

Assignment 4

Posted on: 3/1/14

Due on: 3/17/14 at 11:55 pm (SAKAI)

In this assignment, you will implement several methods based on the **linkedBinaryTree** class. The files we will provide to you:

- **binaryTreeNode.h**
- **binaryTree.h**
- **linkedBinaryTree.h**
- **linkedBinaryTree.cpp**
- **main.cpp**
- **Inorder.txt**
- **Postorder.txt**
- **Makefile**

You are asked to implement **TWO NEW** methods in the **linkedBinaryTree.cpp**. The detail of these methods are given below:

Part I:

Construct the tree for which the inorder and postorder traversals are given. The two sequences are stored in **Inorder.txt** and **Postorder.txt** respectively. The function prototype is given below:

```
void linkedBinaryTree :: constructTree(int *in, int *post);
```

Part II:

Let **heightDifference** (x) be the absolute value of the difference in heights of the left and right subtrees of node x . Let **maxHeightDifference**(t) be $\max\{\text{heightDifference}(x) \mid x \text{ is a node of the binary tree } t\}$. Write a method to compute the max height difference of a binary tree. The function prototype is given below:

```
int linkedBinaryTree :: maxHeightDifference()
```

You will check your method on the binary tree constructed in **Part I**.

For **Part I** and **Part II**, you only have to write the above two methods (constructTree and maxHeightDifference). In main file, the code for displaying the tree is already written.

Creating and Extracting a tar file:

Linux/ Macintosh

- To create a tar file: **tar cvf (tar file name) (file 1) (file 2) (file 3)...**
- To extract the contents of a tar file: **tar xvf (tar file name)**

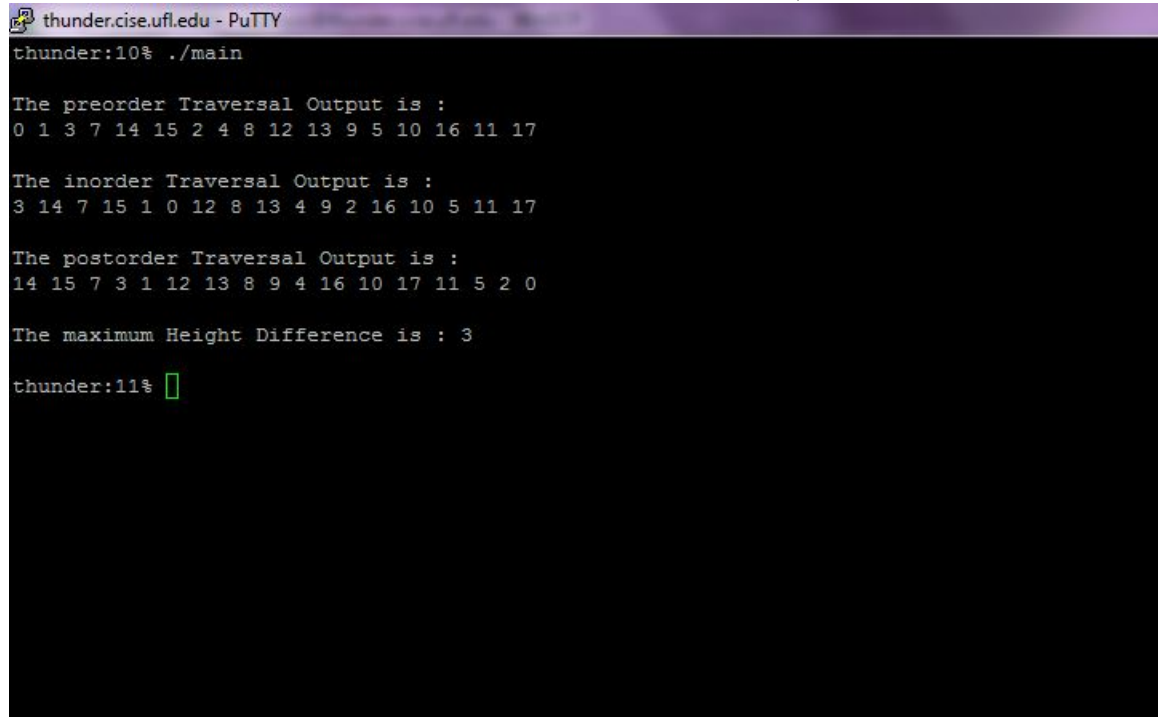
Windows

- You can use **ALZip** to create .tar file.

Things to Remember before Submission:

1. Check for the submission deadline (**both date and time**) and make sure you submit your **.tar file** before the deadline.
2. **LATE SUBMISSIONS ARE NOT ALLOWED.**
3. You should test your code on **thunder machine**. **TA will run your code on thunder machine and if it fails to compile there, you will be penalized.**
4. TA will only do **make** and then run the executable file, e.g. **./main**.
5. You should submit **ONLY** a **.tar** file through **SAKAI** consists of **all the .h, .cpp and makefile**. The name of the **.tar** file should contain your name and UFID.
6. The output of your submission should be **exactly like (not “almost like”)** the snapshot in Figure 1.
7. You can write any helper/ auxiliary method needed for the implementation of the two methods you are responsible for.

Figure 1: Snapshot of required input/ output



```
thunder.cise.ufl.edu - PuTTY
thunder:10% ./main

The preorder Traversal Output is :
0 1 3 7 14 15 2 4 8 12 13 9 5 10 16 11 17

The inorder Traversal Output is :
3 14 7 15 1 0 12 8 13 4 9 2 16 10 5 11 17

The postorder Traversal Output is :
14 15 7 3 1 12 13 8 9 4 16 10 17 11 5 2 0

The maximum Height Difference is : 3

thunder:11% █
```