# AMAZING GAME II

Amy and Bruno are playing another game in a maze! The maze has $N$ rooms (numbered from 1 to $N$) and $M$ bidirectional passageways, where each passageway connects two different rooms $U_i$ and $V_i$. It is possible to travel between any two rooms in the maze using a sequence of passageways. Amy has chosen a path with $K$ rooms: $A_1, A_2, \ldots, A_K$, and you are guaranteed that there is a passageway between consecutive rooms in her path. Note that the same room could appear multiple times in Amy's path.

Amy and Bruno will play their game $Q$ times, where $Q < K$. In the $i$th game, Amy starts in room $A_i$ (the $i$th room in her path) and Bruno starts in room $B_i$. They then play a game with $K - i$ rounds. In each round:

- Amy walks from her current room to the next room in her path. That is, if she is currently in room $A_j$, then she walks to room $A_{j+1}$.
- Bruno can choose to either stay in his current room or walk to any room which is connected via a single passageway to his current room.

In each round, Bruno earns a point if he stays still and Amy moves into his current room. The game ends when Amy reaches the end of her path.

Bruno has come to you for help: in each of the $Q$ games, what is the maximum number of points that he can earn?

Partial points are available for just determining whether Bruno can earn any points. See the scoring section for details.

## Subtasks and Constraints

For all subtasks:

- $2 \le N \le 1000$.
- $N - 1 \le M \le 2000$.
- $3 \le K \le 200\,000$.
- $1 \le Q < K$.
- $1 \le U_i < V_i \le N$ for all $i$.
- All passageways are different. That is $(U_i, V_i) \ne (U_j, V_j)$ for all $i \ne j$.
- It is possible to travel between any two rooms using a sequence of passageways.
- $1 \le A_i \le N$ for all $i$.
- There is a passageway between rooms $A_i$ and $A_{i+1}$ for all $1 \le i \le K - 1$.
- $1 \le B_i \le N$ for all $i$.

Additional constraints for each subtask are given below.

| Subtask | Points | Additional constraints |
|---|---|---|
| 1 | 10 | $Q = 1$, $K = 3$, and $A_1 = B_1$. |
| 2 | 30 | $Q = 1$, $K \le 1000$, and $A_1 = B_1$. |
| 3 | 25 | $Q = 1$ and $A_1 = B_1$. |
| 4 | 15 | $A_i = B_i$ for all $i$. |
| 5 | 20 | No additional constraints. |

## Input

- The first line of input contains the integers $N$ and $M$.
- $M$ lines follow, describing the passageways. The $i$th line contains the two integers $U_i$ and $V_i$.
- The next line contains the integer $K$.
- The next line contains the $K$ integers $A_1, A_2, \ldots, A_K$.
- The next line contains the integer $Q$.
- The next line contains the $Q$ integers $B_1, B_2, \ldots, B_Q$.

## Output

Output $Q$ lines, where the $i$th line contains the maximum number of points that Bruno can earn in the $i$th game.

## Scoring

You will receive 30% for just determining whether the answer is 0 or non-zero in every game. In particular:

- If your output is correct, you will receive 100% for that test case. Otherwise,
- You will receive 30% for a test case if:
  - You correctly answer every game where the maximum number of points Bruno can earn is 0, and
  - You output a non-zero integer for any games where Bruno can earn at least 1 point.

  Otherwise,
- You will receive 0% for that test case.

Your score for a subtask will be the **minimum** score of all test cases in the subtask (multiplied by the number of points you can score in the subtask).

## Sample Input 1

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

## Sample Output 1

```
0
```

### Sample Input 2

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

### Sample Output 2

```
1
```

### Sample Input 3

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

### Sample Output 3

```
3
3
1
1
0
```

## Explanation

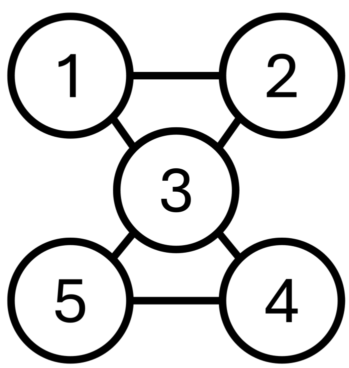


Figure 1: All three sample cases involve the same maze, shown above

In the first sample case, Amy's path is $4 \to 3 \to 2$. There is $Q = 1$ game, where Bruno and Amy both start in room 4. It is impossible for Bruno to earn any points.

In the second sample case, Amy's path is $1 \to 2 \to 1$. There is $Q = 1$ game, where Amy and Bruno both start in room 1. Bruno can earn one point as follows:

- Amy walks from room $A_1 = 1$ to $A_2 = 2$, and Bruno remains in room 1.
- Amy walks from room $A_2 = 2$ to $A_3 = 1$, and Bruno remains in room 1. Bruno earns a point.

In the third sample case, Amy's path is $1 \to 2 \to 3 \to 4 \to 5 \to 3 \to 5$. There are $Q = 3$ games. In the first game, Amy and Bruno both start in room 1 and Bruno can earn three points as follows:

- Amy walks from room $A_1 = 1$ to $A_2 = 2$, and Bruno walks from room 1 to room 3.
- Amy walks from room $A_2 = 2$ to $A_3 = 3$, and Bruno remains in room 3. Bruno earns a point.
- Amy walks from room $A_3 = 3$ to $A_4 = 4$, and Bruno walks from room 3 to room 5.
- Amy walks from room $A_4 = 4$ to $A_5 = 5$, and Bruno remains in room 5. Bruno earns a point.
- Amy walks from room $A_5 = 5$ to $A_6 = 3$, and Bruno remains in room 5.
- Amy walks from room $A_6 = 3$ to $A_7 = 5$, and Bruno remains in room 5. Bruno earns a point.

In the second game, Amy starts in room 2 and Bruno starts in room 3. Bruno can earn three points as follows:

- Amy walks from room $A_2 = 2$ to $A_3 = 3$, and Bruno remains in room 3. Bruno earns a point.
- Amy walks from room $A_3 = 3$ to $A_4 = 4$, and Bruno walks from room 3 to room 5.
- Amy walks from room $A_4 = 4$ to $A_5 = 5$, and Bruno remains in room 5. Bruno earns a point.
- Amy walks from room $A_5 = 5$ to $A_6 = 3$, and Bruno remains in room 5.
- Amy walks from room $A_6 = 3$ to $A_7 = 5$, and Bruno remains in room 5. Bruno earns a point.

In the third game, Amy starts in room 3 and Bruno starts in room 2. Bruno can earn one point as follows:

- Amy walks from room $A_3 = 3$ to $A_4 = 4$, and Bruno walks from room 2 to room 3.
- Amy walks from room $A_4 = 4$ to $A_5 = 5$, and Bruno remains in room 3.
- Amy walks from room $A_5 = 5$ to $A_6 = 3$, and Bruno remains in room 3. Bruno earns a point.
- Amy walks from room $A_6 = 3$ to $A_7 = 5$, and Bruno remains in room 3.

In the fourth and fifth games, Bruno can earn 1 and 0 points respectively.