1. Consider a binary search tree $T$ storing $n$ (key, value) pairs, and let $h$ denote the height of $T$. In the best case, $h$ is $O(\log n)$ and in the worst case, $h$ is $O(n)$ (use asymptotic notation).

2. Draw a binary search tree that would result from inserting the following items in this order (assume the key and value are the same): 10, 20, 30, 40.

![Binary Search Tree Diagram]

3. Consider an AVL tree $T$ storing $n$ (key, value) pairs, and let $h$ denote the height of $T$. In the best case, $h$ is $O(\log n)$ and in the worst $h$ is $O(\log n)$ (use asymptotic notation).

4. Consider an AVL tree $T$ storing $n$ (key, value) pairs. The time for a restructure operation is $O(1)$ and the number of possible restructures in a `remove(k)` operation is $O(\log n)$.

5. Draw an AVL tree that would result from inserting the following items in this order (assume the key and value are the same): 10, 20, 30, 40.

![AVL Tree Diagram]

6. **Bonus.** When implementing the Sorted Set ADT, a _______red-black tree_______ is the preferred implementation.