CPSC 131 Homework 9

Deadline: Wednesday, December 12 (MoWe sections)
                 Thursday, December 13 (TuTh sections)

Turn in your submission as a hard copy in class. Refer to your instructor's syllabus addendum to see their policy on group work. Some instructors allow homework to be completed in groups.

#1 [6 points]
A social network can be represented by a graph where vertices represent persons and edges represent a friend relationship between two persons. A list of 5 persons and their friends are given below.

Friends of Alice: Dolores, Eva
Friends of Bob: Dolores
Friends of Chao: Dolores, Eva
Friends of Dolores: Alice, Bob, Chao, Eva
Friends of Eva: Alice, Chao, Dolores

(a) Sketch the resulting graph
(b) Sketch the adjacency matrix representation for the graph
(c) Sketch the adjacency lists representation for the graph

#2 [4 points]
For the graph in Problem #1 above:
(a) List the vertices of the graph in the order they are visited by a Depth-First Search (DFS) traversal starting from vertex Bob. Specify if you are using the stack-based algorithm or the recursive algorithm. In either case, expand neighboring nodes in alphabetical order: the for-loop should consider adjacent vertices in alphabetical order.

(b) List the vertices of the graph in the order they are visited by a Breadth-First Search (BFS) traversal starting from vertex Eva. Expand neighboring nodes in alphabetical order: the for-loop should consider adjacent vertices in alphabetical order.

#3 [2 points]
Assume that you are tasked with writing a C++ program to represent all CPSC 131 students in a "collaboration network" - a graph where a vertex represents a student, and an edge connects two students who have worked together during the course. Your program will have to answer questions such as if two specific students have worked together. What graph representation - adjacency lists or adjacency matrix - would be more appropriate for this problem? Answer in 2-3 sentences.