Small Mountainous Island

Problem Description

In a small mountainous island, countless villages are scattered among the peaks. Between these villages stretch winding bridges of democracy, allowing people to travel freely, trade goods, and share music and dance. At night, lanterns hang from the bridges, and the villagers celebrate together until dawn, making the entire island feel like one big family. However, in recent days, storms and landslides have damaged several bridges. Some routes have become impassable, and travel between villages has grown increasingly difficult.

This island has n villages, labeled from 1 to n. The bridges are numbered with ID from 1 to m according to the order they are listed in the input. You are the president of this island, tasked with monitoring the changes in village alliances (the exact meaning of a village alliance will be explained in the next paragraph). First, determine how many village alliances exist when all bridges are intact. Then, your officials will report to you the order in which bridges collapse, in a total of q reports. Each report contains the original bridge ID from when it was first listed. After each bridge collapses, record the updated number of village alliances. Therefore, in total, there should be $q+1$ lines of output.

A **village alliance** means a group of villages where every village can reach every other by traveling along some sequence of bridges. In graph theory terms, an alliance is simply a connected component. Importantly, even a single isolated village counts as an alliance of its own. For example, in Sample 1, there are 5 villages and two bridges: one between Village 1 and Village 2, and another between Village 1 and Village 3. In this case, Villages 1, 2, and 3 belong to the same alliance because they are all connected by bridges, while Village 4 and Village 5 remain isolated. Since those isolated villages each form their own alliance, the total number of village alliances is 3.

Input Format

The first line contains three integers `n m q`:

- n: the number of villages, labeled 1 to n
- m: the initial number of bridges, labeled 1 to m in the order they are listed in the input
- q: the number of bridge collapses to process

The next m lines each contain two integers `u v`, meaning there is a bridge between village u and village v.

The next q lines each contain an integer `e`, meaning the bridge **with ID** e has collapsed.

Output Format

Print $q + 1$ lines:

- The first line should contain the number of village alliances when all bridges are intact.
- For each i from 1 to q, print the number of village alliances after the i-th bridge collapse.

Constraints

The island has no strange infrastructure such as bridges from a village back to itself, nor multiple bridges between the same two villages.

- $1 \leq n \leq 2 \times 10^5$
- $0 \leq m \leq \min(2 \times 10^5, \frac{n(n-1)}{2})$
- $0 \leq q \leq \min(3 \times 10^4, m)$
- $u \neq v$
- $1 \leq u, v \leq n$
- $1 \leq e \leq m$

Example Test Case

Sample Input 1

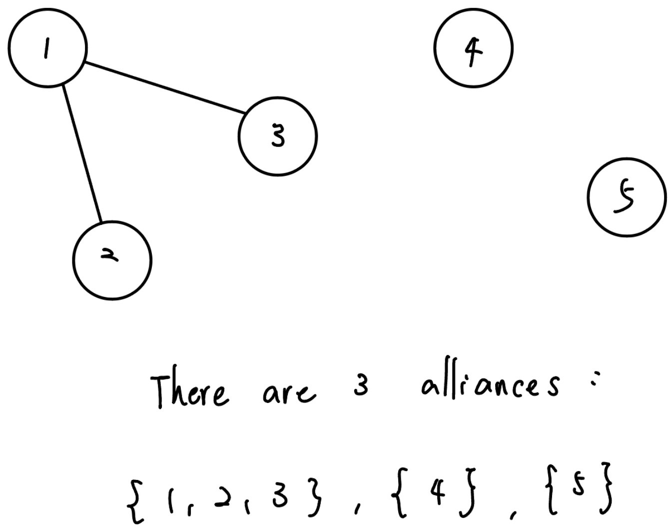
```
5 2 0
1 2
1 3
```

Sample Output 1

```
3
```

Explaination

At the start, there are two bridges: one between Village 1 and Village 2, and one between Village 1 and Village 3. This connects {1, 2, 3} together, while Villages {4} and {5} remain isolated. Note that a single village also counts as an alliance. Since no bridges collapse ($q = 0$), the answer is simply 3.



