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| **Project 2** | **AVL Tree** |
| **Due: check eLearning** |  |

Your work should be readable as well as correct.

**Part A:** Write code using Java or C++ library to build and customize an AVL tree of Book nodes. Using an input file, insert Book nodes and detect imbalance. If imbalance is true, then call the proper rotation function as discussed in the lecture to fix the imbalance condition.

1. Must read AVLNode data from a text file
   * Create a text file containing Book objects
   * ISBN Number /n Title /n Author’s first and last name

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Intro to Java Programming, Comprehensive Version (10th Edition) 10th Edition

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1. Create a Book Object; and an AVL node object to be inserted into the AVL tree
2. At each insert, detect imbalance and fix the AVL tree
3. Report each imbalance detection and the node where it occurred; and output the message:

Example Output:

Imbalance condition occurred at inserting ISBN 12345; fixed in LeftRight Rotation

Imbalance condition occurred at inserting ISBN 87654; fixed in Left Rotation

Imbalance condition occurred at inserting ISBN 974321; fixed in RightLeft Rotation

class BookNode {

Book bookObject; // ISBN <space> Title <space> Author’s name

int height;

AVLNode leftPtr;

AVLNode rightPtr;

}

You must verify the AVL balance condition at each insert and detect and fix imbalance, output result of each insertion. A null node is considered AVL property of height -1.

Programming Languages: Java, C++ or C#   
Source files if any are attached to the Project link on eLearning

Use the following rubric as a guideline; subject to change based on class discussions:

Notes:

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|  |  | **Project 2 - AVL Tree Implementation** | Points |
| **Part A** | No |  |  |
|  | 1 | Create a text file with at least 10 ISBN numbers and Book titles, submit under in class assignment | 5 |
|  | 2 | Write a function to read the Book records from the text file | 10 |
|  | 3 | For each record read in #2, create a Book object; and use it to create the AVLNode with ISBN number as the key | 10 |
|  | 4 | Modify the AVLTree class file provided with the project to work with AVLNode | 50 |
|  | 5 | Insert all AVLNodes into the AVL tree using the AVLTree class | 25 |
|  | 6 | Output all rotations as depicted in the project document | 25 |
|  |  |  | 125 |

1. Post questions related to this project: https://discord.gg/njJaWAbdqZ