

**1. Who is your programming partner? Which of you submitted the source code of your program?**

Anthony lovino. I will.

**2. Evaluate your programming partner. Do you plan to work with this person again?**

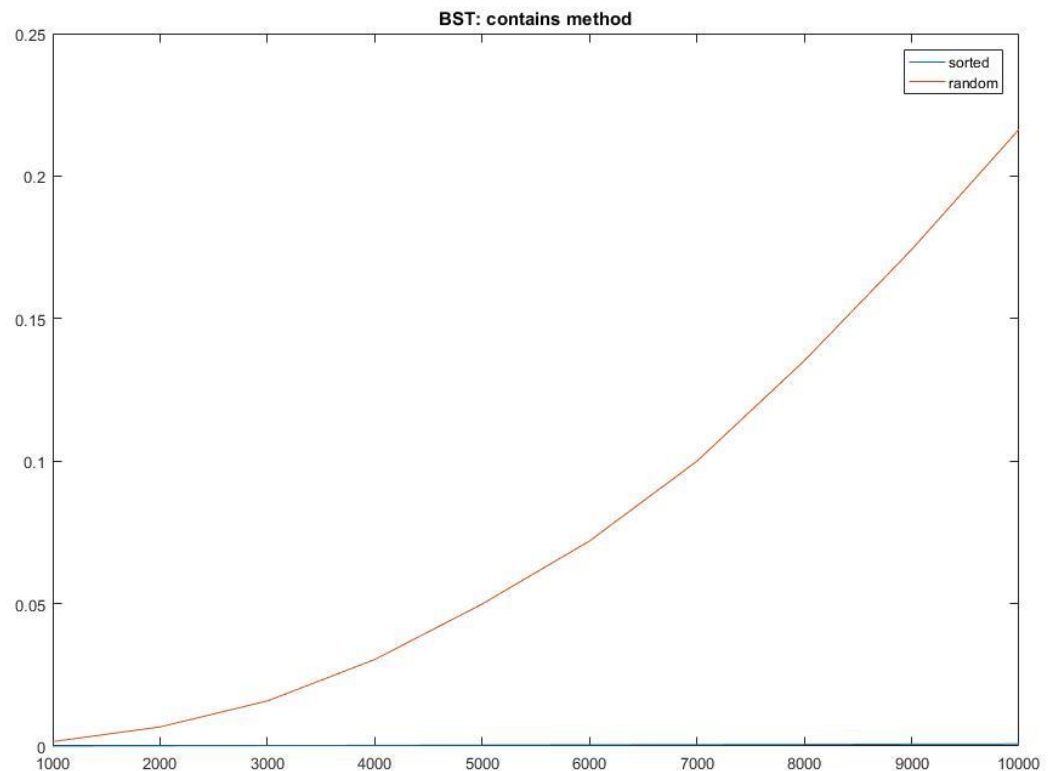
He is a good partner. But I may not plan to work with him again, because the schedule is a big deal for me. I prefer to do all the things in one day, but he likes to divide into parts.

**3. - Add N items to a BST in sorted order, then record the time required to invoke the contains method for each item in the BST.**

**- Add the same N items to a new BST in a random order, then record the time required to invoke the contains method for each item in the new BST. (Due to the randomness of this step, you may want to perform it several times and record the average running time required.)**

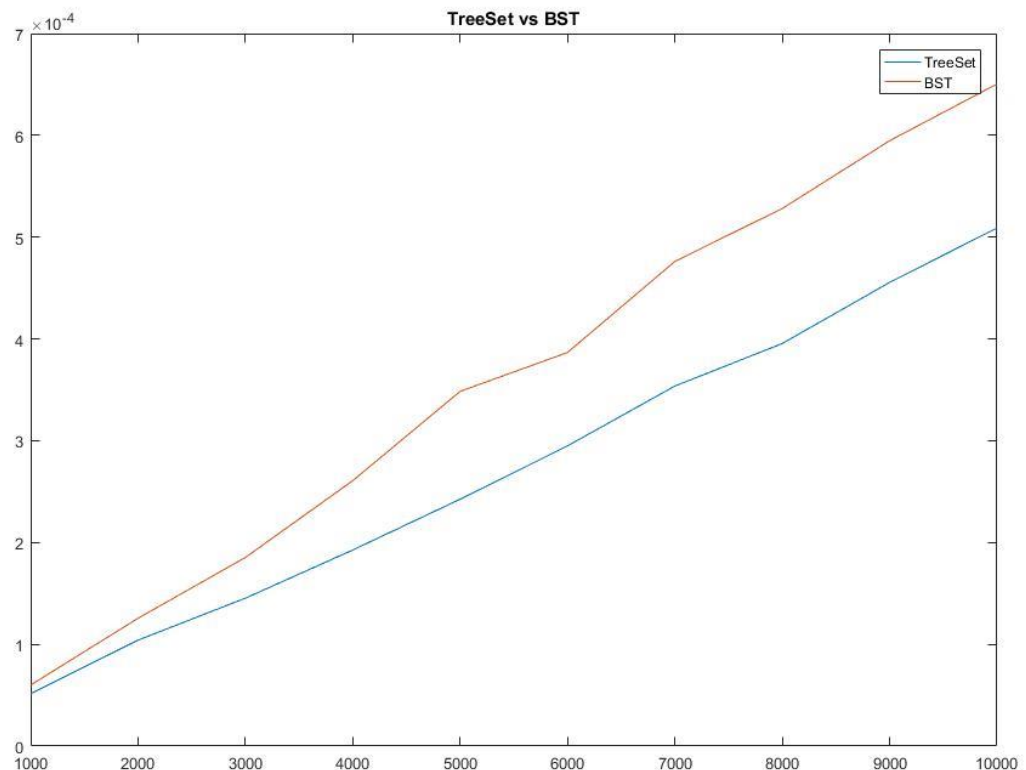
**- Let one line of the plot be the running times found in #1 for each N in the range [1000, 10000] stepping by 100. (Feel free to change the range, as needed, to complement your machine.) Let the other line of the plot be the running times found in #2 for each N in the same range.**

(x axis – size of the BST , y axis – running time).



For add N items to a BST in sorted order, it is the worst case for BST. It is an unbalanced BST. That's the reason why it took longer than add N items to a BST in random order.

4. - Add N items to a TreeSet in a random order and record the time required to do this.  
- Record the time required to invoke the contains method for each item in the TreeSet.  
- Add the same N items (in the same random order) as in #1 to a BinarySearchTree and record the time required to do this.  
- Record the time required to invoke the contains method for each item in the BinarySearchTree.  
- Let one line of the plot be the running times found in #1 for each N in the range [1000, 10000] stepping by 100. (Feel free to change the range, as needed, to complement your machine.) Let the other line of the plot be the running times found in the #3 for each N in the same range as above.  
- Let one line of a new plot be the running times found in #2 for each N in the same range as above. Let the other line of plot be the running times found in #4 for each N in the same range. (You can combine the plots in the last two steps, if the y axes are similar.)  
(x axis – size, y axis – running time).



5. Many dictionaries are in alphabetical order. What problem will it create for

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**a dictionary BST if it is constructed by inserting words in alphabetical order? Explain what you could do to fix the problem.**

The problem is how to make a balanced BST for it. That means the add order is important for a balanced BST. To fix this problem, first is to sort all the words. Then take the middle word as the root. The left part is the words before the middle word, the right part is the words after the middle word. Always add the word which is the middle word of that part.

**6. How many hours did you spend on this assignment?**

11.