

# Connected Components

Partition an undirected graph into connected components (i.e., label the vertices belonging to a given component using a unique number). Output should be the number of components and the number of vertices in each component.

As defined by Wikipedia, connected component of an undirected graph is a subgraph in which any two vertices are connected to each other by some path(s), and which is connected to no additional vertices in the supergraph.

## Input:

First line of the Input will contain two space separated integers ***V*** and ***E*** representing ***Number of Vertices*** and ***Number of Edges*** respectively.

Next ***E*** lines will contain space separate integers representing vertices which possess an edge in between them.

Note: Vertices will be labeled starting from 1. For example, if  $V=5$ , the set of vertices is {1,2,3,4,5}

## Output:

First line of output will contain a single integer ***N*** representing the number of connected components.

Next ***N*** lines will each contain a number  $C_i$  representing the number of vertices in the  $i^{\text{th}}$  component. These should be printed in the decreasing order of the number of vertices in the component.

## Constraints:

$$2 \leq V \leq 10^5$$

$$0 \leq E \leq \min[10^6, (V*(V-1)/2)]$$

## Sample Input

```
10 7
1 2
2 3
10 8
4 5
5 6
7 8
8 9
```

## Sample Output

```
3
4
3
3
```

## Explanation

On interpreting the input and constructing the graph we get:

[1]----[2]----[3]      [4]----[5]----[6]      [7]----[8]----[9]----[10]