INFORMATICS INSTITUTE OF TECHNOLOGY

UNIVERSITY OF WESTMINSTER

Informatics Institute of Technology

Department of Computing

BSc in Computer Science

Module: 5COSC007C Object Oriented Programming

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Individual Course Work

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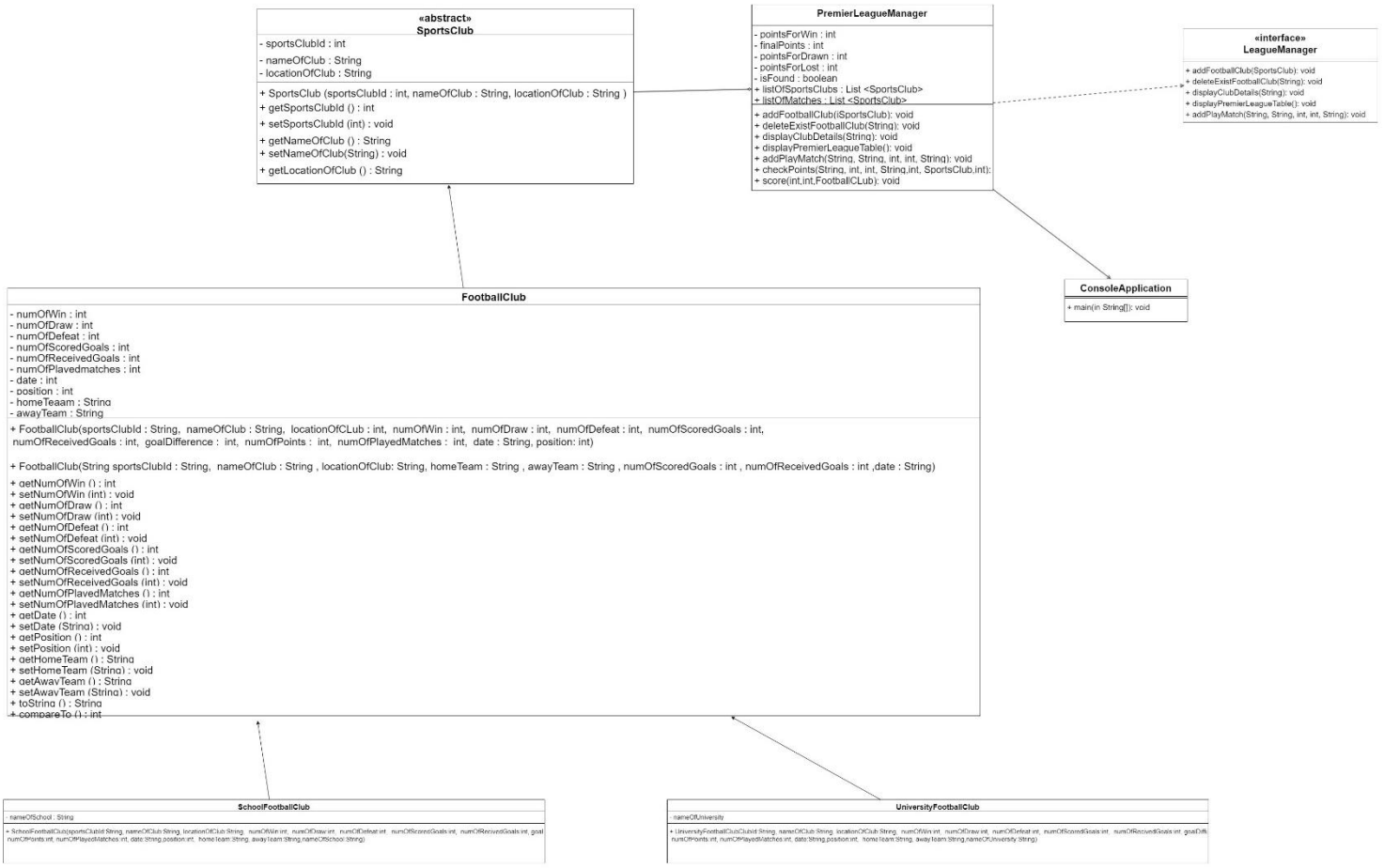
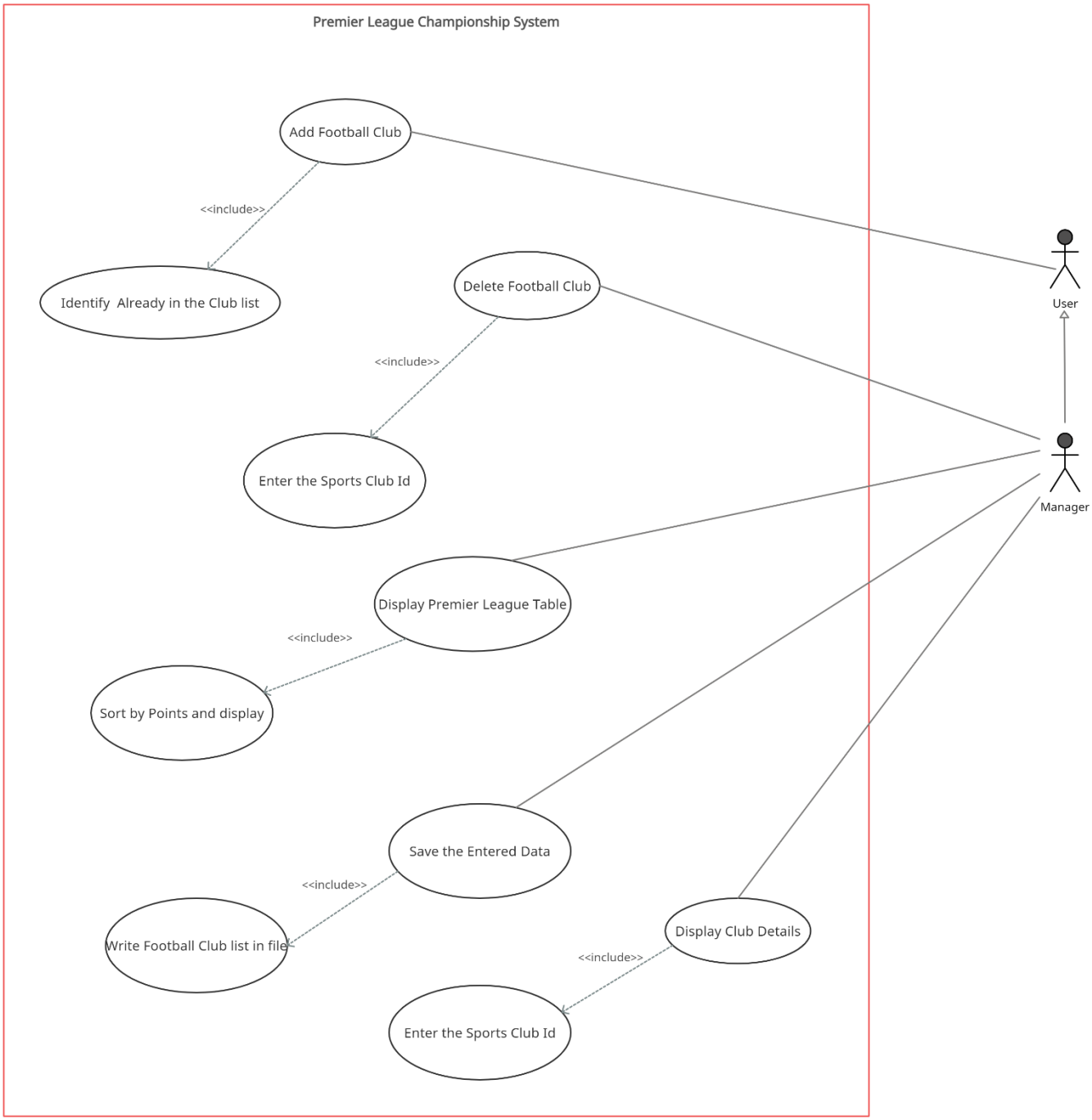
Class Diagram



