Week 8 Quiz

Solutions

Name: ____________________________ NetID (email): __________________

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Fill in your name and NetID.
Please do not open the quiz until I tell you to do so.

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Directions: Answer the following questions to the best of your ability. When appropriate, we encourage you to show your work, to help us understand your thought process. Quizzes count toward your grade; please take them seriously.
1. Assume that you have a BST with \( n \) elements. Give the best-case height of the tree, in big-O notation.

**Solution:** \( O(\log n) \)

2. Suppose that you have an empty BST, and then you insert the following integers, in this order. Draw the shape of the tree after all of the values have been inserted:

\[ 46, 139, 134, 18, 19, 43, 22, 30, -25, 116 \]

**Solution:**

```
               46
               / \   
              /-----  -----
             /      \   
            18      139
            / \      / \
           -25 19 134
           / \ \
          43 116
          / \
         22  \\
        30
```
3. Consider the tree below. Delete 104 from the tree, and then delete 24. Draw the new tree below. Note
that you may delete using the predecessor or successor, up to you. **Do not do any rebalancing** - this
is a “dumb” BST.

\[
\begin{array}{c}
31 \\
/ \ \\
24 \ 104 \\
/ \ / \ \\
1 \ 37 \ 114 \ \\
\ 40 \\
\end{array}
\]

**Solution:**

\{\bf Version 1:} (move up predecessor)

\[
\begin{array}{c}
31 \\
/ \ \\
1 \ 40 \\
/ \ \\
37 \ 114 \\
\end{array}
\]

\{\bf Version 2:} (move up successor)

\[
\begin{array}{c}
31 \\
/ \ \\
1 \ 114 \\
/ \\
37 \\
\ 40 \\
\end{array}
\]