Connected components II

Given an undirected graph with n vertices and m edges. Vertices are numbered from 0 to n-1. Determine connected components in the given graph.

Input

The first line consists of two positive integers, the number n vertices $(0<n<10^5)$ and the number of edges m $(0<m<2\text{x}10^5)$.

Then there are m lines, each containing two integers u and v representing an edge which connects u and v. $(u,v<10^5)$.

Output

For each component , print the smallest vertice and the number of vertices in the component.

Example

Input:
3 1
1 2

Output:
0 1
1 2