

CSE 5311 Lab Assignment 1

Due February 26, 2004

Goals:

1. Review of binary search trees.
2. Understanding of randomized search trees (treaps).

Requirements:

1. Write (and test) a program that processes the commands below for a treap that has been augmented such that all commands are processed in (expected) $O(\log n)$ time. Each command appears on a separate line. Your program must compile and execute on OMEGA. There should be a comment near the beginning of your code that indicates how to compile on OMEGA.
 - a. `I x` - insert key x into the treap. If x is already present, leave the tree alone and print a message. Otherwise, print nothing.
 - b. `D x` - delete key x from the treap. If x is missing, leave the tree alone and print a message. Otherwise, print nothing.
 - c. `S x y` - print the sum of all keys k such that $x \leq k \leq y$. If there are no keys in the range, just print 0. Besides the answer, also print the number of nodes examined.
 - d. `Q` - terminate the program after printing the sum of all keys and the number of rotations performed.
2. Email your code (as attachments) to `yxb4544@omega.uta.edu` before 5:15 pm on February 26. The subject should include your name as recorded by the University.

Getting Started:

1. You may borrow from the code at <http://www.cs.fiu.edu/~weiss> (or other places - besides each other), but be sure to give appropriate credit in your comments.
2. n will not exceed 20,000.
3. All keys will be positive.
4. Be careful with your randomly generated priorities.