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?

6. 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?

7. What time penalty comes from using the add_node function when copying a list?

8. When is a binary search tree most efficient? Least efficient? Why?

9. Given the code in bintree.cpp, can you make a function that multiplies every number in a binary tree by 7?

10. Given the code in bintree.cpp, can you make a function that reverses (mirror images a binary search tree)?

11. If you had a mirror imaged binary search tree, what would you need to do when inserting data into it?

12. Why is self assignment a problem for operator =?

13. Why is self assignment not a problem for the copy constructor?

14. What is the difference between an assignment operator and a copy constructor?

15. Use pointer arithmetic to write a function to reverse an array.

16. Why can't we do binary search on a linked list?

17. Why is contains for a binary search tree faster than O(n)? Can binary tree contains be this fast?

18. 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?

19. Tell me how a stack can be used to tell if a program has balanced {}.

20. Trace out the tree_copy function for a particular binary tree. Which node is copied first? Last?

21. Trace out the tree_clear function for a particular binary tree. Which node is cleared first? Last?

22. Be nauseatingly familiar with the copy command.

23. Where is the smallest number in a binary search tree? How would you find it?

24. When I compare 2 big_numbers, which digits should I compare first and why?