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Narrative Project Two

Binary Search Tree

CS 499

Professor Alim

08/24/2025   
  
**Description:**

This project began as a C++ implementation of a Binary Search Tree (BST) to manage municipal auction data. It allowed for insertion, searching, and traversals. For my capstone, I enhanced it into an **AVL Tree**, which is a self-balancing BST, to improve efficiency.

**Why I Included It:**

I included this artifact because it highlights my growth in **algorithmic thinking and data structures.** By converting the BST into an AVL Tree, I showcased my ability to identify performance issues in existing code and apply advanced techniques to improve scalability and efficiency. This project demonstrates my problem-solving skills in both theory and implementation.

**Reflection:**

The enhancement process deepened my understanding of tree balancing algorithms, rotations, and maintaining height balance after insertions or deletions. A major challenge was debugging rotation logic, since small mistakes could cause cascading errors throughout the tree. Through testing and validation, I learned the importance of rigorous unit testing to ensure correctness in data structure implementations. This artifact aligns strongly with **course outcomes in algorithms and data structures** and also touches on **secure and efficient coding practices**, since balanced trees help prevent performance bottlenecks that could be exploited in real-world systems.