ECE368 Fall 2016 Homework 6

IMPORTANT:

- Do NOT leave your name or Purdue ID on this homework.

- Write your homework security number at the TOP of EACH page.

Read and sign the ***Academic Honesty Statement*** that follows:

"In signing this statement, I hereby certify that the work on this exercise is my own and that I have not copied the work of any other student while completing it. I understand that, if I fail to honor this agreement, I will receive a score of zero for this exercise and will be subject to further disciplinary action."

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Homework security number:
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Please acknowledge any people who have helped you with this homework.

Question	Credits
1	
2	
3	

1. **(50 points)** Show that the tree height of a height-balanced binary search tree with n nodes is O(log n). (Hint: Let T(h) denote the fewest number of nodes that a height-balanced binary search tree of height h can have. Express T(h) in terms of T(h-1) and T(h-2). Then, find a lower bound of T(h) in terms of T(h-2). Finally, express the lower bound of T(h) in terms of h.)

2. (50 points) The following diagram shows a height-balanced binary search tree. Perform the following operations: insert 24, insert 19, and delete 50. When deleting a node that has two children, replace it with its immediate in-order successor. Perform rotation(s) to keep the binary search tree height-balanced after each operation. Draw the tree after each change you make to its structure.