**INFORMATICS INSTITUTE OF TECHNOLOGY**

**IN COLLABORATION WITH**

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OBJECT ORIENTED PRINCIPLES

5COSC007C

**Module Leader:** Guhanathan Poravi

Coursework 01

Premier League System

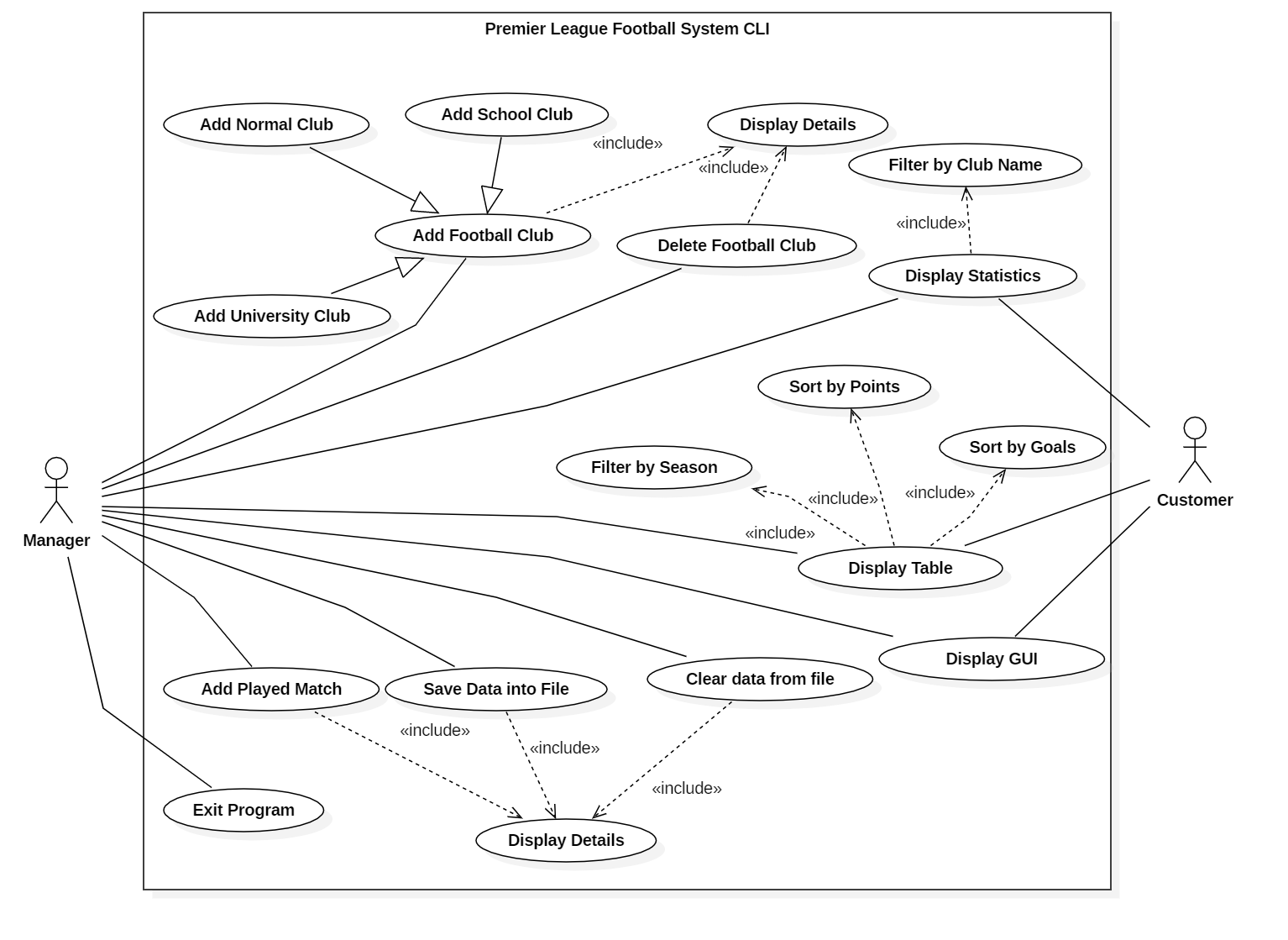
**Name:** Mohammed Nazhim Kalam

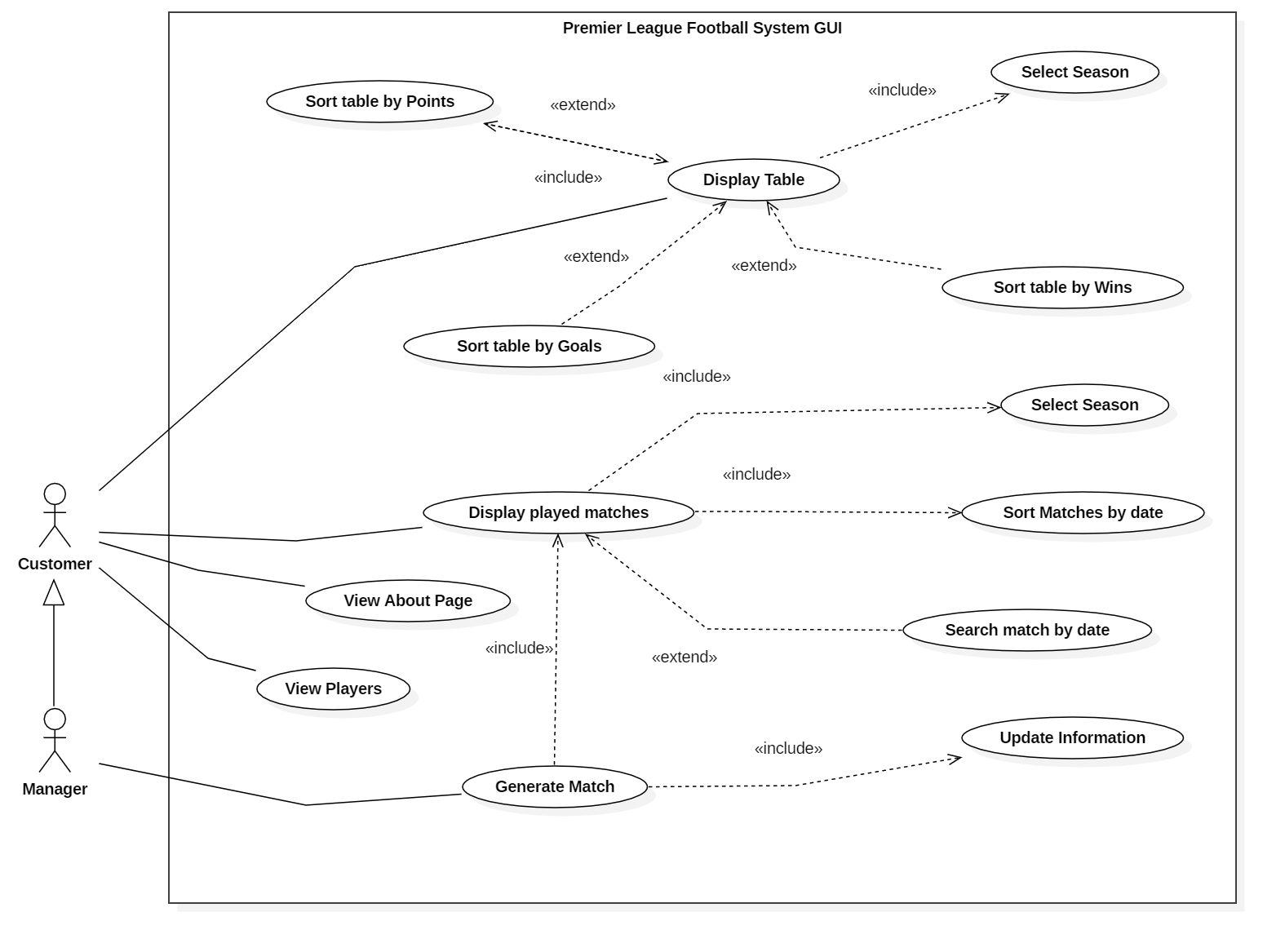
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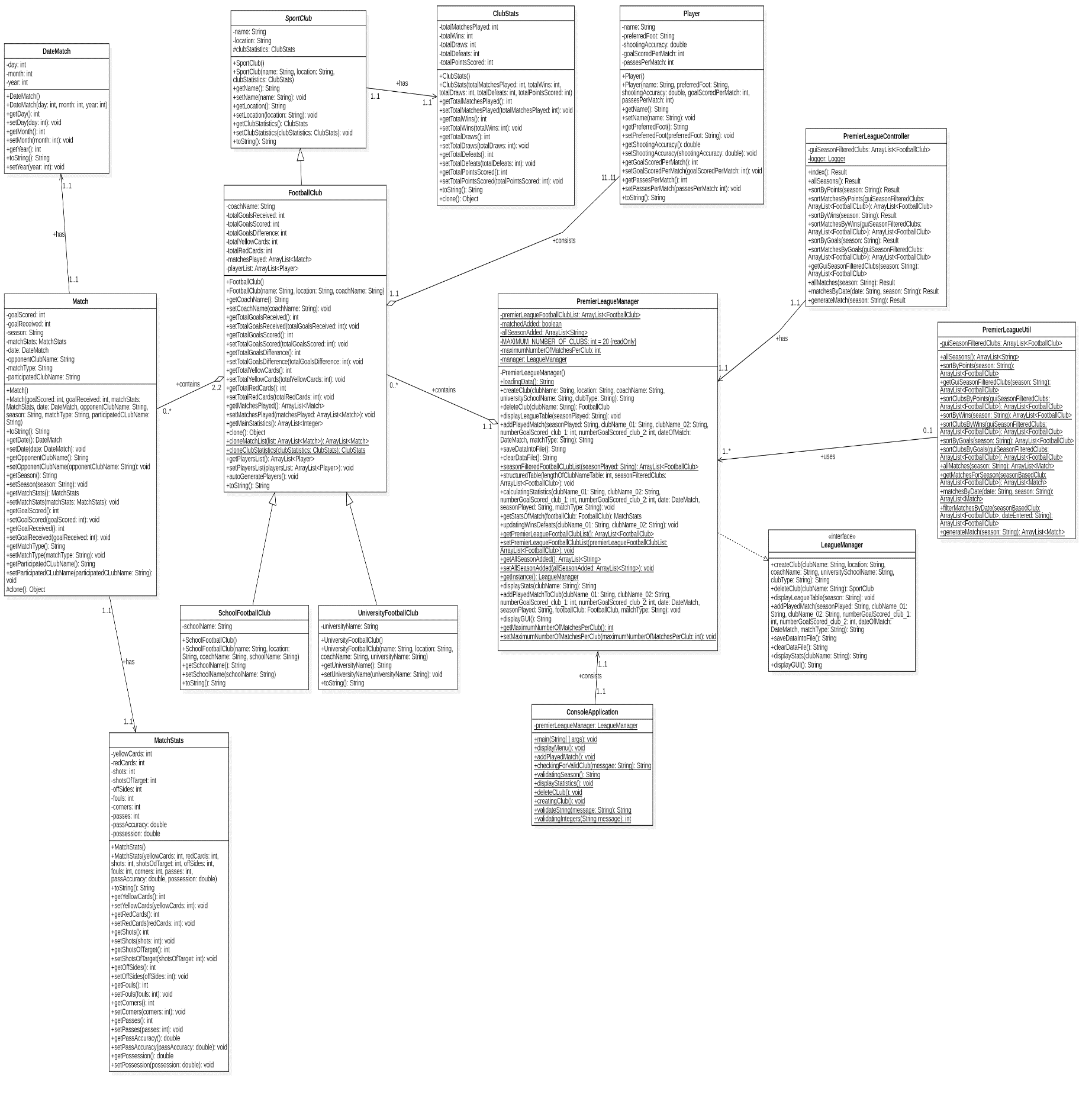
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3. Designs
   1. Usecase Diagram

Usecase diagram for CLI

Usecase diagram for GUI

* 1. Class Diagram

1. Codes
   1. Console Application
      1. Code

**console package**

***ConsoleApplication.java***

package console;  
import entities.DateMatch;  
import entities.FootballClub;  
import entities.LeagueManager;  
import services.PremierLeagueManager;  
import java.util.Scanner;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
/\*  
 \* ASSUMPTIONS:  
 \* --> ALL FOOTBALL CLUBS SHOULD HAVE UNIQUE NAMES  
 \*/*public class ConsoleApplication {  
  
 *// Variable used* private static final LeagueManager *premierLeagueManager* = PremierLeagueManager.*getInstance*();  
  
 *// MAIN METHOD* public static void main(String[] args) {  
 *displayMenu*();  
 }  
  
 *// THIS IS MENU METHOD* public static void displayMenu() {  
 System.*out*.println(" \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n" +  
 "| W E L C O M E |\n" +  
 "|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_|\n" +  
 "| M A I N M E N U |\n" +  
 "|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_|\n" +  
 "| (Option 1) Enter '1' to create a new football club and to add it in the Premier League |\n" +  
 "| (Option 2) Enter '2' to delete an existing club from the Premier League |\n" +  
 "| (Option 3) Enter '3' to display the various statistics for a selected club |\n" +  
 "| (Option 4) Enter '4' to display the Premier League table |\n" +  
 "| (Option 5) Enter '5' to add a played match |\n" +  
 "| (Option 6) Enter '6' to display the GUI |\n" +  
 "| (Option 7) Enter '7' to save all the information entered into a file |\n" +  
 "| (Option 8) Enter '8' to clear the data in the file |\n" +  
 "| (Option 9) Enter '9' to exit the program |\n" +  
 "|\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_|\n");  
  
 *// get user selected option* int userSelectOption = *validatingIntegers*(" Enter an option (please enter only integers): ");  
 String result;  
  
 *// Fires the appropriate method depending on the user selected option* switch (userSelectOption)  
 {  
 case 1:  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// method to get user inputs for creating the club  
 creatingClub*();  
  
 *// saving the data into the file  
 premierLeagueManager*.saveDataIntoFile();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 2:  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// method to get user inputs for deleting a club  
 deleteCLub*();  
  
 *// saving the data into the file  
 premierLeagueManager*.saveDataIntoFile();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
   
 case 3:  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// method to get user inputs for displaying the club details  
 displayStatistics*();  
  
 *// saving the data into the file  
 premierLeagueManager*.saveDataIntoFile();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 4:  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// gets the season entered by the user which is validated* String seasonPlayed = *validatingSeason*();  
  
 *// method to display the CLI premier League table  
 premierLeagueManager*.displayLeagueTable(seasonPlayed);  
  
 *// saving the data into the file  
 premierLeagueManager*.saveDataIntoFile();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 5:  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// method to get user inputs to add match played  
 addPlayedMatch*();  
  
 *// saving the data into the file  
 premierLeagueManager*.saveDataIntoFile();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 6:  
 *// Displaying the Angular GUI* result = *premierLeagueManager*.displayGUI();  
 System.*out*.println(result);  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 7:  
 *// method to save the data  
  
 // loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// save the data into the file and get the return output value* result = *premierLeagueManager*.saveDataIntoFile();  
 System.*out*.println(result);  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 8:  
 *// method to clear the data from the txt file  
  
 // clearing the data from the file* result = *premierLeagueManager*.clearDataFile();  
 System.*out*.println(result + "\n");  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// calling the displayMenu() method  
 displayMenu*();  
 break;  
  
 case 9:  
 *// exiting section* Scanner input = new Scanner(System.*in*);  
 System.*out*.println(" Sure that you want to exist? ");  
 System.*out*.print(" Enter 'y' to confirm or enter any other key to display menu: ");  
 String confirmation = input.nextLine();  
  
 if(confirmation.equalsIgnoreCase("y")){  
 *// note that the data is always saved once exit  
 // NOTE that the data is saved from the backend when generated the match and for CLI its always  
 // saved after any execution so this message is just for a user satisfaction* System.*out*.println(" Saving data . . .");  
 System.*out*.println(" Exiting program . . ."); *// quitting the program* System.*exit*(200);  
  
 }  
 *// else we continue to display the menu  
 displayMenu*();  
 break;  
  
 default:  
 *// Re looping when the user has entered an invalid option* System.*out*.println(" You have entered an invalid option!");  
 System.*out*.println(" Please check the menu properly and re-enter!");  
  
 *// displaying the menu  
 displayMenu*();  
  
 }  
 }  
  
  
 public static void addPlayedMatch() {  
 */\* ADD A PLAYED MATCH WITH IT'S SCORE AND UPDATE THE STATISTICS AND LIST OF MATCHES FOR THE RESPECTIVE CLUBS  
 PLAYED \*/  
  
 // we have to check if there is at least 2 clubs or more present to add a match else we can't add a match* if(PremierLeagueManager.*getPremierLeagueFootballClubList*().size() > 1){  
  
 *// If there is more than 1 club then only we proceed* Scanner input = new Scanner(System.*in*);  
 System.*out*.println("\n Enter details of the played match");  
  
 *// "checkingForValidClub()" checks if it is a valid club else throwing up and error and asking user  
 // to re-enter* String clubName\_01 = *checkingForValidClub*(" Enter club 1 name: ");  
  
 *// This code changes the user entered string into a format where the first character is uppercase and the  
 // rest are in lowercase eg:- 'jUventUs' ---> 'Juventus'* clubName\_01 = clubName\_01.substring(0, 1).toUpperCase() + clubName\_01.toLowerCase().substring(1);  
  
 *// validating the scores to make sure its an integer entered* int numberGoalScored\_club\_1 = *validatingIntegers*(" Enter the number of goal scored: ");  
  
 *// "checkingForValidClub()" checks if it is a valid club else throwing up and error and asking user  
 // to re-enter* String clubName\_02 = *checkingForValidClub*(" Enter club 2 name: ");  
 clubName\_02 = clubName\_02.substring(0, 1).toUpperCase() + clubName\_02.toLowerCase().substring(1);  
  
 *// Checking if the user has entered the same club name again for the next team name (Validation)* while(clubName\_01.equalsIgnoreCase(clubName\_02)){  
  
 System.*out*.println("\n There should be two different clubs to play a match and you have entered the same " +  
 "club twice!");  
 System.*out*.println(" Please enter a different club name! ");  
 clubName\_02 = *checkingForValidClub*(" Enter club 2 name: ");  
 clubName\_02 = clubName\_02.substring(0, 1).toUpperCase() + clubName\_02.toLowerCase().substring(1);  
  
 }  
  
 *// validating the scores to make sure its an integer entered* int numberGoalScored\_club\_2 = *validatingIntegers*(" Enter the number of goal scored: ");  
  
 *// getting the date of the match played as the input from the user and validating if its an integer or not* int day = *validatingIntegers*(" Enter the day (only integers are accepted): ");  
  
 *// validating the day entered which has to be in between 1 and 31* while(day<1 || day>31){  
  
 System.*out*.println(" Invalid day entered, day entered should be with in the range of (1 to 31)! \n");  
 day = *validatingIntegers*(" Enter the day (only integers are accepted): ");  
  
 }  
  
 *// getting the month of the match played as the input from the user and validating if its a integer or not* int month = *validatingIntegers*(" Enter the month (only integers are accepted): ");  
  
 *// validating the month entered which has to be in between 1 and 12* while(month<1 || month>12){  
  
 System.*out*.println(" Invalid month entered, month entered should be with in the range of (1 to 12)! \n");  
 month = *validatingIntegers*(" Enter the month (only integers are accepted): ");  
  
 }  
  
 *// getting the year of the match played as the input from the user and validating if its a integer or not* int year = *validatingIntegers*(" Enter the year (only integers are accepted): ");  
  
 *// validating the year entered* while(year<1000 || year>3000){  
  
 *// Assuming that the minimum year is 1000 and maximum year is 3000* System.*out*.println(" Invalid year entered, year entered should be with in the range of (1000 to 3000)! \n");  
 year = *validatingIntegers*(" Enter the year (only integers are accepted): ");  
  
 }  
  
 *// creating the date object for the match played* DateMatch date = new DateMatch(day, month, year);  
  
 *// we are displaying the season options possible for the match played for the given date* String[] possibleSeason = new String[2];  
 System.*out*.println(" These are the possible seasons for the match played from the given date");  
  
 *// we are taking the last of the year to decide the possible seasons where the match would have played* int lastTwoDigitsOfTheYear = Integer.*parseInt*(String.*valueOf*(year).substring(2));  
  
 *// this array contains the 2 possible seasons for the year played entered by the user* possibleSeason[0] = (year-1) + "-" + (lastTwoDigitsOfTheYear);  
 possibleSeason[1] = (year) + "-" + (lastTwoDigitsOfTheYear+1);  
  
 *// Displaying the season options for the entered year of the match* for (int index = 0; index < possibleSeason.length; index++) {  
  
 System.*out*.println(" " + (index+1) + ". " + possibleSeason[index]);  
  
 }  
  
 *// getting the season user input an validating it to check if an integer is entered* int seasonOption = *validatingIntegers*(" Please select a season from the given list (Enter '1' or '2') : ");  
  
 *// This is to validate if the user has entered a correct season option, (only enter 1 or 2 else we ask user  
 // to re-enter)* boolean invalidOption = true;  
 while (invalidOption){  
  
 if(seasonOption!=1 && seasonOption!=2){  
 System.*out*.println("\n Invalid Input, please only enter either '1' or '2' as the season option!");  
 seasonOption = *validatingIntegers*(" Please select a season from the given list (Enter '1' or '2') : ");  
  
 }else{  
 invalidOption=false;  
  
 }  
  
 }  
  
 *// we gets the selected season from the user, from the 2 option we proposed to the user* String seasonPlayed = possibleSeason[seasonOption-1];  
  
 *// validating and asking the user to enter the type of match played, ("Home" or "Away")* boolean validMatchEntered;  
 String matchType;  
  
 do{  
 *// This block of code loops and validates the user input to be either 'home' or 'away'* System.*out*.print(" Enter the type of match played (Home or Away): ");  
 matchType = input.nextLine();  
 matchType = matchType.substring(0, 1).toUpperCase() + matchType.toLowerCase().substring(1);  
 validMatchEntered = matchType.equalsIgnoreCase("home") ||  
 matchType.equalsIgnoreCase("away");  
  
 if(!validMatchEntered){  
  
 System.*out*.println("\n Invalid match input, please only enter either 'HOME' or 'AWAY' as" +  
 " the match type!");  
  
 }  
  
 }while (!validMatchEntered);  
  
 *// asking the user for confirmation to continue adding the details entered for adding match* System.*out*.print(" Are you sure that the details entered are correct, if you need to re-enter," +  
 " enter 'Y' or 'y'" + " else enter any key to continue: ");  
 input = new Scanner(System.*in*);  
  
 *// gets the user input* String confirmation = input.nextLine();  
  
 *// This is to confirm if the user has entered correct details else the user is able to re enter from beginning* if (confirmation.equalsIgnoreCase("y")) {  
  
 *// since the user entered 'y' we re call the addPlayedMatch method to get the user input* System.*out*.println(" Please re-enter the details ");  
 *addPlayedMatch*();  
  
 }else{  
  
 *// else we send all the details we got from the user to the addPlayedMatch method in the  
 // premierLeagueManager class* String result = *premierLeagueManager*.addPlayedMatch(seasonPlayed, clubName\_01, clubName\_02,  
 numberGoalScored\_club\_1, numberGoalScored\_club\_2, date, matchType);  
  
 *// Display the result* System.*out*.println(result);  
  
 }  
 }else{  
  
 *// We display a message to the user if there arent at least 2 clubs present* System.*out*.println(" Sorry there should be at least 2 clubs present to play a match!");  
  
 }  
 }  
  
 public static String checkingForValidClub(String message) {  
 *// CHECKING FOR VALID CLUB ENTERED BY THE USER WHEN ADDING MATCH  
  
 // getting the club name from the user input* Scanner input = new Scanner(System.*in*);  
 System.*out*.print(message);  
 String clubName = input.nextLine();  
  
 *// validation to check if the entered club name is valid* boolean invalidClubName = true;  
 while (invalidClubName){  
  
 *// going through the current club list to check if the entered club name is valid or not* for (FootballClub footballClub: PremierLeagueManager.*getPremierLeagueFootballClubList*()) {  
  
 if (footballClub.getName().equalsIgnoreCase(clubName)) {  
 invalidClubName = false;  
 break;  
 }  
 }  
  
 *// if the club name is in valid then we ask the user to re-enter the club name* if(invalidClubName){  
  
 System.*out*.println(" There is no team with the name '" + clubName + "', please enter another name\n");  
 System.*out*.print(message);  
 clubName = input.nextLine();  
 }  
 }  
 return clubName;  
 }  
  
 *// VALIDATING THE SEASON ENTERED BY THE USER, IT HAS TO BE IN THE FORMAT 20XX-XX ONLY* public static String validatingSeason() {  
  
 *// This block of code is used to validate the season entered by the user, making sure that it's in the correct  
 // format* String seasonPlayed = "";  
 Scanner input = new Scanner(System.*in*);  
 boolean validatingSeason;  
  
 do{  
  
 validatingSeason = false;  
 System.*out*.print(" Season played (eg:- '2018-19')\n Enter the season of the match played: ");  
 seasonPlayed = input.nextLine();  
  
 if(seasonPlayed.matches("\\d{4}-\\d{2}"))  
 validatingSeason = true;  
 else  
 System.*out*.println("\n Given input is not in proper format, use this format please (0000-00)" +  
 " with integers only! ");  
  
 }while (!validatingSeason);  
  
 return seasonPlayed;  
 }  
  
 *// THIS DEALS WITH DISPLAYING THE STATISTICS OF THE FOOTBALL CLUB* public static void displayStatistics() {  
  
 *// Gets the club name from the user to display the statistics* Scanner input = new Scanner(System.*in*);  
 System.*out*.print(" Enter the club name of which you need to display the statistics: ");  
 String clubName = input.nextLine();  
  
 *// sends the club name as parameter to the displayStats method in the premierLeagueManager class* String result = *premierLeagueManager*.displayStats(clubName);  
  
 *// DISPLAYING THE RESULT IF THERE WAS NO CLUB WITH THE GIVEN NAME* if(!result.equals(" Result Displayed")) {  
 System.*out*.println(result);  
  
 }  
 }  
  
 *// THIS DEALS WITH DELETING THE FOOTBALL CLUB FROM THE LIST* public static void deleteCLub() {  
  
 *// DELETING A CLUB (BY ITS NAME) FROM THE LIST OF CLUBS IN THE PREMIER LEAGUE  
 // Gets the club name from the user to delete the club* Scanner input = new Scanner(System.*in*);  
 System.*out*.print(" Enter the name of the club you wish to remove from the premier league: ");  
 String clubName = input.nextLine();  
  
 String confirmation = "";  
 boolean isValidClubName = false;  
  
 *// DISPLAY RESULT OF THE ITEM TO BE REMOVED* for (int index = 0; index < PremierLeagueManager.*getPremierLeagueFootballClubList*().size(); index++) {  
  
 *// searching for the club name from the list of club names for deletion* if(PremierLeagueManager.*getPremierLeagueFootballClubList*().get(index).getName().equalsIgnoreCase(clubName)){  
 *// if the club name is present then we proceed with the deletion process  
  
 // displaying the details of the club which is to be deleted!* System.*out*.println("\n These are some details of the club you wanted to be deleted \n");  
 System.*out*.println(PremierLeagueManager.*getPremierLeagueFootballClubList*().get(index));  
 isValidClubName = true;  
  
 *// ASK FOR CONFIRMATION, if the user needs to delete for sure or not!* System.*out*.print(" Enter 'y' or 'Y' to confirm the deletion or enter any other key to skip the deletion: ");  
 confirmation = input.nextLine();  
 }  
  
 }  
  
 *// if the club name entered by the user is valid only the next step for deletion is carried on* if(isValidClubName){  
  
 *// ask for the confirmation from the user if he needs to delete the club or not* if(confirmation.equalsIgnoreCase("y")){  
  
 *// GETTING THE REMOVED CLUB RESULT (MAY BE NULL OR THE CLUB REMOVED),  
 // The Null won't be returned but it's for double validation* FootballClub removedClub = (FootballClub) *premierLeagueManager*.deleteClub(clubName);  
  
 *// THIS GIVES THE OUTPUT TO THE USER INDICATING IF THE ITEM WAS SUCCESSFULLY REMOVED OR NOT* if(removedClub != null){  
 System.*out*.println("\n The club with the name '" + clubName + "' is successfully removed!\n");  
 System.*out*.println(" Here are some details related to the deleted club ");  
 System.*out*.println(removedClub);  
  
 }else{  
 *// else message* System.*out*.println("\n Sorry, there is no club with the given name '" + clubName + "'");  
  
 }  
  
 }else{  
 *// else message* System.*out*.println(" Successfully cancelled the deletion request for club '" + clubName + "'");  
  
 }  
 }else{  
 *// else message* System.*out*.println("\n Sorry, there is no club with the given name '" + clubName + "'");  
  
 }  
 }  
  
 *// THIS DEALS WITH CREATING THE FOOTBALL CLUB FOR THE LIST* public static void creatingClub() {  
 Scanner insert = new Scanner(System.*in*);  
  
 *// Asking user the type of football club* System.*out*.println(" Select the type of Football club: ");  
 System.*out*.println(" ---------------------------------------- ");  
 System.*out*.println("| (Option 1) Normal Football club |");  
 System.*out*.println("| (Option 2) University Football club |");  
 System.*out*.println("| (Option 3) School Football club |");  
 System.*out*.println(" ---------------------------------------- ");  
  
 int userSelectOption;  
 boolean notInRange = false;  
  
 *// getting user input with validation places to check if correct option is entered and if its a number as well* do{  
  
 *// This block of code validates the user to enter number from 1 to 3 as the options* if(notInRange) System.*out*.println(" \n The entered option is not valid!\n " +  
 "Available options are (1, 2, 3)\n");  
 System.*out*.print(" Enter your option number (integers only accepted): ");  
 while(!insert.hasNextInt()){  
 String input = insert.next();  
 System.*out*.println("\n '" + input + "' is an Invalid Integer, please enter only Integers!");  
 System.*out*.print(" Enter your option number (integers only accepted): ");  
 }  
 userSelectOption = insert.nextInt();  
 notInRange = true;  
  
 }while (userSelectOption < 1 || userSelectOption > 3);  
  
 insert = new Scanner(System.*in*);  
  
 System.*out*.println("\n NOTE: ALL THE CLUB NAMES HAS TO BE UNIQUE" +  
 "\n PLEASE ENTER A CLUB NAME WHICH IS NOT FROM THE GIVEN LIST BELOW !");  
  
 *// Displaying the list of club names which are currently available so that the user can enter a club name  
 // which is unique and not in the list* if(PremierLeagueManager.*getPremierLeagueFootballClubList*().size()!=0){  
  
 System.*out*.println(" --------------------------------");  
 for (FootballClub footballClub: PremierLeagueManager.*getPremierLeagueFootballClubList*()) {  
 System.*out*.println(" \* " + footballClub.getName());  
  
 }  
 System.*out*.println(" --------------------------------");  
  
 }else{  
 System.*out*.println(" \* There are no club names created yet and you are the first one !\n");  
  
 }  
  
 *// When a new footballClub is created all the stats are set to 0  
 // We ask for club name, location, coach name from the user as the inputs* String clubName = *validateString*(" Enter the club name: ");  
  
 *// getting the club name from the user and converting the first character to uppercase and the rest to lowercase* clubName = clubName.substring(0, 1).toUpperCase() + clubName.toLowerCase().substring(1);  
  
 *// Validation for club name, if there is a club name already present then we ask the user to enter another  
 // unique club name* boolean invalidClubName = true;  
 while (invalidClubName){  
  
 if(PremierLeagueManager.*getPremierLeagueFootballClubList*().size()!=0){  
  
 for (FootballClub footballClub: PremierLeagueManager.*getPremierLeagueFootballClubList*()) {  
  
 *// loops to check if there is a club name already present with the given club name from the user* if(footballClub.getName().equalsIgnoreCase(clubName)){  
 invalidClubName = true;  
 break;  
  
 }else{  
 invalidClubName = false;  
  
 }  
 }  
 }else{  
 invalidClubName = false;  
  
