

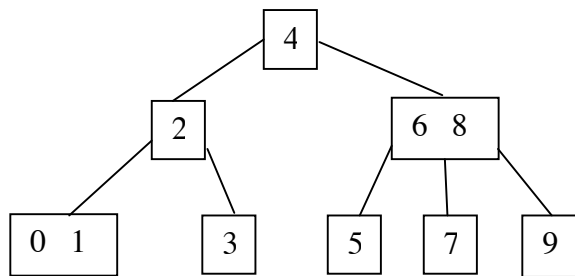
Homework 4 – 71 points possible

You must turn in your homework in ps or pdf format

Be sure to include the names of your partners and how long you worked on the homework together. Remember that you must work with at least 2 other people to form a group of three and you must work for at least 2 hours together (minimum of 1 hour sessions).

1. (10 pts) Show the resulting 2-3 trees if we insert the elements 4, 6, 2, 9, 0, 5, 7, 3, 8, and 1 into an initially empty tree. Insert in the order given. Show the tree after each insert.

2. (10 pts) Show the resulting 2-3 trees if we delete the elements 4, 6, 2, 9, 0, 5, 7, 3, 8, and 1 from the resulting tree in the previous question (Shown below to make sure you start with the correct tree). Delete in the order given. Show the tree after each delete.



3. (11 pts) Show the red-black trees that result after successively inserting the keys in the order 5, 16, 22, 45, 2, 10, 18, 30, 50, 12, and 1 into an initially empty red-black tree. Show the tree after each insert. (Be sure to include a legend for your tree so we know which nodes are red and which are black)

4. (10 pts) Enqueue the following numbers in the given order into a Min Heap. Show the heap after each enqueue: 100, 90, 65, 55, 1, 7, 35, and 2

5. (10 pts) Perform 8 dequeue operations on the final heap from the previous question. Show the heap after each dequeue.

6. (10 pts) Trace the action of heapSort on an array containing the items 5, 1, 2, 8, 6, 10, 3, 9, 4, 7 in that order. You must show the heap at each pass (you may show the heap as a tree structure). Use the linear time algorithm to build your heap and sort the values in ascending order

7. (10 pts) Did you get to <http://hug.ucr.edu/ieval/login> and evaluate your TA and your instructor? If you haven't, please do so now so that you can answer yes to this question. (Do not answer yes if you *plan* to fill out the evaluations, only answer yes if you have *already* filled out the evaluations.) Remember, if you don't have anything constructive to say, say something funny =)

Extra Credit

8. (11 pts) Show the red-black trees that result after successively deleting the keys in the order 5, 16, 22, 45, 2, 10, 18, 30, 50, 12, and 1 from the resulting red-black tree in question 3 (Shown below to make sure you start with the correct tree). Show the tree after each delete operation. (Be sure to include a legend for your tree so we know which nodes are red and which are black) Squares are black for my tree below.

