# 🎯 Leaderboard System using AVL Tree (C++)

A C++ application that implements a dynamic leaderboard using a self-balancing AVL Tree. It allows real-time score tracking, efficient insertion, ranking, and custom search operations — all in logarithmic time.

## 📌 Features

- ✅ Insertion of players and scores with AVL balancing

- 📊 Retrieve top scores or player ranks in O(log n)

- 🔍 Search player by name or score

- 🔁 Range queries (e.g., players within score range)

- ⚙️ Custom functions (15+ operations) beyond basic AVL insert/delete

- 🧠 Focused on efficiency, clean output, and academic clarity

## 🚀 Functionalities Implemented

- `insertNode()` – Adds a new score entry

- `deleteNode()` – Removes a player/score

- `getRank()` – Returns rank of a specific score

- `getTopK()` – Lists top K scorers

- `getInRange(L, R)` – Scores between a given range

- `getMinScore()` / `getMaxScore()`

- `displayLeaderboard()` – Displays full sorted leaderboard

- Many more (15+ total functions)

## 📁 Project Structure