**Programming Project Report**

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**Academic Integrity Statement:** I pledge that I have neither given nor received unauthorized help on this programming assignment.

**Problem Statement:**

The goal of this programing assignment was to design, build, and test a Binary tree. The main inputs of this tree were the Load, Search, Insert, and Delete methods. Here a user could Load a .csv file into this program which will then insert the .csv file into a Binary Tree. Then the user could Insert new data, Delete the data, search for the data, and print the tree. The required error handling was for the inputs of each method making sure the user put in the desired type of information.

**Design:**

The design of this program was split into a book class, tree class, and main function. The book class contained the information and methods of a book such as the title, authors first and last name, genre, rating, and year. Then the Tree class contained all the methods of creating and maintaining a tree. Such as Search, Insert Delete, Print, and balance. Along with the appropriate helpers. Then the main.cpp would contain functions to read in a file into the tree utilizing the insert method. Then a menu will display showing all the previously discussed methods.

**Implementation:**

Beginning with the books.h and books.cpp which were previously done in another homework. Then the tree.h and tree.cpp were added next with the appropriate methods to each. Finally in main the readfile function and menu function were added. Then in main a switch statement was used to allow the user to select from the menu. Finally once the user is done with the program they exit via option 6. The print method not only prints the entire tree, but tells how many branches and how many nodes there are in the tree.

**Testing:**

For testing this tree the .csv file was successfully inserted into the tree. Then the search method was tested with a few names inside the .csv file. Then a book was added via the insert method, then deleted. After the insert and delete method the book was looked up via the search method to check if it was properly working as well. Finally the print method was tested and made sure it printed the number of nodes and height of the tree correctly.

**Conclusions:**

The project overall was a success as all the implemented function worked how they were designed leading to a proper tree being implemented. This project took around 4 hours to fully complete including this report. If this project were to continue a write file would be implemented to write the updated tree to a .csv file.

\*PS…... Thanks Cade for a Wonderful year you’ve been an awesome TA :)