CSE 5311 Lab Assignment 1

Due July 2, 2007

Goals:

1. Review of binary search trees.

2. Understanding of randomized search trees (treaps).

Requirements:

1. Write (and test) a C/C++ 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 ≤ k ≤ 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 `sghosh@uta.edu` before 10:15 am on July 2. 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.