Group Assignment 3: Preorder Binary Search Tree

Introduction:

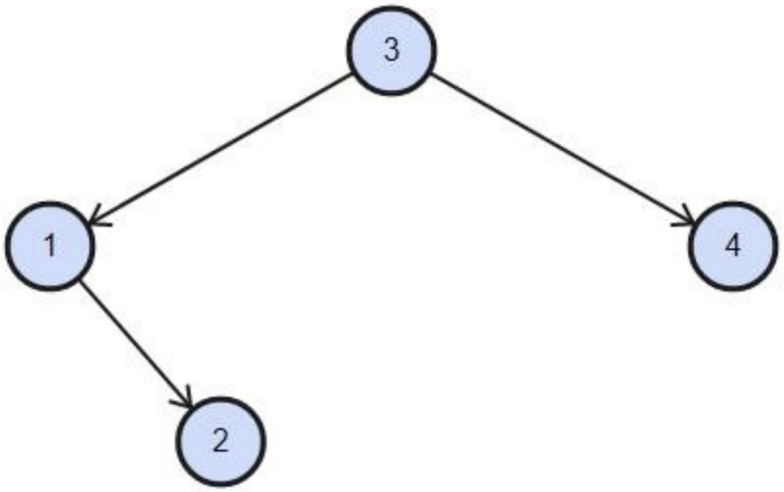
The purpose of this group assignment is to get familiar with binary search trees (BST) and preorder traversal. In this assignment you will read numbers from an input file, store them in a BST, and perform preorder traversal on the BST.

Reading from Input:

- The input file will contain a single line of numbers separated by spaces.
- The input file will never be empty
- There will always be at least 1 number in the input file
- There will never be more than 100 numbers in the input file
- You should insert the numbers into the BST starting from the first number in the input file. For example, if the input file contains: 4 2 5 1 you should input 4 into the BST first, then 2, then 5, and then lastly 1

Performing Preorder Traversal:

- Your preorder traversal should show each node's value and "location" in the BST
- The format should be: **[*location*] *value***
- The location should be enclosed in square brackets [ ]
- There should be a single space between the closing square bracket and the value
- Each node should be printed on its own line
- The location means where the node is in reference to the root node
- The symbols to show location will be **x**, **l**, and **r**:
    - **x** - represents the root
    - **l** - represents going to the left
    - **r** - represents going to the right
- For example, if the BST is



    - 3's location would be **[x]** since it is the root
    - 1's location would be **[xl]** since you start from the root, then go to the left
    - 2's location would be **[xlr]** since you start from the root, then go to the left, then go to the right
    - 4's location would be **[xr]** since you start from the root, then go to the right

input1.txt

```
9 6 3 2 5 4 1
```

ans1.txt

```
[x] 9
[xl] 6
[xll] 3
[xlll] 2
[xllll] 1
[xllr] 5
[xllrl] 4
```

Submitting Assignment:

You must submit your code to the server for grading. You must name your folder **ga3** and it must be located in your root directory. You should only include your main.cpp file, any other .h/.cpp files which are a part of your solution, and the ArgumentManager.h file to your ga3 folder. Everyone in the group must work together on this assignment and everyone in the group must submit the solution to the server. If you do not submit your solution to the server, you will receive a 0 for ga3. This will only be graded once. To ensure that your folder has the correct permissions for grading, after you have uploaded your ga3 folder to your root directory, run the command **chmod -R 755 ga3** in your root directory. View Canvas to see when the deadline for this assignment is.