 }  
  
 *// if there is a club name already present we run the following block of code* if(invalidClubName){  
  
 System.*out*.println(" There is already a team with the name '" + clubName + "', please enter another name\n");  
 clubName = *validateString*(" Enter the club name: ");  
 clubName = clubName.substring(0, 1).toUpperCase() + clubName.toLowerCase().substring(1);  
  
 }  
  
 }  
  
 *// location can have numbers also so no need validation even it can have symbols such as '/'* System.*out*.print(" Enter the location: ");  
 String location = insert.nextLine();  
  
 *// validating the coach Name* String coachName = *validateString*(" Enter the coach name: ");  
 coachName = coachName.substring(0, 1).toUpperCase() + coachName.toLowerCase().substring(1);  
  
 *// this switch case is to create the appropriate club with the user selected option  
 // club may be a normal premier league football club, school or university football club* String result;  
 switch (userSelectOption){  
 case 1:  
 *// creating an instance of the new footballClub and adding it into the premierClub list* result = *premierLeagueManager*.createClub(clubName, location, coachName, null,  
 "normal");  
 break;  
  
 case 2:  
 *// getting the university name* String universityName = *validateString*(" Enter the university name: ");  
  
 *// creating an instance of the new universityFootballClub and adding it into the premierClub list* result = *premierLeagueManager*.createClub(clubName, location,  
 coachName, universityName,"university");  
 break;  
  
 case 3:  
 *// getting the school name* String schoolName = *validateString*(" Enter the school name: ");  
  
 *// creating an instance of the new schoolFootballClub and adding it into the premierClub list* result = *premierLeagueManager*.createClub(clubName, location, coachName,schoolName,"school");  
 break;  
  
 default:  
 throw new IllegalStateException("Unexpected value: " + userSelectOption);  
  
 }  
  
 *// display the result* System.*out*.println(result);  
 }  
  
  
 *// validate strings that should only have alphabets and return the result* public static String validateString(String message) {  
 Scanner input = new Scanner(System.*in*);  
 boolean validStringEntered;  
 String userInput;  
  
 do{  
 validStringEntered = false;  
 System.*out*.print(message);  
  
 *// getting the user input* userInput = input.nextLine();  
  
 *// validating if entered string is a valid alphabet or not* if((userInput != null) && userInput.matches("^[a-z A-Z]\*$") && (!userInput.equals("")))  
 validStringEntered = true;  
 else  
  
 *// displaying messgae* System.*out*.println("\n Given input is not in proper format, only include alphabets please! ");  
  
 }while (!validStringEntered);  
  
 return userInput;  
 }  
  
 *// validates the Integers* public static int validatingIntegers(String message) {  
 Scanner input = new Scanner(System.*in*);  
 System.*out*.print(message);  
 while (!input.hasNextInt()) {  
  
 *// we get the user input and check if the user has entered a valid integer or not and then validate asking  
 // integer input again until condition satisfied* System.*out*.println("\n Invalid input, please enter a valid integer!");  
 System.*out*.print(message);  
 input.next();  
  
 }  
 return input.nextInt();  
 }  
}

**entities package**

***ClubStats.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class ClubStats implements Serializable, Cloneable {  
  
 *// These are the variables used* private int totalMatchesPlayed;  
 private int totalWins;  
 private int totalDraws;  
 private int totalDefeats;  
 private int totalPointsScored;  
  
 *// Default constructor* public ClubStats() {  
  
 }  
  
 *// Parameter constructor* public ClubStats(int totalMatchesPlayed, int totalWins, int totalDraws, int totalDefeats,  
 int totalPointsScored) {  
  
 this.totalMatchesPlayed = totalMatchesPlayed;  
 this.totalWins = totalWins;  
 this.totalDraws = totalDraws;  
 this.totalDefeats = totalDefeats;  
 this.totalPointsScored = totalPointsScored;  
  
 }  
  
 *// Getter and Setters for Encapsulation* public int getTotalMatchesPlayed() {  
 return totalMatchesPlayed;  
 }  
  
 public void setTotalMatchesPlayed(int totalMatchesPlayed) {  
 this.totalMatchesPlayed = totalMatchesPlayed;  
 }  
  
 public int getTotalWins() {  
 return totalWins;  
 }  
  
 public void setTotalWins(int totalWins) {  
 this.totalWins = totalWins;  
 }  
  
 public int getTotalDraws() {  
 return totalDraws;  
 }  
  
 public void setTotalDraws(int totalDraws) {  
 this.totalDraws = totalDraws;  
 }  
  
 public int getTotalDefeats() {  
 return totalDefeats;  
 }  
  
 public void setTotalDefeats(int totalDefeats) {  
 this.totalDefeats = totalDefeats;  
 }  
  
 public int getTotalPointsScored() {  
 return totalPointsScored;  
 }  
  
 public void setTotalPointsScored(int totalPointsScored) {  
 this.totalPointsScored = totalPointsScored;  
 }  
  
 *// Overriding the toString method to display the club statistics* @Override  
 public String toString() {  
 return "\n \* Total Matches Played = " + totalMatchesPlayed + "\n \* Total Number of Wins = " + totalWins +  
 "\n \* Total Number of Draws = " + totalDraws + "\n \* Total Number of Defeats = " + totalDefeats +  
 "\n \* Total Points Scored = " + totalPointsScored + "\n";  
 }  
  
 *// Overriding the clone method this is to clone the ClubStats when required (making another copy)* @Override  
 protected Object clone() throws CloneNotSupportedException {  
 return super.clone();  
 }  
  
}

***DateMatch.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class DateMatch implements Serializable {  
 *// this class is used to handle the date for the match played  
  
 // Variable used* private int day;  
 private int month;  
 private int year;  
  
 public DateMatch(){  
 *// default constructor* }  
  
 *// Parameter constructor* public DateMatch(int day, int month, int year) {  
  
 this.day = day;  
 this.month = month;  
 this.year = year;  
  
 }  
  
 *// Getters and Setters* public int getDay() {  
 return day;  
 }  
  
 public void setDay(int day) {  
 this.day = day;  
 }  
  
 public int getMonth() {  
 return month;  
 }  
  
 public void setMonth(int month) {  
 this.month = month;  
 }  
  
 public int getYear() {  
 return year;  
 }  
  
 public void setYear(int year) {  
 this.year = year;  
 }  
  
 *// The toString method to display the date details* @Override  
 public String toString() {  
 return "\n \* Day Played = " + day +  
 "\n \* Month Played = " + month +  
 "\n \* Year Played = " + year ;  
  
 }  
  
}

***FootballClub.java***

package entities;  
import java.util.ArrayList;  
import java.util.Random;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// Using the abstract class SportClub*public class FootballClub extends SportClub{  
  
 *// variables used* private String coachName;  
 private int totalGoalsReceived;  
 private int totalGoalsScored;  
 private int totalGoalsDifference;  
 private int totalYellowCards;  
 private int totalRedCards;  
 private ArrayList<Match> matchesPlayed;  
 private ArrayList<Player> playersList;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public FootballClub() {  
  
 }  
  
 *// Argument Constructor* public FootballClub(String name, String location, String coachName) {  
  
 super(name, location, new ClubStats());  
 this.coachName = coachName;  
 this.totalGoalsReceived = 0;  
 this.totalGoalsScored = 0;  
 this.totalGoalsDifference = 0;  
 this.totalYellowCards = 0;  
 this.totalRedCards = 0;  
 this.matchesPlayed = new ArrayList<>();  
 this.playersList = new ArrayList<>();  
  
 *// auto generating the players whenever you instantiate a club* autoGeneratePlayers();  
  
 }  
  
 *// this displays the details of the football club by overriding the toString method* @Override  
 public String toString() {  
 return super.toString() +  
 "\n \* Coach Name = '" + coachName + "'" +  
 "\n \* Total Goals Received = " + totalGoalsReceived +  
 "\n \* Total Goals Scored = " + totalGoalsScored +  
 "\n \* Total Goal Difference = " + totalGoalsDifference +  
 "\n \* Total Yellow Cards = " + totalYellowCards +  
 "\n \* Total Red Cards = " + totalRedCards + "\n\n";  
 }  
  
  
 *// These are the setters and getters for the private variables for encapsulation* public String getCoachName() {  
 return coachName;  
 }  
  
 public void setCoachName(String coachName) {  
 this.coachName = coachName;  
 }  
  
 public int getTotalGoalsReceived() {  
 return totalGoalsReceived;  
 }  
  
 public void setTotalGoalsReceived(int totalGoalsReceived) {  
 this.totalGoalsReceived = totalGoalsReceived;  
 }  
  
 public int getTotalGoalsScored() {  
 return totalGoalsScored;  
 }  
  
 public ArrayList<Player> getPlayersList() {  
 return playersList;  
 }  
  
 public void setPlayersList(ArrayList<Player> playersList) {  
 this.playersList = playersList;  
 }  
  
 public void setTotalGoalsScored(int totalGoalsScored) {  
 this.totalGoalsScored = totalGoalsScored;  
 }  
  
 public int getTotalGoalsDifference() {  
 return totalGoalsDifference;  
 }  
  
 public void setTotalGoalsDifference(int totalGoalsDifference) {  
 this.totalGoalsDifference = totalGoalsDifference;  
 }  
  
 public int getTotalYellowCards() {  
 return totalYellowCards;  
 }  
  
 public void setTotalYellowCards(int totalYellowCards) {  
 this.totalYellowCards = totalYellowCards;  
 }  
  
 public int getTotalRedCards() {  
 return totalRedCards;  
 }  
  
 public void setTotalRedCards(int totalRedCards) {  
 this.totalRedCards = totalRedCards;  
 }  
  
 public ArrayList<Match> getMatchesPlayed() {  
 return matchesPlayed;  
 }  
  
 public void setMatchesPlayed(ArrayList<Match> matchesPlayed) {  
 this.matchesPlayed = matchesPlayed;  
 }  
  
 *// This method returns an Arraylist with the main club statistics for the Premier League CLI table* public ArrayList<Integer> getMainStatistics(){  
  
 *// This is the content of the ArrayList in the order  
 // [matches played, wins, draws, defeats, goals scored, goals received, points, goal difference]  
 // 0 1 2 3 4 5 6 7* ArrayList<Integer> overallStatistics = new ArrayList<>();  
 overallStatistics.add(getClubStatistics().getTotalMatchesPlayed());  
 overallStatistics.add(getClubStatistics().getTotalWins());  
 overallStatistics.add(getClubStatistics().getTotalDraws());  
 overallStatistics.add(getClubStatistics().getTotalDefeats());  
 overallStatistics.add(totalGoalsScored);  
 overallStatistics.add(totalGoalsReceived);  
 overallStatistics.add(getClubStatistics().getTotalPointsScored());  
 overallStatistics.add(totalGoalsDifference);  
  
 return overallStatistics;  
 }  
  
 *// cloning the matches and club with its club statistics  
 // when needed to create copies of the match objects for season based filtering* @Override  
 public Object clone() throws CloneNotSupportedException {  
 FootballClub cloned = (FootballClub) super.clone();  
 cloned.setMatchesPlayed(FootballClub.cloneMatchList(this.matchesPlayed));  
 cloned.setClubStatistics(FootballClub.cloneClubStatistics(this.clubStatistics));  
 return cloned;  
 }  
  
 *// returns the list of cloned matches for cloning purpose* public static ArrayList<Match> cloneMatchList(ArrayList<Match> list) {  
 ArrayList<Match> cloneMatches = new ArrayList<>(list.size());  
 for (Match match: list) {  
 try {  
 cloneMatches.add((Match) match.clone());  
 } catch (CloneNotSupportedException e) {  
 e.printStackTrace();  
 }  
 }  
 return cloneMatches;  
 }  
  
 *// returns a cloned copy of the club statistics* public static ClubStats cloneClubStatistics(ClubStats clubStatistics) {  
 ClubStats cloneClubStats = new ClubStats();  
  
 try {  
 cloneClubStats = (ClubStats) clubStatistics.clone();  
 } catch (CloneNotSupportedException e) {  
 e.printStackTrace();  
 }  
  
 return cloneClubStats;  
 }  
  
 *// This method is used to generate players for each club, with 11 players each club* public void autoGeneratePlayers(){  
  
 *// these are the list of player names* String[] playerNames = {  
 "Lionel Messi",  
 "Diego Maradona",  
 "Pele",  
 "Cristiano Ronaldo",  
 "Johan Cruyff",  
 "Alfredo Di Stefano",  
 "Franz Beckenbauer",  
 "Zinedine Zidane",  
 "Ferenc Puskas",  
 "Mane Garrincha",  
 "Ronaldo Nazario"  
 };  
  
 *// some simple stats of the play which is randomly chosen* String[] foot = {"Left", "Right"};  
  
 *// adding 11 players to the list* for (int index = 0; index < 11; index++) {  
 Random random = new Random();  
  
 *// we create a player and add some random statistics to the player* Player player = new Player(playerNames[index],  
 foot[random.nextInt(2)],  
 Math.round(random.nextDouble()\*1000)/10.0,  
 random.nextInt(10)+1,  
 random.nextInt(50)+1);  
  
 *// once a player is created we then add it to the playerList* playersList.add(player);  
 }  
 }  
}

***LeagueManager Interface***

package entities;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public interface LeagueManager {  
  
 *// abstract method for creating a club* String createClub(String clubName, String location, String coachName, String universitySchoolName,String clubType);  
  
 *// abstract method for deleting a club* SportClub deleteClub(String clubName);  
  
 *// abstract method for displaying the statistics* String displayStats(String clubName);  
  
 *// abstract method for displaying the league table results* void displayLeagueTable(String season);  
  
 *// abstract method for adding a played match* String addPlayedMatch(String seasonPlayed, String clubName\_01, String clubName\_02,int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch dateOfMatch, String matchType);  
  
 *// abstract method for displaying the GUI* String displayGUI();  
  
 *// abstract method for saving the data into a file* String saveDataIntoFile();  
  
 *// abstract method for clearing the data stored in the file* String clearDataFile();}

***Match.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class Match implements Serializable, Cloneable {  
  
 *// variables used* private int goalScored;  
 private int goalReceived;  
 private String season;  
 private MatchStats matchStats;  
 private DateMatch date;  
 private String opponentClubName;  
 private String matchType;  
 private String participatedCLubName;  
  
 *// default constructor* public Match(){  
  
 }  
  
 *// Argument Constructor* public Match(int goalScored, int goalReceived, MatchStats matchStats, DateMatch date,  
 String opponentClubName,String season, String matchType, String participatedCLubName) {  
  
 this.goalScored = goalScored;  
 this.goalReceived = goalReceived;  
 this.date = date;  
 this.opponentClubName = opponentClubName;  
 this.matchStats = matchStats;  
 this.season = season;  
 this.matchType = matchType;  
 this.participatedCLubName = participatedCLubName;  
  
 }  
  
 *// overriding the toString method in order to display the details of the match* @Override  
 public String toString() {  
 return "\n Goal Scored = " + goalScored +  
 "\n Goal Received = " + goalReceived +  
 "\n Season = " + season +  
 "\n Date = " + date +  
 "\n Opponent Club Name = " + opponentClubName +  
 matchStats.toString();  
 }  
  
 *// SETTERS AND GETTERS FOR THE CLASS  
 // gets the date* public DateMatch getDate() {  
 return date;  
 }  
  
 *// sets the date* public void setDate(DateMatch date) {  
 this.date = date;  
 }  
  
 *// getting the opponent club name* public String getOpponentClubName() {  
 return opponentClubName;  
 }  
  
 *// setting the opponent club name* public void setOpponentClubName(String opponentClubName) {  
 this.opponentClubName = opponentClubName;  
 }  
  
 *// get the season* public String getSeason() {  
 return season;  
 }  
  
 *// set the season* public void setSeason(String season) {  
 this.season = season;  
 }  
  
 public MatchStats getMatchStats() {  
 return matchStats;  
 }  
  
 public void setMatchStats(MatchStats matchStats) {  
 this.matchStats = matchStats;  
 }  
  
 public int getGoalScored() {  
 return goalScored;  
 }  
  
 public void setGoalScored(int goalScored) {  
 this.goalScored = goalScored;  
 }  
  
 public int getGoalReceived() {  
 return goalReceived;  
 }  
  
 public void setGoalReceived(int goalReceived) {  
 this.goalReceived = goalReceived;  
 }  
  
 public String getMatchType() {  
 return matchType;  
 }  
  
 public void setMatchType(String matchType) {  
 this.matchType = matchType;  
 }  
  
 public String getParticipatedCLubName() {  
 return participatedCLubName;  
 }  
  
 public void setParticipatedCLubName(String participatedCLubName) {  
 this.participatedCLubName = participatedCLubName;  
 }  
  
 *// overriding the clone method, in order to enable cloning of the match when needed to* @Override  
 protected Object clone() throws CloneNotSupportedException {  
 return super.clone();  
 }  
}

***MatchStats.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class MatchStats implements Serializable  
{  
 *// These are the variables* private int yellowCards;  
 private int redCards;  
 private int shots;  
 private int shotsOfTarget;  
 private int offSides;  
 private int fouls;  
 private int corners;  
 private int passes;  
 private double passAccuracy;  
 private double possession;  
  
 *// Default constructor* public MatchStats() {  
  
 }  
  
 *// Args constructor* public MatchStats(int yellowCards, int redCards, int shots, int shotsOfTarget, int offSides, int fouls,  
 int corners, int passes, double passAccuracy, double possession) {  
  
 this.yellowCards = yellowCards;  
 this.redCards = redCards;  
 this.shots = shots;  
 this.shotsOfTarget = shotsOfTarget;  
 this.offSides = offSides;  
 this.fouls = fouls;  
 this.corners = corners;  
 this.passes = passes;  
 this.passAccuracy = passAccuracy;  
 this.possession = possession;  
  
 }  
  
 *// overriding the toString() to display the details of the statistics of the match* @Override  
 public String toString() {  
 return  
 "\n Number of yellow cards = " + yellowCards +  
 "\n Number of red cards = " + redCards +  
 "\n Number of shots = " + shots +  
 "\n Number of target shots = " + shotsOfTarget +  
 "\n Number of offsides = " + offSides +  
 "\n Number of fouls = " + fouls +  
 "\n Number of corner kicks = " + corners +  
 "\n Number of passes = " + passes +  
 "\n Pass Accuracy = " + passAccuracy + "%" +  
 "\n Possession = " + possession + "%";  
 }  
  
 *// SETTERS AND GETTERS* public int getYellowCards() {  
 return yellowCards;  
 }  
  
 public void setYellowCards(int yellowCards) {  
 this.yellowCards = yellowCards;  
 }  
  
 public int getRedCards() {  
 return redCards;  
 }  
  
 public void setRedCards(int redCards) {  
 this.redCards = redCards;  
 }  
  
 public int getShots() {  
 return shots;  
 }  
  
 public void setShots(int shots) {  
 this.shots = shots;  
 }  
  
 public int getShotsOfTarget() {  
 return shotsOfTarget;  
 }  
  
 public void setShotsOfTarget(int shotsOfTarget) {  
 this.shotsOfTarget = shotsOfTarget;  
 }  
  
 public int getOffSides() {  
 return offSides;  
 }  
  
 public void setOffSides(int offSides) {  
 this.offSides = offSides;  
 }  
  
 public int getFouls() {  
 return fouls;  
 }  
  
 public void setFouls(int fouls) {  
 this.fouls = fouls;  
 }  
  
 public int getCorners() {  
 return corners;  
 }  
  
 public void setCorners(int corners) {  
 this.corners = corners;  
 }  
  
 public int getPasses() {  
 return passes;  
 }  
  
 public void setPasses(int passes) {  
 this.passes = passes;  
 }  
  
 public double getPassAccuracy() {  
 return passAccuracy;  
 }  
  
 public void setPassAccuracy(double passAccuracy) {  
 this.passAccuracy = passAccuracy;  
 }  
  
 public double getPossession() {  
 return possession;  
 }  
  
 public void setPossession(double possession) {  
 this.possession = possession;  
 }  
  
}

***Player.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class Player implements Serializable  
{  
 *// variables used for the Players* private String name;  
 private String preferredFoot;  
 private double shootingAccuracy;  
 private int goalScoredPerMatch;  
 private int passesPerMatch;  
  
 *// The Default Constructor* public Player() {  
  
 }  
  
 *// Argument Constructor* public Player(String name, String preferredFoot, double shootingAccuracy,  
 int goalScoredPerMatch, int passesPerMatch) {  
  
 this.name = name;  
 this.preferredFoot = preferredFoot;  
 this.shootingAccuracy = shootingAccuracy;  
 this.goalScoredPerMatch = goalScoredPerMatch;  
 this.passesPerMatch = passesPerMatch;  
  
 }  
  
 *// GETTERS and SETTERS used* public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
 public String getPreferredFoot() {  
 return preferredFoot;  
 }  
  
 public void setPreferredFoot(String preferredFoot) {  
 this.preferredFoot = preferredFoot;  
 }  
  
 public double getShootingAccuracy() {  
 return shootingAccuracy;  
 }  
  
 public void setShootingAccuracy(double shootingAccuracy) {  
 this.shootingAccuracy = shootingAccuracy;  
 }  
  
 public int getGoalScoredPerMatch() {  
 return goalScoredPerMatch;  
 }  
  
 public void setGoalScoredPerMatch(int goalScoredPerMatch) {  
 this.goalScoredPerMatch = goalScoredPerMatch;  
 }  
  
 public int getPassesPerMatch() {  
 return passesPerMatch;  
 }  
  
 public void setPassesPerMatch(int passesPerMatch) {  
 this.passesPerMatch = passesPerMatch;  
 }  
  
 *// overriding the toString() method to display the details of the players* @Override  
 public String toString() {  
 return " ==> \* Name = '" + name + '\'' +  
 "\n ==> \* Preferred Foot = '" + preferredFoot + '\'' +  
 "\n ==> \* Shooting Accuracy = " + shootingAccuracy + " %" +  
 "\n ==> \* Rate Of Goals Scored per Match = " + goalScoredPerMatch +  
 "\n ==> \* Rate of Passes per Match = " + passesPerMatch + "\n";  
 }  
}

***SchoolFootballClub.java***

package entities;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// Inheritance with the FootballClub*public class SchoolFootballClub extends FootballClub {  
  
 *// These are the private variables for Encapsulation* private String schoolName;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public SchoolFootballClub() {  
  
 }  
  
 *// Argument Constructor* public SchoolFootballClub(String name, String location, String coachName, String schoolName) {  
  
 super(name, location, coachName);  
 this.schoolName = schoolName;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getSchoolName() {  
 return schoolName;  
 }  
  
 public void setSchoolName(String schoolName) {  
 this.schoolName = schoolName;  
 }  
  
 *// overriding the toString() method to display the details of the school* @Override  
 public String toString() {  
 return super.toString() + " \* School Name = '" + schoolName + "' ";  
 }  
  
}

***SportClub.java***

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
  
// public abstract class SportClub, abstract because you can't make an object from the SportsClub class*public abstract class SportClub implements Serializable, Cloneable{  
  
 *// Variables used* private String name;  
 private String location;  
 protected ClubStats clubStatistics;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public SportClub(){  
  
 }  
  
 *// Argument Constructor* public SportClub(String name, String location, ClubStats clubStatistics) {  
  
 this.name = name;  
 this.location = location;  
 this.clubStatistics = clubStatistics;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
 public String getLocation() {  
 return location;  
 }  
  
 public void setLocation(String location) {  
 this.location = location;  
 }  
  
 public ClubStats getClubStatistics() {  
 return clubStatistics;  
 }  
  
 public void setClubStatistics(ClubStats clubStatistics) {  
 this.clubStatistics = clubStatistics;  
 }  
  
 *// overriding the toString() method to display the details of the club* @Override  
 public String toString() {  
 return " \* Club Name = '" + name + "'\n \* Club Location = '" + location + "'" + clubStatistics.toString();  
 }  
  
}

***UniversityFootballClub***

package entities;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// Inheritance with the FootballClub*public class UniversityFootballClub extends FootballClub {  
  
 *// These are the private variables for Encapsulation* private String universityName;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public UniversityFootballClub() {  
  
 }  
  
 *// Argument Constructor* public UniversityFootballClub(String name, String location, String coachName, String universityName) {  
  
 super(name, location, coachName);  
 this.universityName = universityName;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getUniversityName() {  
 return universityName;  
 }  
  
 public void setUniversityName(String universityName) {  
 this.universityName = universityName;  
 }  
  
 *// overriding the toString() method to display the details of the university* @Override  
 public String toString() {  
 return super.toString() + " \* University Name = '" + universityName + "'";  
 }  
  
}

**services package**

PremierLeagueManager.java

package services;  
import entities.\*;  
import java.awt.\*;  
import java.io.\*;  
import java.net.URI;  
import java.net.URISyntaxException;  
import java.util.ArrayList;  
import java.util.Comparator;  
import java.util.Random;  
import java.util.stream.Collectors;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class PremierLeagueManager implements LeagueManager {  
 *// Following the Singleton design pattern, this is because we need to only create a single instance of the  
 // PremierLeagueManager class  
  
 // private variables used* private static ArrayList<FootballClub> *premierLeagueFootballClubList*;  
 private static boolean *matchedAdded*;  
 private static ArrayList<String> *allSeasonAdded*;  
 private static final int *MAXIMUM\_NUMBER\_OF\_CLUBS* = 20;  
 private static int *maximumNumberOfMatchesPerClub*;  
  
 *// We are using the Singleton design pattern because we only need one instance of PremierLeagueManager and not many  
 // used for the singleton design pattern, this is set to "null" for lazy initialization, so we only created the  
 // instance when required only," ---> non lazy way LeagueManager manager = new PremierLeagueManager(); "* private static LeagueManager *manager* = null;  
  
 *// Constructor* private PremierLeagueManager(){  
  
 *// initializing the variables  
 matchedAdded* = false;  
 allSeasonAdded = new ArrayList<>();  
 premierLeagueFootballClubList= new ArrayList<>();  
 maximumNumberOfMatchesPerClub = 0;  
  
 *// load the previously saved data from the file* String result = loadingData();  
 System.out.println(result);  
  
 }  
  
  
 *// This method is used for the Singleton Design Pattern, inorder to get the single instance of the class* public static LeagueManager getInstance(){  
  
 *// Double checked locking (due to the double If condition)* if(manager==null){  
 *// This is to check if an instance of the manager has already been created or not (For the first time  
 // when the instance needed to be created), before adding the synchronized lock* synchronized (PremierLeagueManager.class){  
 *// makes sure Thread Safe, if 2 instance are to be created at the same time* if(manager==null){  
 *// This is for ensuring and checking if another created instance when created it checks with this  
 // null and only return the reference of the first instance than creating another one.* manager = new PremierLeagueManager();  
 }  
 }  
 }  
 return manager;  
 }  
  
 *// this method is for loading the data from the file* public static String loadingData() {  
  
 *// Serializing means converting a state into a byte stream  
  
 // text file path* File file = new File("../GUI/public/resources/dataStorage.txt");  
  
 *// used to read the byte stream data from a source which in this case is a txt file* FileInputStream fileInputStream = null;  
  
 *// used to read object data when its serialized* ObjectInputStream objectInputStream = null;  
  
 *// Cleaning the loading variables before use (this is mainly done for clearing the file problem)* premierLeagueFootballClubList = new ArrayList<>();  
 matchedAdded = false;  
 allSeasonAdded = new ArrayList<>();  
 maximumNumberOfMatchesPerClub = 0;  
  
 *// handling the exceptions and loading the data from the file* try {  
 *// At first we read the bytes of data from the file using the FileInputStream and then its filtered  
 // though the ObjectInputStream which converts these bytes into Java Objects  
  
 // creating an instance of FileInputStream and ObjectInputStream* fileInputStream = new FileInputStream(file);  
 objectInputStream = new ObjectInputStream(fileInputStream);  
  
 try {  
 *// reading from the file  
 // we typecast because when reading the object because it doesn't know what type is the object read  
 // from the file* premierLeagueFootballClubList = (ArrayList<FootballClub>) objectInputStream.readObject();  
 matchedAdded = (boolean) objectInputStream.readObject();  
 allSeasonAdded = (ArrayList<String>) objectInputStream.readObject();  
 maximumNumberOfMatchesPerClub = (int) objectInputStream.readObject();  
  
 } catch (ClassNotFoundException e) {  
 *// Handles exception* return " ClassNotFoundException occurred Not able to find the class";  
  
 }  
 }  
 catch (FileNotFoundException fileNotFoundException){  
 *// Handles exception* return" File not found exception occurred!";  
  
 }  
 catch (IOException ioException) {  
 *// Handles exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
 }  
 finally {  
  
 *// closing the file once all the data is loaded* try{  
  
 *// making sure that it is not null, to be closed* if (fileInputStream != null) {  
 fileInputStream.close();  
 }  
  
 *// making sure that it is not null, to be closed* if (objectInputStream != null) {  
 objectInputStream.close();  
 }  
  
 }  
 catch (IOException ioException) {  
  
 *// Handles exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
 }  
 }  
 *// returns a success message if everything goes well* return "\n Successfully loaded all the data\n";  
 }  
  
 *// Overriding the createClub method from the interface* @Override  
 public String createClub(String clubName, String location, String coachName, String universitySchoolName,  
 String clubType) {  
  
 *// variable used* FootballClub club = null;  
  
 *// this is to create the appropriate instance depending on the user input* switch (clubType) {  
  
 case "normal":  
 club = new FootballClub(clubName, location, coachName);  
 break;  
  
 case "university":  
 club = new UniversityFootballClub(clubName, location, coachName, universitySchoolName);  
 break;  
  
 case "school":  
 club = new SchoolFootballClub(clubName, location, coachName, universitySchoolName);  
 break;  
  
 }  
  
 *// Checking if the maximum number of clubs created limit has been reached to add the club or not* if(premierLeagueFootballClubList.size()<MAXIMUM\_NUMBER\_OF\_CLUBS)  
 {  
 *// adding the club if the maximum limit is not reached* premierLeagueFootballClubList.add(club);  
  
 *// updating the number of matches that can be played by a club* maximumNumberOfMatchesPerClub = (2 \* premierLeagueFootballClubList.size()) - 2;  
  
 *// returns a success message to the user* return " Clubs Successfully added!";  
 }  
  
 *// returning and error message to the user* return " Sorry there is no room for a new club, the maximum number of club limit has been reached!";  
  
 }  
  
 *// Overriding the deleteCLub method from the interface* @Override  
 public FootballClub deleteClub(String clubName) {  
  
 *// This loop searches for the club and deletes it from the list* for (int index = 0; index < premierLeagueFootballClubList.size(); index++) {  
  
 if(premierLeagueFootballClubList.get(index).getName().equalsIgnoreCase(clubName)){  
  
 *// we also update the number of matches played by the club  
 // If there are less than 2 clubs present then we set the maximum number of matches played to 0* if((premierLeagueFootballClubList.size()-1) < 2){  
 maximumNumberOfMatchesPerClub = 0;  
 }  
  
 *// if the club name is present it is removed* return premierLeagueFootballClubList.remove(index);  
  
 }  
 }  
 *// returns null if there is not club present with the given name* return null;  
  
 }  
  
 *// Overriding the displayGUI() method to display the GUI* @Override  
 public String displayGUI(){  
  
 *// used to open the external browser with the URL "http://localhost:4200" to open the GUI* Desktop desktop = Desktop.getDesktop();  
 try {  
 desktop.browse(new URI(("http://localhost:4200")));  
 return " Opening the GUI at localhost: 4200\n";  
  
 } catch (IOException | URISyntaxException ioException) {  
 *// Handling caught exception* return "Error when opening the browser! ";  
  
 }  
 }  
  
 *// Overriding the displayStats method from the interface* @Override  
 public String displayStats(String clubName) {  
  
 *// variable for checking if the club name is valid or not* boolean clubNameAvailable = false;  
  
 *// This loop searches for the club and displays it's statistics* for (FootballClub footballClub : premierLeagueFootballClubList) {  
 if (footballClub.getName().equalsIgnoreCase(clubName)) {  
  
 *// checks if the club name entered is present in the club list* clubNameAvailable = true;  
  
