CHAPTER 6 – PROBLEMS (Part 2)

Problem 1. Consider the following sequence of operations on an initially empty search tree:

Insert 10
Insert 100
Insert 30
Insert 80
Insert 50
Remove 10
Insert 60
Insert 70
Insert 40
Remove 80
Insert 90
Insert 20
Remove 30
Remove 70

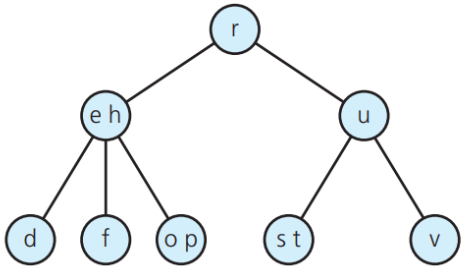
What does the tree look like after these operations execute if the tree is:

a) A binary search tree?
b) An AVL tree?
c) A Red-black tree?
d) A 2-3 tree?
e) A 2-3-4 tree?

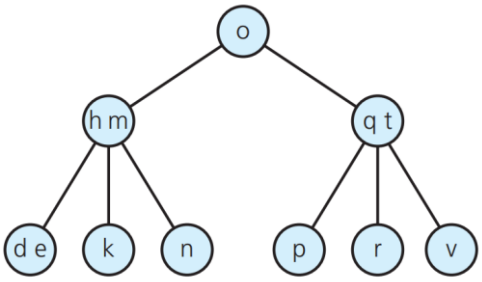
Problem 2. Draw a Red-Black Tree that is not an AVL tree structure. Explain your answer.

Problem 3. Is it possible to have all black nodes in a Red-Black tree? Give an example for your answer.

Problem 4. Given the following 2-3 tree. Draw the tree that results after inserting *k, b, c, y,* and *w* into the tree.



Problem 5. Given the following 2-3 tree. Draw the tree that results after removing *t, e, k,* and *d* from the tree.



Problem 6. Draw the 2-3-4 tree that results from inserting *o, d, j, h, s, g,* and *a*, in the order given, into a 2-3-4 tree that contains a single node whose value is *n*.

Problem 7. Show all legal B-trees of minimum degree 2 that store the keys 1, 2, 3, 4, 5.

Problem 8. Insert the following keys to an empty 5-way B-tree: 3, 7, 9, 23, 45, 1, 5, 14, 25, 24, 13, 11, 8, 19, 4, 31, 35, 56. Draw the result tree after each insertion.

Problem 9. Show the results of deleting C, P, and V, in order, from the following B-tree with $m = 5$: