Tourism

JOI Kingdom is an insular country consisting of N islands, numbered from 1 to N. The islands are connected by $N-1$ bridges, numbered from 1 to $N-1$. The bridge i ($1 \leq i \leq N-1$) connects the island A_i and the island B_i bidirectionally. It is possible to travel from any island to any other island by passing through a number of bridges.

In JOI Kingdom, there are M sightseeing spots, numbered from 1 to M. The sightseeing spot j ($1 \leq j \leq M$) is located in the island C_j.

There are Q travelers. They plan to visit sightseeing spots in JOI Kingdom. The travelers are numbered from 1 to Q. Each traveler makes a trip in the following way.

1. The traveler chooses an island x ($1 \leq x \leq N$). Taking an airplane, the traveler arrives at the island x.
2. The traveler takes the following actions a number of times. The order and the kinds of actions are arbitrary.
   - The traveler chooses a sightseeing spot in the current island, and visits there.
   - The traveler moves to another island by passing through a bridge.
3. Taking an airplane, the traveler leaves JOI Kingdom.

The traveler k ($1 \leq k \leq Q$) wants to visit all of the sightseeing spots $L_k, L_k + 1, \ldots, R_k$. However, since the budget is limited, the traveler k wants to minimize the number of islands where the traveler k visits at least once.

Write a program which, given information of JOI Kingdom and the travelers, calculates, for each k ($1 \leq k \leq Q$), the minimum possible number of islands where the traveler k visits at least once.

Input

Read the following data from the standard input.

$N\ M\ Q$
$A_1\ B_1$
$A_2\ B_2$
$\vdots$
$A_{N-1}\ B_{N-1}$
$C_1\ C_2\ \cdots\ C_M$
$L_1\ R_1$
$L_2\ R_2$
$\vdots$
$L_Q\ R_Q$

Output

Write Q lines to the standard output. The k-th line ($1 \leq k \leq Q$) of output should contain the minimum possible number of islands where the traveler k visits at least once.

Constraints

- $1 \leq N \leq 100\,000$.
- $1 \leq M \leq 100\,000$.
- $1 \leq Q \leq 100\,000$.
- $1 \leq A_i \leq N$ ($1 \leq i \leq N-1$).
- $1 \leq B_i \leq N$ ($1 \leq i \leq N-1$).
- It is possible to travel from any island to any other island by passing through a number of bridges.
- $1 \leq C_j \leq N$ ($1 \leq j \leq M$).
- $1 \leq L_k \leq R_k \leq M$ ($1 \leq k \leq Q$).
- Given values are all integers.

Subtasks

1. (5 points) $N \leq 300$, $M \leq 300$, $Q \leq 300$.
2. (5 points) $N \leq 2\,000$, $M \leq 2\,000$, $Q \leq 2\,000$.
3. (7 points) $A_i = i$, $B_i = i + 1$ $(1 \leq i \leq N - 1)$.
4. (18 points) $L_1 = 1$, $R_k + 1 = L_{k+1}$ $(1 \leq k \leq Q - 1)$, $R_Q = M$.
5. (24 points) $A_i = \left\lfloor \frac{i+1}{2} \right\rfloor$, $B_i = i + 1$ $(1 \leq i \leq N - 1)$. Here, $\lfloor x \rfloor$ is the largest integer not exceeding x.
6. (41 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
7 6 2 1 2 1 3 2 4 2 5 3 6 3 7 2 3 6 4 5 7 1 3 4 6	4 6

The traveler 1 makes a trip in the following way, and visits all of the sightseeing spots $1, 2, 3$.

1. The traveler 1 arrives at the island 2.
2. The traveler 1 visits the sightseeing spot 1 in the island 2.
3. The traveler 1 moves from the island 2 to the island 1 by passing through the bridge 1.
4. The traveler 1 moves from the island 1 to the island 3 by passing through the bridge 2.
5. The traveler 1 visits the sightseeing spot 2 in the island 3.
6. The traveler 1 moves from the island 3 to the island 6 by passing through the bridge 5.
7. The traveler 1 visits the sightseeing spot 3 in the island 6.
8. The traveler 1 departs from the island 6 and leaves JOI Kingdom.

The islands $1, 2, 3, 6$ are the four islands where the traveler 1 visits at least once. If the number of islands

traveler 1 visits at least once is less than or equal to 3, it is impossible to visit all of the sightseeing spots $1, 2, 3$. Therefore, output 4 in the first line.

The traveler 2 makes a trip in the following way, and visits all of the sightseeing spots $4, 5, 6$.

1. The traveler 2 arrives at the island 3.
2. The traveler 2 moves from the island 3 to the island 7 by passing through the bridge 6.
3. The traveler 2 visits the sightseeing spot 6 in the island 7.
4. The traveler 2 moves from the island 7 to the island 3 by passing through the bridge 6.
5. The traveler 2 moves from the island 3 to the island 1 by passing through the bridge 2.
6. The traveler 2 moves from the island 1 to the island 2 by passing through the bridge 1.
7. The traveler 2 moves from the island 2 to the island 4 by passing through the bridge 3.
8. The traveler 2 visits the sightseeing spot 4 in the island 4.
9. The traveler 2 moves from the island 4 to the island 2 by passing through the bridge 3.
10. The traveler 2 moves from the island 2 to the island 5 by passing through the bridge 4.
11. The traveler 2 visits the sightseeing spot 5 in the island 5.
12. The traveler 2 departs from the island 5 and leaves JOI Kingdom.

The islands $1, 2, 3, 4, 5, 7$ are the six islands where the traveler 2 visits at least once. If the number of islands traveler 2 visits at least once is less than or equal to 5, it is impossible to visit all of the sightseeing spots $4, 5, 6$. Therefore, output 6 in the second line.

This sample input satisfies the constraints of Subtasks $1, 2, 4, 5, 6$.

Sample Input 2	Sample Output 2
8 8 9 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 6 4 3 5 2 4 7 3 5 4 6 6 8 1 4 2 3 6 8 5 5 2 8 1 2	3 4 6 6 3 6 1 6 3

This sample input satisfies the constraints of Subtasks 1, 2, 3, 6.

Sample Input 3	Sample Output 3
10 7 9 6 5 3 6 9 3 8 3 7 8 7 1 2 5 7 10 8 4 9 4 10 1 10 7 6 4 4 1 3 1 3 6 7 3 6 3 3 1 5 2 5 1 2	1 6 6 4 3 1 7 5 4

This sample input satisfies the constraints of Subtasks 1, 2, 6.