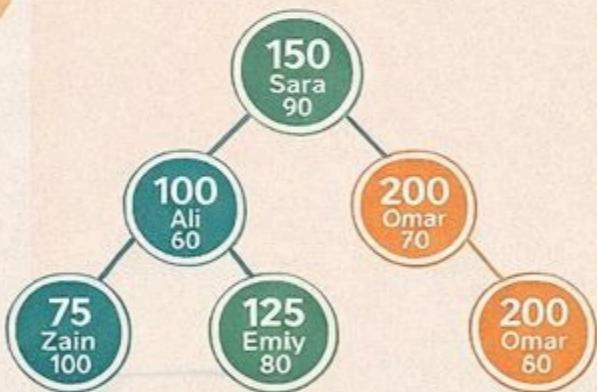


ARENA OF RATINGS – BST MATCHMAKING ENGINE

PROBLEM STATEMENT

Challenges: You must manage an arena where players have unique ratings. Some players are normal. Others are the best and need immediate matchmaking.

Ideal Solution: Use a Binary Search Tree that supports operations like insertion, search, deletion, and rank queries for efficient player matchmaking.



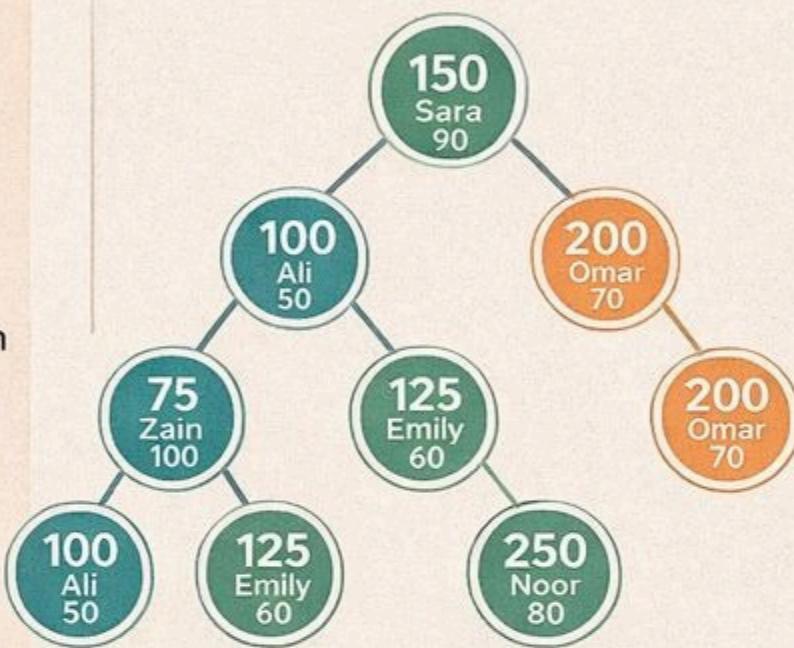
- rating: integer key
- name: player's name
- hp: health points



KEY OPERATIONS

- Navigate to the next/previous closest player
- Find the best-matched opponent
- Find K-th smallest player

HOW IT WORKS



- rating: integer key
- name: player's name
- hp: health points

KEY OPERATIONS

- **INSERTION (JOIN)**
 - Insert players by rating into the BST. The tree maintains balance and uniqueness.
- **DELETION (LEAVE)**
 - Remove a player by rating. The BST structure automatically adjusts.
- **NEXT/PREV, MATCH, RANK, KTH & DUEL**
 - Navigate to the next/previous closest player
 - Find the best-matched opponent
 - Find the K-th smallest player
 - Calculate distance between players