Department of Electrical and Computer Engineering
North South University

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TERM PROJECT REPORT

Player Database for ICC Men's Cricket World Cup 2023

Course Details
CSE225 (Section 12)
Data Structures and Algorithms

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1. Introduction

The 'Player Database for ICC Men's World Cup 2023' project is an admin-based console application developed in C/C++ that serves as a comprehensive information system for managing and organizing data related to the players participating in the ICC Men's World Cup 2023. The primary objective of this application is to efficiently handle player information, allowing users to access, search, add, modify, and delete player data seamlessly. This console-based developed application takes data/information from a defined comma-separated values (.csv) file and manipulates those. While manipulating the data/information, it takes the required data that needs to be updated, inserted, deleted, or searched from the user end through the console screen. Therefore, it can show the information that has been stored in a file, insert new player information, update every player's data instances, delete required students from the database considering any data occurrence, search/find data with any possible instances, ascending or descending sort by player's instances. It produces comma-separated values and writes them in the file. The updated information has also been stored in the file. Importantly, the program does the operations using the Linked List.

2. Definition of the Node (Structure/Class)

The class definition of the node for each player is given below.

```
class Player                              int wickets_taken;
{                                         int catches_taken;
    public:                               float batting_average;
        int player_id;                    float bowling_average;
        string country;                   int strike_rate;
        string player_name;
        string date_of_birth;             Player* next;
        int age;                      };
        string role;
        string batting_style;
        string bowling_style;
        int matches_played;
        int runs_scored;
```
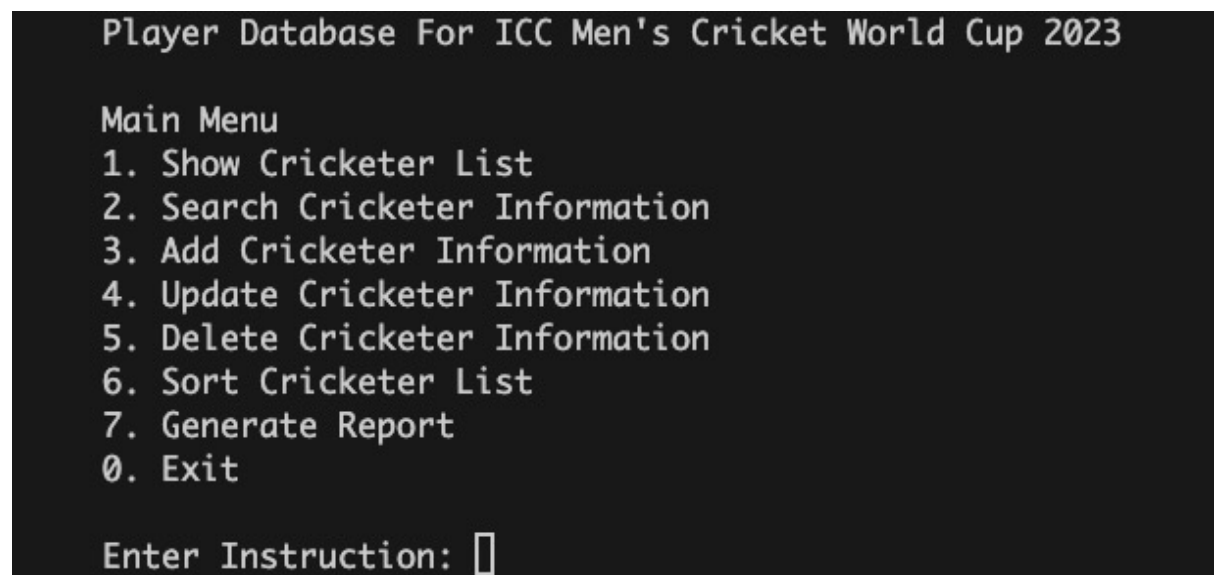
3. Key Features of the Project (with Screenshots)

The required description of the program's functionalities is given below.

- **Main Menu**

The Main Menu has the Functions to View, Insert, Update, Delete, Search, Sort and Generate Report.

