

Cpt S 322 Homework Assignment #1 – BST Number List in Console/Terminal
by Evan Olds

Submission Instructions:

Submit source code (zipped) to Angel BEFORE the due date/time. If the Angel submission is not working, then submit to TA via email BEFORE the due date/time. “Angel wasn’t working” is never an excuse.

Optional: Include a readme.txt file in the zip with any relevant information that you want the grader to be aware of.

Assignment Instructions:

Read all the instructions *carefully* before you write any code.

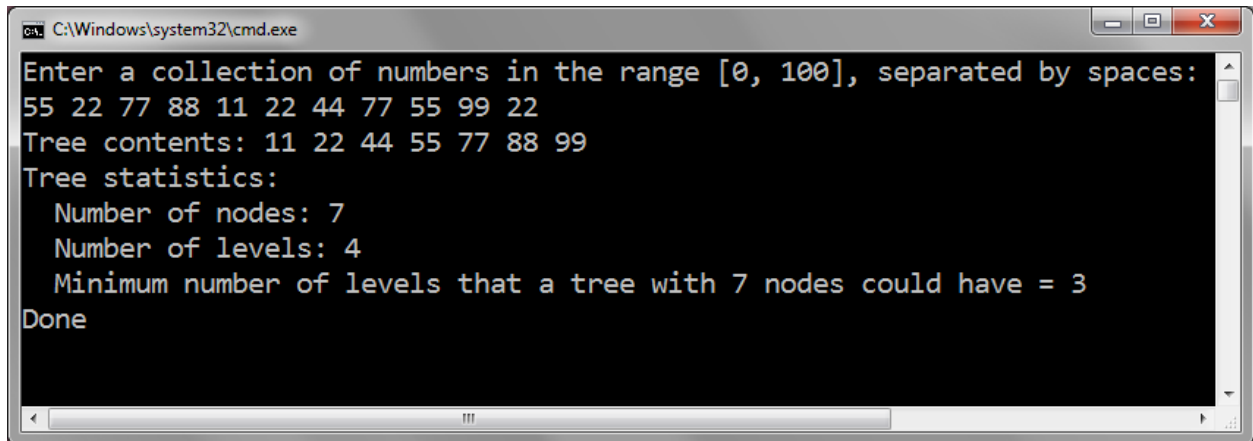
Using Visual Studio (2013 recommended, but 2010 or 2012 should suffice) or SharpDevelop, create a Console application in C# that fulfills the following requirements:

1. Get a list of integer numbers from the user on A SINGLE LINE
 - The numbers will be in the range [0,100]
 - The numbers will be separated by spaces
 - You may assume that the user enters a correctly formatted input string that meets these requirements
2. Add all the numbers to a binary search tree in the order they were entered
 - Don’t allow duplicates
 - Use the [Split](#) function on the entered string for easy parsing (split on the space character)
3. Display the numbers in sorted (ascending) order.
 - Traverse the tree in order to produce this output.
4. Display the following statistics about the tree
 - Number of items (note that this will be less than or equal to the number of items entered by the user, since duplicates won’t be added to the tree). Write a function that determines this from your BST, not the array returned from the split. In other words, you must have a Count function in your BST implementation.
 - Height of tree (number of levels). A tree with no nodes at all has a height of 0. A tree with a single node has a height of 1. A tree with 2 nodes has a height of two. A tree with three nodes could have a height of 2 or three. You should know why this is from your advanced data structures prerequisite course.
 - Theoretical lowest height given the number of nodes in the tree (figure out the formula to calculate this)

Point Breakdown (10 points total):

- 9 points: Fulfill all the requirements above with no inaccuracies in the output and no crashes
- 1 point: Code is clean, efficient and well commented

Sample Output:

A screenshot of a Windows command prompt window titled "C:\Windows\system32\cmd.exe". The window has a black background with white text. The output of the program is as follows:

```
Enter a collection of numbers in the range [0, 100], separated by spaces:  
55 22 77 88 11 22 44 77 55 99 22  
Tree contents: 11 22 44 55 77 88 99  
Tree statistics:  
  Number of nodes: 7  
  Number of levels: 4  
  Minimum number of levels that a tree with 7 nodes could have = 3  
Done
```

Submission:

Zip all your project files and submit them to the appropriate drop-box in Angel.