 System.out.println("\n ===============> S T A T I S T I C S <===============");  
 System.out.println("\n =============> PLAYERS - STATISTICS <=============\n");  
  
 *// loops and displays the player details* for (int index = 0; index < footballClub.getPlayersList().size(); index++) {  
 System.out.println(" <------------ Player " + ( index + 1 ) + " ---------------->\n");  
 System.out.println(footballClub.getPlayersList().get(index));  
  
 }  
  
 *// displays the total statistics together from all the seasons together* System.out.println("\n =============> FROM ALL SEASONS <=============\n");  
 System.out.println(footballClub.toString());  
  
 *// sorting the seasons in ascending* Comparator<String> comparator = (season1, season2) -> {  
  
 if(Integer.parseInt(season1.split("-")[0]) > Integer.parseInt(season2.split("-")[0])){  
 return 1;  
  
 }  
 return -1;  
 };  
  
 *// filters the seasons by getting the distinct seasons and sorting them using the comparator, this  
 // will be useful when displaying the GUI for the drop down menu* allSeasonAdded = (ArrayList<String>)allSeasonAdded.stream().distinct().collect(Collectors.toList());  
 allSeasonAdded.sort(comparator);  
  
 *// Display the total stats by the clubs played in season wise* for (String season : allSeasonAdded) {  
  
 System.out.println("\n =============> FOR SEASON (" + season + ") <=============\n");  
 ArrayList<FootballClub> seasonFilteredClubs = null;  
 try {  
 *// gets the list of football clubs with the filtered matches by season* seasonFilteredClubs = seasonFilteredFootballCLubList(season);  
  
 } catch (CloneNotSupportedException e) {  
 *// handles exception* e.printStackTrace();  
  
 }  
 if (seasonFilteredClubs != null) {  
  
 for (FootballClub club: seasonFilteredClubs){  
  
 if(club.getName().equalsIgnoreCase(clubName)) {  
 *// we search for the club with the name user have given and display the result* System.out.println(club);  
  
 }  
 }  
  
 }  
 }  
  
 *// variable* int number = 0;  
  
 *// looping through each played match and displaying their stats* if(footballClub.getMatchesPlayed().size()!=0){  
  
 *// displaying the statistics* System.out.println(" =============> FROM ALL SEASONS <=============\n");  
 System.out.println(" => Statistics of all the matches played by '"+ clubName + "' so far! <=");  
 for (Match match:footballClub.getMatchesPlayed()) {  
  
 String matchResult = "\n <===============> Match "+ (++number) +" <================>\n "  
 + "\* Opponent team name: '" + match.getOpponentClubName() + "'" + match.getDate()  
 + "\n \* Season: " + match.getSeason() + "\n\n \* Match Type: '" + match.getMatchType() + "'"  
 + "\n \* Number of Goals Scored: " + match.getGoalScored()  
 + "\n \* Number of Goals Received: " + match.getGoalReceived()  
 + "\n \* Number of Goal Difference: " + (match.getGoalScored() - match.getGoalReceived())  
 + "\n \* Number of Yellow Cards: " + match.getMatchStats().getYellowCards()  
 + "\n \* Number of Red Cards: " + match.getMatchStats().getRedCards()  
 + "\n \* Number of Shots: " + match.getMatchStats().getShots()  
 + "\n \* Number of Shots of target: " + match.getMatchStats().getShotsOfTarget()  
 + "\n\n \* Number of off sides: " + match.getMatchStats().getOffSides()  
 + "\n \* Number of fouls: " + match.getMatchStats().getFouls()  
 + "\n \* Number of corners: " + match.getMatchStats().getCorners()  
 + "\n \* Number of passes: " + match.getMatchStats().getPasses()  
 + "\n \* Pass Accuracy: " + match.getMatchStats().getPassAccuracy() + "%"  
 + "\n \* Possession: " + match.getMatchStats().getPossession() + "%"  
 + "\n\n ============================================= \n";  
  
 System.out.println(matchResult);  
  
 }  
 }  
 }  
 }  
  
 *// checking if the given club name is valid or not and return the appropriate message* if(!clubNameAvailable){  
 return "\n Sorry, there is no club with the given name '" + clubName + "'";  
  
 }  
 return " Result Displayed";  
  
 }  
  
  
 *// Overriding the displayLeagueTable method from the interface* @Override  
 public void displayLeagueTable(String seasonPlayed) {  
 *// This method is used to display the Premier League Table in the CLI  
  
 // we add all the football clubs with all the necessary matches related to the season and other removed.* ArrayList<FootballClub> seasonFilteredClubs = new ArrayList<>();  
  
 try {  
 *// Gets the filtered football clubs by season entered* seasonFilteredClubs = seasonFilteredFootballCLubList(seasonPlayed);  
  
 } catch (CloneNotSupportedException e) {  
 *// handles the exception* e.printStackTrace();  
 }  
  
 *// This mainly depends on the length of the club name the rest are normal and fixed* if (seasonFilteredClubs.size()!=0){  
  
 *// getting maximum length club name from the list.* int maxClubNameLength = seasonFilteredClubs.get(0).getName().length();  
  
 for (FootballClub footballClub : seasonFilteredClubs) {  
 *// we find the maximum length of the club names from the list of football clubs* if(footballClub.getName().length() > maxClubNameLength){  
 *// this is also used for the CLI table structure because when the club name changes in length  
 // the CLI table will also get spoilt so to prevent this we get the max length of the string  
 // and solve the issue* maxClubNameLength = footballClub.getName().length();  
 }  
 }  
  
 *// Implementing the comparator for sorting  
 /\*  
 \* Comparator is an interface in java which is  
 \* used to sort collections using two objects as its parameter  
 \* inputs.  
 \*/  
 // here we are using an anonymous class to create the comparator.  
 // Sorting the points and goals in descending order for the football clubs* Comparator<FootballClub> comparator = (club1, club2) -> {  
  
 if(club1.getClubStatistics().getTotalPointsScored() == (club2.getClubStatistics()  
 .getTotalPointsScored())){  
  
 if(club1.getTotalGoalsScored() < club2.getTotalGoalsScored()){  
 return 1;  
  
 }  
  
 }else{  
  
 if(club1.getClubStatistics().getTotalPointsScored() < club2.getClubStatistics()  
 .getTotalPointsScored()){  
 return 1;  
  
 }  
 }  
 return -1;  
  
 };  
  
 *// sorting the list with a new arrayList* seasonFilteredClubs.sort(comparator); *// sorting the clubs  
  
 // function for creating the structure of the table* structuredTable(maxClubNameLength, seasonFilteredClubs);  
  
 }else{  
 *// creating the empty table when there are no clubs present* structuredTable(0, seasonFilteredClubs);  
  
 }  
 }  
  
 *// This method returns a list of football clubs filtered by season with updated stats for that season only.* public static ArrayList<FootballClub> seasonFilteredFootballCLubList(String seasonPlayed)  
 throws CloneNotSupportedException {  
  
 *// creating a new Football arraylist to collect football clubs for a particular season* ArrayList<FootballClub> footballClubsListSeason = new ArrayList<>();  
  
 *// we add all the clubs, before adding the club remove the matches which aren't related* for (int index = 0; index < premierLeagueFootballClubList.size(); index++) {  
  
 *// here we are cloning the football club in every loop* footballClubsListSeason.add((FootballClub) premierLeagueFootballClubList.get(index).clone());  
  
 int matchIndexLoop = 0;  
  
 *// this loops runs for every single match in each of the football club* while ( matchIndexLoop < footballClubsListSeason.get(index).getMatchesPlayed().size() ){  
  
 *// checks if the match season is equal to the season entered by the user as well and then we proceed* if(!footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop).getSeason()  
 .equalsIgnoreCase(seasonPlayed)){  
  
 *// update the stats before removing the match* int goalScored = footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalScored();  
 int goalReceived = footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalReceived();  
  
 *// updating total goal difference* footballClubsListSeason.get(index).setTotalGoalsDifference(  
 footballClubsListSeason.get(index).getTotalGoalsDifference() - (goalScored - goalReceived)  
 );  
  
 *// updating total goal scored* footballClubsListSeason.get(index).setTotalGoalsScored(  
 footballClubsListSeason.get(index).getTotalGoalsScored() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalScored()  
 );  
  
 *// updating total goal received* footballClubsListSeason.get(index).setTotalGoalsReceived(  
 footballClubsListSeason.get(index).getTotalGoalsReceived() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalReceived()  
 );  
  
 *// updating total yellow cards* footballClubsListSeason.get(index).setTotalYellowCards(  
 footballClubsListSeason.get(index).getTotalYellowCards() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getMatchStats().getYellowCards()  
 );  
  
 *// updating total red cards* footballClubsListSeason.get(index).setTotalRedCards(  
 footballClubsListSeason.get(index).getTotalRedCards() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getMatchStats().getRedCards()  
 );  
  
 *// update number of matches* footballClubsListSeason.get(index).getClubStatistics().setTotalMatchesPlayed(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalMatchesPlayed() - 1  
 );  
  
 if(goalScored > goalReceived){  
  
 *// update wins and points scored* footballClubsListSeason.get(index).getClubStatistics().setTotalWins(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalWins() - 1  
 );  
  
 footballClubsListSeason.get(index).getClubStatistics().setTotalPointsScored(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalPointsScored() - 3  
 );  
  
 }else if (goalReceived > goalScored){  
 *// update defeats* footballClubsListSeason.get(index).getClubStatistics().setTotalDefeats(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalDefeats() - 1  
 );  
  
 }else{  
  
 *// update draws and points scored* footballClubsListSeason.get(index).getClubStatistics().setTotalDraws(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalDraws() - 1  
 );  
  
 footballClubsListSeason.get(index).getClubStatistics().setTotalPointsScored(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalPointsScored() - 1  
 );  
 }  
  
 *// removing the match from the list* footballClubsListSeason.get(index).getMatchesPlayed().remove(  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 );  
  
 }else{  
 *// incrementing the index to skip that match which should not be removed* matchIndexLoop++;  
  
 }  
 }  
 }  
  
 *// setting the position value to "00" if all the clubs didnt play for the given season* for (FootballClub footballClub: footballClubsListSeason) {  
  
 if(footballClub.getClubStatistics().getTotalMatchesPlayed() != 0){  
 *// then we can give positions to all the clubs* matchedAdded = true;  
 break;  
  
 }else{  
 matchedAdded = false;  
  
 }  
 }  
  
 return footballClubsListSeason;  
 }  
  
 *// Display the premier league table in a well structured format* public void structuredTable(int lengthOfClubNameTable, ArrayList<FootballClub> seasonFilteredClubs) {  
  
 */\*  
 \* We take the length of the largest club name, then use this to create the main table width  
 \*/* StringBuilder HORIZONTAL\_DASHES = new StringBuilder();  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE = new StringBuilder();  
  
 if(lengthOfClubNameTable != 0){  
  
 *// creating the table with data  
 // These variables are used to create the structure of the table* int clubNameColSpace = lengthOfClubNameTable + 2;  
 int leftClubColSpace = clubNameColSpace/2;  
 int rightClubColSpace = clubNameColSpace - leftClubColSpace;  
  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT = new StringBuilder();  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT = new StringBuilder();  
 StringBuilder LEFT\_CLUB\_COL\_SPACE = new StringBuilder();  
 StringBuilder RIGHT\_CLUB\_COL\_SPACE = new StringBuilder();  
  
 *// All these loops and code block are to just create the CLI table* for (int index = 0; index < 107+lengthOfClubNameTable; index++) {  
 HORIZONTAL\_DASHES.append("-");  
 }  
  
 for (int index = 0; index < 39 + (lengthOfClubNameTable/2); index++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT.append(" ");  
 }  
  
 for (int index = 0; index < 39 + (lengthOfClubNameTable - (lengthOfClubNameTable/2)); index++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT.append(" ");  
 }  
  
 for (int index = 0; index < leftClubColSpace; index++) {  
 LEFT\_CLUB\_COL\_SPACE.append(" ");  
 }  
  
 for (int index = 0; index < rightClubColSpace; index++) {  
 RIGHT\_CLUB\_COL\_SPACE.append(" ");  
 }  
  
 System.out.println("\n"+HORIZONTAL\_DASHES);  
 System.out.println("|" + PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT + "P R E M I E R - L E A G U E" +  
 PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT + "|");  
 System.out.println(HORIZONTAL\_DASHES);  
 System.out.println("| Position |" + LEFT\_CLUB\_COL\_SPACE +"Club" + RIGHT\_CLUB\_COL\_SPACE +  
 "| Played | Won | Drawn | Lost | Goal-Scored | Goal-Received " +  
 "| Goal-Difference | Points |");  
 System.out.println(HORIZONTAL\_DASHES);  
  
 *// display the content of the premierLeagueFootball List* for (int index = 0; index < seasonFilteredClubs.size(); index++) {  
  
 StringBuilder clubNameEndSpace = new StringBuilder();  
  
 for (int innerIndex = 0; innerIndex < 3; innerIndex++) {  
 clubNameEndSpace.append(" ");  
 }  
  
 *// changing the width of the club name for each row* if(seasonFilteredClubs.get(index).getName().length() != lengthOfClubNameTable){  
  
 *// the length of the name will anyways be less than lengthOfClubNameTable* int difference = lengthOfClubNameTable - seasonFilteredClubs.get(index).getName().length();  
 for (int innerIndex = 0; innerIndex < difference; innerIndex++) {  
 clubNameEndSpace.append(" ");  
 }  
  
 }  
  
 */\*  
 \* creating an arraylist with organised data for the table  
 \* The content structure is [position, played match, won, drawn, lost, goal scored, goal received, points,  
 \* goal difference]  
 \*/* ArrayList<String> organisedResultList = new ArrayList<>();  
 if(index<9){  
 organisedResultList.add("0"+(index+1));  
 }else{  
 organisedResultList.add(String.valueOf(index+1));  
 }  
  
 *// getting the stats into an arraylist to organise it* for (int innerIndex = 0; innerIndex < seasonFilteredClubs.get(index).getMainStatistics().size();  
 innerIndex++) {  
  
 if(innerIndex==7){  
  
 *// working with the goal difference* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)>-1){  
  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)<10) {  
 organisedResultList.add("+0"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
 }else{  
 organisedResultList.add("+"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
 }  
  
 }else{  
  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)>-10) {  
 organisedResultList.add("-0"+Math.abs(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
 }else{  
 organisedResultList.add(String.valueOf(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
 }  
  
 }  
 }else{  
  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)<10){  
 organisedResultList.add("0"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
 }else{  
 organisedResultList.add(String.valueOf(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
 }  
  
 }  
 }  
  
 *// if not matches are added then fixed positions cannot be given for any club until they play a match* if(!matchedAdded){  
 organisedResultList.set(0, "00");  
  
 }  
  
 *// this is were the table is created* System.out.println("| "+organisedResultList.get(0)+ " | "+ seasonFilteredClubs.get(index)  
 .getName()  
 + clubNameEndSpace + "| "+organisedResultList.get(1)+  
 " | "+organisedResultList.get(2)+" | "+  
 organisedResultList.get(3)+" | "+  
 organisedResultList.get(4)+" | "+  
 organisedResultList.get(5)+" | "+  
 organisedResultList.get(6)+" | "+  
 organisedResultList.get(8)+" | "+  
 organisedResultList.get(7)+" |");  
 }  
  
 }else{  
  
 *// creating the empty table* for (int innerIndex = 0; innerIndex < 106; innerIndex++) {  
 HORIZONTAL\_DASHES.append("-");  
 }  
  
 for (int innerIndex = 0; innerIndex < 38; innerIndex++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE.append(" ");  
 }  
  
 *// print the table* System.out.println("\n"+HORIZONTAL\_DASHES);  
 System.out.println("|" + PREMIER\_LEAGUE\_SPACE\_TILE + " P R E M I E R - L E A G U E" + PREMIER\_LEAGUE\_SPACE\_TILE + "|");  
 System.out.println(HORIZONTAL\_DASHES);  
 System.out.println("| Position | Club | Played | Won | Drawn | Lost | Goal-Scored " +  
 "| Goal-Difference | Points |");  
 System.out.println(HORIZONTAL\_DASHES);  
  
 *// creating the empty rows* for (int index = 0; index < 10; index++) {  
 System.out.println("| | | | | | | " +  
 " | | |");  
 }  
  
 }  
 System.out.println("\n\n");  
 }  
  
 *// Overriding the addPlayedMatch method from the interface* @Override  
 public String addPlayedMatch(String seasonPlayed, String clubName\_01, String clubName\_02,  
 int numberGoalScored\_club\_1, int numberGoalScored\_club\_2, DateMatch dateOfMatch,  
 String matchType) {  
  
 *// checking if the maximum number of matches has been reached or not, even if either club reached to the max  
 // then the match is cancelled* boolean club1ReachedMaximumMatches = false;  
 boolean club2ReachedMaximumMatches = false;  
 FootballClub club1 = null;  
 FootballClub club2 = null;  
 int matchCounter = 0;  
  
 *// getting the clubs from the name of club received as the parameter* for (FootballClub club: premierLeagueFootballClubList) {  
  
 if(club.getName().equalsIgnoreCase(clubName\_01)){  
 club1 = club;  
  
 }else if(club.getName().equalsIgnoreCase(clubName\_02)){  
 club2 = club;  
  
 }  
  
 }  
  
 *// if both the entered clubs are valid only we continue* if(club1!=null && club2!=null){  
  
 *// we are checking if the club will reach the maximum limit of matches played per club for (club1)* for (Match match: club1.getMatchesPlayed()) {  
  
 if(match.getSeason().equals(seasonPlayed)){  
 matchCounter++;  
 club1ReachedMaximumMatches = matchCounter >= maximumNumberOfMatchesPerClub;  
  
 }  
  
 }  
  
 matchCounter = 0;  
 *// we are checking if the club will reach the maximum limit of matches played per club for (club2)* for (Match match: club2.getMatchesPlayed()) {  
  
 if(match.getSeason().equals(seasonPlayed)){  
 matchCounter++;  
 club2ReachedMaximumMatches = matchCounter >= maximumNumberOfMatchesPerClub;  
  
 }  
  
 }  
 }  
  
 *// If both of the clubs didn't the max number to matches limit only we then add the match* if( !club2ReachedMaximumMatches && !club1ReachedMaximumMatches){  
  
 *// check if the enter clubs are valid and display msg* boolean club01 = false;  
 boolean club02 = false;  
  
 *// checking if the clubs entered are valid* for (FootballClub footballClub : premierLeagueFootballClubList) {  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)) club01=true;  
 if(footballClub.getName().equalsIgnoreCase(clubName\_02)) club02=true;  
  
 }  
  
 *// Checking if the entered club names are valid to further proceed* if(club01 && club02){  
  
 *// Checking if the match has already being played for opponent club depending on the match type  
 // 1 club can play 1 'Home' and 1 'Away' match with 1 opponent club* boolean allGoodToProceed = true;  
 for (FootballClub club: premierLeagueFootballClubList){  
 if( club.getName().equalsIgnoreCase(clubName\_01) ){  
 for (Match match: club.getMatchesPlayed()){  
 if(match.getSeason().equalsIgnoreCase(seasonPlayed) &&  
 match.getOpponentClubName().equalsIgnoreCase(clubName\_02)){  
 if(match.getMatchType().equalsIgnoreCase(matchType)){  
 *// You can further proceed to add the match because,  
 // the match has been already played* allGoodToProceed = false;  
  
 }  
 }  
 }  
 }  
 }  
  
 if(allGoodToProceed){  
 *// THIS SECTION MEANS EVERYTHING IS GOOD TO GO  
 // Adding the played season* allSeasonAdded.add(seasonPlayed);  
  
 *// valid club names so calculating the statistics and add them* calculatingStatistics(clubName\_01, clubName\_02, numberGoalScored\_club\_1, numberGoalScored\_club\_2,  
 dateOfMatch,seasonPlayed, matchType);  
 return "\n Match Successfully added! \n";  
  
 }else{  
 *// This says the user that you cant play a match which has been already played!* return "\n Sorry can't add match, because it's already played for the given teams, season and" +  
 " match type! \n";  
  
 }  
  
 }else{  
  
 *// If in valid club names we return an appropriate message to the user* if(!club01 && !club02){  
 return "\n Sorry,there are no clubs with the names '" + clubName\_01 + "' and '" +  
 clubName\_02 + "'";  
  
 }else {  
 if(!club01){  
 System.out.println();  
 return "\n Sorry,there is no club with the given name '" + clubName\_01 + "'";  
  
 }  
 }  
  
 }  
 return "\n Sorry,there is no club with the given name '" + clubName\_02 + "'";  
  
 }  
  
 *// if maximum number of matches limit has reaches we return an appropriate message to the user* if(club1ReachedMaximumMatches && club2ReachedMaximumMatches){  
 *// returns appropriate message* return "\n Sorry, both the clubs have reached the maximum number of matches played!";  
  
 }else if(club1ReachedMaximumMatches){  
 *// returns appropriate message* return "\n Sorry, '" + clubName\_01 + "' has reached the maximum number of matches played!";  
  
 }  
  
 *// returns appropriate message* return "\n Sorry, '" + clubName\_02 + "' has reached the maximum number of matches played!";  
  
 }  
  
 *// This method is used to calculate the statistics* public void calculatingStatistics(String clubName\_01, String clubName\_02, int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch date, String seasonPlayed,  
 String matchType) {  
 */\*  
 \* This methods uses the input match details to update the stats for the football clubs respectively  
 \* Stats include No of matches, No of wins, No of draws, No of defeats, Current Points, Goal Difference,  
 \* Total yellow cards, total red cards, Goal scored and Goal Received  
 \*/  
  
 // Number of matches has to get incremented to both the clubs* for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)  
 || footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 *// Number of matches has to get incremented to both the clubs and the session* footballClub.getClubStatistics().setTotalMatchesPlayed(footballClub  
 .getClubStatistics().getTotalMatchesPlayed() + 1);  
  
 }  
  
 *// calculate & update the goal received and goal scored for each club played* int goalDifference = 0;  
 int scored = 0;  
 int received = 0;  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
  
 scored = numberGoalScored\_club\_1;  
 received = numberGoalScored\_club\_2;  
  
 *// calculating the goal difference to club 01* goalDifference = numberGoalScored\_club\_1 - numberGoalScored\_club\_2;  
  
 }else if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 scored = numberGoalScored\_club\_2;  
 received = numberGoalScored\_club\_1;  
  
 *// calculating the goal difference to club 02* goalDifference = numberGoalScored\_club\_2 - numberGoalScored\_club\_1;  
  
 }  
 *// setting goals received and scored* footballClub.setTotalGoalsScored(footballClub.getTotalGoalsScored() + scored);  
 footballClub.setTotalGoalsReceived(footballClub.getTotalGoalsReceived() + received);  
  
 *// setting the goal difference* footballClub.setTotalGoalsDifference(footballClub.getTotalGoalsDifference() + goalDifference);  
 }  
  
 *// calculate & update the wins, draws and defeats for each club played* if(numberGoalScored\_club\_1 == numberGoalScored\_club\_2){  
  
 for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)  
 || footballClub.getName().equalsIgnoreCase(clubName\_02)){  
 footballClub.getClubStatistics().setTotalDraws(footballClub.getClubStatistics()  
 .getTotalDraws() + 1);  
 }  
  
 }  
  
 }else if(numberGoalScored\_club\_1 > numberGoalScored\_club\_2){  
 updatingWinsDefeats(clubName\_02, clubName\_01);  
  
 }else{  
 updatingWinsDefeats(clubName\_01, clubName\_02);  
  
 }  
  
 *// calculate & update the current score and goal difference for the clubs* for (FootballClub footballClub: premierLeagueFootballClubList) {  
  
 int totalScore = footballClub.getClubStatistics().getTotalWins() \* 3 + footballClub.getClubStatistics()  
 .getTotalDraws();  
 footballClub.getClubStatistics().setTotalPointsScored(totalScore);  
  
 }  
  
 *// creating the Match object and adding for both the clubs played with their own scores* for (FootballClub footballClub: premierLeagueFootballClubList) {  
  
 *// we have added the matched played by each club to their respective list of matches* if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
  
 addPlayedMatchToClub(clubName\_02, clubName\_01, numberGoalScored\_club\_2, numberGoalScored\_club\_1, date,  
 seasonPlayed, footballClub, matchType);  
  
 }else if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 addPlayedMatchToClub(clubName\_01, clubName\_02, numberGoalScored\_club\_1, numberGoalScored\_club\_2, date,  
 seasonPlayed, footballClub, matchType);  
  
 }  
 }  
 }  
  
 *// This method is used to add the played match to the club* public void addPlayedMatchToClub(String clubName\_01, String clubName\_02, int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch date, String seasonPlayed,  
 FootballClub footballClub, String matchType) {  
  
 *// creating the match statistics object with the data to be stored* MatchStats matchStats = getStatsOfMatch(footballClub);  
  
 *// creating a match object with the data to be stored* Match matchPlayed = new Match(numberGoalScored\_club\_2, numberGoalScored\_club\_1, matchStats, date,  
 clubName\_01, seasonPlayed,matchType, clubName\_02);  
  
 *// adding the played match into the list of matches* footballClub.getMatchesPlayed().add(matchPlayed);  
  
 }  
  
 *// This method is used to get the match statistics which are randomly generated* public MatchStats getStatsOfMatch(FootballClub footballClub) {  
 Random random = new Random();  
  
 *// variables with the random data set to be used for the match statistics* int numberOfYellowCards = random.nextInt(5);  
 int numberOfRedCards = random.nextInt(5);  
 int shots = random.nextInt(20);  
 int shotsOfTarget = random.nextInt(20);  
 int offSides = random.nextInt(30);  
 int fouls = random.nextInt(30);  
 int corners = random.nextInt(30);  
 int passes = random.nextInt(30);  
 double passAccuracy = Math.round(random.nextDouble()\*1000)/10.0;  
 double possession = Math.round(random.nextDouble()\*1000)/10.0;  
  
 *// updating the total red and yellow cards for the club* footballClub.setTotalYellowCards((footballClub.getTotalYellowCards() + numberOfYellowCards));  
 footballClub.setTotalRedCards(footballClub.getTotalRedCards() + numberOfRedCards);  
  
 *// return the matchStat obj with the data parameters* return new MatchStats(numberOfYellowCards, numberOfRedCards, shots, shotsOfTarget, offSides  
 ,fouls, corners, passes, passAccuracy, possession);  
 }  
  
 *// updates the wins and defeats of the played club matches* public void updatingWinsDefeats(String clubName\_01, String clubName\_02) {  
  
 for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
 footballClub.getClubStatistics().setTotalWins(footballClub.getClubStatistics().getTotalWins() + 1);  
  
 }  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
 footballClub.getClubStatistics().setTotalDefeats(footballClub.getClubStatistics().getTotalDefeats() + 1);  
  
 }  
  
 }  
 }  
  
 *// Overriding the saveDataIntoFile method from the interface* @Override  
 public String saveDataIntoFile() {  
 */\*  
 \* If we need to write and object of a Class into a file, we have to make that class to implement the interface  
 \* Serializable.  
 \* This is because Serializable interface gives the permission to save the objects  
 \*/  
  
 // Serializing means converting a state into a byte stream  
  
 // getting the path to save the data* File file = new File("../GUI/public/resources/dataStorage.txt");  
  
 *// This is an out stream which is used to write data into a file* FileOutputStream fileOutputStream = null;  
  
 *// This encodes the java objects into byte streams which can be stored into the file* ObjectOutputStream objectOutputStream = null;  
  
 *// handling the exceptions and saving the data from the file* try {  
 *// saving the data into the file  
  
 // creating an instance of FileInputStream and ObjectInputStream* fileOutputStream = new FileOutputStream(file);  
 objectOutputStream = new ObjectOutputStream(fileOutputStream);  
  
 *// writing the data into the file* objectOutputStream.writeObject(premierLeagueFootballClubList);  
 objectOutputStream.writeObject(matchedAdded);  
 objectOutputStream.writeObject(allSeasonAdded);  
 objectOutputStream.writeObject(maximumNumberOfMatchesPerClub);  
  
 }  
 catch (FileNotFoundException fileNotFoundException) {  
 *// Handles the exception* return " File not found exception occurred!";  
  
 }  
 catch (IOException ioException) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
 }  
 catch (Exception e){  
 *// Handles the exception* return " An exception occurred!";  
  
 }  
 finally {  
 *// once all the data is saved into the file we close it* try {  
 *// making sure that it is not null, to be closed* if (fileOutputStream != null) {  
 fileOutputStream.close();  
 }  
  
 *// making sure that it is not null, to be closed* if (objectOutputStream != null) {  
 objectOutputStream.close();  
 }  
 }  
 catch (IOException e) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
 }  
 }  
  
 *// returns a success message if everything goes well* return "\n Saving the data . . .\n Successfully saved!";  
  
 }  
  
 *// Overriding the readDataFromFile method from the interface* @Override  
 public String clearDataFile() {  
 *// If the user needs to empty the text file details he has the option to do it as well  
 /\*  
 \* This makes sure that the file is empty, by overriding the content of the file with a single ""  
 \*/  
  
 // using file write the data won't be converted into any byte stream it will directly set the exact string what  
 // you are setting* FileWriter file = null;  
 try {  
 file = new FileWriter("../GUI/public/resources/dataStorage.txt");  
  
 *// clearing the content of the file by overriding with an empty string* file.write("");  
  
 }  
 catch (FileNotFoundException fileNotFoundException) {  
 *// Handles the exception* return " File not found exception occurred!";  
  
 }  
 catch (IOException ioException) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
  
 }  
 catch (Exception e){  
 *// Handles the exception* return " An exception occurred!";  
  
 }  
 finally {  
 *// closes the file once all the operations are completed* try {  
 if (file != null) {  
 file.close();  
 }  
 }  
 catch (IOException e) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
 }  
 }  
  
 *// returns a success message if everything goes well* return "\n Clearing the contents of the file . . .\n Successfully cleared the file details!";  
  
 }  
  
 *// Setters and Getters* public static ArrayList<FootballClub> getPremierLeagueFootballClubList() {  
 return premierLeagueFootballClubList;  
 }  
  
 public static void setPremierLeagueFootballClubList(ArrayList<FootballClub> premierLeagueFootballClubList) {  
 PremierLeagueManager.premierLeagueFootballClubList = premierLeagueFootballClubList;  
 }  
  
 public static ArrayList<String> getAllSeasonAdded() {  
 return allSeasonAdded;  
 }  
  
 public static void setAllSeasonAdded(ArrayList<String> allSeasonAdded) {  
 PremierLeagueManager.allSeasonAdded = allSeasonAdded;  
 }  
  
 public static int getMaximumNumberOfMatchesPerClub() {  
 return maximumNumberOfMatchesPerClub;  
 }  
  
 public static void setMaximumNumberOfMatchesPerClub(int maximumNumberOfMatchesPerClub) {  
 PremierLeagueManager.maximumNumberOfMatchesPerClub = maximumNumberOfMatchesPerClub;  
 }  
}

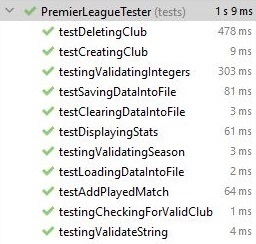
* + 1. Testing Code
       1. Junit Testing

**tests package**

*PremierLeagueTester.java*

package tests;  
  
import console.ConsoleApplication;  
import entities.DateMatch;  
import entities.FootballClub;  
import entities.LeagueManager;  
import org.junit.After;  
import org.junit.Assert;  
import org.junit.Before;  
import org.junit.Test;  
import services.PremierLeagueManager;  
  
import java.io.ByteArrayInputStream;  
import java.io.InputStream;  
import java.util.ArrayList;  
  
import static org.junit.Assert.*assertEquals*;  
import static org.junit.Assert.*assertNull*;  
  
  
*// MAKE SURE THAT THE TXT FILE IS EMPTY (which is inside the GUI directory) BEFORE RUNNING THIS TESTS (if any error occurs)*public class PremierLeagueTester  
{  
 *// variable used* private LeagueManager premierLeagueManager;  
  
