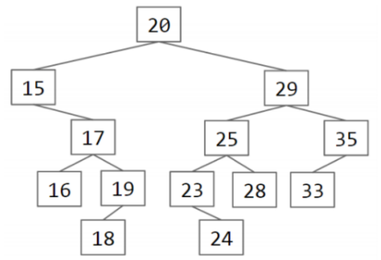
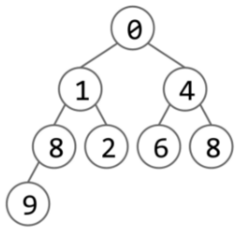
CS 61B Discussion 10 Exam Prep Spring 2017

1 Basic Operations (Spring 2015 MT2 Q1)

a. **To the right of the BST below**, draw a BST that results if we delete 20 from the BST. You should use the deletion procedure discussed in class (i.e. no more than 4 references should change).



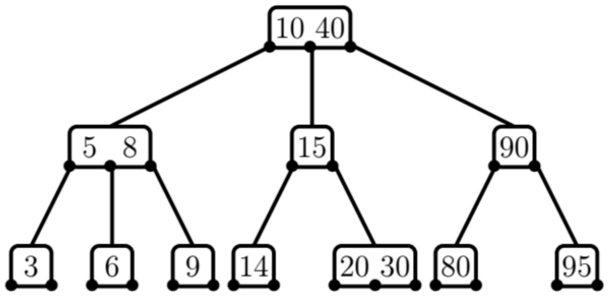
b. **To the right of the minHeap below**, draw the minHeap that results if we delete the smallest item from the minHeap.



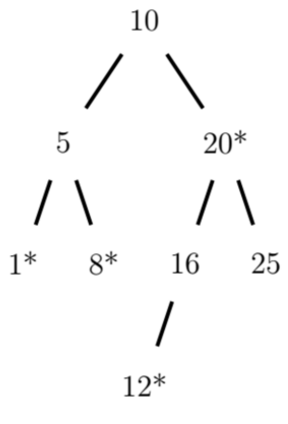
d. Draw a valid Weighted Quick Union object that results after the following calls to connect: `connect(1, 4)`, `connect(2, 3)`, `connect(1, 3)`, `connect(5, 1)`. Don't worry about the order of the arguments to each connect call, we'll accept any reasonable convention.

2 (Fall 2016 Final Q6)

a. Show the left-leaning red-black tree that corresponds to the (2,3) tree on the left. Indicate red nodes with an asterisk (as in part (b) below).

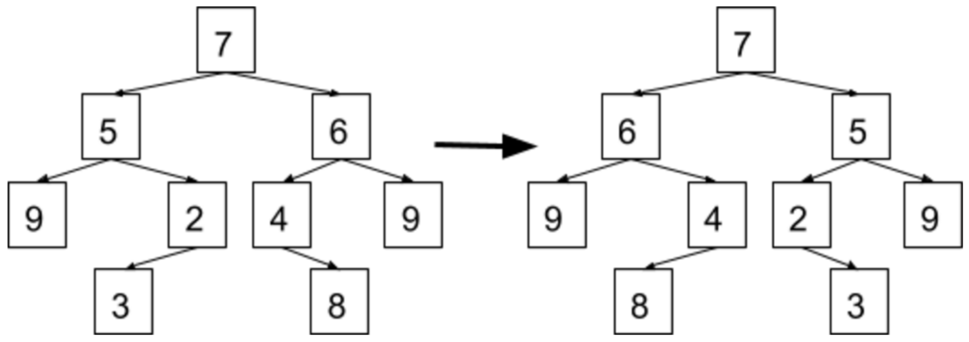
(2, 3) tree	**Left-Leaning Red-Black Tree**
 10 40 5 8 15 90 3 6 9 14 20 30 80 95	

b. Show the (2,4) tree that corresponds to the red-black tree on the left. Red nodes are marked with an asterisk.

Red-Black Tree	**(2, 4) tree**
	

3 Lapras (Summer 2016 MT2 Q7)

Fill in a method, `Tree::flipHorizontally`, which should flip a **symmetric** binary tree's values destructively about the root in linear time. Some helper methods (`swapNumbers` and `safePush`) are given. You may not define your own helper methods. See the example:



```
public class Tree {
    private TreeNode root;

    private static class TreeNode {
        private int num;
        private TreeNode left, right;

        private TreeNode(int num, TreeNode left, TreeNode right) {
            this.num = num;
            this.left = left;
            this.right = right;
        }
    }

    private static void swapNumbers(TreeNode t1, TreeNode t2) {
        int temp = t1.num;
        t1.num = t2.num;
        t2.num = temp;
    }

    private static void safePush(TreeNode t, Stack<TreeNode> s) {
        if (t != null) {
            s.push(t);
        }
    }

    // Continues on next page
    public void flipHorizontally() {

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        while (______________________________________________________) {

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        }
    }
}
```