**ECE 1111: Engineering Computation I**

**Homework No. 11: Lists and Trees in C++**

**Deposit your work in:**

**/data/courses/ece\_1111/current/homework/hw\_11/<lastname\_firstname>**

**Goal:** The design of a data structure can be crucial to the efficiency with which you can manipulate data. In this assignment, you will compare the efficiency of two search algorithms.

**Description:** Create a text file with random data that is 100,000 lines long. For example, use the command:

**cat /usr/include/\*.h > temp.text**

Write a C program that sorts this data, line by line, in lexical order using the Unix binary tree utility (‘man tsearch’) and a linked list. Compare the execution time of this code to the Unix sort command. Make sure that the two programs produce identical output.

Next, convert your C program to a C++ program that uses a linked list. You can use the standard sort tools available in Unix or incorporate code you find from the Internet. You need not write your own sort method. But you must implement your own basic linked list in C++, and provide a sort method as a member function in the class.

Your code must compile and link using make. You will be graded on both the structure and functionality of your code as well as the quality of the documentation.