 @Before  
 public void beforeTesting(){  
  
 *// RUNS BEFORE TESTING* System.*out*.println("testing started . . . ");  
 premierLeagueManager = PremierLeagueManager.*getInstance*();  
  
 *// Emptying the text file before running the tests* premierLeagueManager.clearDataFile();  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
 @Test  
 public void testCreatingClub(){  
  
 *// making sure that the file is cleared again to get started off* premierLeagueManager.clearDataFile();  
  
 *// TESTING FOR CLUBS AS VALID UP TO 20 CLUBS* String[] clubType = {"normal","university","school"};  
 String[] schoolUniName = {null, "IIT", "RoyalInstitute"};  
  
 for (int index = 0; index < clubType.length; index++) {  
  
 for (int num = 0; num < 20; num++) {  
  
 String result = premierLeagueManager.createClub("Everton","Spain","Nazhim",  
 schoolUniName[index],  
 clubType[index]);  
 *assertEquals*(" Clubs Successfully added!",result);  
 System.*out*.println("Club number: " + num);  
 }  
  
 *// TESTING FOR AN INVALID CLUB WHEN ADDED MORE THAN 20* String expectedResult = premierLeagueManager.createClub("Everton","Spain","Nazhim",  
 schoolUniName[index],  
 clubType[index]);  
 *assertEquals*(" Sorry there is no room for a new club, the maximum number of club limit " +  
 "has been reached!",expectedResult);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
 }  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
 @Test  
 public void testDeletingClub(){  
  
 *// TESTING WITH VALID CLUB TO BE REMOVED  
 // adding a club so that it can be deleted* premierLeagueManager.createClub("Juventus","Spain","Nazhim",null,  
 "normal");  
  
 *// getting the details of the added football club* FootballClub actualResult = PremierLeagueManager.*getPremierLeagueFootballClubList*().get(0);  
  
 FootballClub expectedResult = (FootballClub) premierLeagueManager.deleteClub("Juventus");  
 *assertEquals*(actualResult, expectedResult);  
  
 *// TESTING WITH INVALID CLUB TO BE REMOVED* expectedResult = (FootballClub) premierLeagueManager.deleteClub("Real Madird");  
 *assertNull*(expectedResult);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
 @Test  
 public void testDisplayingStats(){  
  
 *// TESTING THE DISPLAY STATS METHOD WITH A VALID CLUB NAME ENTERED* premierLeagueManager.createClub("Juventus","Spain","Nazhim",null,  
 "normal");  
 String expectedResult = premierLeagueManager.displayStats("Juventus");  
 *assertEquals*(" Result Displayed", expectedResult);  
  
 *// TESTING THE DISPLAY STATS METHOD WITH AN INVALID CLUB NAME ENTERED* expectedResult = premierLeagueManager.displayStats("Fake Club");  
 *assertEquals*("\n Sorry, there is no club with the given name 'Fake Club'", expectedResult);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
  
 @Test  
 public void testAddPlayedMatch()  
 {  
  
 *// SINCE THERE ARE 3 CLUBS HERE THEN 1 CLUBS PLAYS 4 MATCHES  
 // Testing adding match into a club* premierLeagueManager.createClub("barca","spain","nazhim",null,  
 "normal");  
 premierLeagueManager.createClub("juventus","japan","hashim",null,  
 "normal");  
 premierLeagueManager.createClub("realMadrid","australia","saman",null,  
 "normal");  
  
 DateMatch date = new DateMatch();  
 String expectedResult;  
 String[] seasons = {"2020-21", "2019-20","2018-19"};  
  
 for(String season: seasons){  
 *// TESTING FOR A VALID MATCH ENTERED FOR A SEASON of match type "Away"  
 // REAL MADRID VS JUVENTUS "away" $$$$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"realMadrid","juventus",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// TESTING FOR A VALID MATCH ENTERED FOR A SEASON of match type "Home"  
 // REAL MADRID VS JUVENTUS "home" $$$$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"realMadrid","juventus",1,  
 2,  
 date,"home"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// TESTING FOR A DUPLICATE MATCH ADDED FOR THE SAME "season", "teams" and "match type"  
 // REAL MADRID VS JUVENTUS "away"* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"realMadrid","juventus",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Sorry can't add match, because it's already played for the given teams, season and" +  
 " match type! \n", expectedResult);  
  
 *// TESTING FOR A DUPLICATE MATCH ADDED FOR THE SAME "season", "teams" and "match type"  
 // REAL MADRID VS JUVENTUS "home"* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"realMadrid","juventus",1,  
 2,  
 date,"home"  
 );  
 *assertEquals*("\n Sorry can't add match, because it's already played for the given teams, season and" +  
 " match type! \n", expectedResult);  
  
  
 *// TESTING FOR MULTIPLE VALID MATCHES ENTERED FOR A SEASON (UNTIL MAXIMUM NUMBER OF MATCHES PER CLUB REACHED)  
 // Real Madrid and juventus has 2 more matches to play inf order to reach the max number of matches played  
 // Barca VS Juventus "away" $$$$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"barca","juventus",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// Barca VS Juventus "home" $$$$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"barca","juventus",1,  
 2,  
 date,"home"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// TESTING FOR ADDING A MATCH WHICH EXCEEDS THE LIMIT for "Juventus"* expectedResult = premierLeagueManager.addPlayedMatch(  
 season,"barca","juventus",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Sorry, 'juventus' has reached the maximum number of matches played!",  
 expectedResult);  
 }  
  
 *// Barca VS Real Madrid "away" $$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 "2020-21","barca","realMadrid",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// Barca VS Real Madrid "home" $$$$$* expectedResult = premierLeagueManager.addPlayedMatch(  
 "2020-21","barca","realMadrid",1,  
 2,  
 date,"home"  
 );  
 *assertEquals*("\n Match Successfully added! \n", expectedResult);  
  
 *// TESTING FOR ADDING A MATCH WHICH EXCEEDS THE LIMIT for "barca"* expectedResult = premierLeagueManager.addPlayedMatch(  
 "2020-21","barca","juventus",1,  
 2,  
 date,"away"  
 );  
 *assertEquals*("\n Sorry, both the clubs have reached the maximum number of matches played!",  
 expectedResult);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
 @Test  
 public void testSavingDataIntoFile(){  
 *// Testing the saving the data into the file* String expectedResult = premierLeagueManager.saveDataIntoFile();  
 *assertEquals*("\n Saving the data . . .\n Successfully saved!", expectedResult);  
  
 *// making sure that the file is cleared for other tests* premierLeagueManager.clearDataFile();  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
  
 }  
  
 @Test  
 public void testLoadingDataIntoFile(){  
 *// Testing the loading data from the file method  
  
 // ASSUMING THAT THERE IS NO DATA IN THE FILE WHEN LOADING  
  
 // we are emptying the file before loading the data* premierLeagueManager.clearDataFile();  
 String expectedResult = PremierLeagueManager.*loadingData*();  
  
 *// testing the output  
 assertEquals*(" Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file", expectedResult);  
  
 *// ASSUMING THAT THERE IS DATA IN THE FILE WHEN LOADING  
  
 // saving some data before loading performance* premierLeagueManager.createClub("Juventus","Spain","Nazhim","IIT",  
 "normal");  
 premierLeagueManager.saveDataIntoFile();  
  
 expectedResult = PremierLeagueManager.*loadingData*();  
  
 *// testing the output  
 assertEquals*("\n Successfully loaded all the data\n", expectedResult);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
  
 }  
  
 @Test  
 public void testClearingDataIntoFile(){  
 *// Testing the clearing the data from the file method  
  
 // Assuming that the file path is correct* String result = premierLeagueManager.clearDataFile();  
 *assertEquals*("\n Clearing the contents of the file . . .\n Successfully cleared the file details!",  
 result);  
  
 *// CLEARING THE CONTENT OF THE obj FOR OTHER TESTINGS* PremierLeagueManager.*setPremierLeagueFootballClubList*(new ArrayList<>());  
  
 *// Performing a thread sleep* try {  
 Thread.*sleep*(100);  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
  
 }  
  
 @Test  
 public void testingCheckingForValidClub(){  
 *// testing for checking valid club method* premierLeagueManager.createClub("Juventus","Spain","Nazhim",null,  
 "normal");  
 premierLeagueManager.createClub("Barca","Spain","Hashim",null,  
 "normal");  
 premierLeagueManager.createClub("Titan Fc","Spain","Kalam",null,  
 "normal");  
  
 String[] clubNames = {"Juventus", "Barca", "Titan Fc"};  
 for (int index = 0; index < 3; index++) {  
  
 String input = clubNames[index];  
 InputStream in = new ByteArrayInputStream(input.getBytes());  
 System.*setIn*(in);  
 Assert.*assertEquals*(clubNames[index], ConsoleApplication.*checkingForValidClub*(input));  
 }  
  
 *// This throws error for invalid clubName as expected  
 // assertEquals("JuventusFake", ConsoleApplication.checkingForValidClub(input));* }  
  
 @Test  
 public void testingValidatingIntegers(){  
 *// testing for the validation of integers entered* for (int index = 0; index < 100; index++) {  
 InputStream in = new ByteArrayInputStream(String.*valueOf*(index).getBytes());  
 System.*setIn*(in);  
 *assertEquals*(index, ConsoleApplication.*validatingIntegers*("Testing integers"));  
 }  
  
 *// Invalid number throws error for invalid integer as expected  
 // assertEquals(14, ConsoleApplication.validatingIntegers("Testing integers"));* }  
  
 @Test  
 public void testingValidatingSeason(){  
 *// testing for the validation of season  
 // When testing with invalid data the program throws exception which is common* String[] seasons = {"2020-21", "2019-20", "2018-19", "2017-18", "2016-17"};  
 for (int index = 0; index < 5; index++) {  
 String input = seasons[index];  
 InputStream in = new ByteArrayInputStream(input.getBytes());  
 System.*setIn*(in);  
 *assertEquals*(seasons[index], ConsoleApplication.*validatingSeason*());  
 }  
  
 *// Invalid Season Format String Entered, this throws an error as expected  
 // String invalidSeason = "21-2020";  
 // InputStream in = new ByteArrayInputStream(invalidSeason.getBytes());  
 // System.setIn(in);  
 // assertEquals("21-2020", ConsoleApplication.validatingSeason());* }  
  
 @Test  
 public void testingValidateString(){  
 *// testing for valid String entered  
 // When testing with invalid data the program throws exception which is common* String[] validStrings = {"Nazhim", "Kalam", "Mohammed", "Saman", "Lakshan"};  
 for (int index = 0; index < 5; index++) {  
 String input = validStrings[index];  
 InputStream in = new ByteArrayInputStream(input.getBytes());  
 System.*setIn*(in);  
 *assertEquals*(validStrings[index], ConsoleApplication.*validateString*("Validating Strings"));  
 }  
 }  
  
 @After  
 public void afterTesting(){  
 *// RUNS AFTER TESTING IS COMPLETED* System.*out*.println("testing completed . . .");  
 }  
}  
  
*// If a test fails when you run all the test codes together this is due to using the same resource problem which in this  
// case is using the same txt file for most of the tests  
  
// References used  
// https://www.youtube.com/playlist?list=PLqq-6Pq4lTTa4ad5JISViSb2FVG8Vwa4o*

* + - 1. Junit Testing Output Screenshots



* + - 1. Test Plan

**(make sure the txt file is empty before running these tests)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test Case ID** | **Test Case** | **Input data** | **Expected Output** | **Actual Output** | **Pass/**  **Fail** |
| 1 | Create Club (Normal)  **(from CLI)** | Select the option 1 from the menu  Select option 1 from the football club types  Enter the all the prompted information  Repeat this until the 2 clubs are created with the details given below  [ Club name: Southampton  Location: England  Coach Name: Mikel],  [ Club name: Juventus  Location: Italy  Coach Name: Roy] | Displays “Clubs Successfully added!” for both the club details entered | Displays “Clubs Successfully added!” for both the club details entered | Pass |
| 2 | Checking for the clubs in table currently  **(from CLI)** | Select the option 4 from the menu  Enter any season you wish, for an instance “2020-21” | Display the table with the 2 clubs created which are “Southampton” and “Juventus” | Display the table with the 2 clubs created which are “Southampton” and “Juventus” | Pass |
| 3 | Delete Club  **(from CLI)** | Select the option 2 from the menu  Enter “Juventus” as the club name to be deleted  Enter “y” to confirm the deletion of the respective club. | Display a message that the club was successfully deleted with more details of the deleted club. | Display a message that the club was successfully deleted with more details of the deleted club. | Pass |
| 4 | Checking for the clubs in table currently  **(from CLI)** | Select the option 4 from the menu  Enter any season you wish, for an instance “2020-21” | Display the table with the updated clubs which are “Southampton” only present and “Juventus” removed from the table | Display the table with the updated clubs which are “Southampton” only present and “Juventus” removed from the table | Pass |
| 5 | Create Club (Normal) **(from CLI)** | Select the option 1 from the menu  Select option 1 from the football club types  Enter the all the prompted information  Repeat this until the 3 clubs are created with the details given below  [ Club name: Chelsea  Location: London  Coach Name: Dean],  [ Club name: Liverpool  Location: England  Coach Name: Arteta],  [ Club name: Arsenal  Location: London  Coach Name: Smith] | Displays “Clubs Successfully added!” for both the club details entered | Displays “Clubs Successfully added!” for both the club details entered | Pass |
| 6 | Create Club (University) **(from CLI)** | Select the option 1 from the menu  Select option 2 from the football club types  Enter the all the prompted information given below  [ Club name: Burnley  Location: Lancashire  Coach Name: Frank  University Name: IIT] | Displays “Clubs Successfully added!” | Displays “Clubs Successfully added!” | Pass |
| 7 | Create Club (School)  **(from CLI)** | Select the option 1 from the menu  Select option 3 from the football club types  Enter the all the prompted information given below  [ Club name: Everton  Location: England  Coach Name: Sean  School Name: Royal] | Displays “Clubs Successfully added!” | Displays “Clubs Successfully added!” | Pass |
| 8 | Display club statistics  **(from CLI)** | Select the option 3 from the menu  Enter “Liverpool” as the club name to display the statistics.  (Likewise, you can enter other club names as well to view their current club statistics) | Display all the statistics of the club “Liverpool” | Display all the statistics of the club “Liverpool” | Pass |
| 9 | Display Premier League Table  **(from CLI)** | Select the option 4 from the menu  Enter any season you wish, for an instance “2020-21” | Display the table with all records of the added clubs set to 0 | Display the table with all records of the added clubs set to 0 | Pass |
| 10 | Add Played Match  **(from CLI)** | Select the option 5 from the menu  Add all the following matches by repeatedly selecting the “Add Played Match Option”   |  | | --- | | Club name 1: Southampton  Goal Scored: 6  Club name 2: Liverpool  Goal Scored: 0  Day: 14  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Southampton  Goal Scored: 4  Club name 2: Arsenal  Goal Scored: 2  Day: 15  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Southampton  Goal Scored: 2  Club name 2: Everton  Goal Scored: 1  Day: 9  Month: 11  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Liverpool  Goal Scored: 3  Club name 2: Southampton  Goal Scored: 0  Day: 10  Month: 9  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Liverpool  Goal Scored: 3  Club name 2: Arsenal  Goal Scored: 2  Day: 6  Month: 9  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Liverpool  Goal Scored: 2  Club name 2: Arsenal  Goal Scored: 2  Day: 10  Month: 10  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Liverpool  Goal Scored: 0  Club name 2: Everton  Goal Scored: 0  Day: 14  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Liverpool  Goal Scored: 0  Club name 2: Chelsea  Goal Scored: 0  Day: 15  Month: 11  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 2  Club name 2: Southampton  Goal Scored: 0  Day: 14  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 1  Club name 2: Arsenal  Goal Scored: 1  Day: 16  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 2  Club name 2: Arsenal  Goal Scored: 2  Day: 29  Month: 10  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 0  Club name 2: Everton  Goal Scored: 0  Day: 30  Month: 9  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 1  Club name 2: Everton  Goal Scored: 1  Day: 15  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 2  Club name 2: Burnley  Goal Scored: 2  Day: 12  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 1  Club name 2: Burnley  Goal Scored: 1  Day: 12  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Chelsea  Goal Scored: 2  Club name 2: Liverpool  Goal Scored: 2  Day: 10  Month: 12  Year: 2020  Select 2020-21 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Display the following message  “Match Successfully added!” for each of the matches added | Display the following message  “Match Successfully added!” for each of the matches added | Pass |
| 11 | Display Club Statistics  **(from CLI)** | Select the option 3 from the menu  Enter “Liverpool” as the club name to display the statistics.  Repeat this process for other clubs as well, which includes,  ‘Southampton’, ‘Chelsea’, ‘Arsenal’, ‘Everton’, ‘Burnley’ | Display all the statistics of the given club name | Display all the statistics of the given club name | Pass |
| 12 | Display Premier League Table  **(from CLI)** | Select the option 4 from the menu  Enter “2020-21” as the season | Displays the Premier League Table for the season 2020-21 records sorted in descending order of points and goals if points are equal | Displays the Premier League Table for the season 2020-21 records sorted in descending order of points and goals if points are equal | Pass |
| 13 | Add Played Match  **(from CLI)** | Select the option 5 from the menu  Add all the following matches by repeatedly selecting the “Add Played Match Option” for other seasons   |  | | --- | | Club name 1: Southampton  Goal Scored: 9  Club name 2: Liverpool  Goal Scored: 6  Day: 20  Month: 12  Year: 2019  Select 2019-20 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Arsenal  Goal Scored: 4  Club name 2: Burnley  Goal Scored: 2  Day: 14  Month: 12  Year: 2019  Select 2019-20 as the season  Enter match type as “Away”  Click ENTER key to add the match | | Club name 1: Everton  Goal Scored: 5  Club name 2: Chelsea  Goal Scored: 7  Day: 15  Month: 2  Year: 2019  Select 2018-19 as the season  Enter match type as “Home”  Click ENTER key to add the match | | Display the following message  “Match Successfully added!” for each of the matches added | Display the following message  “Match Successfully added!” for each of the matches added | Pass |
| 14 | Display Club Statistics  **(from CLI)** | Select the option 3 from the menu  Enter “Liverpool” as the club name to display the statistics.  Repeat this process for other clubs as well, which includes,  ‘Southampton’, ‘Chelsea’, ‘Arsenal’, ‘Everton’, ‘Burnley’ | Display all the statistics of the given club name | Display all the statistics of the given club name | Pass |
| 15 | Display Premier League Table  **(from CLI)** | Select the option 4 from the menu  Enter “2019-20” as the season | Displays the Premier League Table for the season 2019-20 records sorted in descending order of points and goals if points are equal | Displays the Premier League Table for the season 2019-20 records sorted in descending order of points and goals if points are equal | Pass |
| 16 | Display Premier League Table  **(from CLI)** | Select the option 4 from the menu  Enter “2018-19” as the season | Displays the Premier League Table for the season 2018-19 records sorted in descending order of points and goals if points are equal | Displays the Premier League Table for the season 2018-19 records sorted in descending order of points and goals if points are equal | Pass |
| 17 | Display GUI  **(from CLI)** | Select the option 6 from the menu | Displays message “Opening the GUI at localhost: 4200”  The GUI opens in a new tab in the web browser. | Displays message “Opening the GUI at localhost: 4200”  The GUI opens in a new tab in the web browser. | Pass |
| 18 | Display table in the GUI  **(from GUI)** | Select the “tables” option from the nav bar from the GUI | This displays a scrollable record table with the options such as sort by points, goals scored and wins. Moreover, it has an option to select the season to display the records. | This displays the table with the options such as sort by points, goals scored and wins. Moreover, it has an option to select the season to display the records. | Pass |
| 19 | Display matches in the GUI  **(from GUI)** | Select the “matches” option from the nav bar from the GUI | This displays a scrollable list of matches and the user will have the option to search matches by “date” and also select matches by season, Moreover the user is also able to generate a match as well. | This displays a scrollable list of matches and the user will have the option to search matches by “date” and also select matches by season, Moreover the user is also able to generate a match as well. | Pass |
| 20 | Save data to file  **(from CLI)** | Select the option 7 from the menu. | This will display the following message if there are no exceptions caused  “Saving the data . . .”  “Successfully saved!”  The data will be stored into the text file | This will display the following message if there are no exceptions caused  “Saving the data . . .”  “Successfully saved!”  The data will be stored into the text file | Pass |
| 21 | Clear data from file  **(from CLI)** | Select the option 8 from the menu | This will display the following message if there are no exceptions caused  “Clearing the contents of the file”  “Successfully cleared the file details”  All the data from the text file will be cleared | This will display the following message if there are no exceptions caused  “Clearing the contents of the file”  “Successfully cleared the file details”  All the data from the text file will be cleared | Pass |
| 22 | Exit Program  **(from CLI)** | Select the option 9 from the menu.  Enter “y” to confirm that you want to exit | This will display the following message  “Saving data ...”  “Exiting program…”  The program will exit | This will display the following message  “Saving data ...”  “Exiting program…”  The program will exit | Pass |

# Validation Test Cases

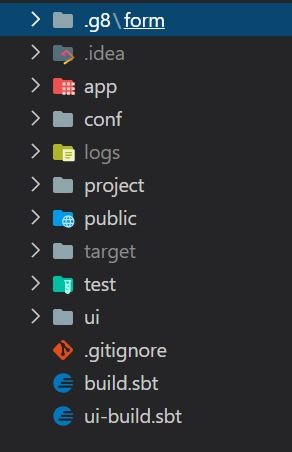
**(make sure the txt file is empty before running these tests)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test Case ID** | **Test Case** | **Input data** | **Expected Output** | **Actual Output** | **Pass/**  **Fail** |
| 1 | Validating the menu options.  **(from CLI)** | 10 | Displays the message below  “You have entered an invalid option! Please check the menu properly and re-enter!”  And asks for user input again | Displays the message below  “You have entered an invalid option! Please check the menu properly and re-enter!”  And asks for user input again | Pass |
| 2 | Validating Integers.  **(from CLI)** | 1.2 | Displays the message below  “Invalid input, please enter a valid integer!” | Displays the message below  “Invalid input, please enter a valid integer!” | Pass |
| 3 | Validating same club names entered again to create a new club  **(from CLI)** | Select the Option 1 from the menu and again select option 1 for normal football club and create a club with the name “Juventus” and fill all the other prompts with any random data.  Again, select Option 1 and create a club with the same name “Juventus” | Displays the message below  “There is already a team with the name 'Juventus', please enter another name  ”  And asks for user input again | Displays the message below  “There is already a team with the name 'Juventus', please enter another name  ”  And asks for user input again | Pass |
| 4 | Validating same club names entered twice for adding a played match  **(from CLI)** | Select the Option 1 from the menu and again select option 1 for normal football club and create a club with the name “Barca” and fill all the other prompts with any random data.  Select Option 5 and added the first club name as “Juventus” with any score and again “Juventus” for the other(opponent) club name as well. | Displays the message below  “There should be two different clubs to play a match and you have entered the same club twice!  Please enter a different club name!”  And asks for user input again | Displays the message below  “There should be two different clubs to play a match and you have entered the same club twice!  Please enter a different club name!”  And asks for user input again | Pass |
| 5 | Validating clubs entered for add played matches, checks if the club name entered is valid  **(from CLI)** | Select the option 5 from the menu.  For the club name 1, enter “Manchester” | Displays the message below  “There is no team with the name 'Manchester', please enter another name”  And asks for the user input again. | Displays the message below  “There is no team with the name 'Manchester', please enter another name”  And asks for the user input again. | Pass |
| 6 | Validating the day entered with a valid range or not  **(from CLI)** | Select the option 5  Enter the first club name as “Juventus” with any random score  Enter the second club name as “Barca” with any random score  Enter -5 or 35 for the day input | Displays the message below  “Invalid day entered, day entered should be with in the range of (1 to 31)!”  And asks for the user input again. | Displays the message below  “Invalid day entered, day entered should be with in the range of (1 to 31)!”  And asks for the user input again. | Pass |
| 7 | Validating the month entered with a valid range or not  **(from CLI)** | Select the option 5  Enter the first club name as “Juventus” with any random score  Enter the second club name as “Barca” with any random score  Enter 14 for the day input  Enter -5 or 13 for the month | Displays the message below  “Invalid month entered, month entered should be with in the range of (1 to 12)!  And asks for the user input again. | Displays the message below  “Invalid month entered, month entered should be with in the range of (1 to 12)!”  And asks for the user input again. | Pass |
| 8 | Validating the year entered with a valid range or not (assumed range 1000 - 3000)  **(from CLI)** | Select the option 5  Enter the first club name as “Juventus” with any random score  Enter the second club name as “Barca” with any random score  Enter 14 for the day input  Enter 12 for the month input  Enter 999 or 3001 for the year | Displays the message below  “Invalid year entered, year entered should be with in the range of (1000 to 3000)!”  And asks for the user input again. | Displays the message below  “Invalid year entered, year entered should be with in the range of (1000 to 3000)!”  And asks for the user input again. | Pass |
| 9 | Validating the season selected by the user when adding a played match  **(from CLI)** | Select the option 5  Enter the first club name as “Juventus” with any random score  Enter the second club name as “Barca” with any random score  Enter 14 for the day input  Enter 12 for the month input  Enter 2020 for the year  Enter any number other than 1 and 2 for the, select season option | Displays the message below  “Invalid Input, please only enter either '1' or '2' as the season option!”  And asks for the user input again. | Displays the message below  “Invalid Input, please only enter either '1' or '2' as the season option!”  And asks for the user input again. | Pass |
| 10 | Validating the type of match played  **(from CLI)** | Select the option 5  Enter the first club name as “Juventus” with any random score  Enter the second club name as “Barca” with any random score  Enter 14 for the day input  Enter 12 for the month input  Enter 2020 for the year  Enter 1 for the select season option  Enter anything other than “home” and “away” for the type of match played | Displays the message below  “Invalid match input, please only enter either 'HOME' or 'AWAY' as the match type!”  And asks for the user input again. | Displays the message below  “Invalid match input, please only enter either 'HOME' or 'AWAY' as the match type!”  And asks for the user input again. | Pass |
| 11 | Validating season entered for displaying the premier league table  **(from CLI)** | Select option 4 from the menu and enter ‘20-2021’ as the season input | Displays the message below  “Given input is not in proper format, use this format please (0000-00) with integers only!  Season played (eg:- '2018-19')”  And asks for the user input again. | Displays the message below  “Given input is not in proper format, use this format please (0000-00) with integers only!  Season played (eg:- '2018-19')”  And asks for the user input again | Pass |
| 12 | Validating Strings inputs  **(from CLI)** | Select the Option 1 from the menu and again select option 1 for normal football club and create a football club with:  Club name: n@12x | Displays the message below  “Given input is not in proper format, only include alphabets please!”  And asks for the user input again. | Displays the message below  “Given input is not in proper format, only include alphabets please!”  And asks for the user input again. | Pass |
| 13 | Validating Club Names when creating new Clubs  **(from CLI)** | Select the Option 1 from the menu and again select option 1 for normal football club and create a football club with:  Club name: aVeNgErS  Location: Spain  Coach Name: Nazhim  Select the Option 4 and enter the season as “2020-21” | Displays the club name entered by user as “aVeNgErS” into “Avengers” in a proper format in the table | Displays the club name entered by user as “aVeNgErS” into “Avengers” in a proper format in the table | Pass |
| 14 | Validating adding match when there is only one club present  **(from CLI)** | Select the Option 8 to clear all the data from the file.  Select the Option 1 from the menu and again select option 1 for normal football club and create a club with the name “Barca” and fill all the other prompts with any random data.  Select the Option 5 from the menu. | Displays the message “Sorry there is only 1 club present currently, so a match can't be played!” and returns the main menu | Displays the message “Sorry there is only 1 club present currently, so a match can't be played!” and returns the main menu | Pass |
| 15 | Validating that no more than 20 clubs can be created.  **(from CLI)** | Keep creating clubs by selecting the option number 1 and entering the necessary information, until the 21st club details are entered | Displays the following message to the user “Sorry there is no room for a new club, the maximum number of club limit has been reached!  ” | Displays the following message to the user “Sorry there is no room for a new club, the maximum number of club limit has been reached!  ” | Pass |
| 16 | Validating that a club cannot play the same type of match twice with the same club for the same season  **(from CLI)** | Get 2 clubs from the list which didn’t play a match so far with each other.  Select option 5 to add a match of type “Home” for season “2020-21”  Repeat the same thing of adding match to the same season and match type | Displays the following message to the user  “Sorry can't add match, because it's already played for the given teams, season and match type!  ” | Displays the following message to the user  “Sorry can't add match, because it's already played for the given teams, season and match type!  ” | Pass |
| 17 | Validating delete club when the user enters an invalid club to be deleted  **(from CLI)** | Select option 2 and enter a random club name which is not in the premier league club list | Displays a message indicating that there is no club with the given name | Displays a message indicating that there is no club with the given name | Pass |
| 18 | Validating display statistics of an invalid club entered  **(from CLI)** | Select option 3 and enter a random club name which is not in the premier league club list | Displays a message indicating that there is no club with the given name | Displays a message indicating that there is no club with the given name | Pass |

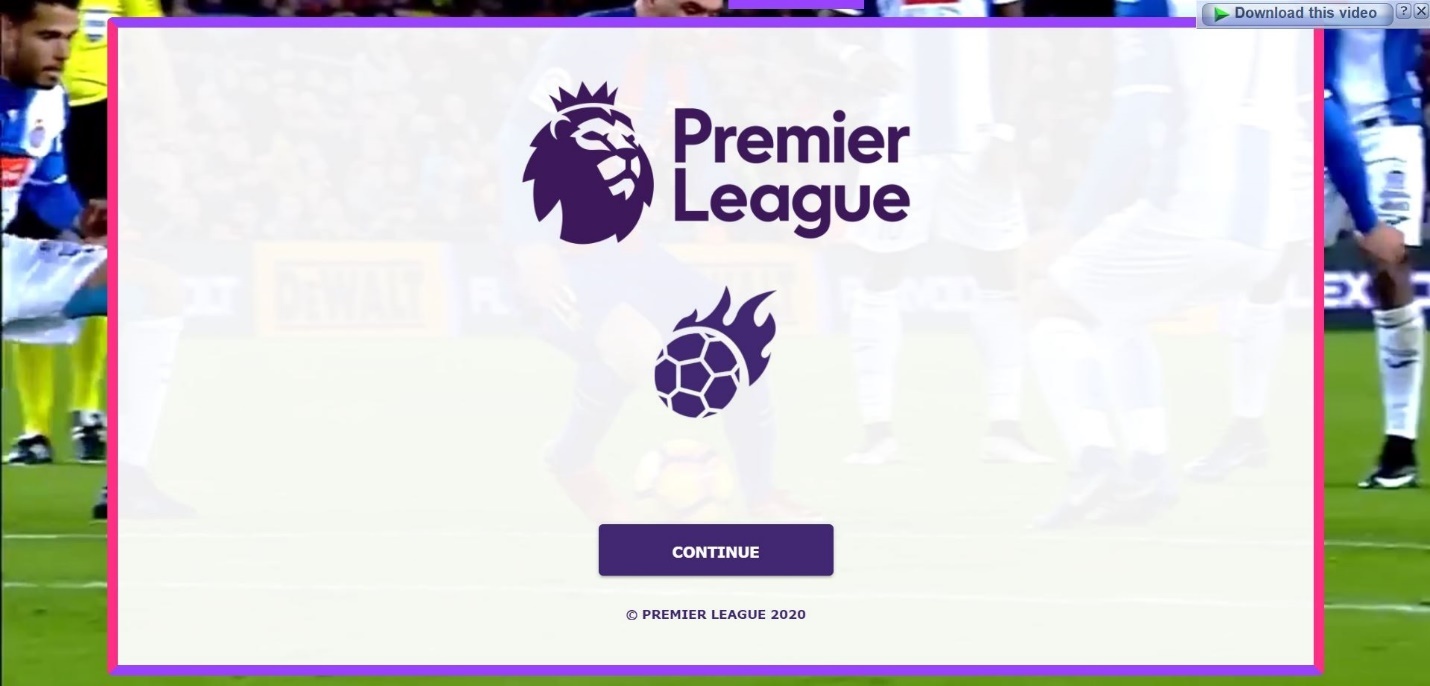
# Further test cases for GUI with validation test cases.

