Lab 3

For this lab we are dealing with Binary Search Trees. We need to create a graph of the binary search tree, and an iterative search function. We need to create a method that makes a BST from an array, make a sorted list from a BST, and print the value at a certain depth. While I did not finish the lab, I can still talk through everything.

First off graphing the binary tree was most troublesome, as it requires you to input the logic of the binary tree into a graph. The trouble I had was getting the graph to work properly in displaying the numbers, getting it to form properly, and getting the order of the BST correct. As of now, the errors in my code are that the tree more resembles the tree from Lab 1-3, so that it has extra branches that are not needed. My traversal of the BST is off, as whenever the tree traverses right, the next Left/Right values get swapped. And lastly the Numbers in the tree are not formatted as the lab intended it. I filled the circles black with white text, mainly because I couldn’t get a full white circle with the black text within it, as the branches kept overlapping the circles.

For the second question, if I’m correct, iterative means that it processes everything node by node, as it traverses to its desired value. So, I developed a search function (Although I’m not too sure it is how the lab wanted it.) that checks the value of each node to see if it’s the value k. If it is, I return that it is found. Otherwise I travel left of the node if its less that the node value, and right if it is more. Also, if it traverses to a node not in the tree, then the value is said to be not found.

For the third question, we need to create a method that receives an array and creates a BST from there. I was working on trying to fit a for statement with recursion, but then I realized that the lab said that the time was supposed to be O(n), so I kind of stopped working on it from there.

For the fourth, we need to take the items in the tree and create a list from it. While I did not work on this, to complete this we would need to traverse the tree in order, and as we process the values in order, we add the values to an array. We would process each value once, so time would be O(n) as we traverse the tree in order.

For the fifth, we need to print the values at a depth. While I also did not work on this, I would assume that we would use recursion to travel down the tree both left and right while subtracting from the depth as we descend the tree, until depth = 0. When depth = 0, we print the value of the node we are at, unless the node is empty.

In conclusion, while I have not finished this lab, I plan to work on it so that I understand the full length of the material. (Mostly setting up 1 and 3) I understand that this lab is extremely late, but here is what I do have.

-------**I certify that this project is entirely my own work. I wrote, debugged and tested the code being presented, performed the experiments and wrote the report. I also certify that I did not share my code or report or provided inappropriate assistance to any student in the class. -Patrick Brannan**