15-211: Assignment 1 Theory Questions

Due July 03, 2009 in class

Name: _____

Andrew ID: _____

These questions count for 15% of the homework grade. Please hand in your answers, written or typeset, in lecture on Friday.

(3) 1. Using the *tree method* solve the recurrence: $T(n) = 4T\left(\frac{n}{5}\right) + n$

(3) 2. What is the worst-case time complexity of searching a hash table that is implemented using linear probing? Explain your answer.

(3) 3. Why might one want to use probing rather than chaining? Why might one use quadratic over linear probing? Linear over quadratic?

(3) 4. A hash table implemented with separate chaining has a load factor of 5.0. What is the length of the average chain?

(3) 5. Consider a hashtable of size 5 that uses linear probing and a hash function **hash(key) = key % 3**. Insert the following sequence of numbers 11, 16, 19, 34, 15 and draw the final resulting hash table. Is this a good hashing scheme? Why?