**-Department of Computing**

**CS250: Data Structures and Algorithms**

**Class: BEE-6AB**

# Lab 11: Graphs

**Date: 10th December, 2015**

**Time: 10am-1pm & 2pm-5pm**

# Instructor: Mr. Faisal Shafiyat

**Lab 11: Graphs**

**Introduction**

In this lab, you will be introduced to what is necessary to implement a Topological sort

(Kahn’s algorithm, 1962).

**Objectives**

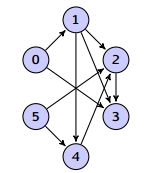
Objective of this lab is to get familiar with Topological sort.

**Tools/Software Requirement**

Visual Studio C++

**Description**

Topological sorting for Directed Acyclic Graph (DAG) is a linear ordering of vertices such that for every directed edge (u, v), vertex u comes before v in the ordering. Topological Sorting for a graph is not possible if the graph is not a DAG. For example, a topological sorting of the following graph is "0 5 1 4 2 3". There can be more than one topological sorting for a graph. The first vertex in topological sorting is always a vertex with in-degree as 0 (a vertex with no in-coming edges).



**Lab Tasks**

The goal of the task is to gain familiarity with a binary tree; complete Lab\_11\_- \_Topological\_Sort.cpp. First, execute the unmodified code, to verify whether it’s working. Begin the lab by completing the function definitions of a simple class that represents a “graph".

1. The task requires some familiarity with the STL containers vector, queue, and list class. You can find all the information at <http://www.cplusplus.com/reference/stl/>.
2. Start by implementing AddEdge() function.
3. Follow the comment in the provided code snippet to implement the Topological Sort. Reference. <http://en.wikipedia.org/wiki/Topological_sorting#Algorithms>.

Execute (Lab\_11\_-\_Topological\_Sort.cpp).

**Deliverables**

Hand in the source code from this lab at the appropriate location on the blackboard system at LMS. You should hand in a single compressed/archived file that contains the following.

1. C++ source code files representing the work accomplished for this lab. All source code files should contain author in the comments at the top of the file. It is expected that you will have files for the task (Lab\_11\_-\_Topological\_Sort.cpp).
2. A plain text file named OUTPUT.txt that includes
   1. Author information at the beginning,
   2. A brief explanation of the lab and
   3. List some possible applications of a topological sort.