

Connected Components

time limit per test: 1 second (3 seconds for Python)
memory limit per test: 500 megabytes
input: standard input
output: standard output
points: 100 · problem code: components

You are given an undirected graph with n vertices numbered from 1 to n .

Find all connected components of the graph. Components are numbered in the order they are first discovered by scanning vertices from 1 to n . When an unvisited vertex is found, it starts the next component, and every vertex reachable from it receives that component number.

Input

The first line contains two integers n and m , the number of vertices and edges.

The next m lines each contain two integers a and b , meaning there is an undirected edge between vertices a and b .

Output

Print one integer k , the number of connected components.

Then print n integers: the component label of each vertex from 1 to n .

Constraints

- $1 \leq n \leq 200000$
- $0 \leq m \leq 300000$
- $1 \leq a, b \leq n$

Example 1

Input

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

Output

```
2
1 1 1 2 2
```

Explanation

Vertices 1, 2, 3 form the first component, and vertices 4, 5 form the second component.

Example 2

Input

```
6 2
2 4
3 6
```

Output

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

Explanation

Vertex 1 starts component 1. Vertices 2 and 4 form component 2. Vertices 3 and 6 form component 3. Vertex 5 starts component 4.