Use Case Diagram

- Use Case for Command line Application



SportsClub.java

```
public abstract class SportsClub implements Serializable {
	private String sportsClubId;
	private String nameOfClub;
	private String locationOfClub;

	public SportsClub(String sportsClubId,String nameOfClub, String locationOfClub) {
		this.sportsClubId = sportsClubId;
		this.nameOfClub = nameOfClub;
		this.locationOfClub = locationOfClub;
	}

	public String getSportsClubId() {
		return sportsClubId;
	}

	public void setSportsClubId(String sportsClubId) {
		this.sportsClubId = sportsClubId;
	}

	public String getNameOfClub() {
		return nameOfClub;
	}

	public void setNameOfClub(String nameOfClub) {
		this.nameOfClub = nameOfClub;
	}

	public String getLocationOfClub() {
```

```
        return locationOfClub;
    }

    public void setLocationOfClub(String locationOfClub) {
        this.locationOfClub = this.locationOfClub;
    }


@Override
    public String toString() {
        return "SportsClub{" +
        "nameOfClub='" + nameOfClub + '\'' +", locationOfClub='" + locationOfClub +
'\'' +'}';}}
```

FootballClub.java

```
public class FootballClub extends SportsClub implements Comparable<FootballClub> {
    private int numOfWin;
    private int numOfDraw;
    private int numOfDefeat;
    private int numOfScoredGoals;
    private int numOfReceivedGoals;
    private int goalDifference;
    private int numOfPoints;
    private int numOfPlayedMatches;
    private String date;
    private int position;
    private String homeTeam;
    private String awayTeam;
```

```
    public FootballClub(String sportsClubId,String nameOfClub, String locationOfCLub, int numOfWin, int numOfDraw, int numOfDefeat, int numOfScoredGoals, int numOfReceivedGoals, int goalDifference, int numOfPoints, int numOfPlayedMatches, String date,int position) {
        super(sportsClubId,nameOfClub, locationOfCLub);
        this.numOfWin = numOfWin;
        this.numOfDraw = numOfDraw;
        this.numOfDefeat = numOfDefeat;
        this.numOfScoredGoals = numOfScoredGoals;
        this.numOfReceivedGoals = numOfReceivedGoals;
        this.goalDifference = goalDifference;
        this.numOfPoints = numOfPoints;
        this.numOfPlayedMatches = numOfPlayedMatches;
        this.date = date;
        this.position = position;


    }

    public FootballClub(String sportsClubId,String nameOfClub, String locationOfClub, String homeTeam, String awayTeam, int numOfScoredGoals, int numOfReceivedGoals, String date) {
        super(sportsClubId,nameOfClub, locationOfClub);
        this.homeTeam = homeTeam;
        this.awayTeam = awayTeam;
        this.numOfScoredGoals = numOfScoredGoals;
        this.numOfReceivedGoals = numOfReceivedGoals;
        this.date = date;

    }
```

```
public int getNumOfWin() {
	return numOfWin;
}

public void setNumOfWin(int numOfWin) {
	this.numOfWin = numOfWin;
}

public int getNumOfDraw() {
	return numOfDraw;
}

public void setNumOfDraw(int numOfDraw) {
	this.numOfDraw = numOfDraw;
}

public int getNumOfDefeat() {
	return numOfDefeat;
}

public void setNumOfDefeat(int numOfDefeat) {
	this.numOfDefeat = numOfDefeat;
}

public int getNumOfScoredGoals() {
	return numOfScoredGoals;
}

public void setNumOfScoredGoals(int numOfScoredGoals) {
	this.numOfScoredGoals = numOfScoredGoals;
```

```
}

public int getNumOfReceivedGoals() {
	return numOfReceivedGoals;
}

public void setNumOfReceivedGoals(int numOfReceivedGoals) {
	this.numOfReceivedGoals = numOfReceivedGoals;
}

public int getGoalDifference() {
	return goalDifference;
}

public void setGoalDifference(int goalDifference) {
	this.goalDifference = goalDifference;
}

public int getNumOfPoints() {
	return numOfPoints;
}

public void setNumOfPoints(int numOfPoints) {
	this.numOfPoints = numOfPoints;
}

public int getNumOfPlayedMatches() {
	return numOfPlayedMatches;
}

public void setNumOfPlayedMatches(int numOfPlayedMatches) {
```

```
        this.numOfPlayedMatches = numOfPlayedMatches;
}

public String getDate() {
        return date;
}

public void setDate(String date) {
        this.date = date;
}

public int getPosition() {
        return position;
}

public void setPosition(int position) {
        this.position = position;
}

public String getHomeTeam() {
        return homeTeam;
}

public void setHomeTeam(String homeTeam) {
        this.homeTeam = homeTeam;
}

public String getAwayTeam() {
        return awayTeam;
}
```

```
    public void setAwayTeam(String awayTeam) {
        this.awayTeam = awayTeam;
    }

    @Override
    public int compareTo(FootballClub football) {
        return Comparator.comparing(FootballClub::getNumOfPoints)
                .thenComparing(FootballClub::getGoalDifference)
                .compare(this, football);
    }

    @Override
    public String toString() {
        return "FootballClub{" +
                "numOfWin=" + numOfWin +
                ", numOfDraw=" + numOfDraw +
                ", numOfDefeat=" + numOfDefeat +
                ", numOfScoredGoals=" + numOfScoredGoals +
                ", numOfReceivedGoals=" + numOfReceivedGoals +
                ", goalDifference=" + goalDifference +
                ", numOfPoints=" + numOfPoints +
                ", numOfPlayedMatches=" + numOfPlayedMatches +
                ", date='" + date + '\'' +
                ", position=" + position +
                ", homeTeam='" + homeTeam + '\'' +
                ", awayTeam='" + awayTeam + '\'' +
                '}';
    }
}

/*
```