1. Show Cricketer List

2. Search Cricketer Information

3. Add Cricketer Information

4. Update Cricketer Information

5. Delete Cricketer Information

6. Sort Cricketer Information

7. Generate Report

8. Exit

```
Player Database For ICC Men's Cricket World Cup 2023

Main Menu
1. Show Cricketer List
2. Search Cricketer Information
3. Add Cricketer Information
4. Update Cricketer Information
5. Delete Cricketer Information
6. Sort Cricketer List
7. Generate Report
0. Exit

Enter Instruction: []
```

3.1. Show Cricketer Information

It shows all the existing cricketer lists and individual data of the cricketers specifically.

```
        Show Cricketer Information

        1. Show All Cricketers List
        2. Show Individual Information
        0. Return Main Menu


        Enter Instruction: ▮
```

3.1.1. Show All Cricketer Information

This function has no sub-category to get any option. It directly shows all the information by traversing the whole linked list.

Player Data:

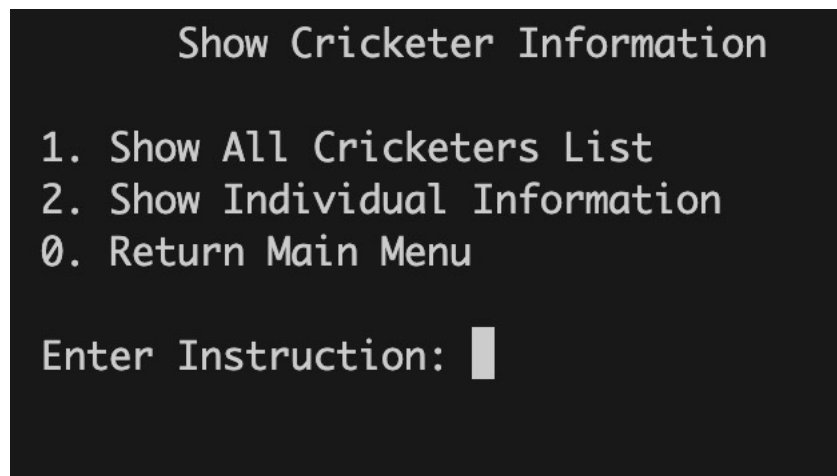| ID	Country	Player Name	Date of Birth	Age	Role	Batting Style	Bowling Style	M.P.	Runs	Wickets	Catches	Bat Avg	Bowl Avg	SR
25	South Africa	Faf du Plessis	13/7/84	38	Batsman	Right-Handed	Right-Arm Leg-Spin	120	6500	20	35	54.17	2.50	80
23	South Africa	Hashim Amla	31/3/83	40	Batsman	Right-Handed	Right-Arm Medium	125	9000	15	25	72.00	26.67	85
12	Australia	David Warner	27/10/86	36	Batsman	Left-Handed	Right-Arm Medium	120	9500	0	30	79.17	0.00	75
9	England	Jonny Bairstow	26/9/89	33	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	105	5000	5	50	47.62	80.00	100
43	Bangladesh	Shakib Al Hasan	24/3/87	36	All-Rounder	Left-Handed	Left-Arm Spin	130	4000	90	25	30.77	26.67	100
35	West Indies	Sheldon Cottrell	19/8/89	33	Bowler	Left-Handed	Left-Arm Fast	85	200	130	20	2.35	1.54	100
18	New Zealand	Ross Taylor	8/3/84	38	Batsman	Right-Handed	Right-Arm Medium	135	7800	5	40	57.78	28.60	75
33	West Indies	Andre Russell	29/4/88	34	All-Rounder	Right-Handed	Right-Arm Fast	110	3500	100	35	23.33	24.00	140
6	England	Joe Root	30/12/90	32	Batsman	Right-Handed	Right-Arm Off-Spin	120	11000	20	45	91.67	105.00	80
2	India	Rohit Sharma	30/4/87	36	Batsman	Right-Handed	Right-Arm Off-Spin	145	14000	3	50	96.55	1050.00	87
20	New Zealand	Lockie Ferguson	13/6/91	31	Bowler	Right-Handed	Right-Arm Fast	95	300	110	20	4.29	10.00	120
51	Zimbabwe	Brendan Taylor	6/2/86	37	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	95	3000	0	20	31.58	0.00	85
41	Bangladesh	Mushfiqur Rahim	9/5/87	35	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	115	4500	0	35	39.13	0.00	80
19	New Zealand	Martin Guptill	30/9/86	36	Batsman	Right-Handed	Right-Arm Medium	120	6500	0	25	54.17	0.00	80
50	Afghanistan	Rahmanullah Gurbaz	22/6/01	21	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	80	1500	0	5	18.75	0.00	90
36	Sri Lanka	Kusal Perera	17/8/90	33	Wicketkeeper-Batsman	Left-Handed	Right-Arm Medium	110	3000	0	35	27.27	0.00	85
53	Zimbabwe	Tendai Chatara	28/2/90	33	Bowler	Right-Handed	Right-Arm Fast-Medium	85	600	80	10	7.06	9.38	85
42	Bangladesh	Tamim Iqbal	20/3/89	34	Batsman	Left-Handed	Right-Arm Medium	125	5500	10	30	44.00	33.00	90
8	England	Jofra Archer	1/4/95	28	Bowler	Right-Handed	Right-Arm Fast	95	1500	160	15	15.79	9.38	80
15	Australia	Glenn Maxwell	14/10/88	34	All-Rounder	Right-Handed	Right-Arm Off-Spin	110	3000	70	40	27.27	31.43	120
31	West Indies	Kieron Pollard	12/5/87	35	All-Rounder	Right-Handed	Right-Arm Medium-Fast	130	4000	90	30	26.67	30.56	110
52	Zimbabwe	Sean Williams	26/9/86	36	All-Rounder	Right-Handed	Left-Arm Spin	90	2500	60	15	27.78	16.67	105
