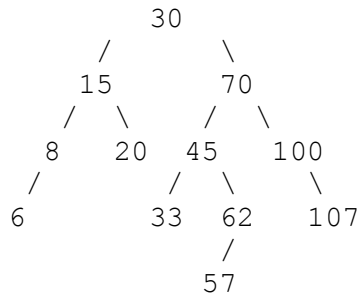
3) (10 pts) ALG (AVL Trees)

This question deals with the AVL Tree shown below:



(a) (7 pts) How many restructure operations (a single restructure operation is either a single or double rotation) would occur if each of the following items was deleted? Consider each item separately as being the only item being deleted from the tree shown above. (Note: It's possible that the answer to some parts is 0.)

Item to Delete	**Number of Restructure Operations**
6	
20	
33	
57	
62	
100	
107	

(b) (3 pts) What is the fewest number of consecutive insertion operations that would need to occur to force a rebalance at the root node of the given tree in the picture? (Hint: In order for this to occur, there has to be the requisite height imbalance at the root node 30, and no other imbalances on the path from the last inserted node to the root.)

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Computer Science Foundation Exam

May 22, 2021

Section II A

ALGORITHMS AND ANALYSIS TOOLS

ONLINE EXAM

Directions: You may either directly edit this document, or write out your answers in a .txt file, or scan your answers to .pdf and submit them in the COT 3960 Webcourses for the Assignment "Section II A". Please put your *name, UCFID and NID* on the top left hand corner of each document you submit. Please aim to submit 1 document, but if it's necessary, you may submit 2. Clearly mark for which question your work is associated with. If you choose to edit this document, please remove this cover page from the file you submit and make sure your *name, UCFID and NID* are on the top left hand corner of the next page (first page of your submission).

Question #	Max Pts	Category	Score
1	5	ANL	
2	10	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 not 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 be neat. 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.