1. Write your name below.

2. Trace the execution (draw the recursion tree) of the OS-SELECT algorithm, on page 341 of the textbook, on the red-black tree of Figure 14.1 (page 340), with the argument x set to the root of the tree and the argument i set to 11,

3. Using a table similar to the one at the bottom of page 342 of the textbook, trace the execution of the OS-Rank algorithm with the argument T set to the red-black tree of Figure 14.1 (page 340) and the argument x set to node with key 21.

4. Consider an *order-statistic tree* with n nodes.

   (a) Express the height of the tree asymptotically using big-Theta.

   (b) Provide exact expressions (not asymptotic) for the minimum and maximum heights of the tree.

   (c) Provide asymptotic expressions (big-Theta) for the costs (time complexities) of insertion and deletion operations.

   (d) Provide an asymptotic and exact expressions for the number of rotations that an insertion operation may generate in worst case.

   (e) Repeat the above for a deletion operation.