This quiz has 4 questions, for a total of 30 points.

1. **10 points** Draw the result of deleting the node with key 8 from the following Binary Search Tree.

```
  16
 /  \\ /  \\
 8  18 12 20
/  \\  /  \\
4 10 14 20
```

**Solution:** 6 points for moving the successor or predecessor to the deleted node's position. 4 points for a resulting tree that is a BST and includes all the nodes except the deleted one.

```
  16
 /  \\ /  \\
 10 18 12 20
/  \\  /  \\
4 10 14 20
```

2. **7 points** What is the output, if any, of the following Python program?

```python
class C:
    def __init__(self, i):
        self.c = i
    def m(self, other):
        return self.c - other.c

def g(a, b):
    return a.c - b.c

d = C(1)
print(d.m(d))
```

**Solution:** 7 points for the correct output, which is 0

3. **6 points** Suppose we create an algorithm that detects whether two equal-length words are anagrams by going through all of the letters in the first word and, for each letter,
performing a linear search for that letter in the second word and checking it off. Which of the following expresses a tight bound on the time complexity of this algorithm, where \( n \) is the length of the two words?

a) \( \Theta(n \lg n) \)
b) \( O(n^2) \)
c) \( \Omega(n^2) \)
d) \( \Theta(n^2) \)

**Solution:** d) \( \Theta(n^2) \) is the correct answer. The answer a) is incorrect because it is too low. The answers b) and c) are incorrect because they do not express tight bounds.

4. **7 points** Write down the sequence of keys from the following Binary Search Tree, ordering according to the in-order traversal strategy.

```
   15
  /   \
 3     45
 /   /     \
2  7 22 53
```

**Solution:** 7 points for the correct sequence, which is:

```
2, 3, 7, 15, 22, 45, 53
```

(4 points if the sequence is close, such as missing one number.)