4	India	Ravindra Jadeja	6/12/88	35	All-Rounder	Left-Handed	Left-Arm Spin	125	5000	90	35	40.00	55.56	85
13	Australia	Pat Cummins	8/5/93	30	Bowler	Right-Handed	Right-Arm Fast	105	1200	180	10	12.00	6.67	90
39	Sri Lanka	Angelo Mathews	2/6/87	36	All-Rounder	Right-Handed	Right-Arm Fast-Medium	105	3000	70	30	28.57	33.33	85
55	Zimbabwe	Wesley Madhevere	22/6/99	23	All-Rounder	Right-Handed	Right-Arm Medium-Fast	75	800	30	10	12.50	11.67	85
44	Bangladesh	Mehidy Hasan	25/10/97	25	Bowler	Right-Handed	Off-Spin	95	1200	50	15	12.00	4.00	80
14	Australia	Mitchell Starc	30/1/90	33	Bowler	Left-Handed	Left-Arm Fast	115	1000	200	20	8.70	5.00	95
45	Bangladesh	Mohammad Saifuddin	1/12/96	26	All-Rounder	Right-Handed	Right-Arm Medium-Fast	90	800	40	10	16.00	20.00	110
32	West Indies	Chris Gayle	21/9/79	43	Batsman	Left-Handed	Right-Arm Off-Spin	140	12000	60	15	85.71	13.33	130
48	Afghanistan	Mujeeb Ur Rahman	28/3/01	22	Bowler	Right-Handed	Off-Spin	80	300	90	5	3.75	6.25	75
40	Sri Lanka	Kusal Mendis	2/2/95	28	Batsman	Right-Handed	Right-Arm Medium	90	2500	0	20	27.78	0.00	70
22	South Africa	Kagiso Rabada	25/5/95	28	Bowler	Right-Handed	Right-Arm Fast	110	400	200	10	3.64	2.00	85
38	Sri Lanka	Dushmantha Chameera	11/1/92	31	Bowler	Right-Handed	Right-Arm Fast	95	400	90	15	4.21	4.44	70
16	New Zealand	Kane Williamson	8/8/90	32	Batsman	Right-Handed	Right-Arm Medium	125	8000	20	30	64.00	61.00	75
17	New Zealand	Trent Boult	22/7/89	33	Bowler	Right-Handed	Left-Arm Fast-Medium	105	600	130	15	6.00	4.62	80
34	West Indies	Shai Hope	10/11/93	29	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	100	3500	0	45	35.00	0.00	80
11	Australia	Steve Smith	2/6/89	34	Batsman	Right-Handed	Right-Arm Leg-Spin	125	9500	40	50	76.00	103.75	86
29	Pakistan	Shadab Khan	4/10/98	25	All-Rounder	Right-Handed	Leg-Spin	100	2000	60	25	20.00	26.67	90
5	India	KL Rahul	18/4/92	31	Batsman	Right-Handed	Right-Arm Medium	85	4000	2	40	47.06	2000.00	80
26	Pakistan	Babar Azam	15/10/94	28	Batsman	Right-Handed	Right-Arm Medium	125	7000	10	30	56.00	36.00	90
47	Afghanistan	Asghar Afghan	22/2/87	36	Batsman	Right-Handed	Right-Arm Medium	95	2500	10	15	26.32	16.67	80
21	South Africa	Quinton de Kock	17/12/92	30	Wicketkeeper-Batsman	Left-Handed	Right-Arm Medium	120	5500	0	50	45.83	0.00	95
54	Zimbabwe	Craig Ervine	19/8/85	37	Batsman	Left-Handed	Right-Arm Medium	80	1500	0	10	18.75	0.00	75
49	Afghanistan	Hashmatullah Shahidi	28/11/94	28	Batsman	Left-Handed	Right-Arm Medium	90	2000	0	10	22.22	0.00	75
1	India	Virat Kohli	5/11/88	35	Batsman	Right-Handed	Right-Arm Medium	140	15000	15	60	51.72	63.33	90
3	India	Jasprit Bumrah	6/12/93	29	Bowler	Right-Handed	Right-Arm Fast	110	6000	180	20	54.55	33.33	95
27	Pakistan	Shaheen Afridi	6/4/00	23	Bowler	Left-Handed	Left-Arm Fast	90	500	160	15	5.56	3.13	85
24	South Africa	Imran Tahir	27/3/79	44	Bowler	Right-Handed	Leg-Spin	105	150	150	25	1.43	1.00	95
30	Pakistan	Imam-ul-Haq	12/12/95	27	Batsman	Left-Handed	Right-Arm Medium	80	2500	0	20	31.25	0.00	80
37	Sri Lanka	Dimuth Karunaratne	21/4/88	35	Batsman	Left-Handed	Right-Arm Medium	120	4500	10	25	37.50	20.00	70
10	England	Eoin Morgan	10/9/86	37	Batsman	Left-Handed	Right-Arm Medium	130	7500	10	40	60.00	63.00	85
28	Pakistan	Mohammad Rizwan	1/6/92	31	Wicketkeeper-Batsman	Right-Handed	Right-Arm Medium	105	3000	0	35	28.57	0.00	85
46	Afghanistan	Rashid Khan	20/9/98	24	Bowler	Right-Handed	Leg-Spin	85	600	120	10	7.06	6.25	70
7	England	Ben Stokes	4/6/91	32	All-Rounder	Left-Handed	Right-Arm Medium-Fast	115	7000	90	30	60.87	55.56	120

