DFS and BFS

Description

Depth-First Search (DFS) and Breadth-First Search (BFS) are famous graph searching algorithms. A graph *G* is often represented as *G(V, E)*, where *V* and *E* represent the vertex set and edge set, respectively. Write a program that prints the results of DFS and BFS for a given graph, with labelled vertices from 1 to *N*, the number of vertices.

In each search, if there is more than one vertex to visit, then you should visit the vertex with a lower value for its label.

You may assume all given graphs are simple and connected. Simple means that there are no two edges connecting the same vertices or an edge that begins and ends at the same edge. Connected means that any vertex in the graph can be reached from any given vertex.

Input

Your program is to read from standard input. In the first line of input you are given 3 numbers, the number of vertices *N* (1 ≤ *N* ≤ 1000), the number of edges *M* (1 ≤ *M* ≤ 10000), and the label of the starting vertex *V* (1 ≤ *V* ≤ *N*), each separated by a space. On the following lines, the edges are given on each line. On each line, two vertices are given by their labels, each separated by a space.

Output

Your program is to write to standard output. In the first line of output you should print the result of depth-first search through the graph, by printing the labels of the vertices in the order they are traversed, each separated by a space. In the second line of output you should print the result of breadth-first search through the graph, by printing the labels of the vertices in the order they are traversed, each separated by a space.

Sample

Input	Output
4 5 1 1 2 1 3 1 4 2 4	1 2 4 3 1 2 3 4

3 4	