Reference

Comparing Multiple field

https://stackoverflow.com/questions/369512/how-to-compare-objects-by-multiple-fields

*/

UniversityFootballClub.java

```
public class UniversityFootballClub extends FootballClub {
	private String nameOfUniversity;

	public UniversityFootballClub (String sportsClubId,String nameOfClub, String locationOfCLub, int numOfWin, int numOfDraw, int numOfDefeat, int numOfScoredGoals, int numOfReceivedGoals, int goalDifference, int numOfPoints,int numOfPlayedMatches, String date,int position, String nameOfUniversity) {
		super (sportsClubId, nameOfClub, locationOfCLub, numOfWin, numOfDraw, numOfDefeat, numOfScoredGoals, numOfPoints,numOfReceivedGoals,goalDifference, numOfPlayedMatches,date,position);
		this.nameOfUniversity = nameOfUniversity;
	}
}
```

SchoolFootballClub.java

```
public class SchoolFootballClub extends FootballClub{
	private String nameOfSchool;
```

```
    public SchoolFootballClub (String sportsClubId,String nameOfClub, String
locationOfCLub, int numOfWin, int numOfDraw, int numOfDefeat, int numOfScoredGoals, int
numOfReceivedGoals, int goalDifference, int numOfPoints, int numOfPlayedMatches, String
date, int position,String nameOfSchool) {

super (sportsClubId, nameOfClub, locationOfCLub, numOfWin, numOfDraw, numOfDefeat,
numOfScoredGoals, numOfReceivedGoals,goalDifference, numOfPoints,
numOfPlayedMatches,date,position);

        this. nameOfSchool = nameOfSchool;

    }



}
```

Question – 2

LeagueManager.java

```
public interface LeagueManager {
    void addFootballClub(SportsClub sportsClub);
    void deleteExistFootballClub(String clubId);
    void displayClubDetails(String clubId);
    void displayPremierLeagueTable();
    void addPlayMatch(String homeTeam,String awayTeam, int homeTeamScore,int
awayTeamScore, String date);
}
```

