Homework lecture 10

Graphs

Exercise 1: Connected components

Given an undirected computer network with *n* nodes (numbered from 1 to *n*) and *m* edges, your task is to write a program to calculate the number of connected components.

Input:

- The first line contains two number *n* and *m* separated by spaces
- The next *m* lines, each contains two numbers *x* and *y* (separated by spaces) indicating an edge between *x* and *y*.

Output: The output consists of the number of connected components.

Example:

Input	Output
5 3 1 2 2 3 3 5	2

Exercise 2: Shortest path

Given a directed computer network with *n* nodes (numbered from 1 to *n*) and *m* edges, your task is to write a program to find the shortest path that has the minimum number of edges between two node X and Y.

Input:

- The first line contains four number *n, m,* X, Y separated by spaces
- The next *m* lines, each contains two numbers *x* and *y* (separated by spaces) indicating an edge from *x* to *y*.

Output: The output consists of the number of edges in the shortest path from X to Y.

Example:

Input	Output
5 5 1 5 1 2	2

2 3 3 4 4 5 2 5	