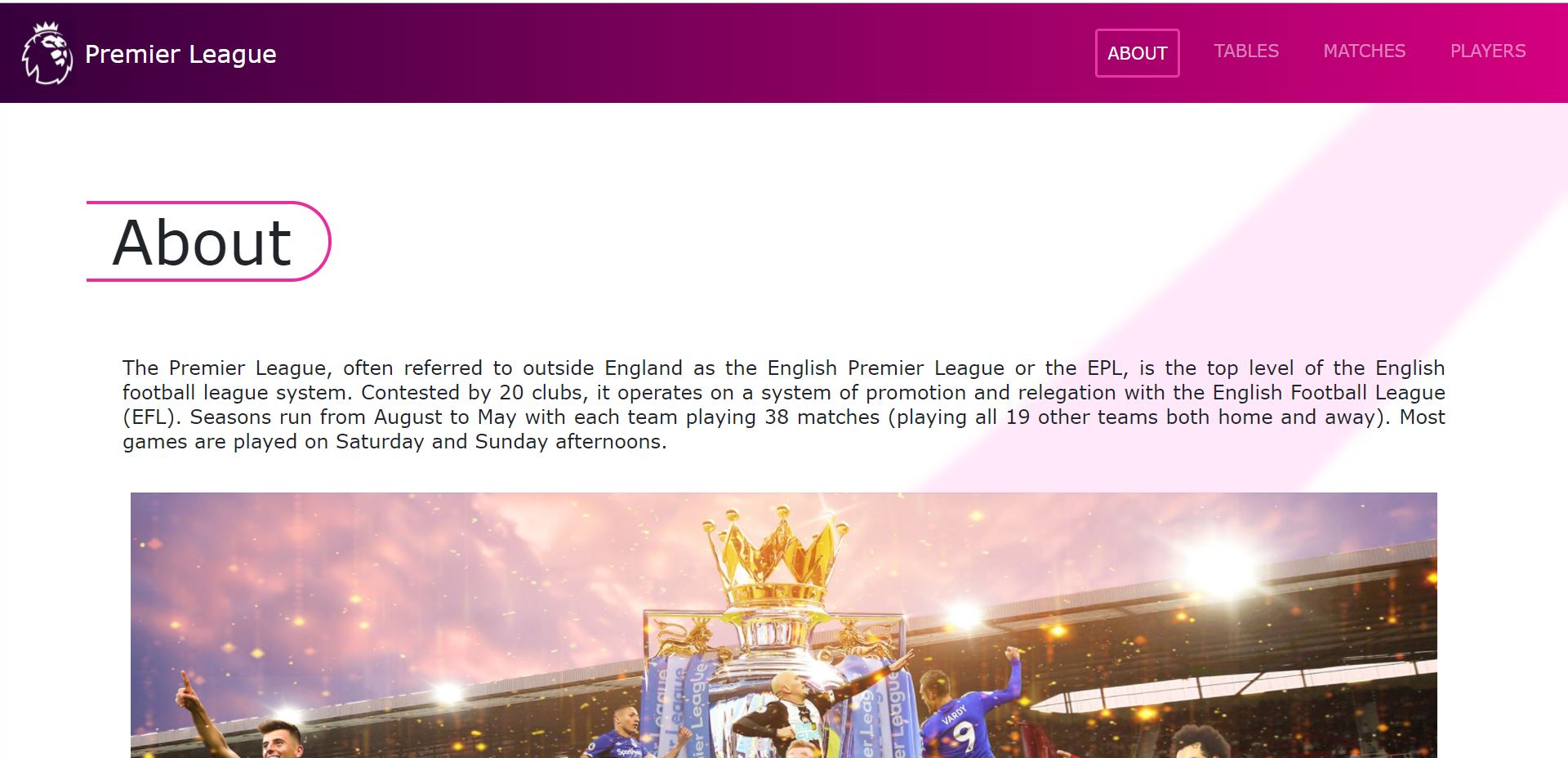
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test Case ID** | **Test Case** | **Input data** | **Expected Output** | **Actual Output** | **Pass/**  **Fail** |
| 1 | Displaying table records (which is by default sorted by points) | Select tables from the navigation bar | Displays the table records which are sorted by points for a specific season, in descending order. | Displays the table records which are sorted by points for a specific season, in descending order. | Pass |
| 2 | Displaying table records (which are sorted by goals) | From the “Sort By” drop down menu select “goals” option, from the tables page | Displays the table records for a specific which are sorted by goals in descending order. | Displays the table records for a specific which are sorted by goals in descending order. | Pass |
| 3 | Displaying table records (which are sorted by wins) | From the “Sort By” drop down menu select “wins” option, from the tables page | Displays the table records for a specific which are sorted by wins in descending order. | Displays the table records for a specific which are sorted by wins in descending order. | Pass |
| 4 | Displaying table records (which are sorted by points) | From the “Sort By” drop down menu select “points” option, from the tables page | Displays the table records for a specific which are sorted by points in descending order. | Displays the table records for a specific which are sorted by points in descending order. | Pass |
| 5 | Displaying table records from different seasons | From the “Season” drop down menu select any season you wish, from the tables page | Displays the table records for the selected season in descending order of points | Displays the table records for the selected season in descending order of points | Pass |
| 6 | Displaying the list of matches played | Select matches from the navigation bar | Displays the list of matches played for a specific season in ascending order of sorted date | Displays the list of matches played for a specific season in ascending order of sorted date | Pass |
| 7 | Displaying the list of played matches for a selected season | Select the season drop down menu and select a season, from the matches page | Displays a list of matches for the selected season in ascending order of sorted date | Displays a list of matches for the selected season in ascending order of sorted date | Pass |
| 8 | Displaying the list of matches by a specific date | Enter a date in proper format inside the text field for searching by date  Click the search button | Displays a list of matches for a specific season with a specific date. | Displays a list of matches for a specific season with a specific date. | Pass |
| 9 | Generating a new match and display with all the list of matches for a specific season | Select any season you wish to generate a match.  Click the “Play Match” button | Displays a message that a match is generate (assuming that random data generated are all valid) and displays the total list of matches with the generated match for the season | Displays a message that a match is generate (assuming that random data generated are all valid) and displays the total list of matches with the generated match for the season | Pass |
| 10 | Validating if user enters date in invalid format | Select the date text field and enter the following “2020-12-14e”  Click Search button | Display the message “Invalid date / format !” | Display the message “Invalid date / format !” | Pass |
| 11 | Validating generation of match when there is only 1 team available | “Assuming that there is only 1 club present”  Click the “Play Match” button | Display and error message indicating the issue | Display and error message indicating the issue | Pass |
| 12 | Validating match generation, when the maximum number of matches played by a club is reached | “Assuming that there are only 2 clubs present for any given season at the moment”, so make sure that a season contains only 2 clubs  Since the maximum number of matches can be played is 2 per club  Keep clicking “Play Match” button | Displays the Error message to the user once all the 2 matches are played by each club  This may also Display an error message even before both the matches are played, this is because this is a random process and there is a probability that the same type of match being selected again. (eg:- Club A can play with Club B with 2 differnent match types such as “Home” and “Away”, they can play the same match type twice) | Displays the Error message to the user once all the 2 matches are played by each club  This may also Display an error message even before both the matches are played, this is because this is a random process and there is a probability that the same type of match being selected again. (eg:- Club A can play with Club B with 2 differnent match types such as “Home” and “Away”, they can play the same match type twice) | Pass |
| 13 | Date Search Validation | Leaving the Search input field empty and clicking the search button | This will display a message indicating that invalid date entered | This will display a message indicating that invalid date entered | Pass |
| 14 | Handling invalid URL Route entered by the user in case. | Select the browser URL and change it to the following  http://localhost:4200/fake | Display an error page to the user | Display an error page to the user | Pass |
| 15 | Handling search date where no matches are played | Select the search by date field from the matches page and enter a data where no matches are played and click the search button | This displays a message to the user indicating that no matches have been played for that particular date | This displays a message to the user indicating that no matches have been played for that particular date | Pass |

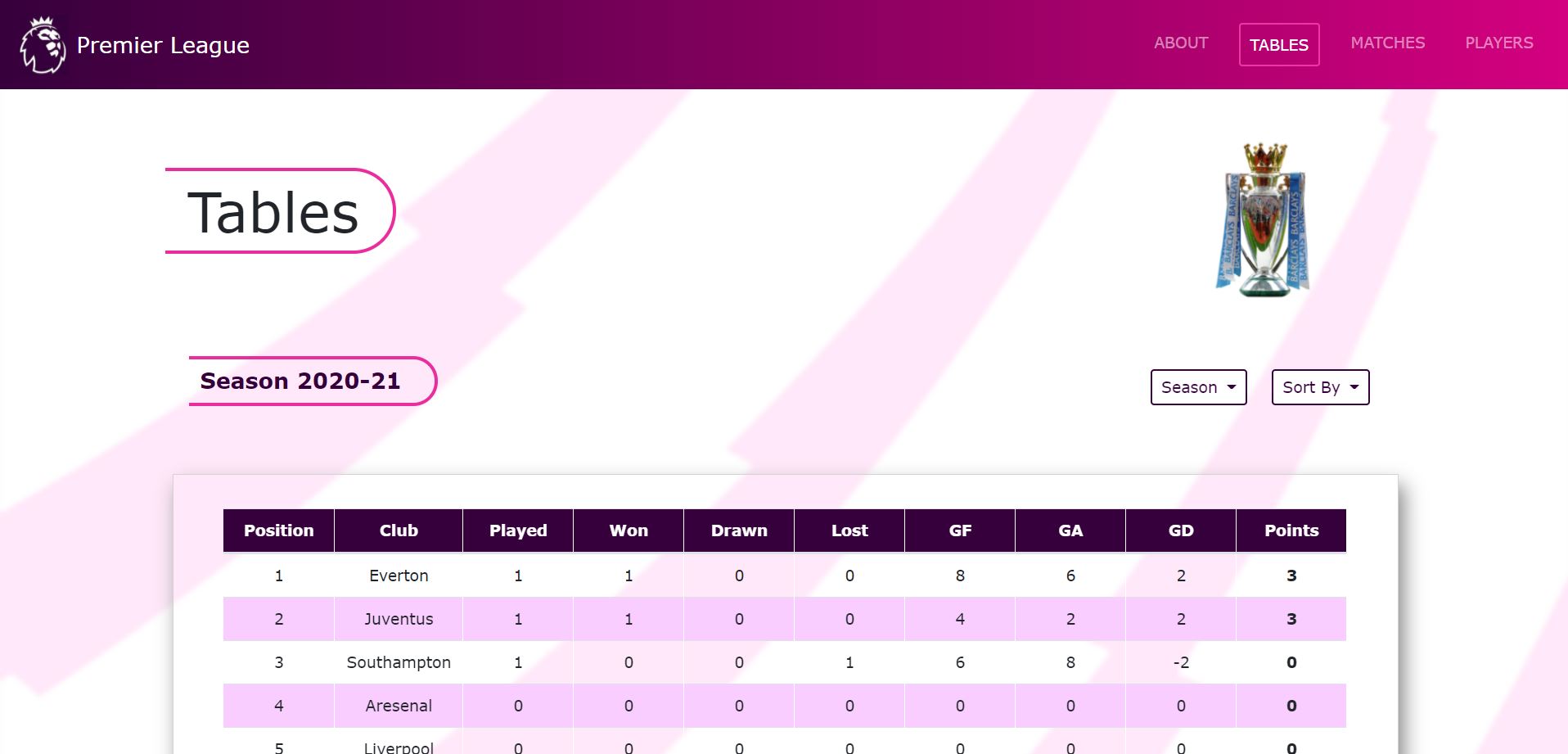
* 1. GUI
     1. GUI Project Structure

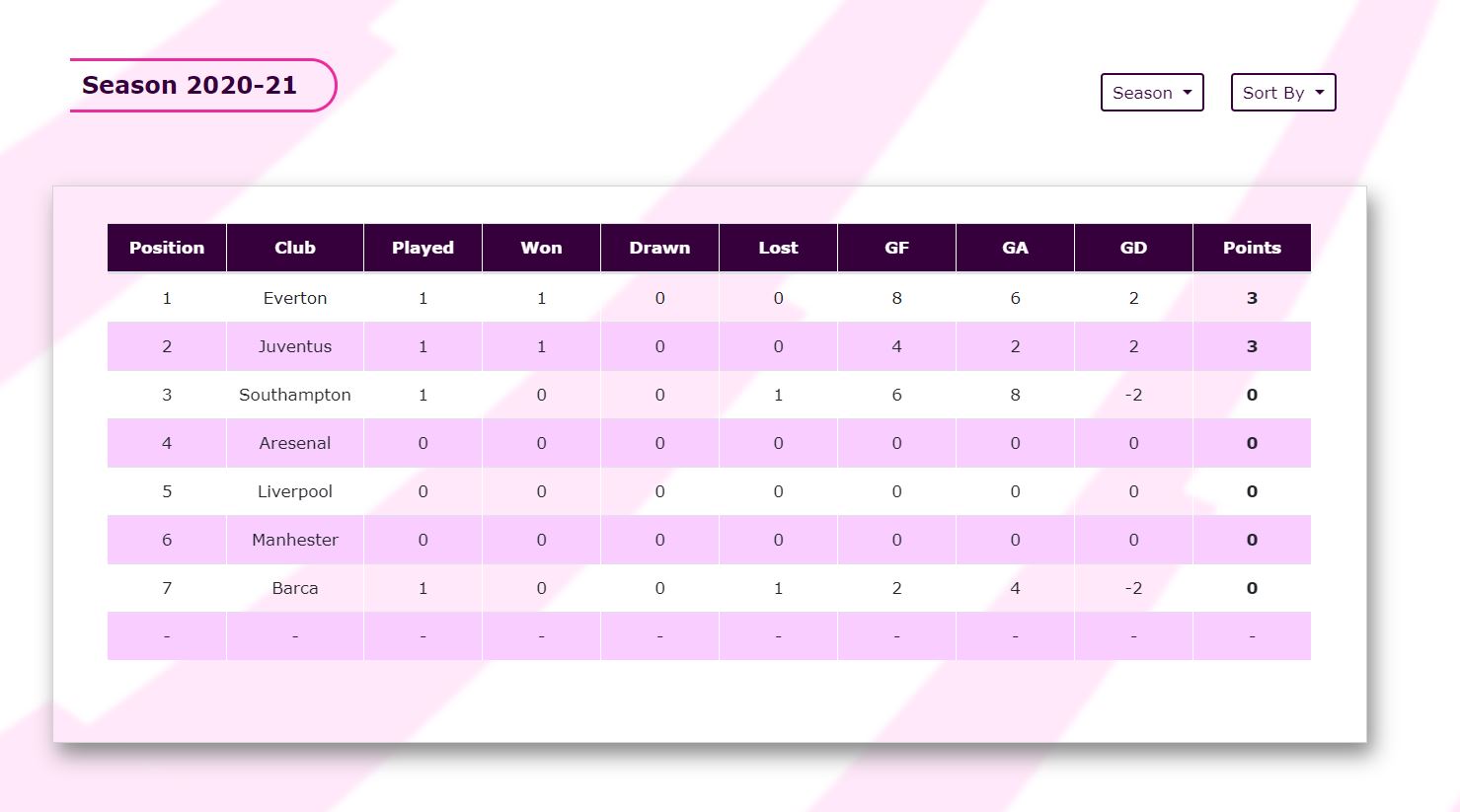


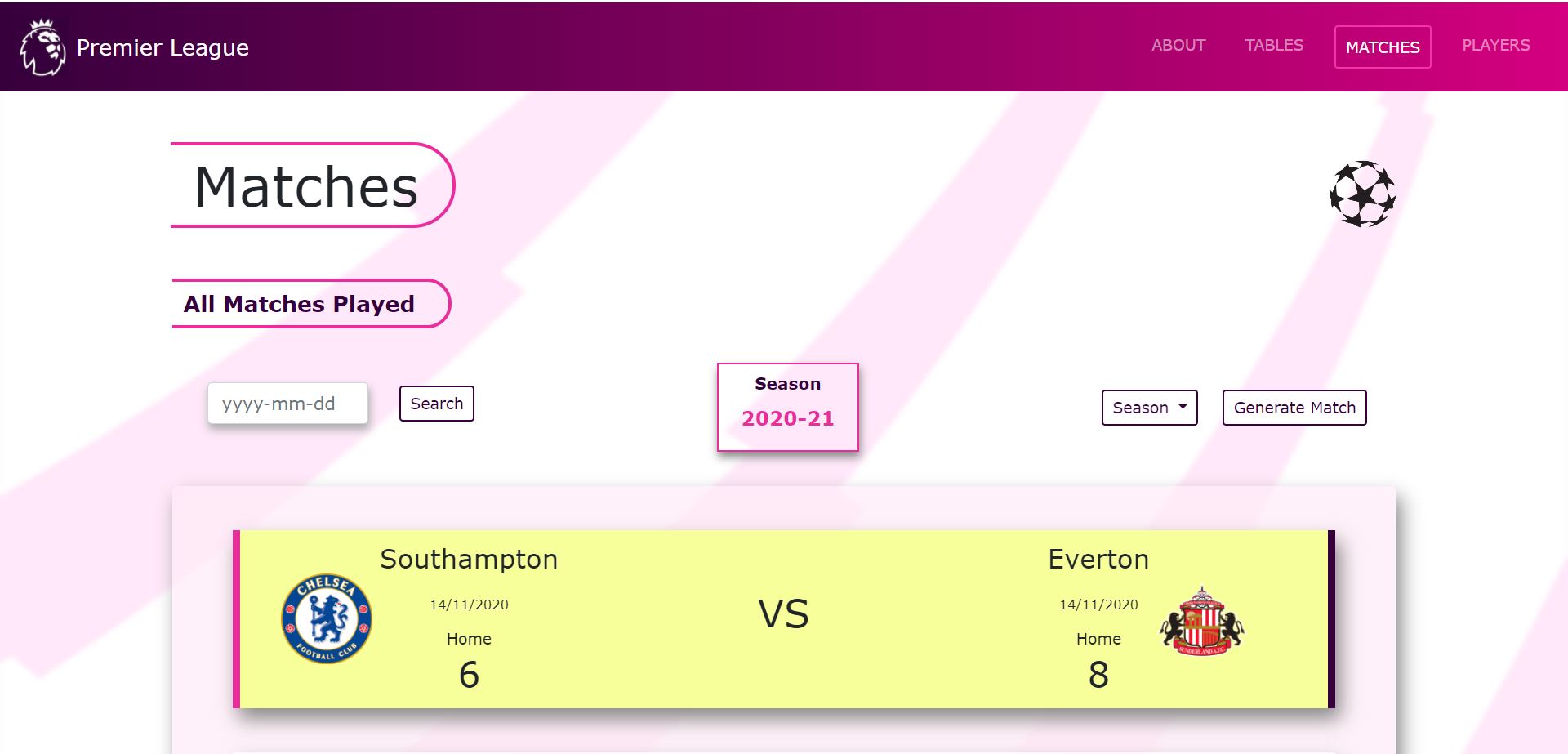
* + 1. GUI Screenshots

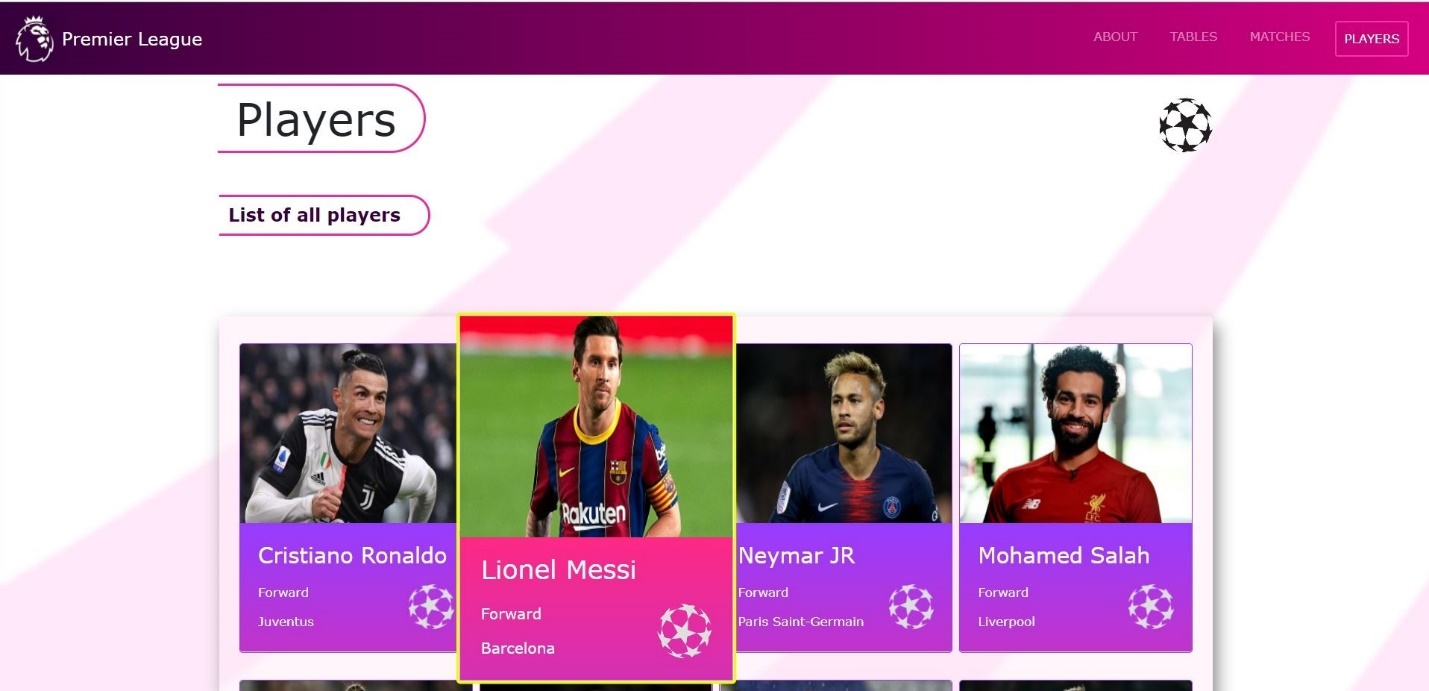






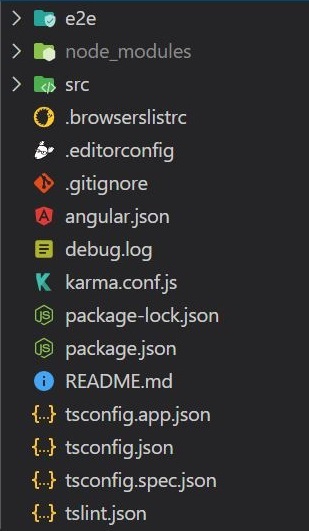
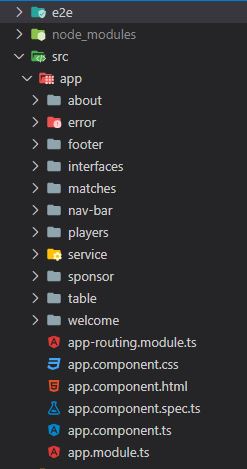








* + 1. Frontend Angular
       1. Project Structure

* + - 1. Code

**about component**

*about.component.html*

<!-- main container -->

<div class="about">

  <!-- about container -->

  <div class="container about\_\_container">

    <!-- about title -->

    <div class="about\_\_heading">About</div>

    <!-- section  -->

    <div class="about\_\_description container">

      <!-- description -->

      <p>

        The Premier League, often referred to outside England as the English

        Premier League or the EPL, is the top level of the English football

        league system. Contested by 20 clubs, it operates on a system of

        promotion and relegation with the English Football League (EFL). Seasons

        run from August to May with each team playing 38 matches (playing all 19

        other teams both home and away). Most games are played on Saturday and

        Sunday afternoons.

      </p>

      <!-- image -->

      <img src="../../assets/aboutPage/1.jpg" alt="" />

    </div>

    <!-- section  -->

    <div class="about\_\_description container">

      <!-- description -->

      <p>

        The competition was founded as the FA Premier League on 20 February 1992

        following the decision of clubs in the Football League First Division to

        break away from the Football League, founded in 1888, and take advantage

        of a lucrative television rights deal. The deal was worth around £1

        billion a year domestically as of 2013–14, with Sky and BT Group

        securing the domestic rights to broadcast 116 and 38 games respectively.

        The league is a corporation in which the member clubs act as

        shareholders, and generates €2.2 billion per year in domestic and

        international television rights. Clubs were apportioned central payment

        revenues of £2.4 billion in 2016–17, with a further £343 million in

        solidarity payments to English Football League (EFL) clubs.

      </p>

      <!-- image -->

      <img src="../../assets/aboutPage/2.jpg" alt="" />

    </div>

    <!-- section  -->

    <div class="about\_\_description container">

      <!-- description -->

      <p>

        The Premier League is the most-watched sports league in the world,

        broadcast in 212 territories to 643 million homes and a potential TV

        audience of 4.7 billion people. For the 2018–19 season average Premier

        League match attendance was at 38,181, second to the Bundesliga's

        43,500, while aggregated attendance across all matches is the highest of

        any league at 14,508,981. Most stadium occupancies are near capacity.

        The Premier League ranks second in the UEFA coefficients of leagues

        based on performances in European competitions over the past five

        seasons as of 2019, only behind Spain's La Liga.

      </p>

      <!-- image -->

      <img src="../../assets/aboutPage/3.jpg" alt="" />

    </div>

    <!-- section  -->

    <div class="about\_\_description container">

      <!-- description -->

      <p>

        There are 20 clubs in the Premier League. During the course of a season

        (from August to May) each club plays the others twice (a double

        round-robin system), once at their home stadium and once at that of

        their opponents', for 38 games. Teams receive three points for a win and

        one point for a draw. No points are awarded for a loss. Teams are ranked

        by total points, then goal difference, and then goals scored. If still

        equal, teams are deemed to occupy the same position. If there is a tie

        for the championship, for relegation, or for qualification to other

        competitions, a play-off match at a neutral venue decides rank.

      </p>

      <!-- image -->

      <img src="../../assets/aboutPage/4.jpg" alt="" />

    </div>

    <!-- section  -->

    <div class="about\_\_description container">

      <!-- description -->

      <p>

        A system of promotion and relegation exists between the Premier League

        and the EFL Championship. The three lowest placed teams in the Premier

        League are relegated to the Championship, and the top two teams from the

        Championship promoted to the Premier League, with an additional team

        promoted after a series of play-offs involving the third, fourth, fifth

        and sixth placed clubs. The number of clubs was reduced from 22 to 20 in

        1995, when four teams were relegated from the league and only two teams

        promoted. The top flight had only been expanded to 22 teams at the start

        of the 1991–92 season – the year prior to the formation of the Premier

        League. On 8 June 2006, FIFA requested that all major European leagues,

        including Italy's Serie A and Spain's La Liga, be reduced to 18 teams by

        the start of the 2007–08 season. The Premier League responded by

        announcing their intention to resist such a reduction. Ultimately, the

        2007–08 season kicked off again with 20 teams.

      </p>

      <!-- image -->

      <img src="../../assets/aboutPage/5.jpg" alt="" />

    </div>

  </div>

  <br />

  <br />

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*about.component.css*

\* {

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

}

.about\_\_container {

  padding-top: 80px;

}

.about\_\_heading {

  font-size: 50px;

  border: 3px solid #ea2d9d;

  width: fit-content;

  padding: 20px;

  transition: 0.3s ease-in-out;

  border-left: transparent;

  padding-right: 30px;

  border-top-right-radius: 100px;

  border-bottom-right-radius: 100px;

}

.about\_\_description img{

  transition: 1s ease-in-out;

}

.about\_\_description img:hover {

  transform: scale(1.03);

  transition: 1s ease-in-out;

}

.about\_\_description {

  margin-top: 60px;

  display: flex;

  flex-direction: column;

}

.about\_\_description p {

  font-size: 16px;

  text-align: justify;

}

.about\_\_description img {

  object-fit: contain;

  height: 600px;

  margin-top: 20px;

}

/\* Animation Part \*/

.about {

  -webkit-animation: fadein 1s; /\* Safari, Chrome and Opera > 12.1 \*/

  -moz-animation: fadein 1s; /\* Firefox < 16 \*/

  -ms-animation: fadein 1s; /\* Internet Explorer \*/

  -o-animation: fadein 1s; /\* Opera < 12.1 \*/

  animation: fadein 1s;

}

@keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Firefox < 16 \*/

@-moz-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Safari, Chrome and Opera > 12.1 \*/

@-webkit-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Internet Explorer \*/

@-ms-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Opera < 12.1 \*/

@-o-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

.about\_\_heading {

  -webkit-animation: titleLeftMove 1.2s infinite linear; /\* Chrome, Safari, Opera \*/

  animation: 1.2s infinite titleLeftMove linear;

}

@keyframes titleLeftMove {

  0% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

  50% {

    position: relative;

    right: 15px;

    transition: 0.2s ease-in-out;

  }

  100% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

}

*about.component.ts*

import { Component } from '@angular/core';

@Component({

  selector: 'app-about',

  templateUrl: './about.component.html',

  styleUrls: ['./about.component.css']

})

export class AboutComponent {

  // constructor

  public constructor() { }

}

**error**

*error.component.css*

.error\_\_page {

  display: flex;

  justify-content: center;

  flex-direction: column;

  height: 100vh;

  align-items: center;

}

.error\_\_page img{

    height: 300px;

    position: relative;

    left: 40px;

    object-fit: contain;

}

.error\_\_page p{

  font-size: 50px;

  font-weight: 600;

}

/\* Animation Part \*/

.error\_\_page {

  -webkit-animation: fadein 1s; /\* Safari, Chrome and Opera > 12.1 \*/

  -moz-animation: fadein 1s; /\* Firefox < 16 \*/

  -ms-animation: fadein 1s; /\* Internet Explorer \*/

  -o-animation: fadein 1s; /\* Opera < 12.1 \*/

  animation: fadein 1s;

}

@keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Firefox < 16 \*/

@-moz-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Safari, Chrome and Opera > 12.1 \*/

@-webkit-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Internet Explorer \*/

@-ms-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Opera < 12.1 \*/

@-o-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

*error.component.html*

<!-- error main container -->

<div class="container error\_\_page">

  <!-- error gif -->

  <img src="../../assets/error404.gif" alt="" />

  <!-- error message -->

  <p>Error 404</p>

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*error.component.ts*

import { Component,  } from '@angular/core';

@Component({

  selector: 'app-error',

  templateUrl: './error.component.html',

  styleUrls: ['./error.component.css']

})

export class ErrorComponent {

  // constructor

  public constructor() { }

}

**footer**

*footer.component.css*

\* {

    font-family: Verdana, Geneva, Tahoma, sans-serif !important;

  }

.footer {

  display: flex;

  flex-direction: column;

  align-items: center;

  justify-content: center;

  padding-top: 20px;

  padding-bottom: 10px;

  color: white;

  background-image: linear-gradient(to right, #36003c, #3e0044, #46004c, #4e0055, #56005d, #630064, #70006b, #940076, #a9007a, #bf007d, #d4007f);}

p {

  font-family: Verdana, Geneva, Tahoma, sans-serif;

}

*footer.component.html*

<!-- main container -->

<footer class="footer">

  <!-- footer content -->

  <p style="font-size: 13px; font-weight: 600">© PREMIER LEAGUE 2020</p>

  <p style="font-size: 12px">

    Modern Slavery Statement • Equality Standard • Terms & Conditions • Policies

    • Cookie Policy

  </p>

  <!-- footer image -->

  <div>

    <img src="../../assets/footerImage.png" alt="" height="30ox" />

  </div>

</footer>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*footer.component.ts*

import { Component } from '@angular/core';

@Component({

  selector: 'app-footer',

  templateUrl: './footer.component.html',

  styleUrls: ['./footer.component.css']