PremierLeagueManager.java

```
public class PremierLeagueManager implements LeagueManager {
	private static int pointsForWin;
	private static int finalPoints;
	private static int pointsForDrawn;
	private static int pointsForLost;
	private static boolean isFound;

	public static List<SportsClub> listOfSportsClubs = new ArrayList<>(); // Array list For Sports CLub
	public static List<SportsClub> listOfMatches = new ArrayList<>();  // Arraylist for Matches


	@Override
	public void addFootballClub(SportsClub sportsClub) {
		isFound = false;
		for (SportsClub sportsClub1 : listOfSportsClubs) {
	if (sportsClub1.getNameOfClub().equalsIgnoreCase(sportsClub.getNameOfClub())) { // Check Whether Club is  exist
			isFound = true;
	System.out.println("\nThis Club Already added in Premier League");
break;
			}

		}
		if (!isFound) {
			listOfSportsClubs.add(sportsClub); // add the Football Club into ListOF Sports Club
			System.out.println("\nSuccessfully added the Football Club");
		}
```

```
    }

    @Override
    public void deleteExistFootballClub(String clubId) {
        isFound = false;
        for (SportsClub sportsClub : listOfSportsClubs) {
            if (sportsClub.getSportsClubId().equalsIgnoreCase(clubId)) {
                isFound = true;
                listOfSportsClubs.remove(sportsClub);
                System.out.println("\nSportsClub with the " + clubId + "
Successfully removed ");
                break;
            }
        }
        if (!isFound) {
            System.out.println("\nNot found the Entered Id");

        }
    }


    @Override
    public void displayClubDetails(String clubId) {
        isFound = false;
        if (listOfSportsClubs.isEmpty()) { // Check Whether ListOfSportsClub is Empty
            System.out.println("No Clubs are Added in Premier League ");
        } else {
            for (SportsClub sportsClub : listOfSportsClubs) {
                if (sportsClub.getSportsClubId().equalsIgnoreCase(clubId)) {  //
check the football club in the added list
```

```
                                        System.out.println("\n:::::::::::::::::::: Created Football
Clubs ::::::::::::::::::::::::::::::");
                                        System.out.println("\n1: Id  Of the Club : " +
sportsClub.getSportsClubId());
                                        System.out.println("\n1: Name Of the Club : " +
sportsClub.getNameOfClub());
        System.out.println("\n2: Location of the Club : " + sportsClub.getLocationOfClub());
        System.out.println("\n3: Number of Played Matches : " + ((FootballClub)
sportsClub).getNumOfPlayedMatches());
        System.out.println("\n4: Number of Won Matches : " + ((FootballClub)
sportsClub).getNumOfWin());
        System.out.println("\n5: Number of Defeat Matches : " + ((FootballClub)
sportsClub).getNumOfDefeat());
        System.out.println("\n6: Number of Drawn Matches : " + ((FootballClub)
sportsClub).getNumOfDraw());
        System.out.println("\n7: Total Score of the Club :  " + ((FootballClub)
sportsClub).getNumOfScoredGoals());
        System.out.println("\n8: Total Received Goal : " + ((FootballClub)
sportsClub).getNumOfReceivedGoals());
        System.out.println("\n9: Goal Difference : " + ((FootballClub)
sportsClub).getGoalDifference());
        System.out.println("\n8: Total Points of the Club : " + ((FootballClub)
sportsClub).getNumOfPoints());

                }
        }
        if (!isFound) {
        System.out.println("\nNot found the Entered Id");

        }
```

```
}

}


    @Override
    public void displayPremierLeagueTable() {

        listOfSportsClubs.sort(Collections.reverseOrder()); // Sort
        System.out.println("\n\t\t\t\t\t\t\t\t\t\t\t::::::::::::::::::::::::::::::::::::::Ranking
Table::::::::::::::::::::::::::::::::::::::\n");
        String tableAlignment = "| %-15s | %-7s | %-20s | %-15s | %-8s | %-8s | %-8s | %-
8s | %-12s | %-15s | %-15s | %-7s | %n";
        System.out.format("+-----------------+---------+----------------------+-----------------+-
---------+----------+----------+----------+-------------+----------------+----------------+---------+%n");
        System.out.format("| Position        | Club Id | Club Name            | Club Location   |
Played   | Won      | Drawn    | Lost     | Goals For    | Goal Against    | Goal Difference | Points
|%n");
        System.out.format("+-----------------+---------+----------------------+-----------------+-
---------+----------+----------+----------+-------------+----------------+----------------+---------+%n");
        for (SportsClub sportsClub : listOfSportsClubs) {
System.out.format(tableAlignment, ((FootballClub) sportsClub).getPosition(),
sportsClub.getSportsClubId(), sportsClub.getNameOfClub(), sportsClub.getLocationOfClub(),
((FootballClub) sportsClub).getNumOfPlayedMatches(), ((FootballClub)
sportsClub).getNumOfWin(), ((FootballClub) sportsClub).getNumOfDraw(), ((FootballClub)
sportsClub).getNumOfDefeat(), ((FootballClub) sportsClub).getNumOfScoredGoals(),
((FootballClub) sportsClub).getNumOfReceivedGoals(),((FootballClub)
sportsClub).getGoalDifference(), ((FootballClub) sportsClub).getNumOfPoints());
```

```
                }System.out.format("+-----------------+---------+--------------------+----------------
+----------+----------+----------+----------+-------------+----------------+----------------+---------
+%n");



        }

        @Override
        public void addPlayMatch(String homeTeam, String awayTeam, int homeTeamScore, int
awayTeamScore, String date) {
                int count = 0;
                for (SportsClub sportsClub : listOfSportsClubs) {
                        int difference1 = homeTeamScore + ((FootballClub)
sportsClub).getNumOfScoredGoals() - awayTeamScore + ((FootballClub)
sportsClub).getNumOfReceivedGoals();
                        int difference2 = awayTeamScore + ((FootballClub)
sportsClub).getNumOfScoredGoals() - homeTeamScore + ((FootballClub)
sportsClub).getNumOfReceivedGoals();
                        if (sportsClub.getNameOfClub().equals(homeTeam)) {
                                checkPoints(homeTeam, homeTeamScore, awayTeamScore, date,
count, sportsClub, difference1);
                        } else if (sportsClub.getNameOfClub().equals(awayTeam)) {
                                checkPoints(awayTeam, awayTeamScore, homeTeamScore, date,
count, sportsClub, difference2);
                        }
                        count++;
                }

                int position = 0;
                listOfSportsClubs.sort(Collections.reverseOrder());
                for (SportsClub sportsClub2 : listOfSportsClubs) {
```

```
                    SportsClub sportsClub3 = new
FootballClub(sportsClub2.getSportsClubId(), sportsClub2.getNameOfClub(),
sportsClub2.getLocationOfClub(), ((FootballClub) sportsClub2).getNumOfWin(),
((FootballClub) sportsClub2).getNumOfDraw(), ((FootballClub)
sportsClub2).getNumOfDefeat(), ((FootballClub) sportsClub2).getNumOfScoredGoals(),
((FootballClub) sportsClub2).getNumOfReceivedGoals(),
                                    ((FootballClub) sportsClub2).getGoalDifference(),
((FootballClub) sportsClub2).getNumOfPoints(), ((FootballClub)
sportsClub2).getNumOfPlayedMatches(), ((FootballClub) sportsClub2).getDate(), position + 1);
                    listOfSportsClubs.set(position, sportsClub3);
                    position++;
                }

        }

        private void checkPoints(String homeTeam, int homeTeamScore, int awayTeamScore,
String date, int count, SportsClub sportsClub, int difference1) {
                score(homeTeamScore, awayTeamScore, ((FootballClub) sportsClub));
                SportsClub sportsClub1 = new FootballClub(sportsClub.getSportsClubId(),
homeTeam, sportsClub.getLocationOfClub(), pointsForWin, pointsForDrawn, pointsForLost,
homeTeamScore + ((FootballClub) sportsClub).getNumOfScoredGoals(), awayTeamScore +
((FootballClub) sportsClub).getNumOfReceivedGoals(),
                                difference1, finalPoints, ((FootballClub)
sportsClub).getNumOfPlayedMatches() + 1, date, ((FootballClub) sportsClub).getPosition());


                listOfSportsClubs.set(count, sportsClub1);
        }
```

```
	private void score(int homeTeamScore, int awayTeamScore, FootballClub footballClub)
{
		pointsForWin = 0;
		finalPoints = 0;
		pointsForDrawn = 0;
		pointsForLost = 0;
		if (homeTeamScore > awayTeamScore) {
			pointsForWin = footballClub.getNumOfWin() + 1;
			finalPoints = footballClub.getNumOfPoints() + 3;
		} else if (homeTeamScore == awayTeamScore) {
			pointsForDrawn = footballClub.getNumOfDraw() + 1;
			finalPoints = footballClub.getNumOfPoints() + 1;
		} else {
			pointsForLost = footballClub.getNumOfDefeat() + 1;
			finalPoints = footballClub.getNumOfPoints();
		}


	}


}

/*
	Reference

	# Printing the Table in Console
		* https://stackoverflow.com/questions/15215326/how-can-i-create-table-using-ascii-in-a-console

 */
```

```
// Write the data to file

public static void saveData() {

		try {
			FileOutputStream fileOut = new
		FileOutputStream("premierLeagueData.txt");
			ObjectOutputStream objOut = new ObjectOutputStream(fileOut);

			objOut.writeObject(PremierLeagueManager.listOfSportsClubs);
			objOut.writeObject(PremierLeagueManager.listOfMatches);

			System.out.println("Data Saved Successfully");

			objOut.flush();
			objOut.close();
			fileOut.close();
		} catch (IOException ioe) {
			ioe.printStackTrace();

} }


// Load the Data

public static void loadData() {
		try {
			FileInputStream fileInput = new
		FileInputStream("premierLeagueData.txt");
			ObjectInputStream objOutput = new ObjectInputStream(fileInput);
```

```
                    PremierLeagueManager.listOfSportsClubs = (ArrayList)
objOutput.readObject();
                    PremierLeagueManager.listOfMatches = (ArrayList)
objOutput.readObject();

                    objOutput.close();
                    fileInput.close();
                } catch (IOException ioException) {
                    ioException.printStackTrace();
                } catch (ClassNotFoundException classNotFound) {
                    System.out.println("Class not found");
                    classNotFound.printStackTrace();
                }
        }


/*
        Reference

        # Printing the Table in Console
                * https://stackoverflow.com/questions/15215326/how-can-i-create-table-using-
ascii-in-a-console

        # Serialization & Deserialization

                * https://www.geeksforgeeks.org/serialization-in-java/

 */
```

