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Abstract

A Java program which constructs a binary tree from user input and determines if the tree is balanced, proper, or full, as well as determining the height, number of nodes, and prints the in order traversal of the tree

CMSC 350 Data structures and analysis

Project 3

Lessons Learned

After the last assignment, this assignment was much easier to wrap my head around. Creating trees is fairly straight forward and simple. For this assignment, the most complicated part for me was splitting the string on the parenthesis. I spent a lot of time in the Java Documentation as well as the Geeksforgeeks website reading about splitting strings. I know that string manipulation is a basic, and plan on spending time in the future working on it.

UML Class Plan



Test Plan

|  |  |  |  |
| --- | --- | --- | --- |
| Test Case | Input | Expected Output | Pass/Fail |
| 1 | (A(G(j)(1))(z(5))) | isBalanced: True | Pass |
| 2 | (A(G(J)(1))(z(5(4))) | Syntax Error | Pass |
| 3 | (A(G(j)(1))(z(5)(3))) | isFull: True | Pass |
| 4 | (A(G(j)(1))(z(5)(3))(r)) | Syntax Error | Pass |
| 5 | (4(2(3)(1))(6(5))) | isProper: False | Pass |
| 6 | (4(2(3)(1))) | isBalanced: False | Pass |
| 7 | (A(G(j))(z(5))) | isFull: False | Pass |
| 8 | (x(c(j)(8))(z)) | isProper: True | Pass |
| 9 | (4(2(3)(1))(6(5))) | Height: 2 | Pass |
| 10 | (A(G(j)(1))(z(5)(3))) | Number of Nodes: 7 | Pass |
| 11 | (A(G(j))(z(5))) | inOrder: (((j)G)A((5)z)) | Pass |
| 12 |  | Need Input Error | Pass |

A screenshot of a cell phone

Description automatically generated

Figure 1 Test Case 1

A screenshot of a cell phone

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Figure 2 Test Case 2

A screenshot of a cell phone

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Figure 3 Test Case 3

A screenshot of a cell phone

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Figure 4 Test Case 4

A screenshot of a computer screen

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Figure 5 Test Case 5

A screenshot of a computer screen

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Figure 6 Test Case 6

A screenshot of a cell phone screen with text

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Figure 7 Test Case 7

A screenshot of a cell phone screen with text

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Figure 8 Test Case 8

A screenshot of a cell phone screen with text

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Figure 9 Test Case 9

A screenshot of a cell phone screen with text

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Figure 10 Test Case 10

A screenshot of a cell phone screen with text

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Figure 11 Test Case 11

A screenshot of a social media post

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Figure 12 Test Case 12