3.1.2. Show Cricketer Individual Information

This function directly shows all the individual information by traversing the whole linked list.

```
Individual Player Data:

Player ID          : 1
Country            : India
Player Name        : Virat Kohli
Date of Birth      : 5/11/88
Player Age         : 35
Player Role        : Batsman
Batting Style      : Right-Handed
Bowling Style      : Right-Arm Medium
Matches Played     : 140
Runs Scored        : 15000
Wickets Taken      : 15
Catches Taken      : 60
Batting Average    : 51.72
Bowling Average    : 63.33
Strike Rate        : 90
```

3.2. Search Cricketer Information

This function searches student information based on parameters.

```
Enter Instruction: 2
        Search Cricketer Information

1. Search by Player ID
2. Search by Country
3. Search by Player Name
4. Search by Date of Birth
5. Search by Age
6. Search by Role
7. Search by Batting Style
8. Search by Bowling Style
9. Search by Matches Played
10. Search by Runs Scored
11. Search by Wickets Taken
12. Search by Catches Taken
13. Search by Batting Average
14. Search by Bowling Average
15. Search by Strike Rate

0. Return Main Menu

Enter Instruction: 
```

3.2.1. Search Player by Player ID

This sub-menu for searching player information from the existing student list searches for a particular player by its ID by traversing the whole linked list.

