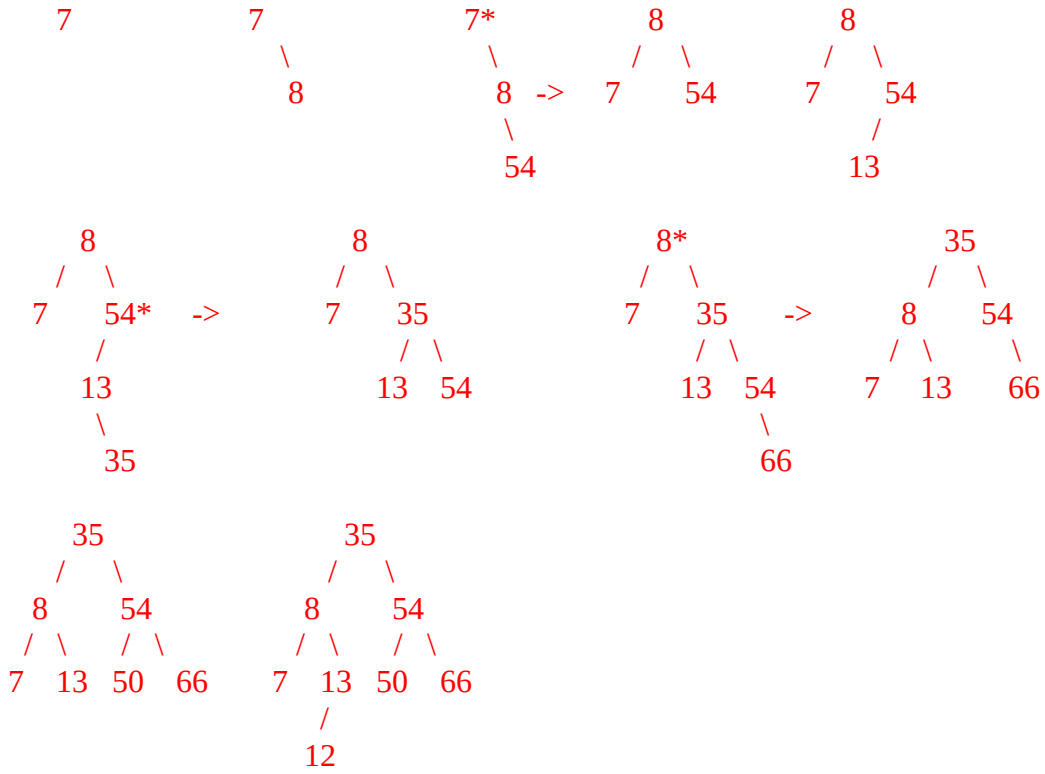
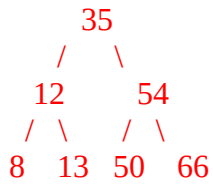
3) (10 pts) DSN (AVL Trees)

(a) (8 pts) Create an AVL tree by inserting the following values into an initially empty AVL Tree in the order given: 7, 8, 54, 13, 35, 66, 50, and 12. Show the state of the tree after each insertion.



Grading: Students should show each insertion step for **1 pt each.** Imbalances should be detected and corrected for after inserting 54, 35, and 66; detected at 7, 54, and 8 respectively.

(b) (2 pts) Draw the state of the tree after the deletion of the node containing the value 7.



Deleting 7 creates an imbalance at 8 that must be corrected.

Grading: 1 pt for a valid BST without 7, **1 pt** for it being the correct BST without 7 (0 pts if either 7 is still in it or it's not a valid BST.)

Computer Science Foundation Exam

May 19, 2018

Section II A

ALGORITHMS AND ANALYSIS TOOLS

SOLUTION

NO books, notes, or calculators may be used,
and you must work entirely on your own.

Question #	Max Pts	Category	Score
1	10	ANL	
2	5	ANL	
3	10	ANL	
TOTAL	25		

You must do all 3 problems in this section of the exam.

Problems will be graded based on the completeness of the solution steps and <u>not</u> graded based on the answer alone. Credit cannot be given unless all work is shown and is readable. Be complete, yet concise, and above all <u>be neat</u>. For each coding question, assume that all of the necessary includes (stdlib.h, stdio.h, math.h, string.h) for that particular question have been made.