PLAYER MANAGEMENT SYSTEM

Mini Project Documentation (C Language)

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1. Introduction

The **Player Management System** is a **menu-driven, console-based application** developed using the **C programming language**.
This project is designed to manage player records efficiently using **dynamic memory allocation**, **structured programming**, and **user-friendly interaction**.

The system allows users to **add, view, search, update, delete, and sort player records**, simulating a real-world sports management database.

This project demonstrates practical implementation of:

- Structures
- Pointers
- Dynamic memory
- Modular programming
- User experience (UX) design in console applications

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2. Objectives of the Project

- To manage player records dynamically
- To implement full **CRUD operations**
- To provide **partial and case-insensitive search**
- To ensure **unique player IDs** using system-generated logic
- To improve user experience using confirmations and formatted output
- To apply real-world logic using C programming

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3. Technologies Used

Component	Description
Programming Language	C
Compiler	Dev C++
Platform	Console-based
Header Files	stdio.h, stdlib.h, string.h

4. Features of the System

- Add multiple players at once
- Add a single player dynamically
- Display all player records
- Display a specific player
- Search player by:
    - Player ID
    - Partial Player Name (case-insensitive)
- Update selected fields of a specific player
- Delete player records with confirmation
- Sort players based on performance data
- Dynamic memory allocation using `malloc` and `realloc`
- Safe ID generation using system-controlled ID tracking

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5. Data Structures Used

5.1 Date Structure

Stores date-related information:

- Day
- Month
- Year

5.2 Team Structure

Stores team-related details:

- Team ID
- Team Name
- Player Role
- Captain Status
- Active Status

5.3 PerformanceStats Structure

Stores player performance data:

- Matches Played
- Total Score
- Best Performance Score

5.4 System Structure

Stores system-level information:

- Data upload date
- Last updated date
- Remarks
- Contact value (charges)

5.5 Player Structure

Main structure that combines all player-related data:

- Personal information
- Contact details
- Team information
- Performance statistics
- System metadata

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6. Functional Modules

6.1 Add Players (Multiple Records)

- Allows user to add multiple player records at once
- Player IDs are automatically generated
- Uses dynamic memory allocation

6.2 Add Single Player

- Adds a new player dynamically using `realloc`
- Maintains **unique player ID** using `currentId`
- Prevents ID duplication even after deletion

6.3 Display Players

- Displays all player records in a structured format
- Includes personal, team, performance, and system information

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6.4 Display Player by Search Result

- Displays details of a specific player after search
- Improves clarity and reduces data overload

6.5 Search Player (Enhanced Search)

Players can be searched using:

a) Player ID

- Exact match search

b) Player Name (Improved Functionality)

- Partial name search
- Case-insensitive search
- Example:
  - Searching `virat` finds `Virat Koli`
  - Searching `KOLI` also works

This improves real-world usability and user experience.

6.6 Update Player (Selective Update)

- User can select **specific player** to update
- Shows **old record before update**
- Asks for confirmation (Y/N) before modifying data
- Allows updating:
  - Personal details
  - Team information
  - Performance stats
  - System remarks and charges

6.7 Delete Player (Safe Delete)

- Player deletion requires confirmation
- Displays player details before deletion
- Prevents accidental data loss
- Adjusts memory size dynamically

6.8 Sort Player Data

Players can be sorted based on:

- Total Score
- Matches Played
- Best Performance Score

Sorting options:

- Minimum to Maximum
- Maximum to Minimum

Output is displayed in a clean **tabular format** for readability.

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7. Memory Management

- Dynamic memory allocation using `malloc`
- Memory resizing using `realloc`
- Safe deletion using array shifting
- No dependency on fixed-size arrays
- Efficient memory usage

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8. User Experience Enhancements

- Confirmation before update and delete operations
- Partial name search
- Clean formatted output
- Clear menu-driven navigation
- Real-time feedback messages

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9. Error Handling

- Displays meaningful messages when:
  - Data is not available
  - Player is not found
  - Invalid menu choice is entered
- Prevents invalid operations gracefully

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10. Limitations

- Data is stored in memory only (no file handling)
- Console-based interface
- Uses `gets()` which is not recommended for production systems

11. Future Enhancements

- File handling for permanent storage
- Input validation for mobile number and email
- Authentication system (Admin/User)
- GUI-based interface
- SMS or notification integration

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12. Conclusion

The **Player Management System** successfully demonstrates advanced usage of **C programming concepts** such as structures, pointers, dynamic memory allocation, searching, sorting, and user-centric design.

This project goes beyond basic CRUD operations by focusing on **real-world usability**, **data safety**, and **clean interaction**, making it a strong academic and practical project.

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13. Developer Details

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Academic Year: 2025