3.2.2. Search Player by Name

This sub-menu for searching player information from the existing student list searches for a particular player by its Name by traversing the whole linked list.

3.2.3. Search Player by Country

This sub-menu for searching player information from the existing student list searches for a particular player by its Country by traversing the whole linked list.

3.2.4. Search Player by Date of Birth

This sub-menu for searching player information from the existing student list searches for a particular player by its Date of Birth by traversing the whole linked list.

3.2.5. Search Player by Player Age

This sub-menu for searching player information from the existing student list searches for a particular player by Age by traversing the whole linked list.

3.2.6. Search Player by Role

This sub-menu for searching player information from the existing student list searches for a particular player by its Role by traversing the whole linked list.

3.2.7. Search Player by Batting Style

This sub-menu for searching player information from the existing student list searches for a particular player by its Batting Style by traversing the whole linked list.

3.2.8. Search Player by Bowling Style

This sub-menu for searching player information from the existing student list searches for a particular player by its Bowling, traversing the whole linked list.

3.2.9. Search Player by Match Played

This sub-menu for searching player information from the existing student list searches for a particular player by Match Played by traversing the linked list.

3.2.10. Search Player by Run Scored

This sub-menu for searching player information from the existing student list searches for a particular player by Run scored by traversing the linked list.

3.2.11. Search Player by Wickets Taken

This sub-menu for searching player information from the existing student list searches for a particular player by its Role by traversing the whole linked list.

3.2.12. Search Player by Catches Taken

This sub-menu for searching player information from the existing student list searches for a particular player by Catches Taken by traversing the whole linked list.

3.2.13. Search Player by Batting Average

This sub-menu for searching player information from the existing student list searches for a particular player by its Batting Average by traversing the whole linked list.

3.2.14. Search Player by Bowling Average

This sub-menu for searching player information from the existing student list searches for a particular Bowling Average by traversing the linked list.

3.2.15. Search Player by Strike Rate

This sub-menu for searching player information from the existing student list searches for a particular player by its Strike Rate by traversing the linked list.

3.3. Add Cricketer Information

This function inserts player information as a new student structure by taking input of all 15

instances of the player class.

```
Enter Instruction: 3
        Add Cricketer Information

1. Add New Player Data at Front
2. Add New Player Data at End
3. Add New Player Data at Position
0. Return Main Menu

Enter Instruction: █
```

3.3.1. Add New Player Information at Front

This sub-menu option allows you to add a new player's information at the beginning of the

existing player list in the linked list data structure.

3.3.2. Add New Player Information at End

This sub-menu option allows you to append new player information to the end of the existing

player list in the linked list data structure.

3.3.3. Add New Player Information at any position

This sub-menu option enables you to add new player information at a specific position within

the existing player list in the linked list data structure.

3.4. Update Cricketer Information

This function updates existing player information by passing specific parameters and/or by passing every instance.

```
        Enter Instruction: 4
Enter Player ID you want to update: 1

Player Data:
1        India            Virat Kohli      5/11/88     35              Batsman
        1. Update Player ID
        2. Update Player Name
        3. Update Country
        4. Update Date of Birth
        5. Update Age
        6. Update Role
        7. Update Batting Style
        8. Update Bowling Style
        9. Update Matches Played
        10. Update Runs Scored
        11. Update Wickets Taken
        12. Update Catches Taken
        13. Update Batting Average
        14. Update Bowling Average
        15. Update Strike Rate
        0. Return Main Menu

        Do you want to update any information?    Yes - (1-15)     No - (0)
        Enter Instruction: 3
Enter Country: Bangladesh
Country Bangladesh updated successfully.
        Do you want to update any information?    Yes - (1-15)     No - (0)
        Enter Instruction: 5
Enter Age: 39
Age 39 updated successfully.
        Do you want to update any information?    Yes - (1-15)     No - (0)
        Enter Instruction: 0

Updated Player Data:
1     Bangladesh          Virat Kohli      5/11/88     39              Batsman
```

3.4.1. Update Player Data by Player ID

This sub-menu option allows you to update the data of a player within the existing player list based on their Player ID. You can modify attributes and information associated with a specific player, such as their name, statistics, or other relevant data. This functionality provides a means to keep the player's information up-to-date and accurate.

