Research Project 1: Binary Search Trees (30)

This project requires you to implement operations on unbalanced binary search trees, AVL trees, and splay trees. You are to analyze and compare the performances of a sequence of insertions and deletions on these search tree structures. The testing must be done on a set of *N* distinct integers in the following ways:

(1) Insert *N* integers in increasing order and delete them in the same order;

(2) Insert *N* integers in increasing order and delete them in the reverse order;

(3) Insert *N* integers in random order and delete them in random order.

The size of input can be taken from 1000 to 10000. The run times must be plotted with respect to the sizes to illustrate the difference.

Grading Policy:

The report of this assignment is due Monday, March 6th, 2017 at 10:00pm.

- **Programming:** Implement all the necessary operations on unbalanced binary search trees, AVL trees, and splay trees **(6 pts.)**. Write a test of performance program **(3 pts.). All the codes must be sufficiently commented**.
- **Testing:** Provide the necessary inputs for testing and give the run time table **(2 pts.)**. Plot the run times vs. input sizes for illustration **(2 pts.)**. Write analysis and comments **(3 pts.)**.
- **Documentation:** Chapter 1 **(1 pt.)**, Chapter 2 **(2 pts.)**, and finally a complete report **(1 point for overall style of documentation)**.

The presentation **(10 pts.)** of this assignment is due Tuesday, March 7th, 2017 at 09:50am. All the contributors must be present at the classroom before 09:35am to have the computer ready and the speaker decided.

Peer review of the reports is due Thursday, March 9th, 2017 at 10:00pm.

Final grading sheets will be uploaded after the arbitration.