Quiz 8

Name: _____
NetID: _____

1) (3 points) What is the smallest number of nodes in a balanced tree with height 1? How about 2? 3? 4? Draw pictures!

2) (4 points) Call $f(h)$ the smallest number of nodes in a balanced tree with height h. Write a recursive relation for $f(h)$. *Hint: Use trees with minimal nodes built for $h-1$ and $h-2$ to build the tree with minimal nodes for height h. Hint 2: What are the minimum heights of the left and right subtrees?*

3) (3 points) Conclude that a balanced tree has $h = O(\log n)$ where n is the number of nodes. *Hint: the h-th term of the Fibonacci series is bigger than C^h for some number C.*

Bonus (2 points) How much slower is `get` in an AVL tree compared to binary search? *Hint: The h-th term of the Fibonacci series is also smaller than C^h for some number $C < 2$.*