

Red Black Sets

Due Date:

This assignment is due *Friday, 2009-11-27*.

Purpose:

The purpose of this lab is to become familiar with red-black trees, and with algorithms for set operations on trees.

A Red Black Set Class:

Write a set class that is implemented using red-black trees. The class should support the following operations and amortized running time estimates.

- determine whether an item is in the set ($O(\log n)$).
- insert an item ($O(\log n)$).
- delete an item ($O(\log n)$).
- construct a set from an ordered collection ($O(n)$).
- compute the union of two sets.
- compute the intersection of two sets.
- compute the symmetric difference of two sets.
- compute the (non-symmetric) difference of two sets.

The running times of the binary set functions should be linear in the sum of the sizes of the operands.

Hand in Format:

E-mail to the instructor a `tar`'d and `gzip`'d file consisting of

- All source code
- `.pdf` versions of all test plots
- Other calculations and data either as text files, `TeX` files, or `.pdf`-files.

The name of the `tar`'d and `gzip`'d file should be

- `cpsc482-2009-surname-lab2.tgz`

and it is helpful if the files contained in the `tar`'d and `gzip`'d file are contained in a directory structure

- `cpsc482-2009/surname/lab1`