CS xyz3-001 Foundations of Programming and Data Structures

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Homework 11
Due date: check BB
!!!! NO LATE HOMEWORK WILL BE ACCEPTED !!!

(Binary search trees)
In this assignment you are asked to write a simple driver program and a set of functions (maybe in a library) that can be performed on a binary search tree. Your program should allow user to **insert/delete integer values** into a binary search tree (BST) and perform several other operations on that binary search tree. *You can use the code given in slides. But this time your key will be int!*

> Note: In this hw, you don't need to *worry about balancing, just do simple insertion/deletion.*

Specifically, your program will ask user to enter a command and related parameters (if any) in a loop, and then perform the given commands. Here is the list of commands that your program must implement:

* insert <a positive integer>
* find <a positive integer>
* delete <a positive integer>
* inorder
* preorder
* postorder
* levelorder
* max
* min
* average
* height
* count
* sum
* quit

Please make sure your program processes the above comments as is so that TA can copy/paste his test cases.

As always, make sure you release (free) the dynamically allocated memories if you allocate any memory in your programs. So, before submitting your program, run it with `valgrind` to see if there is any memory leakage…

What to do and return: !!!! NO LATE HOMEWORK WILL BE ACCEPTED !!!

1. Create a directory `abc123-hw11`, using your own abc123. Do all your work under that directory. You can implement everything in one .c file or as we did before, you can implement tree related things as a library and then use it with a simple driver program. Either way is fine. But it may be easier to implement all in one .c file.

2. To easily compile the library and driver program, you must have a Makefile and use "make" to compile your code.

3. Follow the problem solving methodology, and solve the problem(s). Then convert your solution(s) to a C program. You can name your program here as `hw11.c`

```
/*
 * Don't forget to include comments about the
 * problem, yourself and each major step in your
 * program! so that we can understand your
 * solution(s).
 */
```

4. Compile your program using Makefile. Then run it with a few times with different input values and copy/paste the results in an output file, which you can name as hw11-out.txt. Also make sure you get hw11-valgrind.txt, as described in previous assignments.

5. Zip the whole directory `abc123-hw11 as abc123-hw11.zip`
6. Go to BB Learn (http://learn.utsa.edu/) , login using your abc123
7. Submit your `abc123-hw11.zip` for hw11 under Assignments

You must submit your work using Blackboard Learn and respect the following rules:

1) All assignments must be submitted as either a zip or tar archive file unless it is a single pdf file.
2) Assignments must include all source code.
3) Assignments must include an output.txt file which demonstrates the final test output run by the student.
4) If your assignment does not run/compile, the output.txt file should include an explanation of what was accomplished, what the error message was that prevented the student from finishing the assignment and what the student BELIEVES to be the underlying cause of the error.