Algorithms

Homework 2: due 16 May 2023

1. You are to write a program that finds strongly connected components of a directed graph. Your program should be able to find strongly connected components when the input graph is given as

- an adjacency matrix,
- an adjacency list, and
- an adjacency array (using one array for vertices and another array for edges).

Your program should read the input graph from an input file. Your program should output each strongly connected component in a line such that vertices in a line are sorted, and the lines appear in the output in the lexicographic order.

2. Your program should proceed as follows.

(1) Read the input graph from an input file

(2) Run your program when the graph is given as an adjacency matrix, and measure the time. Print the output and the time.

(3) Run your program when the graph is given as an adjacency list, and measure the time. Print the output and the time.

(4) Run your program when the graph is given as an adjacency array, and measure the time. Print the output and the time.

○ Measure the time on various inputs (different values of n, sparse and dense, etc.) and discuss the results.
○ Hand in your report, program, and an example running.
○ Write down the environment you run your program and how to run your program in your report.
○ Write comments appropriately in your program.