CS575 Homework 3

Submit a scanned pdf file through blackboard by 8:59am on April 3, and submit a hard copy at the beginning of the Class on April 3. (The soft and hard copies should be exactly the same.)

Your Name:_____**Section:**_____

I promise to follow the academic honesty requirements of the Binghamton University. I agree that I will fill out and sign an official form that I have cheated if I get caught cheating. I understand that this form will be stored by the university. Furthermore, I understand that the minimum penalty for cheating is getting a grade of 0 for this assignment.

Signature:_____

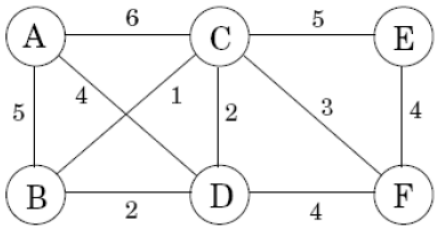
1. [10%] Show that there can be more than one minimum spanning tree in an undirected graph by giving an example.

2. [10%] Briefly yet clearly describe how to tell whether an undirected graph is connected or not.

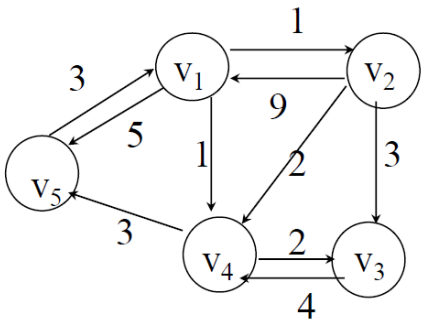
3. [10%] Briefly describe how to determine whether a directed graph has a cycle using the depth first search algorithm.

4. [15%] Suppose that we have n professional wrestlers and a list of r pairs of wrestlers for which there are rivalries. (Between any pair of wrestlers, there may or may not be a rivalry.) Give an O(n+r) time algorithm that determines whether it is possible to designate some of the wrestlers to Red team and the remainder as Blue team such that each rivalry is between a Red and a Blue team member. If it is possible to perform such an assignment, your algorithm should produce it.

5. [20%] Use Prim's algorithm to find the minimum spanning tree in the following graph starting from vertex A. Show every step.



6. [15%] Using Floyd's algorithm, find all pairs shortest paths in the following graph.



7. [20%] Find the longest common subsequence between two strings ABCE and ABDC via dynamic programming.