

Homework lecture 6

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	