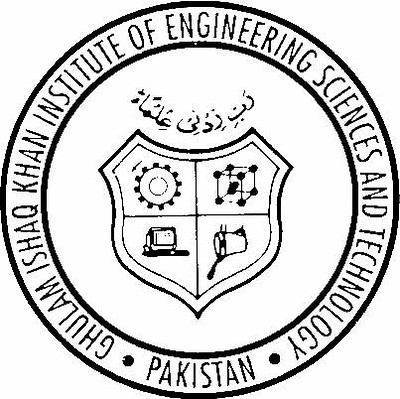
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**DISCOVERABLE 2**

**DATA STRUCTURES AND ALGORITHMS**

**PROJECT TITLE:**

FOOTBALL LEAGUE MANAGEMENT SYSTEM

**TEAM MEMBERS:**

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**Analysis of the Implementation of the Football Score Management System**

This implementation meets the requirements for Deliverable 2 by demonstrating core data structures and their functionality in a football league management system.

**Implemented Data Structures**

1. **TeamList (Linked List)**
   * Stores all teams participating in the league
   * Provides O(n) search and insertion operations
   * Maintains team statistics (points, goals scored/conceded)
2. **MatchBST (Binary Search Tree)**
   * Organizes matches chronologically by date
   * Enables efficient range queries for matches between dates (O(n) in-order traversal)
   * Provides O(log n) average case insertion

**Functional Demonstration**

**The system provides a menu-driven interface with these functions:**

* Add new teams to the league
* Record match results (automatically updates standings)
* Display current league standings (sorted by points, then goal difference)
* Search matches within a date range
* Generate statistical reports (total teams, matches, goals, averages)

**Efficiency Analysis**

1. **TeamList Operations**
   * addTeam(): O(n) - must traverse entire list to append
   * findTeam(): O(n) - linear search
   * getAllTeams(): O(n) - linear traversal
2. **MatchBST Operations**
   * addMatch(): O(log n) average case, O(n) worst case (unbalanced tree)
   * getMatchesInRange(): O(n) - must visit all nodes in range
3. **Standings Display**
   * O(n log n) - due to sorting operation on teams

**EXPECTED CODE OUTPUT:**

1. Add New Team

2. Record Match

3. Display League Standings

4. Search Matches by Date Range

5. Generate Statistical Report

6. Exit

Enter your choice: 1

Enter team name: Arsenal

Team added successfully!

(Record several matches...)

League Standings:

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Team Pts GS GC GD

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Arsenal 9 7 2 5

Chelsea 7 5 3 2

Liverpool 4 4 4 0

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Matches between 2024-01-01 and 2024-01-31:

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2024-01-15: Arsenal 2 - 1 Chelsea

2024-01-22: Liverpool 1 - 1 Arsenal

Total matches: 2

Football League Analysis Report

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Total Teams: 3

Total Matches Played: 5

Total Goals Scored: 14

Average Goals per Match: 2.80