Sample Input 2

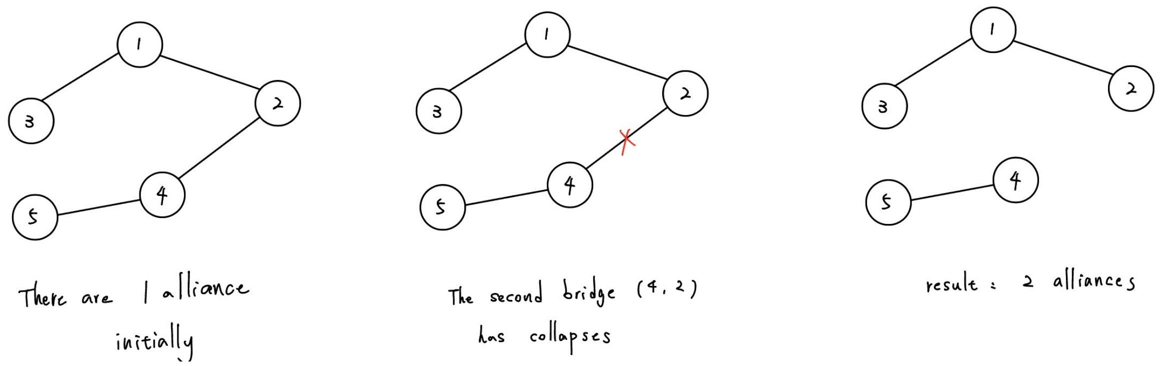
```
5 4 1
1 2
4 2
3 1
5 4
2
```

Sample Output 2

```
1
2
```

Explaination

Initially, all villages are connected through some path of bridges, forming a single alliance {1, 2, 3, 4, 5}. Then the second bridge in the list (between Village 4 and Village 2) collapses. After that, the island is split into two alliances: {1, 2, 3} and {4, 5}.



Sample Input 3

```
9 8 3
3 4
8 9
2 6
5 6
4 8
3 9
1 6
3 5
6
5
7
```

Sample Output 3

```
2
2
3
4
```

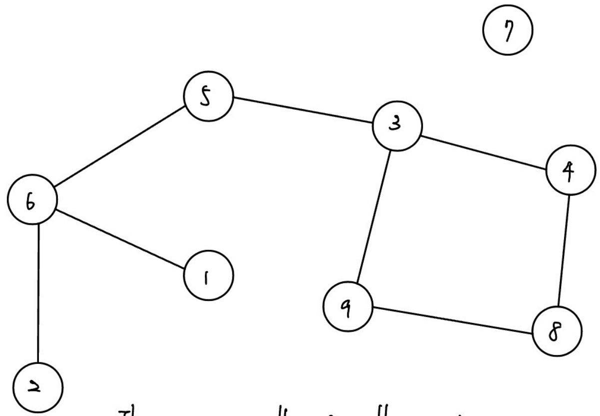
Explaination

Initially, the alliances are {1, 2, 3, 4, 5, 6, 8, 9} and {7}, so the number of alliances is 2.

After removing bridge 6 (between Village 3 and Village 9), the graph remains connected via $3 \to 4 \to 8 \to 9$, so the number of alliances stays 2.

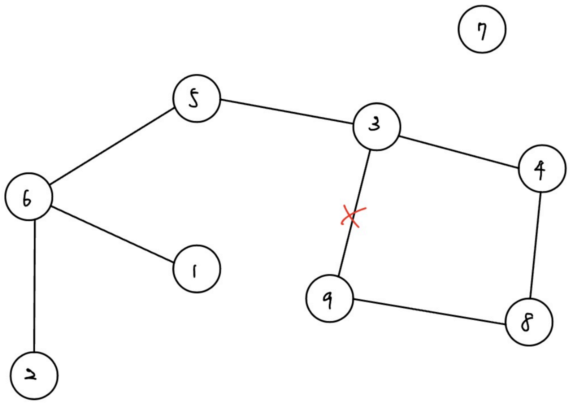
After removing bridge 5 (between Village 4 and Village 8), the alliances are {1, 2, 3, 4, 5, 6}, {7}, and {8, 9}, giving 3 alliances.

After removing bridge 7 (between Village 1 and Village 6), the alliances are {1}, {2, 3, 4, 5, 6}, {7}, {8, 9}, giving 4 alliances.

