**Binary Search Tree API**

This program showcases a binary search tree which is a structure that organizes nodes according to the order in which they were added as wells as how their data compares to each other. So, all nodes left to a given node are lesser while nodes greater than a given node are added to the right. I have included functions that add, delete and find the maximum nodes to the tree while using generic templates to allow the user to use whatever data types they want. This program was written in C++.

**Classes**

**Node**

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| --- | --- | --- | --- |
| Class/Function Name | Parameters | Return Type | Explanation |
| **Node( )** | None | None | This creates a new Node constructor that contains no data |
| **Node(a,b,c)** | Generic\_Type | None | This creates a new Node that contains data specified by what is entered in as an argument |

**BST**

|  |  |  |  |
| --- | --- | --- | --- |
| Class/Function Name | Parameters | Return Type | Explanation |
| **BST( )** | None | None | This creates a new Binary Search Tree constructor that contains no nodes |
| **BST(a,b)** | Generic\_Type | None | This creates a new binary tree object, BST, that contains nodes, specifically a root & leaf node |
| **\*Insert(a,b)** | Generic\_Type Node & data | Pointer | Creates a new node with a pointer & adds it to the existing tree. Uses recursion to take data passed to it as an argument as the node’s data. |
| **\*Find(a,b)** | Generic\_Type Node & data | Pointer | Iterates through the current binary tree nodes for data that matches data passed to it as argument starting with node also passed to it. Returns pointer of matching node |
| **\*Delete(a,b)** | Generic\_Type Node pointer & data | Pointer | Iterates through current binary tree for node that matches node pointer passed to it as argument beginning at the node that is passed to it using recursion. Deletes the node that matches its argument |
| **Max( )** | Generic\_Type Node pointer | Generic\_Type Node pointer | Iterates through binary tree to find the maximum value node of the argument node’s left side. |
| **showTree(a)** | Generic\_Type Node pointer | Void | Iterates through tree starting with pointer node passed in as argument |

**Main/Testing**

|  |  |  |  |
| --- | --- | --- | --- |
| **Main( )** | None | Void | Main function that begins execution of the entire program. It also starts the menu loop. |
| **Menu** | N/A | N/A | Uses a do While loop to offer the user options for executing the testing suite. When user chooses an option, certain functions are automatically ran to test for a full range of conditions including creating empty constructors, creating binary trees that contain the correct nodes and the performance of all functions. |