

## BYTEOTIA

This project is about Byteotia; a country consisting of  $N$  cities connected via  $M$  bidirectional roads.

Everything was going great in Byteotia until one day, this beautiful land was struck with a terrible and

incurable disease. The disease appeared out of nowhere, and infected  $K$  different cities within one

night. As if this was not enough, this disease kept spreading. At each day, cities that are directly

connected to one of the already infected cities gets infected. This infection spread for a total of  $T$  days

until the king of Byteotia decided to take action; and ordered a country-wide quarantine, which stopped

the infection from furthermore spreading. However it was too late for the cities that were already

infected; they had to be removed completely from Byteotia. Doing so, however, made it so that the

remaining cities in Byteotia were no longer connected, thus Byteotia had to be separated into individual

connected states.

Your task in this project is to, given the initial layout of Byteotia, the  $K$  cities that were infected at the

first day, and the amount of days  $T$  in which the disease spread, calculate into how many different

states Byteotia needs to be divided after the quarantine occurred and the infected cities were removed.

### Input Format:

- In the first line, four space separated integers; the number of cities  $N$  ( $2 \leq N \leq 100\,000$ ), the

- number of bidirectional roads  $M$  ( $2 \leq M \leq 1\,000\,000$ ), the number of cities infested in the first

- night  $K$  ( $1 \leq K \leq N$ ), and the amount of days passed  $T$  ( $1 \leq T \leq N$ ) in which the disease spread.

- In each of the following  $M$  lines, two integers  $a_i$  and  $b_i$  ( $1 \leq a_i, b_i \leq N$ ) describing a single bidirectional road.

- In the following  $K$  lines, one integer  $c_i$  per line; the indexes of the  $K$  cities initially infected with the disease.

- See the last page of the document.

### Output Format:

- In a single line; the number of connected states Byteotia needs to be separated into.

### Example Input/Output:

#### Input

9 8 1 2

1 2

2 3

3 4

4 5

5 6

6 7

7 8

8 9

5

### Output

2

//In this input, Byteotia is in a single line, and after the first day, cities 4 and 6 gets infected,  
//after thesecond day, cities 3 and 7 gets infected. After the second day, the unaffected  
//cities are therefore; 1, 2, 8 and 9. 1 & 2 make a single connected state, and 8 & 9 make a  
//single connected state, so the answer is 2.

### Input

12 14 2 1

1 2

2 3

3 4

4 5

5 6

6 7

7 8

8 1

3 9

9 10

10 3

7 11

11 12

12 7

15

### Output

2

//This time there are two cities that are infected on the first day; 1 and 5, but the infection  
//spreads for only one day. After the first day, the infection spreads into cities 2, 4, 6 and 8.  
//Then the unaffected cities are; 3, 7, 9, 10, 11, 12. 3, 9 and 10 form a single connected  
//state, and 7, 11 and 12 form a single connected state, thus the answer is 2.