})

export class FooterComponent{

  // constructor

  public constructor() { }

}

**interfaces**

*ClubStatistics.ts*

// interface for the club statistics

export interface ClubStatistics {

  // variables

  totalMatchesPlayed: number;

  totalWins: number;

  totalDraws: number;

  totalDefeats: number;

  totalPointsScored: number;

}

*Date.ts*

// interface for the date

export interface Date {

  // variables

  day: number;

  month: number;

  year: number;

}

*FootballClub.ts*

import { MatchPlayed } from './MatchPlayed';

import { ClubStatistics } from './ClubStatistics';

// interface for the football club

export interface FootballClub {

  // variables

  name: string;

  location: string;

  clubStatistics: ClubStatistics;

  coachName: string;

  totalGoalsReceived: number;

  totalGoalsScored: number;

  totalGoalsDifference: number;

  totalYellowCards: number;

  totalRedCards: number;

  matchesPlayed: MatchPlayed[];

  playersList: object[];

  mainStatistics: number[];

}

*MatchPlayed.ts*

// interface for the match played

export interface MatchPlayed {

  // variables

  goalScored: number;

  goalReceived: number;

  season: string;

  matchStats: object;

  date: Date;

  opponentClubName: string;

  matchType: string;

  participatedCLubName: string;

}

**matches**

*matches.component.css*

\* {

    font-family: Verdana, Geneva, Tahoma, sans-serif !important;

  }

  .matches {

    padding-top: 80px;

  }

  .season:hover {

    cursor: pointer !important;

  }

  .matches\_\_titleContent {

    display: flex;

    align-items: center;

    justify-content: space-between;

  }

  .closeBtn {

    color: #ea2d9d;

  }

  #myModal {

    z-index: 1000000000000;

  }

  .matches\_\_titleContent h1 {

    font-size: 50px !important;

    border: 3px solid #ea2d9d;

    width: fit-content;

    padding: 20px;

    transition: 0.3s ease-in-out;

    border-left: transparent;

    padding-right: 30px;

    border-top-right-radius: 100px;

    border-bottom-right-radius: 100px;

  }

  .validationDate\_\_visible {

    position: relative;

    top: 18px;

  }

  .validationDate\_\_invisible p {

    display: none;

  }

  .validationDate\_\_visible p {

    width: 100%;

    -webkit-animation: invalidAnimation 1s infinite;

    /\* Chrome, Safari, Opera \*/

    animation: 1s infinite invalidAnimation;

  }

  .validationDate\_\_visible p small {

    color: red;

    font-weight: 600;

  }

  .date\_\_group {

    display: flex;

    flex-direction: column;

  }

  #dateEntered {

    transition: 0.2s ease-in-out !important;

    margin: 1px !important;

  }

  #dateEntered:hover {

    transition: 0.2s ease-in-out !important;

    border: 2px #ea2d9d solid !important;

    transform: scale(1.02) !important;

    margin: 0px !important;

  }

  .matches\_\_textField\_\_searchBtn,

  .matches\_\_btn > div > button,

  .matches\_\_btn > button {

    background-color: #fff;

    color: #36003c;

    border-color: #36003c;

    transition: 0.1s ease-in-out;

    margin: 1px 11px;

    border-width: 2px;

  }

  .matches\_\_textField\_\_searchBtn:hover,

  .matches\_\_btn button:hover,

  .matches\_\_btn div button:hover {

    transition: 0.1s ease-in-out;

    border-color: #ea2d9d;

    margin: 0px 10px;

    border-width: 3px;

    transform: scale(1.03);

    color: #ea2d9d;

  }

  .matches\_\_inputs {

    display: flex;

    align-items: center;

    justify-content: space-between;

    margin-top: 30px;

  }

  .dropdown-item:active {

    background-color: #ea2d9d !important;

  }

  .matches\_\_list > div {

    margin: 40px;

  }

  .matches\_\_playedSoFar {

    margin-top: 30px;

    font-size: 20px;

    font-weight: 600;

    border: 3px solid #ea2d9d;

    width: fit-content;

    padding: 10px;

    transition: 0.3s ease-in-out;

    border-left: transparent;

    padding-right: 30px;

    border-top-right-radius: 100px;

    border-bottom-right-radius: 100px;

    color: #36003c;

  }

  .matches\_\_list {

    height: 1000px;

    overflow: scroll;

    box-shadow: 5px 10px 18px #888888;

    margin-top: 30px;

    border-radius: 5px;

    background-color: #ffebf7b7;

  }

  .matches\_\_matchCard {

    display: flex;

    align-items: center;

    justify-content: space-between;

    background-image: linear-gradient(to right, #ffffff98, #ffffff9a);

    border-right: 0px #3C0042 solid;

    border-left: 0px #3C0042 solid;

    transition: 0.5s ease-in-out;

    padding: 18px;

    box-shadow: 5px 10px 18px #888888;

  }

  .matches\_\_matchCard:hover {

    transition: 0.5s ease-in-out;

    transform: scale(1.03);

    border-left: 7px #ea2d9d solid;

    border-right: 7px #36003c solid;

    padding: 10px;

  }

  .matches\_\_club1,

  .matches\_\_club2 {

    display: flex;

    /\* border: 1px black solid; \*/

    align-items: center;

    width: 300px;

    justify-content: center;

  }

  .match\_\_clubContent {

    display: flex;

    /\* border: 1px black solid; \*/

    flex-direction: column;

    align-items: center;

    justify-content: center;

  }

  .match\_\_date {

    font-size: 12px;

  }

  .match\_\_score {

    font-size: 32px;

  }

  .matches\_\_versus p {

    font-size: 25px;

  }

  .match\_\_logo {

    /\* border: 1px black solid; \*/

    padding: 0 10px;

  }

  .noMatches\_\_found {

    display: flex;

    flex-direction: column;

    justify-content: center;

    padding-top: 80px;

    align-items: center;

  }

  .noMatches\_\_found img {

    object-fit: contain;

    -webkit-animation: ballRotate 2s infinite linear;

    /\* Chrome, Safari, Opera \*/

    animation: 2s infinite ballRotate linear;

    height: 200px;

  }

  .noMatches\_\_found p {

    padding-top: 40px;

    font-size: 20px;

  }

  .dropdown-item {

    cursor: pointer !important;

  }

  .date\_\_calender {

    cursor: pointer;

    box-shadow: 1px 5px 8px #acacac;

    border: 2px black #888888;

  }

  .matches\_\_season {

    border: 2px #ea2d9d solid;

    transition: 0.2s ease-in-out;

    display: flex;

    margin: 1px;

    flex-direction: column;

    align-items: center;

    justify-content: center;

    padding: 7px 20px;

    box-shadow: 1px 5px 8px #888888;

    /\* border-radius: 20px; \*/

  }

  .matches\_\_season:hover {

    transform: scale(1.05);

    border-width: 3px;

    margin: 0px;

    transition: 0.2s ease-in-out;

  }

  .matches\_\_season p:first-child {

    font-size: 15px;

    font-weight: 600;

    color: #36003c;

  }

  .matches\_\_season p:last-child {

    font-size: 18px;

    font-weight: 600;

    color: #ea2d9d;

  }

  .loading {

    display: flex;

    align-items: center;

    justify-content: center;

    margin: 100px 0;

  }

  .loading img {

    object-fit: contain;

    height: 150px;

  }

  /\* Animation Part \*/

  .matches {

    -webkit-animation: fadein 1s;

    /\* Safari, Chrome and Opera > 12.1 \*/

    -moz-animation: fadein 1s;

    /\* Firefox < 16 \*/

    -ms-animation: fadein 1s;

    /\* Internet Explorer \*/

    -o-animation: fadein 1s;

    /\* Opera < 12.1 \*/

    animation: fadein 1s;

  }

  @keyframes fadein {

    from {

      opacity: 0;

      transform: scale(1.1);

    }

    to {

      opacity: 1;

      transform: scale(1);

    }

  }

  /\* Firefox < 16 \*/

  @-moz-keyframes fadein {

    from {

      opacity: 0;

      transform: scale(1.1);

    }

    to {

      opacity: 1;

      transform: scale(1);

    }

  }

  /\* Safari, Chrome and Opera > 12.1 \*/

  @-webkit-keyframes fadein {

    from {

      opacity: 0;

      transform: scale(1.1);

    }

    to {

      opacity: 1;

      transform: scale(1);

    }

  }

  /\* Internet Explorer \*/

  @-ms-keyframes fadein {

    from {

      opacity: 0;

      transform: scale(1.1);

    }

    to {

      opacity: 1;

      transform: scale(1);

    }

  }

  /\* Opera < 12.1 \*/

  @-o-keyframes fadein {

    from {

      opacity: 0;

      transform: scale(1.1);

    }

    to {

      opacity: 1;

      transform: scale(1);

    }

  }

  /\* Change the ball rotation every second \*/

  .matches\_\_titleContent img {

    -webkit-animation: ballRotate 2s infinite linear;

    /\* Chrome, Safari, Opera \*/

    animation: 2s infinite ballRotate linear;

  }

  @keyframes ballRotate {

    0% {

      transform: rotate(0deg);

      transition: 1s ease-in-out;

    }

    10% {

      transform: rotate(36deg);

      transition: 1s ease-in-out;

    }

    20% {

      transform: rotate(72deg);

      transition: 1s ease-in-out;

    }

    30% {

      transform: rotate(108deg);

      transition: 1s ease-in-out;

    }

    40% {

      transform: rotate(144deg);

      transition: 1s ease-in-out;

    }

    50% {

      transform: rotate(180deg);

      transition: 1s ease-in-out;

    }

    60% {

      transform: rotate(216deg);

      transition: 1s ease-in-out;

    }

    70% {

      transform: rotate(252deg);

      transition: 1s ease-in-out;

    }

    80% {

      transform: rotate(288deg);

      transition: 1s ease-in-out;

    }

    90% {

      transform: rotate(324deg);

      transition: 1s ease-in-out;

    }

    100% {

      transform: rotate(360deg);

      transition: 1s ease-in-out;

    }

  }

  @keyframes invalidAnimation {

    0% {

      transform: scale(0.95);

      transition: 0.3s ease-in-out;

    }

    50% {

      transform: scale(1);

      transition: 0.3s ease-in-out;

    }

    100% {

      transform: scale(0.95);

      transition: 0.3s ease-in-out;

    }

  }

  /\* Adding animation for the matches cards \*/

  .matches\_\_matchCard:hover {

    background-color: #eaff00;

  }

  .matches\_\_matchCard:hover > .matches\_\_club1 > div:first-child,

  .matches\_\_matchCard:hover > .matches\_\_club2 > div:last-child {

    transition: 1s ease-in-out;

    transform: scale(1.1);

  }

  .matches\_\_versus p {

    transition: 0.5s ease-in-out;

  }

  .matches\_\_matchCard:hover > .matches\_\_versus p {

    font-size: 35px;

    transition: 0.5s ease-in-out;

  }

  .matches\_\_header {

    -webkit-animation: titleLeftMove 1.2s infinite linear;

    /\* Chrome, Safari, Opera \*/

    animation: 1.2s infinite titleLeftMove linear;

  }

  @keyframes titleLeftMove {

    0% {

      position: relative;

      right: 0;

      transition: 0.2s ease-in-out;

    }

    50% {

      position: relative;

      right: 15px;

      transition: 0.2s ease-in-out;

    }

    100% {

      position: relative;

      right: 0;

      transition: 0.2s ease-in-out;

    }

  }

  .celebration\_\_theme {

    -webkit-animation: celebrationTheme 2s infinite;

    /\* Chrome, Safari, Opera \*/

    animation: 2s infinite celebrationTheme;

  }

  @keyframes celebrationTheme {

    0% {

      transition: 0.2s ease-in-out;

    }

    50% {

      background-image: url(../../assets/celebration.gif);

      transition: 1s ease-in-out;

    }

    100% {

      transition: 0.2s ease-in-out;

    }

  }

  .error\_\_theme {

    -webkit-animation: errorTheme 2s infinite linear;

    /\* Chrome, Safari, Opera \*/

    transition: 1s ease-in-out;

    animation: 2s infinite errorTheme linear;

  }

  @keyframes errorTheme {

    0% {

      background: -moz-linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      background: -webkit-linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      background: linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      transition: 1s ease-in-out linear;

    }

    50% {

      background: -moz-linear-gradient(rgb(255, 102, 102) 0%, transparent 35%);

      background: -webkit-linear-gradient(rgb(255, 102, 102) 0%, transparent 35%);

      background: linear-gradient(rgb(255, 102, 102) 0%, transparent 35%);

      transition: 1s ease-in-out linear;

    }

    100% {

      background: -moz-linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      background: -webkit-linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      background: linear-gradient(rgb(255, 169, 169) 0%, transparent 35%);

      transition: 1s ease-in-out linear;

    }

  }

  .matches\_\_matchCard {

    opacity: 0.5;

    animation-name: slideDown;

    animation-duration: 1.5s;

    animation-iteration-count: 1;

    animation-fill-mode: forwards;

  }

  @keyframes slideDown {

    from {

      opacity: 0.5;

      transform: translateY(-70px);

    }

    to {

      opacity: 1;

      transform: translateY(0px);

    }

  }

*matches.component.html*

<!-- main container -->

<div class="{{ getDisplayCelebration() }}">

  <!-- Pop up modal if there are null matches generated due to clubs less than 2 present -->

  <div id="myModal" class="modal fade" role="dialog">

    <div class="modal-dialog">

      <!-- Modal content-->

      <div class="modal-content">

        <!-- Modal header -->

        <div class="modal-header">

          <!-- modal title -->

          <h1 class="modal-title" [ngStyle]="{ color: getHeaderModalColor() }">

            {{ getMatchGenerateHeaderMessage() }}

          </h1>

          <!-- modal close button -->

          <button

            type="button"

            class="close"

            (click)="handleCloseModal()"

            data-dismiss="modal"

          >

            &times;

          </button>

        </div>

        <!-- Modal message -->

        <div class="modal-body">

          <p>{{ getMatchGenerateBodyMessage() }}</p>

        </div>

        <!-- Modal Footer -->

        <div class="modal-footer">

          <!-- Modal close button -->

          <button

            type="button"

            class="btn btn-default closeBtn"

            data-dismiss="modal"

            (click)="handleCloseModal()"

          >

            Close

          </button>

        </div>

      </div>

    </div>

  </div>

  <!-- main match container -->

  <div class="matches container">

    <!-- match title container -->

    <div class="matches\_\_titleContent">

      <!-- match header -->

      <h1 class="matches\_\_header">Matches</h1>

      <!-- match header image -->

      <img src="../../assets/ball.png" alt="" height="60px" />

    </div>

    <!-- all matches title -->

    <p class="matches\_\_playedSoFar">All Matches Played</p>

    <!-- matches input data-->

    <div class="matches\_\_inputs container">

      <!-- getting date input from user -->

      <div class="matches\_\_textField">

        <form class="form-inline">

          <div

            class="form-group mx-sm-3 mb-2 date\_\_group {{

              getValidationDate\_\_visible()

            }}"

          >

            <!-- date input text field for the user to enter the date -->

            <input

              type="text"

              class="form-control date\_\_calender"

              id="dateEntered"

              size="10"

              placeholder="yyyy-mm-dd"

              (change)="setSelectedDate($event.target.value)"

              value="{{ getSelectedDate() }}"

            />

            <!-- validation message -->

            <p><small>Invalid date / format !</small></p>

          </div>

          <!-- search button -->

          <button

            type="button"

            class="btn btn-sm mb-2 matches\_\_textField\_\_searchBtn"

            (click)="handleSearchSelectedDate()"

            \*ngIf="getDisplaySearchButton()"

          >

            Search

          </button>

          <!-- reset button -->

          <button

            type="button"

            class="btn btn-sm mb-2 matches\_\_textField\_\_searchBtn"

            (click)="handleReset()"

            \*ngIf="!getDisplaySearchButton()"

          >

            Reset

          </button>

        </form>

      </div>

      <!-- display the selected current season -->

      <div class="matches\_\_season">

        <p>Season</p>

        <p>{{ getCurrentSeason() }}</p>

      </div>

      <!-- matches buttons -->

      <div class="matches\_\_btn">

        <!-- drop down season -->

        <div class="btn-group season">

          <!-- dropdown button -->

          <button

            class="btn btn-light btn-sm dropdown-toggle"

            type="button"

            data-toggle="dropdown"

            aria-haspopup="true"

            aria-expanded="false"

          >

            Season

          </button>

          <!-- each drop down seasons -->

          <div class="dropdown-menu" aria-labelledby="dropdownMenuButton">

            <a

              class="dropdown-item"

              \*ngFor="let season of getSeason()"

              (click)="handleClickedSeason(season)"

              >{{ season }}</a

            >

          </div>

        </div>

        <!-- generate match btn -->

        <button

          type="button"

          class="btn btn-primary btn-sm"

          (click)="generateMatch()"

          data-toggle="modal"

          data-target="#myModal"

          data-backdrop="static"

          data-keyboard="false"

        >

           Play Match

<img src="../../assets/icons/play.svg" height="20px" alt="">

        </button>

      </div>

    </div>

    <!-- main card container -->

    <div

      class="matches\_\_list container"

      \*ngIf="!getLoadingContent() && !getNoMatchesAvailable()"

    >

      <!-- each match card -->

      <div

        class="matches\_\_matchCard"

        \*ngFor="let match of getMatches(); index as i"

      >

        <!-- details for club one -->

        <div class="matches\_\_club1">

          <!-- club logo -->

          <div>

            <img

              src="../../assets/logo/{{ getClubLogo()[i] }}.png"

              class="match\_\_logo"

              height="75px"

              alt=""

            />

          </div>

          <!-- club details -->

          <div class="match\_\_clubContent">

            <!-- the participated match club name -->

            <h1>{{ match.participatedCLubName }}</h1>

            <!-- date of the match played -->

            <p class="match\_\_date">

              {{ match.date["day"] }}/{{ match.date["month"] }}/{{

                match.date["year"]

              }}

            </p>

            <!-- match type -->

            <p class="match\_\_type">{{ match.matchType }}</p>

            <!-- match goal scored -->

            <p class="match\_\_score">{{ match.goalScored }}</p>

          </div>

        </div>

        <!-- VS -->

        <div class="matches\_\_versus">

          <p>VS</p>

        </div>

        <!-- details of club two -->

        <div class="matches\_\_club2">

          <!-- club details -->

          <div class="match\_\_clubContent">

            <!-- opponent club name -->

            <h1>{{ match.opponentClubName }}</h1>

            <!-- date of the match played -->

            <p class="match\_\_date">

              {{ match.date["day"] }}/{{ match.date["month"] }}/{{

                match.date["year"]

              }}

            </p>

            <!-- match type -->

            <p class="match\_\_type">{{ match.matchType }}</p>

            <!-- match goals received -->

            <p class="match\_\_score">{{ match.goalReceived }}</p>

          </div>

          <!-- club logo -->

          <div>

            <img

              src="../../assets/logo/{{ getClubLogo()[i + 2] }}.png"

              class="match\_\_logo"

              height="75px"

              alt=""

            />

          </div>

        </div>

      </div>

    </div>

    <!-- displaying the loading gif -->

    <div class="container loading" \*ngIf="getLoadingContent()">

      <img src="../../assets/loading.gif" alt="" />

    </div>

    <!-- displaying when there are no matches to be displayed or when the matches list is empty -->

    <div class="container noMatches\_\_found" \*ngIf="getNoMatchesAvailable()">

      <!-- ball image -->

      <img src="../../assets/ball.png" alt="" />

      <!-- message -->

      <p>NO MATCHES FOUND</p>

    </div>

  </div>

  <br />

  <br />

  <br />

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*matches.component.ts*

import { Component, OnInit } from '@angular/core';

import { MatchPlayed } from './../interfaces/MatchPlayed';

import { FootballInteractionService } from './../service/football-interaction.service';

@Component({

  selector: 'app-matches',

  templateUrl: './matches.component.html',

  styleUrls: ['./matches.component.css'],

})

export class MatchesComponent implements OnInit {

  // variables used

  private matches: MatchPlayed[];

  private currentSeason: string;

  private seasons: string[];

  private selectedDate: string;

  private clubLogo: number[];

  private loadingContent: boolean;

  private audio: any;

  private displayCelebration: string;

  private validationDate\_\_visible: string;

  private noMatchesAvailable: boolean;

  private displaySearchButton: boolean;

  private matchGenerateHeaderMessage: string;

  private matchGenerateBodyMessage: string;

  private headerModalColor: string;

  private tempTotalMatches: number;

  // constructor for initialization

  public constructor(private \_footballService: FootballInteractionService) {

    this.currentSeason = '2020-21';

    this.selectedDate = '';

    this.noMatchesAvailable = false;

    this.matches = [];

    this.loadingContent = true;

    this.displayCelebration = 'noCelebration';

    this.validationDate\_\_visible = 'validationDate\_\_invisible';

    this.displaySearchButton = true;

    this.tempTotalMatches = 0;

  }

  // runs just after the constructor

  public ngOnInit(): void {

    // we have to set the seasons here when the user loads this page

    this.\_footballService

      .getSeasons()

      .subscribe((data) => (this.seasons = data));

    // getting the matches for the current season

    this.\_footballService

      .getMatchesBySeason(this.currentSeason)

      .subscribe((data) => {

        // the temTotalMatches stores the total number of matches currently for checking

        // purpose when generating match(match limit)

        this.matches = data;

        this.tempTotalMatches = this.matches.length;

        this.generateClubLogo();

        this.loadingContent = false;

        this.validationDate\_\_visible = 'validationDate\_\_invisible';

        this.displaySearchButton = true;

        // if the matches list is empty we display the div container for no matches

        if (this.matches.length === 0) {

          this.noMatchesAvailable = true;

        } else {

          this.noMatchesAvailable = false;

        }

      });

  }

  // this method runs when the user selects a season

  public handleClickedSeason(clickedSeason: string) {

    // changes the variables accordingly when season changes

    this.selectedDate = '';

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    this.loadingContent = true;

    this.currentSeason = clickedSeason;

    // get the new records by season clicked

    this.\_footballService

      .getMatchesBySeason(clickedSeason)

      .subscribe((data) => {

        // the temTotalMatches stores the total number of matches currently for checking

        // purpose when generating match(match limit)

        this.matches = data;

        this.tempTotalMatches = this.matches.length;

        this.generateClubLogo();

        this.loadingContent = false;

        this.validationDate\_\_visible = 'validationDate\_\_invisible';

        this.displaySearchButton = true;

        // if the matches list is empty we display the div container for no matches

        if (this.matches.length === 0) {

          this.noMatchesAvailable = true;

        } else {

          this.noMatchesAvailable = false;

        }

      });

  }

  // this method runs when the user selects a date

  public handleSearchSelectedDate() {

    if (this.selectedDate !== '' && this.selectedDate !== null) {

      // changes the variables accordingly when season changes

      this.audio = new Audio();

      this.audio.src = '../../assets/matchPlayed.mp3';

      this.audio.load();

      this.audio.play();

      this.loadingContent = true;

      this.displaySearchButton = false;

      // using the service to get the matches by date

      this.\_footballService

        .getMatchesByDate(this.selectedDate, this.currentSeason)

        .subscribe((data) => {

          this.matches = data;

          this.generateClubLogo();

          this.loadingContent = false;

          this.validationDate\_\_visible = 'validationDate\_\_invisible';

          // if the matches list is empty we display the div container for no matches

          if (this.matches.length === 0) {

            this.noMatchesAvailable = true;

          } else {

            this.noMatchesAvailable = false;

          }

        });

      this.generateClubLogo();

    } else {

      this.validationDate\_\_visible = 'validationDate\_\_visible';

    }

  }

  // setting the selected data by the user to the variable for searching

  public setSelectedDate(date: string) {

    // validating the date

    var dateReg = /^\d{4}[-]\d{2}[-]\d{2}$/;

    console.log(date.match(dateReg));

    if (date === '') {

      this.validationDate\_\_visible = 'validationDate\_\_invisible';

      this.selectedDate = null;

    } else if (date.match(dateReg) === null) {

      this.validationDate\_\_visible = 'validationDate\_\_visible';

      this.selectedDate = null;

    } else {

      this.validationDate\_\_visible = 'validationDate\_\_invisible';

      this.selectedDate = date;

    }

  }

  // The reset button reloads the data for the current season selected

  public handleReset() {

    this.selectedDate = '';

    this.\_footballService

      .getMatchesBySeason(this.getCurrentSeason())

      .subscribe((data) => {

        this.matches = data;

        this.generateClubLogo();

        this.loadingContent = false;

        this.validationDate\_\_visible = 'validationDate\_\_invisible';

        this.displaySearchButton = true;

        // if the matches list is empty we display the div container for no matches

        if (this.matches.length === 0) {

          this.noMatchesAvailable = true;

        } else {

          this.noMatchesAvailable = false;

        }

      });

  }

  // When the user closed the modal we again load the matches

  public handleCloseModal() {

    this.\_footballService

      .getMatchesBySeason(this.getCurrentSeason())

      .subscribe((data) => {

        // the temTotalMatches stores the total number of matches currently for checking

        // purpose when generating match(match limit)

        this.matches = data;

        this.tempTotalMatches = this.matches.length;

        this.generateClubLogo();

        this.loadingContent = false;

        this.validationDate\_\_visible = 'validationDate\_\_invisible';

        this.displaySearchButton = true;

        // if the matches list is empty we display the div container for no matches

        if (this.matches.length === 0) {

          this.noMatchesAvailable = true;

        } else {

          this.noMatchesAvailable = false;

        }

      });

  }

  // this method runs when the user clicks the generate button

  public generateMatch() {

    // changes the variables accordingly when season changes

    this.selectedDate = '';

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    this.loadingContent = true;

    // using the service to get all the matches with the generated match

    this.\_footballService

      .getGeneratedMatchesBySeason(this.currentSeason)

      .subscribe((data) => {

        // the temTotalMatches stores the total number of matches currently for checking

        // purpose when generating match(match limit)

        this.matches = data;

        this.matchGenerateHeaderMessage = 'Error!';

        this.headerModalColor = '#FF0134';

        // if the data = null then we change the content of the model

        if (data === null) {

          this.displayCelebration = 'error\_\_theme';

          this.matchGenerateBodyMessage =

            'Cannot generate match, at least two clubs should be present to generate a match';

          } else if (this.matches.length === this.tempTotalMatches) {

          this.displayCelebration = 'error\_\_theme';

          this.matchGenerateBodyMessage = "Cannot generate match, this is due to the random club or match type selected has already reached it's maximum matches played, please re-generate to generate another random match";

        } else {

          this.displayCelebration = 'celebration\_\_theme';

          this.headerModalColor = '#2DBF64';

          this.matchGenerateHeaderMessage = 'Congratulations!';

          this.matchGenerateBodyMessage = 'Match Successfully generated.';

        }

        this.generateClubLogo();

        this.loadingContent = false;

        this.validationDate\_\_visible = 'validationDate\_\_invisible';

        this.displaySearchButton = true;

        // if the matches list is empty we display the div container for no matches

        if (this.matches.length === 0) {

          this.noMatchesAvailable = true;

        } else {

          this.noMatchesAvailable = false;

        }

        // In this case the tempTotalMatches has to be updated after the above code is executed

        this.tempTotalMatches = this.matches.length;

      });

    this.generateClubLogo();

    // Setting a delay

    setTimeout(() => {

      this.displayCelebration = 'noCelebration';

    }, 1500);

  }

  // generate random clubLogo

  public generateClubLogo() {

    this.clubLogo = [];

    this.matches.forEach((match) => {

      this.clubLogo.push(Math.floor(Math.random() \* Math.floor(23)) + 1);

      this.clubLogo.push(Math.floor(Math.random() \* Math.floor(23)) + 1);

      this.clubLogo.push(Math.floor(Math.random() \* Math.floor(23)) + 1);

    });

  }

  // setters and getters

  public setMatches(data: MatchPlayed[]) {

    this.matches = data;

  }

  public getMatches() {

    return this.matches;

  }

  public setCurrentSeason(data: string) {

    this.currentSeason = data;

  }

  public getCurrentSeason() {

    return this.currentSeason;

  }

  public setSeason(data: string[]) {

    this.seasons = data;

  }

  public getSeason() {

    return this.seasons;

  }

  public getMatchGenerateHeaderMessage() {

    return this.matchGenerateHeaderMessage;

  }

  public getMatchGenerateBodyMessage() {

    return this.matchGenerateBodyMessage;

  }

  public getSelectedDate() {

    return this.selectedDate;

  }

  public setClubLogo(data: number[]) {

    this.clubLogo = data;

  }

  public getClubLogo() {

    return this.clubLogo;

  }

  public setLoadingContent(data: boolean) {

    this.loadingContent = data;

  }

  public getLoadingContent() {

    return this.loadingContent;

  }

  public setAudio(data: string) {

    this.audio = data;

  }

  public getAudio() {

    return this.audio;

  }

  public getNoMatchesAvailable() {

    return this.noMatchesAvailable;

  }

  public setNoMatchesAvailable(data: boolean) {

    this.noMatchesAvailable = data;

  }

  public getDisplaySearchButton() {

    return this.displaySearchButton;

  }

  public setDisplaySearchButton(data: boolean) {

    this.displaySearchButton = data;

  }

  public setDisplayCelebration(data: string) {

    this.displayCelebration = data;

  }

  public getDisplayCelebration() {

    return this.displayCelebration;

  }

  public setValidationDate\_\_visible(data: string) {

    this.validationDate\_\_visible = data;

  }

  public getValidationDate\_\_visible() {

    return this.validationDate\_\_visible;

  }

  public getHeaderModalColor() {

    return this.headerModalColor;

  }

  public setHeaderModalColor(data: string) {

    this.headerModalColor = data;

  }

  public getTempTotalMatches() {

    return this.tempTotalMatches;

  }

  public setTempTotalMatches(data: number) {

    this.tempTotalMatches = data;

  }

}

**nav-bar**

*nav-bar.component.css*

\* {

    font-family: Verdana, Geneva, Tahoma, sans-serif !important;

    z-index: 9999;

}

.navigation\_\_bar {

    display: flex;

    justify-content: space-between;

    background-image: linear-gradient(to right, #36003c, #3e0044, #46004c, #4e0055, #56005d, #630064, #70006b, #940076, #a9007a, #bf007d, #d4007f);}

    position: sticky;

    top: 0;

}

.navigation\_\_barLogo {

    display: flex;

    align-items: center;

    justify-content: space-between;

    width: 210px;

}

.nav-item {

    transition: 0.1s ease-in-out;

    margin: 0 10px;

}

.nav-item:hover {

    transform: scale(1.1);

    transition: 0.1s ease-in-out;

}

.active {

    border: 2px #ff48b6c2 solid;

    border-radius: 3px;

    /\* font-weight: 600; \*/

    /\* background-color: #eb008dc2; \*/

}

*nav-bar.component.html*

<!-- main navigation bar -->

<nav class="navbar navbar-expand-lg navbar-dark navigation\_\_bar">

  <!-- left hand side content -->

  <div>

    <!-- premier league logo section -->

    <a

      class="navbar-brand navigation\_\_barLogo"

      routerLink="/"

      (click)="onHandleLogoClick()"

    >

      <!-- logo -->

      <img src="../../assets/head.jpg" height="55px" alt="" />

      <!-- title name -->

      <span>Premier League</span></a

    >

  </div>

  <!-- right hand side content -->

  <div class="navbarNav">

    <ul class="navbar-nav">

      <!-- about link -->

      <li class="nav-item">

        <a

          class="nav-link {{ getActiveLinks()[0] }}"

          (click)="onHandleClick('about')"

          routerLink="/about"

          >ABOUT

        </a>

      </li>

      <!-- table link -->

      <li class="nav-item">

        <a

          class="nav-link {{ getActiveLinks()[1] }}"

          (click)="onHandleClick('table')"

          routerLink="/tables"

          >TABLES</a

        >

      </li>

      <!-- matches link -->

      <li class="nav-item">

        <a

          class="nav-link {{ getActiveLinks()[2] }}"

          (click)="onHandleClick('matches')"

          routerLink="/matches"

