**Midterm 2 review CSCI 2270**

1. **How does a binary search tree’s shape depend on the order of the numbers inserted into it?**
2. **What parts are similar in the two processes of searching a binary tree and searching a sorted array by binary search? What parts are different? What depends on luck?**
3. **Given an arbitrary binary tree, print it out in preorder, inorder, and postorder.**
4. **Given a bunch of numbers, in some order, insert them into a binary search tree.**

**5a. Given the binary search code and a particular array of sorted numbers, tell me the first array slot the search code will check to find 3 in the array 1 3 5 6 8 9 11 14. What’s the last array slot a search for the 3 will check?**

**5b. Repeat the question but look for a number that’s not in the array, like 10. What will be the last slot checked?**

1. **To get the 6 big\_number comparison functions ==, !=, <, >, <=, and >=, how many must you write, and why, and what can you do for the other ones instead of writing them all from scratch?**
2. **What time penalty comes from using the add\_node function when copying a list?**
3. **When is a binary search tree most efficient? Least efficient? Why?**
4. **Given the code in bintree.cpp, can you make a function that multiplies every number in a binary tree by 7?**
5. **Given the code in bintree.cpp, can you make a function that reverses (mirror images a binary search tree)?**
6. **If you had a mirror imaged binary search tree, what would you need to do when inserting data into it?**
7. **Why is self assignment a problem for operator =?**
8. **Why is self assignment not a problem for the copy constructor?**
9. **What is the difference between an assignment operator and a copy constructor?**
10. **Use pointer arithmetic to write a function to reverse an array.**
11. **Why can’t we do binary search on a linked list?**
12. **Why is contains for a binary search tree faster than O(n)? Can binary tree contains be this fast?**
13. **Suppose I am adding 2 big\_numbers as follows:**

**big\_number alice(98); big\_number bobo(87); alice+=bobo;**

**In the code for operator +=, big\_number& big\_number::operator+= (const big\_number& b) which number, alice or bobo corresponds to b? Which number corresponds to \*this?**

1. **Tell me how a stack can be used to tell if a program has balanced {}.**
2. **Trace out the tree\_copy function for a particular binary tree. Which node is copied first? Last?**
3. **Trace out the tree\_clear function for a particular binary tree. Which node is cleared first? Last?**
4. **Be nauseatingly familiar with the copy command.**
5. **Where is the smallest number in a binary search tree? How would you find it?**
6. **When I compare 2 big\_numbers, which digits should I compare first and why?**