BST Number List in Console/Terminal

Cpt S 322 Homework Assignment

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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
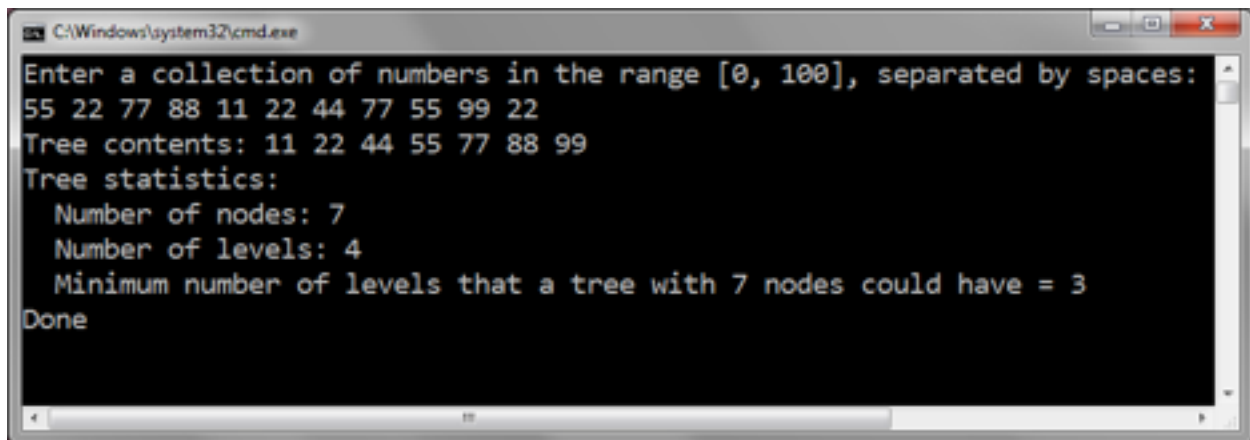
three nodes could have 2 or 3 levels. You should know why this is from your advanced data structures prerequisite course.

- 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
```