          >MATCHES</a

        >

      </li>

      <!-- players link -->

      <li class="nav-item">

        <a

          class="nav-link {{ getActiveLinks()[3] }}"

          (click)="onHandleClick('players')"

          routerLink="/players"

          >PLAYERS</a

        >

      </li>

    </ul>

  </div>

</nav>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*nav-bar.component.ts*

import { WelcomeInteractionService } from './../service/welcome-interaction.service';

import { Component, OnInit } from '@angular/core';

@Component({

  selector: 'app-nav-bar',

  templateUrl: './nav-bar.component.html',

  styleUrls: ['./nav-bar.component.css'],

})

export class NavBarComponent implements OnInit {

  // variables

  private linkNames: string[];

  private activeLinks: string[];

  // getters

  public getLinkNames(){

    return this.linkNames;

  }

  public getActiveLinks(){

    return this.activeLinks;

  }

  // setters

  public setLinkNames(data: string[]){

    this.linkNames = data

  }

  public setActiveLinks(data: string[]){

    this.activeLinks = data

  }

  // constructor

  public constructor(private \_welcomeInteractionService: WelcomeInteractionService) {

    this.linkNames = ['about', 'table', 'matches', 'players'];

    this.activeLinks = [];

  }

  // sets the active link

  public ngOnInit(): void {

    this.activeLinks[0] = 'active';

  }

  // handles the onClick of the logo

  public onHandleLogoClick(){

    // this again removes the nav and footer parts and display the welcome page

    this.\_welcomeInteractionService.sendMessage(false);

  }

  // THIS IS TO MAKE THE ACTIVE LINKS VISIBLE IN THE NAV BAR

  public onHandleClick(linkName: string) {

    this.activeLinks = [];

    this.activeLinks[this.linkNames.indexOf(linkName)] = 'active';

  }

}

**players**

*players.component.css*

\* {

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

}

.players {

  margin-top: 80px;

}

.players\_\_heading {

  display: flex;

  align-items: center;

  justify-content: space-between;

}

.players\_\_heading h1 {

  font-size: 50px !important;

  border: 3px solid #ea2d9d;

  width: fit-content;

  padding: 20px;

  transition: 0.3s ease-in-out;

  border-left: transparent;

  padding-right: 30px;

  border-top-right-radius: 100px;

  border-bottom-right-radius: 100px;

}

.players\_\_list img {

  object-fit: fill;

  height: 200px;

}

.players\_\_list {

  display: flex;

  justify-content: space-evenly;

  flex-wrap: wrap;

  border-radius: 5px;

  background-color: #ffebf77a;

  box-shadow: 5px 10px 18px #888888;

  margin-top: 90px;

  padding-bottom: 50px;

}

.players\_\_listHeading {

  margin-top: 30px;

  font-size: 20px;

  font-weight: 600;

  border: 3px solid #ea2d9d;

  width: fit-content;

  padding: 10px;

  transition: 0.3s ease-in-out;

  border-left: transparent;

  padding-right: 30px;

  border-top-right-radius: 100px;

  border-bottom-right-radius: 100px;

  color: #36003c;

}

.players\_\_list > div {

  transition: 0.3s ease-in-out;

  border: 1px solid var(--colour-right);

  margin-top: 30px;

}

.players\_\_list > div:hover {

  transform: scale(1.2);

  z-index: 1;

  border: 3px #EAFF04 solid;

  transition: 0.3s ease-in-out;

}

.card-body {

  background-image: linear-gradient(var(--colour-right), var(--colour-left));

  color: white;

  height: 100%;

}

.card-body:hover {

  animation-name: example;

  animation-duration: 1s;

}

@keyframes example {

  from {

    background-image: linear-gradient(var(--colour-right), var(--colour-left));

  }

  to {

    background-image: linear-gradient(var(--colour-left), var(--colour-right));

  }

}

.card {

  /\* now a container for the image \*/

  display: inline-block; /\* shrink wrap to image \*/

  overflow: hidden; /\* hide the excess \*/

}

.card img {

  display: block; /\* no whitespace \*/

  transition: 0.5s ease-in-out;

}

.card:hover img {

  transform: scale(1.06);

}

.cardDescription\_\_container {

  display: flex;

  align-items: center;

  justify-content: space-between;

}

.cardDescription\_\_container img {

  object-fit: contain;

  height: 50px;

  -webkit-filter: invert(1);

  filter: invert(1);

}

/\* Animation Part \*/

.players {

  -webkit-animation: fadein 1s; /\* Safari, Chrome and Opera > 12.1 \*/

  -moz-animation: fadein 1s; /\* Firefox < 16 \*/

  -ms-animation: fadein 1s; /\* Internet Explorer \*/

  -o-animation: fadein 1s; /\* Opera < 12.1 \*/

  animation: fadein 1s;

}

@keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Firefox < 16 \*/

@-moz-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Safari, Chrome and Opera > 12.1 \*/

@-webkit-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Internet Explorer \*/

@-ms-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Opera < 12.1 \*/

@-o-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Change the ball rotation every second \*/

.players\_\_list > div:hover .player\_\_tatoo{

  -webkit-animation: ballRotate 2s infinite linear; /\* Chrome, Safari, Opera \*/

  animation: 2s infinite ballRotate linear;

}

.players\_\_heading img {

  -webkit-animation: ballRotate 2s infinite linear; /\* Chrome, Safari, Opera \*/

  animation: 2s infinite ballRotate linear;

}

@keyframes ballRotate {

  0% {

    transform: rotate(0deg);

    transition: 1s ease-in-out;

  }

  10% {

    transform: rotate(36deg);

    transition: 1s ease-in-out;

  }

  20% {

    transform: rotate(72deg);

    transition: 1s ease-in-out;

  }

  30% {

    transform: rotate(108deg);

    transition: 1s ease-in-out;

  }

  40% {

    transform: rotate(144deg);

    transition: 1s ease-in-out;

  }

  50% {

    transform: rotate(180deg);

    transition: 1s ease-in-out;

  }

  60% {

    transform: rotate(216deg);

    transition: 1s ease-in-out;

  }

  70% {

    transform: rotate(252deg);

    transition: 1s ease-in-out;

  }

  80% {

    transform: rotate(288deg);

    transition: 1s ease-in-out;

  }

  90% {

    transform: rotate(324deg);

    transition: 1s ease-in-out;

  }

  100% {

    transform: rotate(360deg);

    transition: 1s ease-in-out;

  }

}

.players\_\_heading h1 {

  -webkit-animation: titleLeftMove 1.2s infinite linear; /\* Chrome, Safari, Opera \*/

  animation: 1.2s infinite titleLeftMove linear;

}

@keyframes titleLeftMove {

  0% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

  50% {

    position: relative;

    right: 15px;

    transition: 0.2s ease-in-out;

  }

  100% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

}

*players.component.html*

<!-- main player container -->

<div class="players container">

  <!-- heading -->

  <div class="players\_\_heading">

    <!-- header text -->

    <h1>Players</h1>

    <!-- header image -->

    <img src="../../assets/ball.png" alt="ball" height="60" />

  </div>

  <!-- message -->

  <p class="players\_\_listHeading">List of all players</p>

  <!-- players list -->

  <div class="container players\_\_list">

    <!-- each player card -->

    <div

      class="card"

      style="width: 16.3rem"

      \*ngFor="let player of getPlayers()"

    >

      <!-- player image -->

      <img

        class="card-img-top"

        src="{{ player.imageUrl }}"

        alt="Card image cap"

      />

      <!-- player description -->

      <div class="card-body">

        <!-- player name -->

        <h1 class="card-text">{{ player.name }}</h1>

        <div class="cardDescription\_\_container">

          <div>

            <!-- player position -->

            <p class="card-text">{{ player.position }}</p>

            <!-- player team name -->

            <p class="card-text">{{ player.teamName }}</p>

          </div>

          <!-- ball image -->

          <img src="../../assets/ball.png" class="player\_\_tatoo" alt="" />

        </div>

      </div>

    </div>

  </div>

</div>

<br />

<br />

<br />

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*players.component.ts*

import { Component } from '@angular/core';

// Player class

export class Player {

  constructor(

    public name: string,

    public imageUrl: string,

    public position: string,

    public teamName: string

  ) {}

}

@Component({

  selector: 'app-players',

  templateUrl: './players.component.html',

  styleUrls: ['./players.component.css'],

})

export class PlayersComponent {

  // variable used

  private players: Player[];

  // getter

  public getPlayers(){

    return this.players;

  }

  // setter

  public setPlayers(data: Player[]){

    this.players = data;

  }

  // constructor

  public constructor() {

    // initialization of the players list

    this.players= [

      new Player(

        'Cristiano Ronaldo',

        'https://talksport.com/wp-content/uploads/sites/5/2020/01/GettyImages-1192179860.jpg?strip=all&w=960&quality=100',

        'Forward',

        'Juventus'

      ),

      new Player(

        'Lionel Messi',

        'https://e0.365dm.com/20/09/768x432/skysports-lionel-messi-barcelona\_5113303.jpg?20200929233110',

        'Forward',

        'Barcelona'

      ),

      new Player(

        'Neymar JR',

        'https://img.bleacherreport.net/img/images/photos/003/769/883/hi-res-b12f08482b83ecc478d0e9708320a6d3\_crop\_north.jpg?1539843641&w=3072&h=2048',

        'Forward',

        'Paris Saint-Germain'

      ),

      new Player(

        'Mohamed Salah',

        'https://t1.gstatic.com/images?q=tbn:ANd9GcRjYYL6HNd6tdsEFOdh2jashcKmEVGYt7kEGxbgqN1E0kYsXCJvP-nuV7GLz0Q7',

        'Forward',

        'Liverpool'

      ),

      new Player(

        'Gareth Bale',

        'https://i2-prod.walesonline.co.uk/incoming/article18724514.ece/ALTERNATES/s615/0\_GettyImages-1201483728.jpg',

        'Forward',

        'Tottenham'

      ),

      new Player(

        'Paul Pogba',

        'https://images2.minutemediacdn.com/image/fetch/w\_736,h\_485,c\_fill,g\_auto,f\_auto/https%3A%2F%2Freddevilarmada.com%2Fwp-content%2Fuploads%2Fgetty-images%2F2020%2F05%2F1190666177-850x560.jpeg',

        'Midfilder',

        'Man United'

      ),

      new Player(

        'James Rodriguez',

        'https://images.daznservices.com/di/library/GOAL/2e/86/james-rodriguez-everton-2020-21\_6wlqlm929ch51khaya8g1dddc.jpg?t=-226409164&quality=100',

        'Midfielder',

        'Everton'

      ),

      new Player(

        'Bruno Fernandas',

        'https://images.daznservices.com/di/library/GOAL/f6/8c/bruno-fernandes-manchester-united-2019-20\_h30alk79c52l155kge00jlhoz.jpg?t=-1932164368&quality=100',

        'Midfielder',

        'Man United'

      ),

      new Player(

        'Timo Werner',

        'https://img.bundesliga.com/tachyon/sites/2/2018/12/GettyImages-1074111228-2.jpg?crop=611px,0px,3058px,2447px',

        'Forward',

        'Chelsea'

      ),

      new Player(

        'Christian Pulisic',

        'https://images.daznservices.com/di/library/GOAL/9f/9c/christian-pulisic-chelsea\_qhz7fbcw3hdr1848z2ts97y1y.jpg?t=1115640851&quality=100',

        'Midfielder',

        'Chelsea'

      ),

      new Player(

        'Kai Havertz',

        'https://www.talkchelsea.net/wp-content/uploads/2020/07/kai-havertz.jpg',

        'Midfielder',

        'Chelsea'

      ),

      new Player(

        'Jamie Vardy',

        'https://ichef.bbci.co.uk/news/1024/cpsprodpb/C757/production/\_114113015\_jamievardy.jpg',

        'Forward',

        'Leicester City'

      ),

      new Player(

        'Thiago',

        'https://images.daznservices.com/di/library/GOAL/6d/87/thiago-alcantara-liverpool-chelsea-2020-21\_1qrow2nikwn801n4e45i90t4zo.jpg?t=-1309077228&quality=100',

        'Midfielder',

        'Liverpool'

      ),

      new Player(

        'Mason',

        'https://images.daznservices.com/di/library/GOAL/95/5a/mason-greenwood-manchester-united-2019-20\_b32uzxtuu6pp10ksaoue0tvhv.jpg?t=1664782883&quality=100',

        'Forward',

        'Man United'

      ),

      new Player(

        'Willian',

        'https://images.daznservices.com/di/library/GOAL/28/3a/willian-chelsea-2019-20\_105qyzwsxzgy81sagr6sbpex66.jpg?t=-1469151920&quality=60&w=1200&h=800',

        'Forward',

        'Arsenal'

      ),

      new Player(

        'Diogo Jota',

        'https://i2-prod.liverpool.com/incoming/article19336800.ece/ALTERNATES/s615/0\_Jota.jpg',

        'Forward',

        'Liverpool'

      ),

      new Player(

        'Jack Grealish',

        'https://images.daznservices.com/di/library/GOAL/7a/de/jack-grealish-aston-villa\_amq9p5p1xurj1ohwle48mh5wm.jpg?t=-1648035394&quality=100',

        'Midfielder',

        'Aston Villa'

      ),

      new Player(

        'Danny lngs',

        'https://images2.minutemediacdn.com/image/upload/c\_fill,w\_912,h\_516,f\_auto,q\_auto,g\_auto/shape/cover/sport/newcastle-united-v-southampton-fc-premier-league-5e19b3f77bf345ceb1000001.jpg',

        'Forward',

        'Southampton'

      ),

      new Player(

        'Michail Anonio',

        'https://talksport.com/wp-content/uploads/sites/5/2020/10/NINTCHDBPICT000616215883-e1604007246711.jpg?strip=all&w=960&quality=100',

        'Midfielder',

        'West Ham'

      ),

      new Player(

        'Kepa',

        'https://sportsalert.org/wp-content/uploads/2020/09/\_chelsea-boss-frank-lampard-says-kepa-arrizabalaga-needs-his-support-after-latest-mistake.jpg',

        'Goalkeeper',

        'Chelsea'

      ),

      new Player(

        'Wilfried Zaha',

        'https://imgresizer.eurosport.com/unsafe/1200x0/filters:format(jpeg):focal(1369x479:1371x477)/origin-imgresizer.eurosport.com/2020/11/23/2942187-60399708-2560-1440.jpg',

        'Forward',

        'Crystal'

      ),

      new Player(

        'Hakim Ziyech',

        'https://images.daznservices.com/di/library/GOAL/a7/2e/hakim-ziyech-chelsea-2020-21\_174wjv2xkjsv412px3n0gcaunx.jpg?t=-2064621035&quality=100',

        'Midfielder',

        'Chelsea'

      ),

      new Player(

        'Takumi Minamino',

        'https://images.daznservices.com/di/library/GOAL/28/3a/takumi-minamino-liverpool-2019-20\_1v3y00fakwu3f1tqghhyl8fz5m.jpg?t=-543607265&quality=100',

        'Forward',

        'Liverpool'

      ),

      new Player(

        'Marcus Rashford',

        'https://c.files.bbci.co.uk/1000E/production/\_112105556\_gettyimages-1162543444.jpg',

        'Forward',

        'Man United'

      ),

      new Player(

        'Jesse Lingard',

        'https://www.thesun.co.uk/wp-content/uploads/2020/08/c9e6e39f-13e9-4bcc-bb1e-7edaf9583321.jpg',

        'Midfielder',

        'Man United'

      ),

      new Player(

        'Callum Wilson',

        'https://e0.365dm.com/20/09/2048x1152/skysports-callum-wilson-newcastle-united\_5089625.jpg',

        'Forward',

        'Newcastle'

      ),

    ]

  }

}

**services**

*football-interaction.service.ts*

import { FootballClub } from './../interfaces/FootballClub';

import { HttpClient } from '@angular/common/http';

import { Injectable } from '@angular/core';

import { Observable } from 'rxjs';

import { MatchPlayed } from '../interfaces/MatchPlayed';

@Injectable({

  providedIn: 'root',

})

export class FootballInteractionService {

  // variables used

  private allSeasonsURL: string;

  private tablesRecordsSortByPoints: string;

  private tablesRecordsSortByWins: string;

  private tablesRecordsSortByGoals: string;

  private matchesBySeason: string;

  private matchesByDate: string;

  private matchGeneration: string;

  // constructor

  public constructor(private http: HttpClient) {

    this.allSeasonsURL = 'http://localhost:9000/seasons/all';

    this.tablesRecordsSortByPoints =

      'http://localhost:9000/records/sortPoints/';

    this.tablesRecordsSortByWins = 'http://localhost:9000/records/sortWins/';

    this.tablesRecordsSortByGoals = 'http://localhost:9000/records/sortGoals/';

    this.matchesBySeason = 'http://localhost:9000/matches/season/';

    this.matchesByDate = 'http://localhost:9000/matches/season/';

    this.matchGeneration =

      'http://localhost:9000/matches/season/match/generate/';

  }

  // get all the seasons

  public getSeasons(): Observable<string[]> {

    return this.http.get<string[]>(this.allSeasonsURL);

  }

  // get records sorted by points

  public getSortedByPoints(season: string): Observable<FootballClub[]> {

    return this.http.get<FootballClub[]>(

      this.tablesRecordsSortByPoints + season

    );

  }

  // get records sorted by wins

  public getSortedByWins(season: string): Observable<FootballClub[]> {

    return this.http.get<FootballClub[]>(this.tablesRecordsSortByWins + season);

  }

  // get records sorted by goals

  public getSortedByGoals(season: string): Observable<FootballClub[]> {

    return this.http.get<FootballClub[]>(

      this.tablesRecordsSortByGoals + season

    );

  }

  // get matches for a season

  public getMatchesBySeason(season: string): Observable<MatchPlayed[]> {

    return this.http.get<MatchPlayed[]>(this.matchesBySeason + season);

  }

  // get matches by date

  public getMatchesByDate(date: string, season: string): Observable<MatchPlayed[]> {

    return this.http.get<MatchPlayed[]>(

      this.matchesByDate + season + '/date/' + date

    );

  }

  // generate a match and get the result

  public getGeneratedMatchesBySeason(season: string): Observable<MatchPlayed[]> {

    return this.http.get<MatchPlayed[]>(this.matchGeneration + season);

  }

}

*welcome-interaction.service.ts*

import { Injectable } from '@angular/core';

import { Subject } from 'rxjs';

@Injectable({

  providedIn: 'root'

})

export class WelcomeInteractionService {

  //This service is used to not display the navabar and the footer for the welcome page

  // variables

  private \_welcomePageMessage: Subject<boolean>;

  private welcomePageMessage: any;

  // getters

  public getWelcomePageMessage(){

    return this.welcomePageMessage;

  }

  // constructors

  public constructor() {

    this.\_welcomePageMessage  = new Subject<boolean>();

    this.welcomePageMessage = this.\_welcomePageMessage.asObservable()

   }

  // this method changes the boolean to display the navbar and footer or not.

  public sendMessage(message: boolean){

    this.\_welcomePageMessage.next(message);

  }

}

**sponsor**

*sponsor.component.css*

\* {

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

}

.sponsors {

  margin-top: 50px;

  height: 190px;

  /\* border-top: 5px #d4007f solid; \*/

  background: linear-gradient(to left, #ff2882, #963cff);

  display: flex;

  justify-content: center;

  align-items: center;

}

.sponsors\_\_all {

  display: flex;

  width: 100vw;

  align-items: center;

  justify-content: space-evenly;

}

.sponsors\_\_each img {

  object-fit: contain;

  height: 55px;

}

.sponsors\_\_each {

  display: flex;

  background-color: #fff;

  flex-direction: column;

  align-items: center;

  justify-content: space-between;

  flex: 1;

  padding: 30px 0;

}

.sponsors\_\_each p {

    padding-top: 30px;

}

*sponsor.component.html*

<div class="sponsors">

  <!-- main container -->

  <div class="sponsors\_\_all">

    <!-- container for each sponsor -->

    <div class="sponsors\_\_each" \*ngFor="let sponsor of getSponsors()">

      <!-- image -->

      <img src="{{ sponsor.imageURL }}" alt="" />

      <!-- description -->

      <p class="text-muted">{{ sponsor.sponsorName }}</p>

    </div>

  </div>

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*sponsor.component.ts*

import { Component } from '@angular/core';

// sponsor class

export class Sponsor {

  constructor(public imageURL: string, public sponsorName: string) {}

}

@Component({

  selector: 'app-sponsor',

  templateUrl: './sponsor.component.html',

  styleUrls: ['./sponsor.component.css'],

})

export class SponsorComponent {

  // variable used

  private sponsors: Sponsor[];

  // setter and getter

  public getSponsors(){

    return this.sponsors;

  }

  public setSponsors(data: Sponsor[]){

    this.sponsors = data;

  }

  // constructor

  public constructor() {

    // initializing the sponsor

    this.sponsors = [

      new Sponsor('../../assets/sponsorships/eaSports.png', 'Lead Partner'),

      new Sponsor('../../assets/sponsorships/barclays.png', 'Official Bank'),

      new Sponsor('../../assets/sponsorships/bud.png', 'Official Beer'),

      new Sponsor('../../assets/sponsorships/coca.png', 'Official Soft Drink'),

      new Sponsor(

        '../../assets/sponsorships/Hublot\_logo.png',

        'Official Timekeeper'

      ),

      new Sponsor('../../assets/sponsorships/nike.png', 'Official Ball'),

      new Sponsor(

        '../../assets/sponsorships/Avery-Dennison-Logo.svg.png',

        'Official Licensee'

      ),

    ];

  }

}

**table**

*table.component.css*

\* {

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

}

.pTable {

  margin-top: 60px;

}

.pTable\_\_header {

  font-size: 50px;

  border: 3px solid #ea2d9d;

  width: fit-content;

  padding: 20px;

  transition: 0.3s ease-in-out;

  border-left: transparent;

  padding-right: 30px;

  border-top-right-radius: 100px;

  border-bottom-right-radius: 100px;

}

.pTable\_\_selectedSeason p {

  font-size: 20px;

  font-weight: 600;

  border: 3px solid #ea2d9d;

  width: fit-content;

  padding: 10px;

  transition: 0.3s ease-in-out;

  border-left: transparent;

  padding-right: 30px;

  border-top-right-radius: 100px;

  border-bottom-right-radius: 100px;

  color: #36003c;

}

/\* $$$$$$$$$$$$$$$$$$$$$$$$$$$$ T A B L E   C S S  $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ \*/

.pTable\_\_table{

  display: flex;

  margin-top: 50px !important;

  margin-bottom: 100px !important;

  border: 1px lightgray solid;

  align-items: center;

  justify-content: center;

  padding: 30px 0px;

  box-shadow: 5px 10px 18px #888888;

background-image: linear-gradient(to right top,#ffffff, #fcfbff,#fbf6fe, #fbf1fd, #fcecfa, #fcecfa,#fcecfa, #fcecfa, #fbf1fd,#fbf6fe,#fcfbff,#ffffff);}

table {

  border-collapse: collapse;

  width: 1000px;

  table-layout: auto;

}

td,th {

  padding: 10px;

  min-width: 100px;

  word-wrap: break-word !important;

  border-right: 1px solid #fff;

  text-align: center;

}

th:nth-child(2){

  width: 100%;

}

td:hover,th:hover{

  cursor: pointer;

}

.pts\_\_data{

  font-weight: 600;

}

tbody > tr:hover{

  background-color: #fff;

}

thead tr {

  background: #36003c;

  color: white;

  display: block;

  position: relative;

}

thead tr > th:hover{

  background: #ea2d9d;

}

tbody {

  display: block;

  height: 350px;

  width: 100%;

  overflow-y: auto;

  overflow-x: hidden;

}

tbody tr:nth-child(even) {

  background: #f9cdff;

}

tbody tr:nth-child(even):hover {

  background: #f6b0ff;

}

/\* $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ \*/

.season button,

.sortBy button {

  background-color: #fff;

  color: #36003c;

  border-color: #36003c;

  transition: 0.1s ease-in-out;

  margin: 1px 11px;

  border-width: 2px;

}

.season button:hover,

.sortBy button:hover {

  border-color: #ea2d9d;

  transition: 0.1s ease-in-out;

  border-width: 3px;

  margin: 0px 10px;

  transform: scale(1.05);

  color: #ea2d9d;

}

.pTable\_\_btnOptions {

  display: flex;

  align-items: center;

  justify-content: space-between;

}

.dropdown-item:active {

  background-color: #ea2d9d !important;

}

.pTable\_\_header\_\_container {

  display: flex;

  align-items: center;

  justify-content: space-between;

}

.pTable\_\_header\_\_container img {

  padding-right: 70px;

}

.dropdown-item {

  cursor: pointer !important;

}

.loading {

  display: flex;

  align-items: center;

  justify-content: center;

  margin: 100px 0;

}

.loading img {

  object-fit: contain;

  height: 150px;

}

/\* Animation Part \*/

.tablePage {

  -webkit-animation: fadein 1s; /\* Safari, Chrome and Opera > 12.1 \*/

  -moz-animation: fadein 1s; /\* Firefox < 16 \*/

  -ms-animation: fadein 1s; /\* Internet Explorer \*/

  -o-animation: fadein 1s; /\* Opera < 12.1 \*/

  animation: fadein 1s;

}

@keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Firefox < 16 \*/

@-moz-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Safari, Chrome and Opera > 12.1 \*/

@-webkit-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Internet Explorer \*/

@-ms-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Opera < 12.1 \*/

@-o-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Change the ball rotation every second \*/

.pTable\_\_header\_\_container img {

  -webkit-animation: trophyZoom 2s infinite; /\* Chrome, Safari, Opera \*/

  animation: 2s infinite trophyZoom;

}

@keyframes trophyZoom {

  0% {

    transform: scale(0.9);

    transition: 0.5s ease-in-out;

  }

  50% {

    transform: scale(1);

    transition: 0.5s ease-in-out;

  }

  100% {

    transform: scale(0.9);

    transition: 0.5s ease-in-out;

  }

}

.pTable\_\_header {

  -webkit-animation: titleLeftMove 1.2s infinite linear; /\* Chrome, Safari, Opera \*/

  animation: 1.2s infinite titleLeftMove linear;

}

@keyframes titleLeftMove {

  0% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

  50% {

    position: relative;

    right: 15px;

    transition: 0.2s ease-in-out;

  }

  100% {

    position: relative;

    right: 0;

    transition: 0.2s ease-in-out;

  }

}

tr:not(:first-child) {

  opacity: 0.5;

  /\* height: 90px; \*/

  animation-name: slideDown;

  animation-duration: 1.5s;

  animation-iteration-count: 1;

  animation-fill-mode: forwards;

}

@keyframes slideDown {

  from {

    opacity: 0.5;

    transform: translateY(-70px);

  }

  to {

    opacity: 1;

    transform: translateY(0px);

  }

}

*table.component.html*

<div class="tablePage">

  <!-- main table container -->

  <div class="container pTable">

    <!-- table header container -->

    <div class="pTable\_\_header\_\_container">

      <!-- table header -->

      <h1 class="pTable\_\_header">Tables</h1>

      <!-- image -->

      <img src="../../assets/trophy.png" alt="" height="150px" />

    </div>

    <!-- table buttons container -->

    <div class="pTable\_\_btnOptions mt-5 container">

      <!-- current season -->

      <div class="pTable\_\_selectedSeason">

        <p>Season {{ getCurrentSeason() }}</p>

      </div>

      <!-- drop down buttons -->

      <div>

        <!-- season dropdown -->

        <div class="btn-group season">

          <!-- drop down button -->

          <button

            class="btn btn-light btn-sm dropdown-toggle"

            type="button"

            data-toggle="dropdown"

            aria-haspopup="true"

            aria-expanded="false"

          >

            Season

          </button>

          <!-- drop down menu list -->

          <div class="dropdown-menu" aria-labelledby="dropdownMenuButton">

            <a

              class="dropdown-item"

              \*ngFor="let season of getSeasons()"

              (click)="handleClickedSeason(season)"

              >{{ season }}</a

            >

          </div>

        </div>

        <!-- sorting dropdown -->

        <div class="btn-group sortBy">

          <!-- sort by button -->

          <button

            class="btn btn-light btn-sm dropdown-toggle"

            type="button"

            data-toggle="dropdown"

            aria-haspopup="true"

            aria-expanded="false"

          >

            Sort By

          </button>

          <div class="dropdown-menu" aria-labelledby="dropdownMenuButton">

            <!-- sort by points -->

            <div class="dropdown-item" (click)="sortByPoints()">Points</div>

            <!-- sort by goals -->

            <div class="dropdown-item" (click)="sortByGoals()">Goals</div>

            <!-- sort by wins -->

            <div class="dropdown-item" (click)="sortByWins()">Wins</div>

          </div>

        </div>

      </div>

    </div>

    <!-- main table structure and content section -->

    <div

      class="container mt-4 pTable\_\_table"

      \*ngIf="!getIsLoading()"

    >

      <!-- table -->

      <table class="table">

        <!-- table header -->

        <thead class="table\_\_header">

          <tr>

            <th scope="col">Position</th>

            <th scope="col">Club</th>

            <th scope="col">Played</th>

            <th scope="col">Won</th>

            <th scope="col">Drawn</th>

            <th scope="col">Lost</th>

            <th scope="col">GF</th>

            <th scope="col">GA</th>

            <th scope="col">GD</th>

            <th scope="col">Points</th>

          </tr>

        </thead>

        <!-- table body -->

        <tbody>

          <tr \*ngFor="let rowResult of getResultsRecords(); index as position">

            <td scope="row">{{ position + 1 }}</td>

            <td>{{ rowResult.name }}</td>

            <td>{{ rowResult.clubStatistics.totalMatchesPlayed }}</td>

            <td>{{ rowResult.clubStatistics.totalWins }}</td>

            <td>{{ rowResult.clubStatistics.totalDraws }}</td>

            <td>{{ rowResult.clubStatistics.totalDefeats }}</td>

            <td>{{ rowResult.totalGoalsScored }}</td>

            <td>{{ rowResult.totalGoalsReceived }}</td>

            <td>{{ rowResult.totalGoalsDifference }}</td>

            <td class="pts\_\_data">{{ rowResult.clubStatistics.totalPointsScored }}</td>

          </tr>

          <!-- This is to add dummy rows if there are less clubs available for the table  -->

          <tr \*ngFor="let row of getNumberOfDummyRows()">

            <td \*ngFor="let x of [].constructor(10)">-</td>

          </tr>

        </tbody>

      </table>

    </div>

    <!-- loading gif for delay purpose -->

    <div class="container loading" \*ngIf="getIsLoading()">

      <img src="../../assets/loading.gif" alt="" />

    </div>

  </div>

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*table.component.ts*

import { FootballClub } from './../interfaces/FootballClub';

import { FootballInteractionService } from './../service/football-interaction.service';

import { Component, OnInit } from '@angular/core';

@Component({

  selector: 'app-table',

  templateUrl: './table.component.html',

  styleUrls: ['./table.component.css'],

})

export class TableComponent implements OnInit {

  // variables used

  private resultsRecords: FootballClub[];

  private currentSeason: string;

  private seasons: string[];

  private isLoading: boolean;

  private audio: any;

  private numberOfDummyRows: string[];

  // constructor with the service FootballInteractionService injected

  public constructor(private \_footballService: FootballInteractionService) {

    this.resultsRecords = [];

    this.currentSeason = '2020-21';

    this.isLoading = true;

    this.numberOfDummyRows = [];

    this.seasons = [];

  }

  public ngOnInit(): void {

    // get all the records sorted by points initially when the records are loaded

    this.\_footballService

      .getSortedByPoints(this.currentSeason)

      .subscribe((data) => {

        this.resultsRecords = data;

        this.isLoading = false;

        this.numberOfDummyRows = [];

        for (let index = 0; index < 8 - this.resultsRecords.length; index++) {

          this.numberOfDummyRows.push(' ');

        }

      });

    // we have to set the seasons here when the user loads this page

    this.\_footballService

      .getSeasons()

      .subscribe((data) => (this.seasons = data));

  }

  public sortByPoints() {

    //  get the records sorted by points

    // plays audio when clicked

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    // displays the gif until the data is received

    this.isLoading = true;