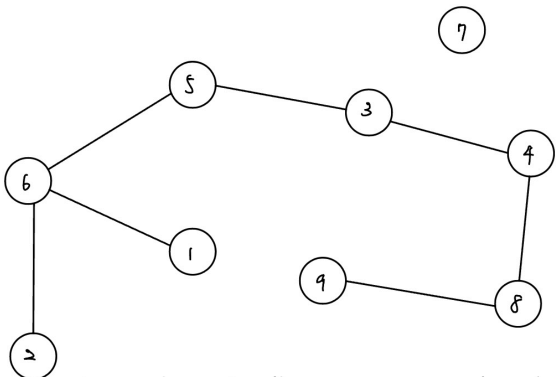


There are initially 2 alliances:

{1, 2, 3, 4, 5, 6, 8, 9}, {7}

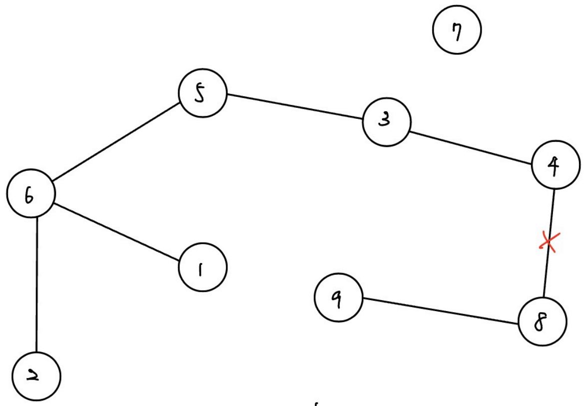


The 6th bridge (3, 9)
has collapsed

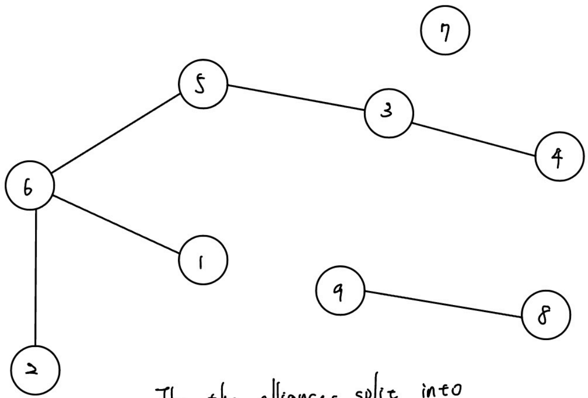


The number of alliances remain unchanged

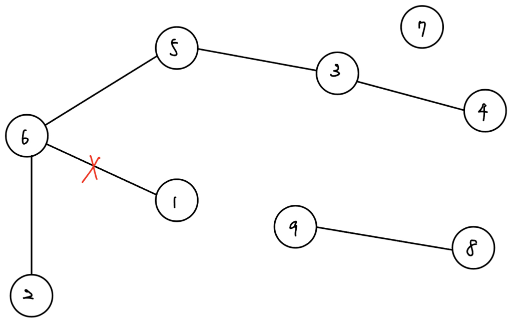
total alliances = 2



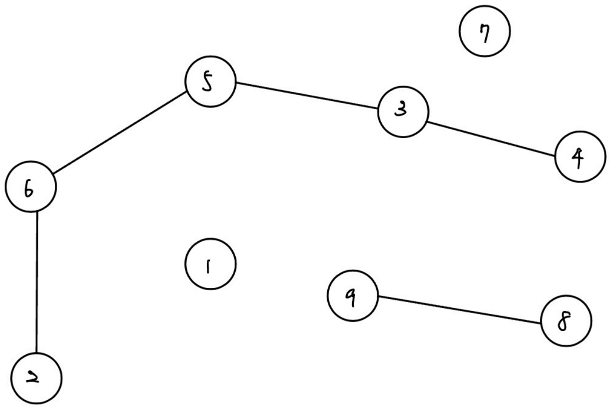
The 5th bridge (4,8)
has collapsed



The the alliances split into
{1, 2, 3, 4, 5, 6}, {8, 9}, {7}
total alliances = 3



The 7th bridge (1, 6)
has collapsed



The alliances now are

{1} , {2, 3, 4, 5, 6} , {8, 9} , {7}

total alliances = 4