Quiz 3

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz and all logic symbols make use of the textbook notation.

1. [4] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true and briefly justify your answer. Otherwise, circle F and provide a counterexample or brief reasoning.

   T F The Binary Search algorithm is O(n).

   T F The Binary Search algorithm can take a sequence of real numbers and return the greatest value.

2. A palindrome is a string that reads the same forward and backward.

   (a) [5] (§3.1 #9/interview question) Determine an algorithm for determining whether a string of n characters is a palindrome. Make sure you clearly state how spaces are handled in your algorithm.

   (b) [2] (§3.3 #1) Determine the complexity of the algorithm you creased in part (a). Show your reasoning.

3. [2] (§3.2 #23) Suppose you have two different algorithms for solving a problem. The first algorithm is $O(n \log_2 n)$ and the second is $O(n^{\frac{3}{2}})$. Which algorithm will perform better as n grows? Justify yourself.

4. [4] (§3.4 Example 4) Use the Bubble Sort algorithm on $\{3, 2, 5, 1, 5\}$. Clearly identify when and what swaps/recordings/interchanges are made.

5. [3] (§3.1) Write down pseudocode or code for Bubble Sort that accepts a sequence of real numbers $\{a_1, a_2, ...a_n\}$ with $n \geq 2$ and returns a sequence of numbers in increasing order.