This lab explores binary search trees and their implementation in the cs2set class, along with the use of recursive functions to manipulate binary search trees. Once you have a basic understanding of trees, the actual code that you have to write for the lab is quite short. Review the notes from Lectures 21 and 22 prior to starting.

Download the files:

- http://www.cs.rpi.edu/academics/courses/fall06/cs2/labs/13_trees/cs2set.h

Then, turn off all network connections.

Examine the code in cs2set.h and testset.cpp. The former contains the implementation discussed in Lectures 21 and 22, including the functions implemented in lecture as exercises. The latter contains code for testing the implementation. Some of this has been commented out because all the functions have not yet been implemented.

Checkpoint 1

The implementation of find provided in cs2set.h is recursive. Implement and test a non-recursive replacement for this function.

To complete this checkpoint: Show one of the TAs your new code. Be prepared to discuss the running time for the two different versions of find for various inputs.

Checkpoint 2

The implementation of the copy constructor and the assignment operator is not yet complete because each depends on a private member function called copy_tree, the body of which has not yet been written. Write copy_tree and then test to see if it works by “uncommenting” the appropriate code from the main function.

To complete this checkpoint: Show one of the TAs your new code and some new test cases you’ve written to exercise the copy constructor, the assignment operator, and the destructor.