

# CST8130 - Data structures

## Lab 5 - Using Binary Trees

### Problem Description:

Download starter files [here](#) and add them to an Eclipse project named **Lab5\_Fname\_Lname**. You are permitted to reference demo code provided in the learning slides on Brightspace). That is, it will help greatly to review the learning content for binary trees.

### Other Requirements and Hints:

Add a recursive method to the BinaryTree class which will calculate and return the **height** of the tree. In your “main”, add a choice to display of the height of the tree. During your demo, you will need to show your code.

- Consider in general at any node....calculate the height of the left subtree, and the height of the right subtree – then return the larger of the two heights (+1 to include the current node)
- Consider how to end the recursion – and what the bottom nodes of the tree’s height is.
- Add exception handling for input validation.
- Add meaningful code comments to your code to explain the processing logic.
- Create and generate Javadoc for all classes, fields and methods.

**Submit** your solution as a zip folder named as Lab5\_Fname\_Lname containing source files and Javadoc via this [link](#).

#### Lab 5 Grading Scheme (Total 10 Marks)

Item	Marks
<b>Menu option 1:</b> Add value to binary tree works correctly	<b>2.5</b>
<b>Menu option 2:</b> Display Pre-order Tree Traversal works correctly Code uses recursion to traverse the tree	<b>3</b>
<b>Menu option 3:</b> Calculate and Display Tree height works and yields correct value	<b>2.5</b>
Correct output, Code comments and Javadoc, input validation and Menu option 4 works	<b>2</b>
<b>Total</b>	<b>10</b>

### Sample Output: user input in green

```
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 1
```

```
Enter an integer to add to the tree: 44
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 1
Enter an integer to add to the tree: 20
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 1
Enter an integer to add to the tree: 60
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 1
Enter an integer to add to the tree: 6
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 3
Tree Height
3
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 2
Pre-order Tree Traversal
X1 X2 X3 X4 (show the actual data values in preorder sequence)
1: Add Value to Tree
2: Display Tree (Pre-order Traversal)
3: Display Height
4: To Exit
> 4
Exiting...
```