CS5343 Assignment 5

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Assignment 5 Description

Write program to do Topological sort (DFS).
your graph must have at lease 10 nodes and 15 edges. It must have multiple edges going in and also coming out from some of the edges.
1. Run the program on a graph with no cycles. Your print out would show all the edges of the graph. Then it will show the list of vertices in the topological order.
2. Run the program on a graph that has a cycle. Your program catches the cycle and print the list of edges that form the cycle.
Submit code and screen shots of the execution.

Description of the program.

The program implements a Graph class and creates a directed graph of 11 nodes and 15 edges using an adjacency list implemented with the vector C++ class library. The program then runs the DFS topological sort Algorithm and either prints the topological sorted vertices or the vertices making up the cycle.

Methods implemented in the program:

- Graph: constructor creates an adjacency list using vectors of size 11 (VERTICES).
- Distplay_Edges(): prints the edges of the graph
- add_Edge: accepts 2 arguments, the first is the starting vertex and the second is the end vertex and creates an edge between the two by adding to the adjacency matrix.
- DFS: depth first search utility to perform the depth first search algorithm for topological sort
- get_cycle: method finds the vertices making up the cycle in the graph and outputs the vertices
- topological: method runs the topological sort on the vertices, uses a char array to track if the vertices have been visited(W – indicates no, G – yes, but still in use, B – yes, and finished), a stack to hold the topological order, and a Boolean value to indicate if a cycle is found or not. The method returns the topological order of the vertices or the vertices making up a cycle.

The program runs topological on a graph without a cycle and then a graph with a cycle.

Compiling instructions.

This program was created using Microsoft Visual Studio. To compile open Visual Studio and create a new empty C++ project. Right click the source files folder under the solution explore window and click Add then Existing item. Browse to the file Source.cpp and double click. Save the project, click build, then “Local Windows Debugger.” The program should run.