ConsoleApplication.java

```
public class ConsoleApplication {

	private static boolean decide;
	private static String clubId;
	private static String clubName;
	private static String location;
	private static boolean idCheck;
	private static boolean clubNameCheck;
	private static boolean locationCheck;
	private static String homeTeam;
	private static String awayTeam;
	private static int homeTeamScore;
	private static int awayTeamScore;
	private static String date;
	private static boolean homeTeamCheck;
	private static boolean awayTeamCheck;
	private static boolean homeTeamScoreCheck;
	private static boolean awayTeamScoreCheck;
	private static boolean dateCheck;
	static LeagueManager manager = new PremierLeagueManager();
	static Scanner userInput = new Scanner(System.in);

	public static void main(String[] args) {
		FileHandleUtil loadData = new FileHandleUtil();
		loadData.loadData();  // Call the function for load the file
		menu:
```

```
do {
        try {
                userInput = new Scanner(System.in);
                displayMenu();
                System.out.print("\nEnter the option here : ");
                int option = userInput.nextInt();

                switch (option) {
                case 1:
                        addFootballClub();
                        userDecision();
                        break;
                case 2:
                        deleteClub();
                        userDecision();
                        break;

                case 3:
                        DisplayClubDetails();
                        userDecision();
                        break;

                case 4:
                        manager.displayPremierLeagueTable();
                        userDecision();
                        break;
                case 5:
                        addPlayMatch();
                        userDecision();
                        break;
                case 6:
```

```
                                        Desktop.getDesktop().browse(new
URI("http://localhost:4200/points_table ")); // open Gui From Cli
                                        userDecision();
                                        break;
                                case 7:
                                        FileHandleUtil saveData = new FileHandleUtil(); // Write
to the File
                                        saveData.saveData();
                                        userDecision();
                                        break;

                                case 8:
                                        System.out.println("\n::::::::::Thank You For Use the
Premier League Console Application::::::::");
                                        decide = false;
                                        break menu;
                                default:
                                        System.out.println("\nYou Selected an Invalid Option.
Please Try Again! ");
                                        userDecision();
                                }
                        } catch (Exception e) {

                                System.out.println("\nPlease Enter Valid input");
                                decide = true;
                        }
                } while (decide);
        }

                private static void displayMenu() {
```

```
		System.out.println("\n::::::::::::::::::::::::::Welcome to Premier League
Football::::::::::::::::::::::::");
		System.out.println("\n1: Create a New Football Club ");
		System.out.println("\n2: Delete The existing club from the Premier league");
		System.out.println("\n3: Display the Information about Selected Club ");
		System.out.println("\n4: Display the Premier League Table");
		System.out.println("\n5: Add a played match with its score and its date ");
		System.out.println("\n6: Open the GUI Application ");
		System.out.println("\n7: Save the Entered Data ");
		System.out.println("\n8: Quit the Application\n");
		System.out.println("\n:::::::::::::::::::::::::::::Choose the option You
want::::::::::::::::::::::::::::::::");
	}

	private static void addFootballClub() {
		SportsClub sportsClub;
		System.out.println("\n********** Add the FootballClub
**********");
		do {
			System.out.print("\nEnter the Club Id: ");
			clubId = userInput.next();
			idCheck = clubId.matches("^[a-zA-Z0-9]+$");

			if (idCheck) {
				break;
			} else {
				System.out.println("Please Enter the valid id");
			}
		} while (!idCheck);
```

```
                do {
                        System.out.print("\nEnter the Club Name: ");
                        clubName = userInput.next();
                        clubNameCheck = clubName.matches("^[a-zA-Z0-9_ ]*$");

                        if (clubNameCheck) {
                                break;
                        } else {
                                System.out.println("Please enter the valid Foot club name");
                        }
                } while (!clubNameCheck);

                do {
                        userInput = new Scanner(System.in);
                        System.out.print("\nEnter the Location of Club: ");
                        location = userInput.next();
                        locationCheck = location.matches("^[a-zA-Z0-9_ ]*$");

                        if (locationCheck) {
                                break;
                        } else {
                                System.out.println("Please valid the valid location name");
                        }
                } while (!locationCheck);

                sportsClub = new FootballClub(clubId, clubName, location, 0, 0, 0, 0, 0, 0, 0, 0,
"", 0);
                manager.addFootballClub(sportsClub);


        }
```

```
	private static void addPlayMatch() {
		SportsClub sportsClub;
		System.out.println("\n********** Add the Match Between two Clubs **********");
		do {
			System.out.print("\nEnter the Home Club name : ");
			homeTeam = userInput.next();
			homeTeamCheck = homeTeam.matches("^[a-zA-Z]*$"); // Check the String using regex

			if (homeTeamCheck) {
				break;
			} else {
				System.out.println("Please enter valid Club Name");
			}
		} while (!homeTeamCheck);


		do {
			System.out.print("\nEnter the Away Club Name : ");
			awayTeam = userInput.next();
			awayTeamCheck = awayTeam.matches("^[a-zA-Z]*$");

			if (awayTeamCheck) {
				break;
			} else {
				System.out.println("Please enter Valid Club Name");
			}
		} while (!awayTeamCheck);
```

```
do {
        try {
                userInput = new Scanner(System.in);
                System.out.print("\nEnter the Home Club Score : ");
                homeTeamScore = userInput.nextInt();
                homeTeamScoreCheck = false;
        } catch (Exception e) {
                System.out.println("Please enter the valid input");
                homeTeamScoreCheck = true;
        }
} while (homeTeamScoreCheck);

do {
        try {
                userInput = new Scanner(System.in);
                System.out.print("\nEnter the Away Club Score : ");
                awayTeamScore = userInput.nextInt();
                awayTeamScoreCheck = false;
        } catch (Exception e) {
                System.out.println("Please enter the valid input");
                awayTeamScoreCheck = true;
        }
} while (awayTeamScoreCheck);


do {
        System.out.print("\nEnter the Date: ");
        date = userInput.next();
        dateCheck = date.matches("^(0?[1-9]|[12][0-9]|3[01])-(0?[1-9]|1[012])-
([12][0-9]{3})$"); // check the Date Format
```

```
                    if (dateCheck) {
                        break;
                    } else {
                        System.out.println("Please Enter Valid Date Format Like this (dd-mm-yyyy) ");
                    }
                } while (!dateCheck);

                sportsClub = new FootballClub("", "", "", homeTeam, awayTeam, homeTeamScore, awayTeamScore, date);
                manager.addPlayMatch(homeTeam, awayTeam, homeTeamScore, awayTeamScore, date);
                PremierLeagueManager.listOfMatches.add(sportsClub); // Add the match into listOfMatches ArrayList

        }

        private static void deleteClub() {

                System.out.print("\nEnter the Existing Club Id : ");
                clubId = userInput.next();
                manager.deleteExistFootballClub(clubId);
        }


        private static void DisplayClubDetails() {

                System.out.print("\nEnter the Club Id: ");
                clubId = userInput.next();
                manager.displayClubDetails(clubId);
```

```
	}

	private static void userDecision() {
		while (true) {
			System.out.println("\nExit the Program Enter :: E  \nContinue the Program Enter :: C");
			System.out.println("\n::::::::::::::::::::::::::::::Choose the Option You Want ::::::::::::::::::::::::::");
			System.out.print("\nEnter the Option here : ");
			userInput = new Scanner(System.in);
			String decision = userInput.next();

			if (decision.equalsIgnoreCase("e")) {
				System.out.println(":::::::::::::::::::::::::::::::: Exit the Program ::::::::::::::::::::::::::::::::");
				decide = false;
				break;
			} else if (decision.equalsIgnoreCase("c")) {
				decide = true;
				break;
			} else {
				System.out.println("\nPlease type valid command");
			}

		}
	}


}
```

