Kongou

2015 Mock CCC by Alex and Timothy

You are the admiral of an admirable fleet of battleships! Your flagship is the *Kongou**, and you have never lost a single battle in your entire career. This is because you have adopted the foolproof strategy of blocking off all **critical** rivers before engaging in battle.

The battlefield can be thought of as N $(1 \leq N \leq 100\,000)$ **seas** connected to each other by bidirectional **rivers**, each joining a pair of seas. No sea will be directly connected to itself by a river, but the same pair of seas can be connected by multiple rivers, and it may not be possible to draw the rivers on a map without some of them crossing each other. A river is considered **critical** if after blocking it, the pair of seas originally joined by it are no longer reachable from each other. Specifically, you can reach a sea v from another sea u if there exists a sequence of seas $S_1, S_2, \ldots, S_n$ where $n > 1$, $S_1 = u$, $S_n = v$, and S_i is connected to S_{i+1} for $1 \leq i < n$.

You and your fleet girls are immortal, and so you get called upon to fight every few years, for a total of T $(1 \leq T \leq 200\,000)$ times. The passage of time is not kind to the battlefield, and so the rivers that connect the seas change often (the seas themselves remain the same though). Normally, this would make it hard to quickly devise a plan for each battle, but there is still hope. In your experience, you have observed that there are M $(1 \leq M \leq 100\,000)$ basic **formations**. A **formation** is simply a set of rivers, and each battlefield you fight on can be represented by combining two formations (see the sample input for a better understanding).

For each battlefield, you would like to determine the number of critical rivers.

*Kongou, based off of the Kongō.

Input Format

The first line of input will have N, M, and T, each separated by a single space.

The second line of input will have $T + 1$ numbers, $A_0, A_1, \ldots, A_T$ $(1 \leq A_i \leq M)$. The i^{th} time you fight will be on the battlefield represented by the combination of formations A_{i-1} and A_i $(1 \leq i \leq T)$.

The next M lines will contain descriptions of a single formation. Formation i $(1 \leq i \leq M)$ on line $i + 2$ will be described with $2K_i + 1$ $(1 \leq K_i \leq 200\,000)$ integers in this order: K_i $x_{i,1}$ $y_{i,1}$ $\ldots$ x_{i,K_i} y_{i,K_i}. For each pair $(x_{i,j}, y_{i,j})$ $(1 \leq j \leq K_i, x_{i,j} \neq y_{i,j}, 1 \leq x_{i,j}, y_{i,j} \leq N)$, there is a river between lakes $x_{i,j}$ and $y_{i,j}$ in formation i.

It is guaranteed that the sum of all K_i will not exceed $200\,000$.

Output Format

The output should consist of T lines. Line i should have the number of critical rivers on the battlefield you fight on for the ith time $(1 \leq i \leq T)$.

Scoring

For test cases worth at least 30% of the points, the additional constraints N, M, K_i, $T \leq 2\,000$ will hold.

Sample Input 1

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

Sample Output 1

```
0
2
1
1
```

Sample Input 2

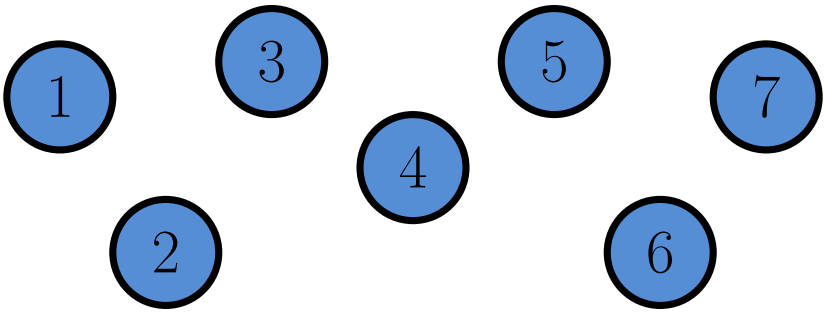
```
7 3 3
1 2 3 1
4 1 2 1 3 5 7 6 7
4 2 3 3 4 4 5 5 6
3 1 4 4 7 2 6
```

