1...$
2	15	$n \leq 1000, k \leq 50, m \leq 20$
3	20	The maximum of degree is 2
4	20	$k = 2$
5	40	No constraints

Sample

Sample Input 1

```
8 4 3
6 5
4 3
7 5
8 4
3 1
5 2
2 1
6 5 2 3
6 2 8
```

Sample Output 1

```
6 1
5 0
2 1
8 1
```

Sample Input 2

```
7 2 5
6 2
2 1
3 1
4 2
7 5
5 2
4 2
5 5 2 7 1
```

Sample Output 2

```
1 2
7 3
```

Notes

I originally thought k=1 was a good subtask.