

COSC 3100 – Data Structures II

Assignment 6

Deadline October 9, 2023

- 1) Develop an implementation of the template BinarySearchTree class. This class should have the following public functions defined:

BinarySearchTree();

Constructor to create an empty binary search tree

~BinarySearchTree();

Destructor to deallocate all nodes, leaving an empty binary search tree

void destroy();

Destroy all nodes in the tree, leaving an empty tree.

void insert(const T& item);

Insert a new item into the appropriate location of the tree

void inorder() const;

Display values using the inorder traversal algorithm

void preorder() const;

Display values using the preorder traversal algorithm

void postorder() const;

Display values using the preorder traversal algorithm

T* search(const T& item) const;

Returns a pointer to the item, if it is found in the tree (*not a copy of the item, just a pointer to the item*). If the value doesn't exist in the tree, this function should return 'nullptr'.

int height() const;

Return the height of the tree

- 2) In a 'main()' function write code to address the following requirements:
- a) Randomly generate 10 'int' values, in the range 1..5000, and insert them into a Binary Search Tree.
 - b) Display the values stored in the tree using the three methods of traversal.
 - c) Display the height of the tree.
 - d) Destroy the whole tree.

- 3) In the 'main()' function read Stock data from the file 'Stock.txt'. Insert each Stock into a Binary Search Tree.

The program should then present the user with the following options:

- a) Display a stock's name given its symbol
- b) Display a stock's price given its symbol
- c) Insert a new stock
- d) Display all stocks
- e) Quit

Option (a) should prompt for a stock symbol, search for that stock in the tree, and display the name of that stock. Option (b) should prompt for a stock symbol, search for that stock in the tree, and display the price of that stock. The Quit option should write the current contents of the tree to the data file for future use.

THE DEPARTMENT STANDARDS FOR "STYLE GUIDELINES" SHOULD BE FOLLOWED IN ALL CODE.