

# **BST Number List in Console/Terminal**

## **Cpt S 321 Homework Assignment**

### **by Evan Olds**

**Submission Instructions:** (see syllabus)

**Assignment Instructions:**

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

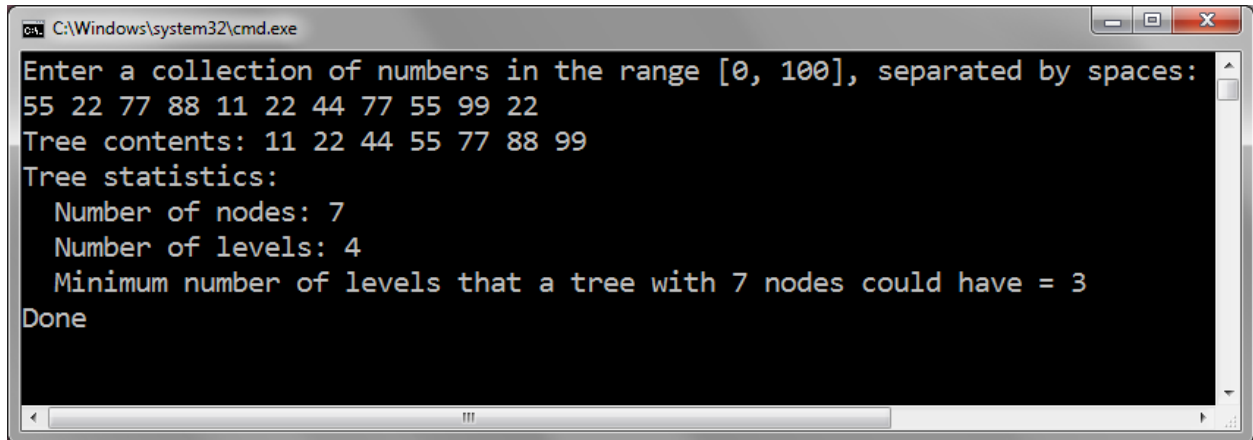
Using Visual Studio or SharpDevelop, create a Console application in C# that fulfills the following requirements:

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
  - You may use [Console.ReadLine](#) or one of the other methods we discussed in class to get input from the user
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 order (smallest first, largest last).
  - 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.
  - Number of levels in the tree. A tree with no nodes at all has 0 levels. A tree with a single node has 1 level. A tree with 2 nodes has 2 levels. A tree with three nodes could have 2 or 3 levels. You should know why this is from your advanced data structures prerequisite course.
  - Theoretical minimum number of levels that the tree could have given the number of nodes it contains (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:



```
C:\Windows\system32\cmd.exe
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
```