3.5. Delete Cricketer Information

This menu option deletes or removes cricketer information from the system. You can use this option to clear or reset the entire cricketer database, removing all the player data or records stored within the system.

```
        Enter Instruction: 5
    Player Data Deletion

        1. Delete Player Data by Player ID
        2. Delete Player Data by Player Name
        3. Delete Player Data by Country
        4. Delete Plater Data From Front
        5. Delete Player Data From End
        6. Delete Player Data From Any Position
        7. Delete Whole Player Database
        0. Return Main Menu

        Enter Instruction: █
```

3.5.1. Delete Player Data by Player ID

This sub-menu option allows to delete of a player's data from the list based on their unique Player ID. It provides a way to remove a specific player's information.

3.5.2. Delete Player Data by Player Name

This sub-menu option allows to delete a player's data by specifying their name. It's useful when you want to remove all records associated with a particular player's name.

3.5.3 Delete Player Data by Country

This option enables to delete player data by specifying the country associated with the player. It allows you to remove all players from a particular country.

3.5.4. Delete Player Data From Front

This sub-menu option allows you to delete the data of the player at the front or the beginning of the player list.

3.5.5 Delete Player Data From End

This sub-menu option lets you delete the data of the player at the end of the player list, effectively removing the last player in the list.

3.5.6. Delete Player Data From Any Position

This sub-menu option allows you to specify a position within the player list and delete the player's data at that particular position.

3.5.6. Delete Whole Player Database

This sub-menu option allows you to specify a position within the player list and delete the player's data at that particular position

3.6. Sort Cricketer Information

This menu option allows sorting the cricketer information stored in the database. It allows you to arrange the cricketer data based on various criteria, such as PlayerID, Country, Match Played, Run Scored, Wickets Taken, Catches Taken, and Strike Rate.

```
        Enter Instruction: 6
   Sort Player Information

        1. Sort Cricketers by PlayerID
        2. Sort Cricketers by Country
        3. Sort Cricketer by Match Played
        4. Sort Cricketer by Run Scored
        5. Sort Cricketer by Wickets Taken
        6. Sort Cricketer by Catches Taken
        7. Sort Cricketer by Strike Rate
   Enter Instruction: █
```

3.6.1. Sort Cricketers by PlayerID

This sub-menu option allows you to sort cricketers based on their unique PlayerID. It

organizes the cricketers in ascending or descending order of their IDs.

3.6.2. Sort Cricketers by Country

This menu option enables you to sort cricketers based on their respective countries. It

arranges the cricketers alphabetically or in any specified order based on their country.

3.6.3. Sort Cricketer by Match Played

This sub-menu option provides the ability to sort cricketers by the number of matches they

have played. You can choose to arrange them in ascending or descending order of matches

played.

3.6.4. Sort Cricketer by Run Scored

This option allows you to sort cricketers based on the total runs they have scored. You can

arrange them in ascending or descending order of run scores.

3.6.5. Sort Cricketer by Wickets Taken

This sub-menu option lets you sort cricketers by the number of wickets they have taken. You can specify whether to sort in ascending or descending order of wickets taken.

3.6.6. Sort Cricketer by Catches Taken

This menu option enables you to sort cricketers by the number of catches they have taken. You can arrange them in ascending or descending order of catches taken.

3.6.7. Sort Cricketer by Strike Rate

This sub-menu option allows you to sort cricketers based on their Strike Rate. You can specify whether to sort in ascending or descending order of Strike Rates.

4. Conclusion

In conclusion, the "Player Database for ICC Men's World Cup 2023" application is a powerful utility for managing and maintaining player information for this iconic sporting event. Whether it's for coaches, analysts, or fans, this application streamlines the task of accessing, updating, and deleting player data, providing a valuable resource for the World Cup. Its ability to handle data efficiently through a linked list structure and its emphasis on data persistence make it a valuable asset for the cricketing community.