**CSCE 4133**

**Algorithms**

**Programming Assignment 4 Report**

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**Academic Integrity Statement:** I pledge that I have neither given nor received unauthorized help on this programming assignment.

**Problem Statement:**

For this project, I was tasked with implementing binary search tree to store data in order so that we can search or find the minimum value quickly. The map is represented as a graph structure where each node represents one building, and an undirected edge between two nodes represents the path between buildings. Since I am an undergraduate student, I only needed to implement the binary search tree and not the AVL tree. The starter code was provided by Dr. Luu.

For this project, I was tasked with implementing a Minimum Spanning Tree as if the university wanted to install cables between every building on campus.

**Implementation:**

I started by downloading the homework file provided on Blackboard. The pseudocode provided in the cpp files were very helpful in that they provided a description of every function that needed to be implemented. In particular, I needed to write a find, popMaximum, popMinimum, insert, and remove function for the binary search tree. The popMaximum and popMinimum were very similar to each other, just reversed basically. The find, insert, and remove functions were the different ones. During the assignment review day, the TA provided us with function outlines, which matched all of mine.

**Testing:**

All the makefile instructions as well as the compilation commands were given to us in the review and instructions. We also were given the required test cases to test all the functions. This means that the only testing I had to do was run the program with the given commands. This streamlined the testing process, meaning that I could “test” the program in seconds. I am extremely grateful for this.

The results of running the makefile are below:

**Conclusions:**

Overall, everything worked as expected. The program creates a map of the campus and then outlines the shortest path