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CSCI 422 Project Proposal

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Project description:

Project will be primarily coding based, implementing two algorithms that interact with unweighted and sparse graphs. Each algorithm will have two modes, one for directed graphs and one for undirected graphs.

The two algorithms are as follows:

1) Determine if a graph contains a cycle of length at least 3.
    This should be completed in O(|v| * |e|) time.

2) Remove each vertex of degree 2 from a graph by replacing the edges (u, v) and (v, w) with the edge (u, w). Removing vertices may end up creating a new vertex of degree 2 which must then be removed.
    This should be completed in linear time.

Program description:

Program will read adjacency list representation of a graph from a file. This file will signal if the graph is directed or undirected at the start of the file before supplying the adjacency list.

The program will run algorithm 1 giving results to the user through the terminal. It will then run algorithm 2 and the resulting adjacency list will be output to a file so the user can inspect it later. Finally, the program will run algorithm 1 on the newly created adjacency list and again output results to the user.

Programming will be done in C++. I imagine I will make use of the Vector STL to hold the adjacency list.

Textbook used: The Algorithm Design Manual (2nd edition) by Steven S. Skiena
Algorithm 1: exercise 5-17 page 188
Algorithm 2: exercise 5-23 page 188