Question – 3

Angular Code

Points-table.component.html

```
<div>
  <h2>Points Table</h2>
</div>
<div class="tbl">
<table class="table table-light table-striped ">
  <thead class="thead-light">
  <tr>
    <th scope="col">Position</th>
    <th scope="col">Club</th>
    <th scope="col">Location</th>
    <th scope="col">Wins</th>
    <th scope="col">Draw</th>
    <th scope="col">Defeat</th>
    <th scope="col" >Goal Scored</th>
    <th scope="col">Goal Against</th>
    <th scope="col">Goal Difference</th>
    <th scope="col">Points</th>
    <th scope="col">Played Matches</th>
  </tr>
  </thead>
  <tbody>
  <tr class="text-center" *ngFor="let col of matchTable " >
    <td> {{col.position}}</td>
    <td>{{col.nameOfClub}}</td>
```

```
    <td>{{col.locationOfClub}}</td>
    <td>{{col.numOfWin}}</td>
    <td>{{col.numOfDraw}}</td>
    <td>{{col.numOfDefeat}}</td>
    <td>{{col.numOfScoredGoals}}</td>
    <td>{{col.numOfReceivedGoals}}</td>
    <td>{{col.goalDifference}}</td>
    <td>{{col.numOfPoints}}</td>
    <td>{{col.numOfPlayedMatches}}</td>
  </tr>
  </tbody>
</table>
</div>

/*
 # Reference
   # Bootstrap Table Documentation
   https://getbootstrap.com/docs/4.0/content/tables/
*/
```

Points-table.component.ts

```
@Component({
  selector: 'app-points-table',
  templateUrl: './points-table.component.html',
  styleUrls: ['./points-table.component.css']
})
```

```
export class PointsTableComponent implements OnInit {

  matchTable : any;
  constructor(private pointsService : PointsTableService) { }


  ngOnInit(){
    this.pointsService.getAllClubDetails().subscribe((data) =>{
      this.matchTable = data.response;
    })
  }

}
```

points-table.service.ts

```
@Injectable({
  providedIn: 'root'
})
export class PointsTableService {

  constructor(private httpRequest : HttpClient) { }

  getAllClubDetails(){
    return this.httpRequest.get("http://localhost:9000/pointsTable");
  }
}
```

Random-match.component.html

```
<div class="head">
  <h2>Random Match Table</h2>
</div>
<div>
  <button class="btnRandom" mat-raised-button
(click)="randomMatchGenerate()"><span>Random match</span> </button>
</div>
<div class="tbl">
<table class="table table-light table-striped">
  <thead class="thead-light">
  <tr>
    <th scope="col">Date</th>
    <th scope="col">Home Team</th>
    <th scope="col">Away Team</th>
    <th scope="col">Goal Scored </th>
    <th scope="col">Goal Against</th>
  </tr>
  </thead>
```

```
  <tbody>
  <tr *ngFor="let col of randomTable " >
    <td>{{col.date}}</td>
    <td>{{col.homeTeam}}</td>
    <td>{{col.awayTeam}}</td>
    <td>{{col.numOfScoredGoals}}</td>
    <td>{{col.numOfReceivedGoals}}</td>

  </tr>
  </tbody>
</table>
</div>
```

Random-match.component.ts

```
@Component({
  selector: 'app-random-match',
  templateUrl: './random-match.component.html',
  styleUrls: ['./random-match.component.css']
})
export class RandomMatchComponent implements OnInit {

  randomTable : any;
```

```
  constructor(private randomService : RandomMatchService) { }

  ngOnInit(){
    this.randomService.getRandomMatch().subscribe((data) =>{
      this.randomTable = data.response;
    })
  }

  randomMatchGenerate(): void {
    this.randomService.getRandomMatch()
      .subscribe((data) => {
        this.randomTable = data.response;
      });
  }}
```

