CS61B, Fall 2004 **HW #8** **P. N. Hilfinger**

Due: Wed., 17 November 2004 at midnight

Create a directory to hold your answers to this homework set. Copy the files from `$master/hw/hw8` into this directory. Put non-program answers into a file `hw8`. Use the command `submit hw8` to submit your solutions to the problems below.

1. Implement a skip list data structure from the template in `~cs61b/hw/hw8/SkipList.java`. Fill in the class `SkipListTest` to build some skip lists from sorted data and measure the maximum number of nodes one must visit to find any key.

2. Give an example of how inserting integers into a (2,4) tree in two different orders gives two different trees.

3. Given the mapping I described between red-black and (2,4) trees (each (2,4) node corresponds to a 1–3 node cluster with one black root and the rest red) is there a unique red-black tree for each (2,4) tree? Is there a unique (2,4) tree for each red-black tree.

4. Show how to convert any n-node binary search tree into any other n-node binary search tree with the same keys. Can it be done in $O(n)$ rotations? Is the same possible for a general binary tree (i.e., can any two trees with the same keys be converted into each other rotations)?