Sample Output 2

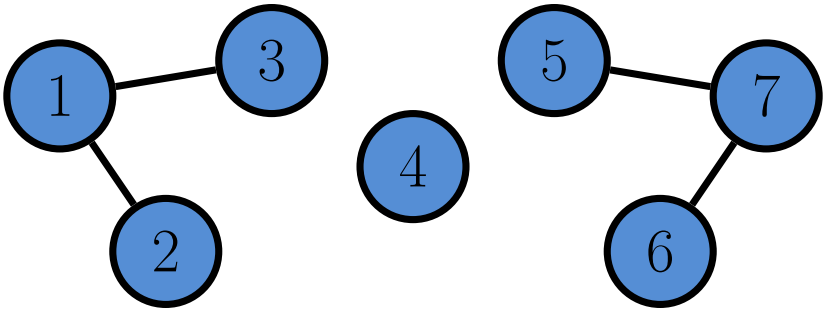
```
2
2
2
```

Explanation for Sample Input 2

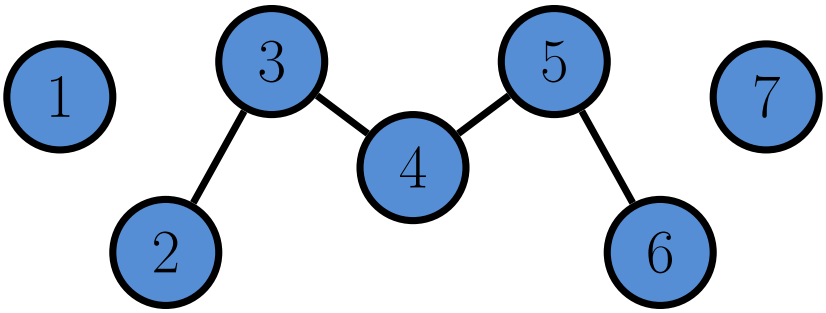
Originally, there are 7 seas numbered from 1 to 7.



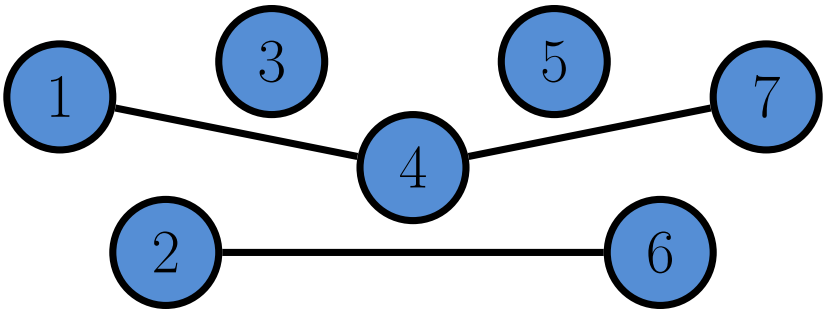
The first formation looks like this:



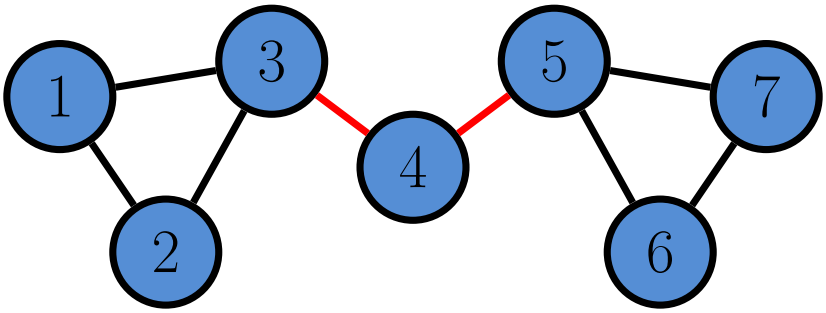
The second formation looks like this:



The third formation looks like this:

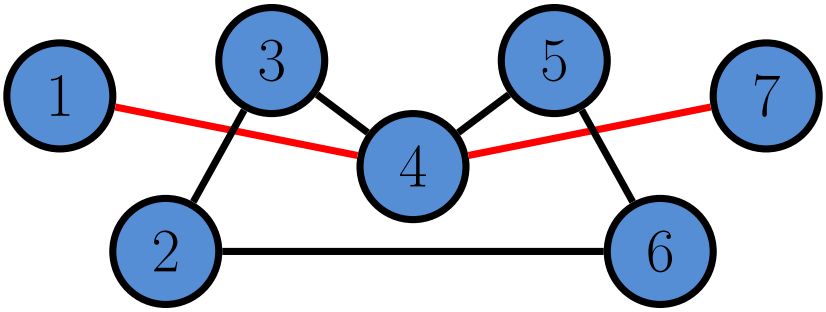


In the first battle, the battlefield is made up of the first and second formations and looks like this:



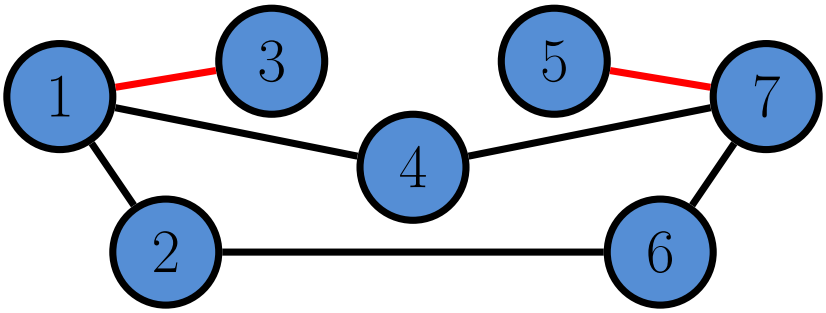
The two critical rivers (in red) are 3 ↔ 4 and 4 ↔ 5.

In the second battle, the battlefield is made up of the second and third formations and looks like this:



The two critical rivers (in red) are 1 ↔ 4 and 4 ↔ 7.

In the third and final battle, the battlefield is made up of the third and first formations and looks like this:



The two critical rivers (in red) are 1 ↔ 3 and 5 ↔ 7.