Random-match.service.ts

```
@Injectable({
  providedIn: 'root'
})
export class RandomMatchService {

  constructor(private httpRequest : HttpClient) { }

  getRandomMatch(){
    return this.httpRequest.get("http://localhost:9000/getRandom");
  }
}
```

Match-table.component.html

```
<div>
  <h2>Match Table</h2>
</div>
  <mat-form-field class="example-full-width" appearance="fill">
    <mat-label>Search By Date</mat-label>
<input matInput type="text"  [(ngModel)]="dateArray" />
  </mat-form-field>
  <div>
    <button class="btnSort" mat-raised-button (click)="sortByDate()">  <span>Sort By Date
</span></button>
  </div>

<div class="tbl">
<table class="table table-light table-striped ">
  <thead class="thead-light">
  <tr>
    <th scope="col">Date</th>
    <th scope="col">Home Team</th>
    <th scope="col">Away Team</th>
    <th scope="col">Goal Scored </th>
    <th scope="col">Goal Against</th>
  </tr>
  </thead>
  <tbody>
  <tr *ngFor="let col of footballClubMatch | dateSearch:dateArray" >
    <td >{{col.date}}</td>
    <td>{{col.homeTeam}}</td>
    <td>{{col.awayTeam}}</td>
```

```
    <td>{{col.numOfScoredGoals}}</td>
    <td>{{col.numOfReceivedGoals}}</td>
  </tr>
  </tbody>
</table>
</div>
```

Match-table.component.ts

```
@Component({
  selector: 'app-match-table',
  templateUrl: './match-table.component.html',
  styleUrls: ['./match-table.component.css']
})
export class MatchTableComponent implements OnInit {
  footballClubMatch : any;
  dateArray="";
  constructor(private matchService : MatchTableService ) { }

  ngOnInit() {
    this.matchService.getMatchTable()
      .subscribe((data) =>{
        this.footballClubMatch = data.response;
      })
  }
```

```
  sortByDate(): void {
    this.matchService.sortDate()
      .subscribe((data) => {
        this.footballClubMatch = data.response;
      })


  }
}
```

Match-table.service.ts

```
@Injectable({
  providedIn: 'root'
})
export class MatchTableService {
constructor(private httpRequest : HttpClient) { }
```

```
  getMatchTable(){
    return this.httpRequest.get("http://localhost:9000/getMatch");
  }

  sortDate(){
    return this.httpRequest.get("http://localhost:9000/getDate");
  }
}
```

Play Framework Codes

Controllers

MatchTableController.java

```
public class MatchTableController {

        public Result MatchTableData() {
                PointsTableService.loadTheData();
                ObjectMapper objectMap = new ObjectMapper();
                JsonNode dataOfJson =
objectMap.convertValue(PointsTableService.listOfServiceMatches, JsonNode.class);
                return created(ResponseUtil.createResponse(dataOfJson,true));

        }

        public Result RandomTableData() {

                PointsTableService.get();
```

```
            ObjectMapper objectMap = new ObjectMapper();
            JsonNode dataOfJson =
objectMap.convertValue(PointsTableService.listOfServiceMatches, JsonNode.class);
            return created(ResponseUtil.createResponse(dataOfJson, true));

        }

        public Result SortedDate() {

            DateService.getDate();
            ObjectMapper objectMap = new ObjectMapper();
            JsonNode dataOfJson =
objectMap.convertValue(PointsTableService.listOfServiceMatches, JsonNode.class);
            return created(ResponseUtil.createResponse(dataOfJson, true));

        }

}
```

PointsTableController.java

```
public class PointsTableController extends Controller {

   public Result pointsTableData() {

      PointsTableService.loadTheData();
      ObjectMapper objectMap = new ObjectMapper();
      JsonNode dataOfJson =
objectMap.convertValue(PointsTableService.listOfServiceSportsClubs, JsonNode.class);
      return created(ResponseUtil.createResponse(dataOfJson, true));
```

```
    }

}
```

Services

DateService.java

```
public class DateService implements Comparator<SportsClub> {

        public static void getDate() {
                PointsTableService.loadTheData(); // load the data from Points Table Service
                PointsTableService.listOfServiceMatches.sort(new DateService());  // Sort the
data
        }


        DateTimeFormatter formatOfDate = DateTimeFormatter.ofPattern("dd-MM-yyyy");  //
Formatting the Date
```

```
        @Override
        public int compare(SportsClub firstSportsClub, SportsClub secondSportsClub) {
                LocalDate firstDate = LocalDate.parse(((FootballClub)
firstSportsClub).getDate(), formatOfDate);  // get the date and assign to firstDate
                LocalDate secondDate = LocalDate.parse(((FootballClub)
secondSportsClub).getDate(), formatOfDate); // get the date and assign to secondDate
                try {
                        return firstDate.compareTo(secondDate);  // Comparing the first and
second date
                } catch (Exception exception) {
                        throw new IllegalArgumentException(exception);
                }
        }


}
```

