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CS 499

Enhancement Two

Artifact Overview

The artifact I selected for enhancement is an Android-based Weight Tracking App originally developed in CS 360 – Mobile Architecture and Programming. This app allows users to log in, create an account, and track daily weight entries. This second enhancement focuses on the algorithmic and data structure aspects of the application by using a custom Binary Search Tree (BST) to store, search, and retrieve weight entries efficiently.

Why This Artifact Was Selected

I chose this artifact for my ePortfolio because it shows both mobile application development and my growth in software engineering principles. It showcases my ability to build an interactive, user-facing app using Android SDK and Java. The original version of the app stored weight entries in a basic list structure, which worked for small datasets but lacked efficiency and scalability. By integrating a Binary Search Tree, I was able to search for an exact weight or find the closest weight to a user-specified value.

Enhancement Description

- Created a WeightBST class with recursive insert, search, and findClosest methods.
- Used a custom TreeNode structure to store WeightEntry objects by weight.
- Integrated the BST into the LoginViewModel to store all weight entries in memory and enable fast queries.
- Verified the functionality through test insertions and toast messages on activity load.

Outcome Alignment and Improvements

This enhancement aligns with the course outcomes related to algorithmic thinking and innovative problem-solving:

“Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.”

“Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.”

Reflection on the Enhancement Process

Implementing this data structure in a mobile environment taught me several key skills:

- How to build a recursive BST in Java.
- How to test data structures within the Android lifecycle

A challenge I faced was verifying that the BST was properly populated and traversed before login redirects. I solved this by using `onResume()` to temporarily insert test data and confirm results with on-screen messages. This helped ensure the BST logic was fully integrated and working properly.