PointsTableService.java

```
public class PointsTableService {

        public static ArrayList <SportsClub> listOfServiceSportsClubs = new ArrayList();
        public static ArrayList <SportsClub> listOfServiceMatches = new ArrayList();
```

```
	private static int point;
	private static int win;
	private static int drawn;
	private static int lost;
	private static int firstPositionOfIndex;
	private static int secondPositionOfIndex;

	public static void loadTheData() {
		try {

			FileInputStream fileOfInput = new
FileInputStream("premierLeagueData.txt");
			ObjectInputStream objectOfOutput = new
ObjectInputStream(fileOfInput);

			listOfServiceSportsClubs = (ArrayList) objectOfOutput.readObject(); //
get the the data from file and assign the listOfServiceSportsClubs List
			listOfServiceMatches = (ArrayList) objectOfOutput.readObject(); // get
the the data from file and assign the listOfServiceMatches List

			objectOfOutput.close();
			fileOfInput.close();
		} catch (IOException ioException) {
			ioException.printStackTrace();
		} catch (ClassNotFoundException classNotFound) {
			System.out.println("Class not found");
			classNotFound.printStackTrace();
		}


	}
```

```
	public static void saveTheData() {

		try {
			FileOutputStream fileOfInput = new
FileOutputStream("premierLeagueData.txt");
			ObjectOutputStream objectOfOutput = new
ObjectOutputStream(fileOfInput);

			objectOfOutput.writeObject(listOfServiceSportsClubs);
			objectOfOutput.writeObject(listOfServiceMatches);

			System.out.println("Data Saved Successfully");

			objectOfOutput.flush();
			objectOfOutput.close();
			fileOfInput.close();
		} catch (IOException ioe) {
			ioe.printStackTrace();
		}
	}
	public static void get(){
		loadTheData();
		randomMatch();
		saveTheData();
	}

	public static void randomMatch() {
		java.text.SimpleDateFormat formatOfDate = new
java.text.SimpleDateFormat("dd-MM-yyyy");
```

```
		while (true) {
			firstPositionOfIndex = new
Random().nextInt(listOfServiceSportsClubs.size());
			secondPositionOfIndex = new
Random().nextInt(listOfServiceSportsClubs.size());

			if (firstPositionOfIndex != secondPositionOfIndex) {
				break;
			}
		}

		String homeTeam =
listOfServiceSportsClubs.get(firstPositionOfIndex).getNameOfClub(); // Pick the one club
randomly and assign to home team
		String awayTeam =
listOfServiceSportsClubs.get(secondPositionOfIndex).getNameOfClub(); // Pick the one club
randomly and assign to away team

		int homeTeamGoal = new Random().nextInt(15);  // Randomly pick one number
and assign to Home team goal
		int awayTeamGoal = new Random().nextInt(15); // Randomly pick one number
and assign to away team goal

		// Randomly generate the date
		Random randomDate = new Random();
		java.util.Calendar calenderClass = java.util.Calendar.getInstance();
		calenderClass.set(java.util.Calendar.MONTH, Math.abs(randomDate.nextInt()) %
12);
		calenderClass.set(java.util.Calendar.DAY_OF_MONTH,
Math.abs(randomDate.nextInt()) % 30);
		calenderClass.setLenient(true);
```

```
                String date = formatOfDate.format(calenderClass.getTime());



                addPlayMatch(homeTeam, awayTeam, homeTeamGoal, awayTeamGoal, date);
                FileHandleUtil.saveData();
                SportsClub sportsClub = new FootballClub("","", "", homeTeam, awayTeam,
homeTeamGoal, awayTeamGoal, date);
                listOfServiceMatches.add(sportsClub);

        }

        public static void addPlayMatch(String homeTeam, String awayTeam, int
homeTeamScore, int awayTeamScore, String date) {
                int count = 0;
                for (SportsClub sportsClub : listOfServiceSportsClubs) {
                        int difference1 = homeTeamScore + ((FootballClub)
sportsClub).getNumOfScoredGoals() - awayTeamScore + ((FootballClub)
sportsClub).getNumOfReceivedGoals();
                        int difference2 = awayTeamScore + ((FootballClub)
sportsClub).getNumOfScoredGoals() - homeTeamScore + ((FootballClub)
sportsClub).getNumOfReceivedGoals();
                        if (sportsClub.getNameOfClub().equals(homeTeam)) {
                                checkPoints(homeTeam, homeTeamScore, awayTeamScore, date,
count, sportsClub, difference1);
                        } else if (sportsClub.getNameOfClub().equals(awayTeam)) {
                                checkPoints(awayTeam, awayTeamScore, homeTeamScore, date,
count, sportsClub, difference2);
                        }
                        count++;
                }
```

```
                int position = 0;
                listOfServiceSportsClubs.sort(Collections.reverseOrder());
                for(SportsClub sportsClub2 : listOfServiceSportsClubs) {
                        SportsClub sportsClub3 = new
FootballClub(sportsClub2.getSportsClubId(),sportsClub2.getNameOfClub(),
sportsClub2.getLocationOfClub(), ((FootballClub) sportsClub2).getNumOfWin(),
((FootballClub) sportsClub2).getNumOfDraw(), ((FootballClub)
sportsClub2).getNumOfDefeat(), ((FootballClub) sportsClub2).getNumOfScoredGoals(),
((FootballClub) sportsClub2).getNumOfReceivedGoals(),
                                        ((FootballClub) sportsClub2).getGoalDifference(),
((FootballClub) sportsClub2).getNumOfPoints(), ((FootballClub)
sportsClub2).getNumOfPlayedMatches(), ((FootballClub) sportsClub2).getDate(), position + 1);
                        listOfServiceSportsClubs.set(position, sportsClub3);
                        position++;
                }

        }

        private static void checkPoints(String homeTeam, int homeTeamScore, int
awayTeamScore, String date, int count, SportsClub sportsClub, int difference1) {
                score(homeTeamScore, awayTeamScore, ((FootballClub) sportsClub));
                SportsClub sportsClub1 = new
FootballClub(sportsClub.getSportsClubId(),homeTeam, sportsClub.getLocationOfClub(), win,
drawn, lost, homeTeamScore + ((FootballClub) sportsClub).getNumOfScoredGoals(),
awayTeamScore + ((FootballClub) sportsClub).getNumOfReceivedGoals(),
                                        difference1, point, ((FootballClub)
sportsClub).getNumOfPlayedMatches() + 1, date, ((FootballClub) sportsClub).getPosition());


                listOfServiceSportsClubs.set(count, sportsClub1);
        }
```

```
        private static void score(int homeTeamScore, int awayTeamScore, FootballClub
footballClub) {
                win = 0;
                point = 0;
                drawn = 0;
                lost = 0;
                if (homeTeamScore > awayTeamScore) {
                        win = footballClub.getNumOfWin() + 1;
                        point = footballClub.getNumOfPoints() + 3;
                } else if (homeTeamScore == awayTeamScore) {
                        drawn = footballClub.getNumOfDraw() + 1;
                        point = footballClub.getNumOfPoints() + 1;
                } else {
                        lost = footballClub.getNumOfDefeat() + 1;
                        point = footballClub.getNumOfPoints();
                }


        }
}
```

Junit Test

Code

premierLeagueManagerTest

```
class PremierLeagueManagerTest {

	@Test
	void addFootballClub() {
		List <SportsClub> sportsClubList = new ArrayList<>();

SportsClub newFootballClub = new FootballClub("C001","Barcelona","Sapin","","",0,0,"");

sportsClubList.add(newFootballClub); // adding new Football Club into sportClubList

assertTrue("Successfully added into SportsClub List",sportsClubList.add(newFootballClub));

assertEquals(true,sportsClubList.contains(newFootballClub));
}
```