    // gets the football clubs sorted by points

    this.\_footballService

      .getSortedByPoints(this.currentSeason)

      .subscribe((data) => {

        this.resultsRecords = data;

        this.isLoading = false;

        this.numberOfDummyRows = [];

        for (let index = 0; index < 4 - this.resultsRecords.length; index++) {

          this.numberOfDummyRows.push(' ');

        }

      });

  }

  public sortByGoals() {

    // get the records sorted by goals

    // plays audio when clicked

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    // displays the gif until the data is received

    this.isLoading = true;

    // gets the football clubs sorted by goals

    this.\_footballService

      .getSortedByGoals(this.currentSeason)

      .subscribe((data) => {

        this.resultsRecords = data;

        this.isLoading = false;

        this.numberOfDummyRows = [];

        for (let index = 0; index < 4 - this.resultsRecords.length; index++) {

          this.numberOfDummyRows.push(' ');

        }

      });

  }

  public sortByWins() {

    // get the records sorted by wins

    // plays audio when clicked

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    // displays the gif until the data is received

    this.isLoading = true;

    // gets the football clubs sorted by wins

    this.\_footballService

      .getSortedByWins(this.currentSeason)

      .subscribe((data) => {

        this.resultsRecords = data;

        this.isLoading = false;

        this.numberOfDummyRows = [];

        for (let index = 0; index < 4 - this.resultsRecords.length; index++) {

          this.numberOfDummyRows.push(' ');

        }

      });

  }

  public handleClickedSeason(clickedSeason: string) {

    // get the new records by season clicked

    // plays audio when clicked

    this.audio = new Audio();

    this.audio.src = '../../assets/matchPlayed.mp3';

    this.audio.load();

    this.audio.play();

    // changes the current season selected

    this.currentSeason = clickedSeason;

    // displays the gif until the data is received

    this.isLoading = true;

    // gets the football clubs by season

    this.\_footballService.getSortedByPoints(clickedSeason).subscribe((data) => {

      this.resultsRecords = data;

      this.isLoading = false;

      this.numberOfDummyRows = [];

      for (let index = 0; index < 4 - this.resultsRecords.length; index++) {

        this.numberOfDummyRows.push(' ');

      }

    });

  }

  // Setters and Getters

  public getResultsRecords() {

    return this.resultsRecords;

  }

  public getCurrentSeason() {

    return this.currentSeason;

  }

  public getSeasons() {

    return this.seasons;

  }

  public getIsLoading() {

    return this.isLoading;

  }

  public getAudio() {

    return this.audio;

  }

  public setResultsRecords(data: FootballClub[]) {

    this.resultsRecords = data;

  }

  public setCurrentSeason(data: string) {

    this.currentSeason = data;

  }

  public setSeasons(data: string[]) {

    this.seasons = data;

  }

  public setNumberOfDummyRows(data: string[]) {

    this.numberOfDummyRows = data;

  }

  public getNumberOfDummyRows() {

    return this.numberOfDummyRows;

  }

  public setIsLoading(data: boolean) {

    this.isLoading = data;

  }

  public setAudio(data: string) {

    this.audio = data;

  }

}

**welcome**

*welcome.component.css*

\* {

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

  overflow: hidden;

}

.welcome {

  /\* background-image: linear-gradient(to right, #fce0ff, #ffccea); \*/

  font-family: Verdana, Geneva, Tahoma, sans-serif !important;

}

/\* Style the video: 100% width and height to cover the entire window \*/

#myVideo {

  position: fixed;

  right: 0;

  bottom: 0;

  min-width: 100%;

  min-height: 100%;

}

.welcome,

.welcome\_\_sectionBottom,

.welcome\_\_sectionTop,

.welcome\_\_sectionMiddle {

  display: flex;

  flex-direction: column;

  align-items: center;

  justify-content: space-between;

}

.welcome\_mainContainer {

  z-index: 999;

  display: flex;

  border: 2px white solid;

  flex-direction: column;

  height: 95vh;

  width: 85vw;

  align-items: center;

  border-radius: 5px;

  justify-content: space-between;

  -webkit-animation: bgColorFade 2.5s infinite; /\* Chrome, Safari, Opera \*/

  animation: 2.5s infinite bgColorFade;

}

.welcome {

  height: 100vh;

  display: grid;

  justify-content: center;

  place-items: center;

}

.welcome\_\_button button {

  outline: none;

  background-color: #422872;

  color: white;

  border: 1px black solid;

  z-index: 999;

  border: 1px transparent solid;

  width: 210px;

  font-weight: 600;

  font-size: 13px;

}

.welcome\_\_sectionTop :last-child {

  position: relative;

  bottom: 40px;

}

.welcome\_\_sectionTop {

  margin-top: -30px;

}

.welcome\_\_sectionBottom {

  padding: 40px;

}

.welcome\_\_copyrightLaws small {

  font-weight: bold;

  position: relative;

  top: 5px;

  color: #422872;

}

.welcome\_\_sectionBottom :first-child {

  padding: 3px;

}

.welcome\_\_button button:hover {

  color: #ea2d9d;

  background-color: white;

  border: 1px #ea2d9d solid;

}

.welcome\_\_button:hover {

  transition: 0.2s ease-in-out;

  transform: scale(1.05);

}

.welcome\_\_button button:hover span {

  display: none;

}

.welcome\_\_button button:hover:before {

  content: "WELCOME";

}

/\* Animation Part \*/

.welcome {

  -webkit-animation: fadein 1s; /\* Safari, Chrome and Opera > 12.1 \*/

  -moz-animation: fadein 1s; /\* Firefox < 16 \*/

  -ms-animation: fadein 1s; /\* Internet Explorer \*/

  -o-animation: fadein 1s; /\* Opera < 12.1 \*/

  animation: fadein 1s;

}

@keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Firefox < 16 \*/

@-moz-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Safari, Chrome and Opera > 12.1 \*/

@-webkit-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Internet Explorer \*/

@-ms-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Opera < 12.1 \*/

@-o-keyframes fadein {

  from {

    opacity: 0;

    transform: scale(1.1);

  }

  to {

    opacity: 1;

    transform: scale(1);

  }

}

/\* Adding jumping animation for the button \*/

.welcome\_\_button {

  -webkit-animation: jumpButton 1.2s infinite; /\* Chrome, Safari, Opera \*/

  animation: 1.2s infinite jumpButton;

}

@keyframes jumpButton {

  0% {

    position: relative;

    bottom: 0;

    transition: 0.2s ease-in-out;

  }

  50% {

    position: relative;

    bottom: 15px;

    transition: 0.2s ease-in-out;

  }

  100% {

    position: relative;

    bottom: 0;

    transition: 0.2s ease-in-out;

  }

}

@keyframes bgColorFade {

  0% {

    background-color: rgba(255, 255, 255, 0.75);

    transition: 2s ease-in-out;

  }

  50% {

    background-color: rgba(255, 255, 255, 0.95);

    transition: 2s ease-in-out;

    border-top: 10px #963cff solid;

    border-bottom:10px #963cff solid;

    border-left:10px #ff2882 solid;

    border-right:10px #ff2882 solid;

  }

  100% {

    background-color: rgba(255, 255, 255, 0.75);

    transition: 2s ease-in-out;

  }

}

*welcome.component.html*

<div class="welcome">

  <!-- The background video -->

  <video [muted]="true" autoplay playsinline loop id="myVideo">

    <!-- video source -->

    <source

      src="../../assets/Leo Messi - Dribbling Skills In Slow Motion\_1.mp4"

      type="video/mp4"

    />

  </video>

  <!-- main container -->

  <div class="welcome\_mainContainer">

    <!-- top section -->

    <div class="welcome\_\_sectionTop">

      <!-- logo 1 -->

      <img

        src="../../assets/premierLeagueWelcome.png"

        alt="headingLogo"

        height="300vh"

      />

      <!-- logo 2 -->

      <img

        src="../../assets/welcomeFireBall.png"

        height="120vh"

        alt="fireballLogo"

      />

    </div>

    <!-- bottom section -->

    <div class="welcome\_\_sectionBottom">

      <!-- welcome & continue button -->

      <div class="welcome\_\_button">

        <button (click)="handleWelcome()" mat-raised-button routerLink="/about">

          <span>CONTINUE</span>

        </button>

      </div>

      <!-- copyright laws -->

      <div class="welcome\_\_copyrightLaws">

        <small>© PREMIER LEAGUE 2020</small>

      </div>

    </div>

  </div>

</div>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*welcome.component.ts*

import { WelcomeInteractionService } from './../service/welcome-interaction.service';

import { Component } from '@angular/core';

@Component({

  selector: 'app-welcome',

  templateUrl: './welcome.component.html',

  styleUrls: ['./welcome.component.css'],

})

export class WelcomeComponent{

  // injecting the service

  public constructor(private welcomeInteractionService: WelcomeInteractionService) {}

  // when the welcome button is clicked it sets the send message as true so that we can display the nav bar

  // and footer

  public handleWelcome() {

    this.welcomeInteractionService.sendMessage(true)

  }

}

*app-routing.module.ts*

import { ErrorComponent } from './error/error.component';

import { PlayersComponent } from './players/players.component';

import { MatchesComponent } from './matches/matches.component';

import { TableComponent } from './table/table.component';

import { AboutComponent } from './about/about.component';

import { WelcomeComponent } from './welcome/welcome.component';

import { NgModule } from '@angular/core';

import { Routes, RouterModule } from '@angular/router';

// these are the routes for the website

const routes: Routes = [

  { path: '', component: WelcomeComponent },  // this is the default route http://localhost:9000/

  { path: 'welcome', component: WelcomeComponent },

  { path: 'about', component: AboutComponent },

  { path: 'tables', component: TableComponent },

  { path: 'matches', component: MatchesComponent },

  { path: 'players', component: PlayersComponent },

  { path: '\*\*', component: ErrorComponent },  // this is the route when an error is occurred

];

@NgModule({

  imports: [RouterModule.forRoot(routes)],

  exports: [RouterModule],

})

export class AppRoutingModule {}

*app.component.html*

<!-- this is the nav bar -->

<app-nav-bar \*ngIf="getVisibleNavFooter()"></app-nav-bar>

<!-- this is the router outlet for routing of the pages/ components -->

<router-outlet></router-outlet>

<!-- this is the sponsor bottom banner -->

<app-sponsor \*ngIf="getVisibleNavFooter()"></app-sponsor>

<!-- this is the footer -->

<app-footer \*ngIf="getVisibleNavFooter()"></app-footer>

<!-- References -->

<!-- https://www.premierleague.com/ -->

<!-- https://en.wikipedia.org/wiki/Premier\_League -->

<!-- https://www.premierleague.com/tables -->

<!-- https://www.premierleague.com/players -->

<!-- https://getbootstrap.com/docs/4.0/getting-started/introduction/ -->

<!-- https://angular.io/ -->

*app.component.ts*

import { WelcomeInteractionService } from './service/welcome-interaction.service';

import { Component } from '@angular/core';

@Component({

  selector: 'app-root',

  templateUrl: './app.component.html',

  styleUrls: ['./app.component.css'],

})

export class AppComponent {

  private visibleNavFooter = false;

  public getVisibleNavFooter(){

    return this.visibleNavFooter;

  }

  // visibleNavFooter this makes the nav bar and the footer invisible when displaying the home page

  // and makes it visible when displaying the important components

  public constructor(private welcomeInteractionService: WelcomeInteractionService) {

    this.welcomeInteractionService.getWelcomePageMessage().subscribe((message) => {

      this.visibleNavFooter = message;

    });

  }

}

*app.module.ts*

import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { WelcomeComponent } from './welcome/welcome.component';

import { BrowserAnimationsModule } from '@angular/platform-browser/animations';

import { MatButtonModule } from '@angular/material/button';

import { NavBarComponent } from './nav-bar/nav-bar.component';

import { AboutComponent } from './about/about.component';

import { TableComponent } from './table/table.component';

import { MatchesComponent } from './matches/matches.component';

import { PlayersComponent } from './players/players.component';

import { FooterComponent } from './footer/footer.component';

import { ErrorComponent } from './error/error.component';

import { AppRoutingModule } from './app-routing.module';

import { HttpClientModule } from '@angular/common/http';

import { SponsorComponent } from './sponsor/sponsor.component'

@NgModule({

  // this is were the declaration of the modules go when you create a new component

  declarations: [

    AppComponent,

    WelcomeComponent,

    NavBarComponent,

    AboutComponent,

    TableComponent,

    MatchesComponent,

    PlayersComponent,

    FooterComponent,

    ErrorComponent,

    SponsorComponent,

  ],

  // importing angular modules

  imports: [BrowserModule, BrowserAnimationsModule, MatButtonModule, AppRoutingModule, HttpClientModule],

  providers: [],

  bootstrap: [AppComponent],

})

export class AppModule {}

*index.html*

<!doctype html>

<html lang="en">

<head>

  <meta charset="utf-8">

  <title>Premier League</title>

  <base href="/">

  <meta name="viewport" content="width=device-width, initial-scale=1">

  <link rel="icon" type="image/x-icon" href="favicon.ico">

  <link href="https://fonts.googleapis.com/css?family=Roboto:300,400,500&display=swap" rel="stylesheet">

  <link href="https://fonts.googleapis.com/icon?family=Material+Icons" rel="stylesheet">

  <!-- <script src="//ajax.googleapis.com/ajax/libs/jquery/1.11.0/jquery.min.js"></script>

  <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.min.js"></script> -->

  <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css" integrity="sha384-MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPMO" crossorigin="anonymous">

  <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="sha384-q8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo" crossorigin="anonymous"></script>

<script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js" integrity="sha384-ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIPm49" crossorigin="anonymous"></script>

<script src="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/js/bootstrap.min.js" integrity="sha384-ChfqqxuZUCnJSK3+MXmPNIyE6ZbWh2IMqE241rYiqJxyMiZ6OW/JmZQ5stwEULTy" crossorigin="anonymous"></script>

</head>

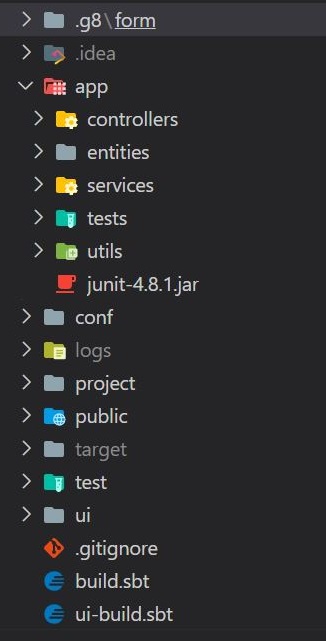
<body class="mat-typography">

  <app-root></app-root>

</body>

</html>

* + 1. Backend Play Framework
       1. Project Structure

* + - 1. Code

**controllers**

PremierLeagueController.java

package controllers;  
import com.fasterxml.jackson.databind.JsonNode;  
import entities.FootballClub;  
import entities.Match;  
import org.slf4j.Logger;  
import org.slf4j.LoggerFactory;  
import play.libs.Json;  
import play.mvc.\*;  
import utils.PremierLeagueUtil;  
import java.util.ArrayList;  
  
public class PremierLeagueController extends Controller {  
  
 *// variables used* private ArrayList<FootballClub> guiSeasonFilteredClubs = new ArrayList<>();  
 private static Logger *logger* = LoggerFactory.*getLogger*("premierLeagueController");  
  
 *// This is the index URL* public Result index(){  
 return *ok*("Main route");  
 }  
  
 *// sending all the season for the dropdown menu* public Result allSeasons(){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.allSeasons()");  
  
 *// the PremierLeagueUtils returns the seasons* ArrayList<String> allSeasons = PremierLeagueUtil.*allSeasons*();  
  
 *// converting into JSON format* JsonNode allSeasonsJson = Json.*toJson*(allSeasons);  
 *logger*.debug("In PremierLeagueController.allSeasons(), result is {}",allSeasonsJson.toString());  
 return *ok*(allSeasonsJson);  
  
 }  
  
 *// sending the sorted table data by points (descending order) by season* public Result sortByPoints(String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.sortByPoints()");  
  
 *// gets the sorted clubs from the Utils class* guiSeasonFilteredClubs = PremierLeagueUtil.*sortByPoints*(season);  
  
 *// converting into json format* JsonNode guiSortedByPointsClubs = Json.*toJson*(guiSeasonFilteredClubs);  
 *logger*.debug("In PremierLeagueController.sortByPoints(), result is {}",guiSortedByPointsClubs.toString());  
 return *ok*(guiSortedByPointsClubs);  
  
 }  
  
 *// sending the sorted table data by wins (descending order) by season* public Result sortByWins(String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.sortByWins()");  
  
 *// gets the sorted clubs from the PremierLeagueUtil class* guiSeasonFilteredClubs = PremierLeagueUtil.*sortByWins*(season);  
  
 *// converting into JSON format* JsonNode guiSortedByWinsClubs = Json.*toJson*(guiSeasonFilteredClubs);  
 *logger*.debug("In PremierLeagueController.sortByWins(), result is {}",guiSortedByWinsClubs.toString());  
 return *ok*(guiSortedByWinsClubs);  
  
 }  
  
 *// sending the sorted table data by goals (descending order) by season* public Result sortByGoals(String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.sortByGoals()");  
  
 *// gets the sorted clubs from the PremierLeagueUtil class* guiSeasonFilteredClubs = PremierLeagueUtil.*sortByGoals*(season);  
  
 *// converting the data into JSON format* JsonNode guiSortByGoalsClubs = Json.*toJson*(guiSeasonFilteredClubs);  
 *logger*.debug("In PremierLeagueController.sortByGoals(), result is {}",guiSortByGoalsClubs.toString());  
 return *ok*(guiSortByGoalsClubs);  
  
 }  
  
 *// sending all the matches data by season* public Result allMatches(String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.allMatches()");  
  
 *// gets the list of matches* ArrayList<Match> matchesDisplayed = PremierLeagueUtil.*allMatches*(season);  
  
 *// converting the data into JSON format* JsonNode allMatchesJson = Json.*toJson*(matchesDisplayed);  
 *logger*.debug("In PremierLeagueController.allMatches(), result is {}",allMatchesJson.toString());  
 return *ok*(allMatchesJson);  
  
 }  
  
 *// sending all the matches data for a specific date* public Result matchesByDate(String date,String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.matchesByDate()");  
  
 *// returning the matches filled by date* ArrayList<Match> filteredMatchedOnDate = PremierLeagueUtil.*matchesByDate*(date, season);  
  
 *// converting into JSON format* JsonNode matchesByDateJson = Json.*toJson*(filteredMatchedOnDate);  
 *logger*.debug("In PremierLeagueController.matchesByDate(), result is {}",matchesByDateJson.toString());  
 return *ok*(matchesByDateJson);  
  
 }  
  
 *// generating a new match* public Result generateMatch(String season){  
  
 *// this is the logger for debugging purposes  
 logger*.debug("In PremierLeagueController.generateMatch()");  
  
 *// gets all the matches with the generated matches list* ArrayList<Match> matchesDisplayed = PremierLeagueUtil.*generateMatch*(season);  
  
 *// converts the data into JSON format* JsonNode generatedWithAllMatches = Json.*toJson*(matchesDisplayed);  
 *logger*.debug("In PremierLeagueController.generateMatch(), result is {}",generatedWithAllMatches.toString());  
 return *ok*(generatedWithAllMatches);  
  
 }  
  
}  
  
*// References used  
// https://www.playframework.com/documentation/2.8.x/Home  
// https://www.playframework.com/documentation/2.8.x/JavaJsonActions  
// https://github.com/dilum1995/IIT-PlayFramework-Session*

FrontendController.scala

package controllers  
  
import javax.inject.\_  
  
import play.api.Configuration  
import play.api.http.HttpErrorHandler  
import play.api.mvc.\_  
  
*/\*\*  
 \* Frontend controller managing all static resource associate routes.  
 \** @param assets *Assets controller reference.  
 \** @param cc *Controller components reference.  
 \*/*@Singleton  
class FrontendController @Inject()(assets: Assets, errorHandler: HttpErrorHandler, config: Configuration, cc: ControllerComponents) extends AbstractController(cc) {  
  
 def index: Action[AnyContent] = assets.at("index.html")  
  
 def assetOrDefault(resource: String): Action[AnyContent] = if (resource.startsWith(config.get[String]("apiPrefix"))){  
 Action.async(r => errorHandler.onClientError(r, *NOT\_FOUND*, "Not found"))  
 } else {  
 if (resource.contains(".")) assets.at(resource) else index  
 }  
}

***// References:- Dilums Lecture 03 one running backend and frontend using a single command "sbt run"***

**entities**

ClubStats.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class ClubStats implements Serializable, Cloneable {  
  
 *// These are the variables used* private int totalMatchesPlayed;  
 private int totalWins;  
 private int totalDraws;  
 private int totalDefeats;  
 private int totalPointsScored;  
  
 *// Default constructor* public ClubStats() {  
  
 }  
  
 *// Parameter constructor* public ClubStats(int totalMatchesPlayed, int totalWins, int totalDraws, int totalDefeats,  
 int totalPointsScored) {  
  
 this.totalMatchesPlayed = totalMatchesPlayed;  
 this.totalWins = totalWins;  
 this.totalDraws = totalDraws;  
 this.totalDefeats = totalDefeats;  
 this.totalPointsScored = totalPointsScored;  
  
 }  
  
 *// Getter and Setters for Encapsulation* public int getTotalMatchesPlayed() {  
 return totalMatchesPlayed;  
 }  
  
 public void setTotalMatchesPlayed(int totalMatchesPlayed) {  
 this.totalMatchesPlayed = totalMatchesPlayed;  
 }  
  
 public int getTotalWins() {  
 return totalWins;  
 }  
  
 public void setTotalWins(int totalWins) {  
 this.totalWins = totalWins;  
 }  
  
 public int getTotalDraws() {  
 return totalDraws;  
 }  
  
 public void setTotalDraws(int totalDraws) {  
 this.totalDraws = totalDraws;  
 }  
  
 public int getTotalDefeats() {  
 return totalDefeats;  
 }  
  
 public void setTotalDefeats(int totalDefeats) {  
 this.totalDefeats = totalDefeats;  
 }  
  
 public int getTotalPointsScored() {  
 return totalPointsScored;  
 }  
  
 public void setTotalPointsScored(int totalPointsScored) {  
 this.totalPointsScored = totalPointsScored;  
 }  
  
 *// Overriding the toString method to display the club statistics* @Override  
 public String toString() {  
  
 return "\n \* Total Matches Played = " + totalMatchesPlayed + "\n \* Total Number of Wins = " + totalWins +  
 "\n \* Total Number of Draws = " + totalDraws + "\n \* Total Number of Defeats = " + totalDefeats +  
 "\n \* Total Points Scored = " + totalPointsScored + "\n";  
  
 }  
  
 *// Overriding the clone method this is to clone the ClubStats when required (making another copy)* @Override  
 protected Object clone() throws CloneNotSupportedException {  
  
 return super.clone();  
  
 }  
}

DateMatch.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class DateMatch implements Serializable {  
 *// this class is used to handle the date for the match played  
  
 // Variable used* private int day;  
 private int month;  
 private int year;  
  
  
 public DateMatch(){  
 *// default constructor* }  
  
 *// Parameter constructor* public DateMatch(int day, int month, int year) {  
  
 this.day = day;  
 this.month = month;  
 this.year = year;  
  
 }  
  
 *// Getters and Setters* public int getDay() {  
 return day;  
 }  
  
 public void setDay(int day) {  
 this.day = day;  
 }  
  
 public int getMonth() {  
 return month;  
 }  
  
 public void setMonth(int month) {  
 this.month = month;  
 }  
  
 public int getYear() {  
 return year;  
 }  
  
 public void setYear(int year) {  
 this.year = year;  
 }  
  
 *// The toString method to display the date details* @Override  
 public String toString() {  
  
 return "\n \* Day Played = " + day +  
 "\n \* Month Played = " + month +  
 "\n \* Year Played = " + year ;  
  
  
 }  
  
}

FootballClub.java

package entities;  
import java.util.ArrayList;  
import java.util.Random;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// Using the abstract class SportClub*public class FootballClub extends SportClub{  
  
 *// variables used* private String coachName;  
 private int totalGoalsReceived;  
 private int totalGoalsScored;  
 private int totalGoalsDifference;  
 private int totalYellowCards;  
 private int totalRedCards;  
 private ArrayList<Match> matchesPlayed;  
 private ArrayList<Player> playersList;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public FootballClub() {  
  
 }  
  
 *// Argument Constructor* public FootballClub(String name, String location, String coachName) {  
  
 super(name, location, new ClubStats());  
 this.coachName = coachName;  
 this.totalGoalsReceived = 0;  
 this.totalGoalsScored = 0;  
 this.totalGoalsDifference = 0;  
 this.totalYellowCards = 0;  
 this.totalRedCards = 0;  
 this.matchesPlayed = new ArrayList<>();  
 this.playersList = new ArrayList<>();  
  
 *// auto generating the players whenever you instantiate a club* autoGeneratePlayers();  
  
 }  
  
 *// this displays the details of the football club by overriding the toString method* @Override  
 public String toString() {  
  
 return super.toString() +  
 "\n \* Coach Name = '" + coachName + "'" +  
 "\n \* Total Goals Received = " + totalGoalsReceived +  
 "\n \* Total Goals Scored = " + totalGoalsScored +  
 "\n \* Total Goal Difference = " + totalGoalsDifference +  
 "\n \* Total Yellow Cards = " + totalYellowCards +  
 "\n \* Total Red Cards = " + totalRedCards + "\n\n";  
  
 }  
  
  
 *// These are the setters and getters for the private variables for encapsulation* public String getCoachName() {  
 return coachName;  
 }  
  
 public void setCoachName(String coachName) {  
 this.coachName = coachName;  
 }  
  
 public int getTotalGoalsReceived() {  
 return totalGoalsReceived;  
 }  
  
 public void setTotalGoalsReceived(int totalGoalsReceived) {  
 this.totalGoalsReceived = totalGoalsReceived;  
 }  
  
 public int getTotalGoalsScored() {  
 return totalGoalsScored;  
 }  
  
 public ArrayList<Player> getPlayersList() {  
 return playersList;  
 }  
  
 public void setPlayersList(ArrayList<Player> playersList) {  
 this.playersList = playersList;  
 }  
  
 public void setTotalGoalsScored(int totalGoalsScored) {  
 this.totalGoalsScored = totalGoalsScored;  
 }  
  
 public int getTotalGoalsDifference() {  
 return totalGoalsDifference;  
 }  
  
 public void setTotalGoalsDifference(int totalGoalsDifference) {  
 this.totalGoalsDifference = totalGoalsDifference;  
 }  
  
 public int getTotalYellowCards() {  
 return totalYellowCards;  
 }  
  
 public void setTotalYellowCards(int totalYellowCards) {  
 this.totalYellowCards = totalYellowCards;  
 }  
  
 public int getTotalRedCards() {  
 return totalRedCards;  
 }  
  
 public void setTotalRedCards(int totalRedCards) {  
 this.totalRedCards = totalRedCards;  
 }  
  
 public ArrayList<Match> getMatchesPlayed() {  
 return matchesPlayed;  
 }  
  
 public void setMatchesPlayed(ArrayList<Match> matchesPlayed) {  
 this.matchesPlayed = matchesPlayed;  
 }  
  
 *// This method returns an Arraylist with the main club statistics for the Premier League CLI table* public ArrayList<Integer> getMainStatistics(){  
  
 *// This is the content of the ArrayList in the order  
 // [matches played, wins, draws, defeats, goals scored, goals received, points, goal difference]  
 // 0 1 2 3 4 5 6 7* ArrayList<Integer> overallStatistics = new ArrayList<>();  
 overallStatistics.add(getClubStatistics().getTotalMatchesPlayed());  
 overallStatistics.add(getClubStatistics().getTotalWins());  
 overallStatistics.add(getClubStatistics().getTotalDraws());  
 overallStatistics.add(getClubStatistics().getTotalDefeats());  
 overallStatistics.add(totalGoalsScored);  
 overallStatistics.add(totalGoalsReceived);  
 overallStatistics.add(getClubStatistics().getTotalPointsScored());  
 overallStatistics.add(totalGoalsDifference);  
  
 return overallStatistics;  
 }  
  
 *// cloning the matches and club with its club statistics  
 // when needed to create copies of the match objects for season based filtering* @Override  
 public Object clone() throws CloneNotSupportedException {  
  
 FootballClub cloned = (FootballClub) super.clone();  
 cloned.setMatchesPlayed(FootballClub.*cloneMatchList*(this.matchesPlayed));  
 cloned.setClubStatistics(FootballClub.*cloneClubStatistics*(this.clubStatistics));  
 return cloned;  
  
 }  
  
 *// returns the list of cloned matches for cloning purpose* public static ArrayList<Match> cloneMatchList(ArrayList<Match> list) {  
  
 ArrayList<Match> cloneMatches = new ArrayList<>(list.size());  
  
 for (Match match: list) {  
  
 try {  
 cloneMatches.add((Match) match.clone());  
 } catch (CloneNotSupportedException e) {  
 e.printStackTrace();  
 }  
  
 }  
 return cloneMatches;  
 }  
  
 *// returns a cloned copy of the club statistics* public static ClubStats cloneClubStatistics(ClubStats clubStatistics) {  
  
 ClubStats cloneClubStats = new ClubStats();  
  
 try {  
 cloneClubStats = (ClubStats) clubStatistics.clone();  
  
 } catch (CloneNotSupportedException e) {  
 e.printStackTrace();  
  
 }  
  
 return cloneClubStats;  
 }  
  
 *// This method is used to generate players for each club, with 11 players each club* public void autoGeneratePlayers(){  
  
 *// these are the list of player names* String[] playerNames = {  
 "Lionel Messi",  
 "Diego Maradona",  
 "Pele",  
 "Cristiano Ronaldo",  
 "Johan Cruyff",  
 "Alfredo Di Stefano",  
 "Franz Beckenbauer",  
 "Zinedine Zidane",  
 "Ferenc Puskas",  
 "Mane Garrincha",  
 "Ronaldo Nazario"  
 };  
  
 *// some simple stats of the play which is randomly chosen* String[] foot = {"Left", "Right"};  
  
 *// adding 11 players to the list* for (int i = 0; i < 11; i++) {  
  
 Random random = new Random();  
  
 Player player = new Player(playerNames[i],  
 foot[random.nextInt(2)],  
 Math.*round*(random.nextDouble()\*1000)/10.0,  
 random.nextInt(10)+1,  
 random.nextInt(50)+1);  
  
 *// once a player is created we then add it to the playerList* playersList.add(player);  
  
 }  
 }  
}

LeagueManager.java

package entities;  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*import entities.DateMatch;  
import entities.SportClub;  
  
public interface LeagueManager {  
  
 *// abstract method for creating a club* String createClub(String clubName, String location, String coachName, String universitySchoolName,String clubType);  
  
 *// abstract method for deleting a club* SportClub deleteCLub(String clubName);  
  
 *// abstract method for displaying the statistics* String displayStats(String clubName);  
  
 *// abstract method for displaying the league table results* void displayLeagueTable(String season);  
  
 *// abstract method for adding a played match* String addPlayedMatch(String seasonPlayed, String clubName\_01, String clubName\_02, int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch dateOfMatch, String matchType);  
  
 *// abstract method for displaying the GUI* String displayGUI();  
  
 *// abstract method for saving the data into a file* String saveDataIntoFile();  
  
 *// abstract method for clearing the data stored in the file* String clearDataFile();  
  
}

Match.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class Match implements Serializable, Cloneable {  
  
 *// variables used* private int goalScored;  
 private int goalReceived;  
 private String season;  
 private MatchStats matchStats;  
 private DateMatch date;  
 private String opponentClubName;  
 private String matchType;  
 private String participatedCLubName;  
  
 *// default constructor* public Match(){  
  
 }  
  
 *// Argument Constructor* public Match(int goalScored, int goalReceived, MatchStats matchStats, DateMatch date,  
 String opponentClubName,String season, String matchType, String participatedCLubName) {  
  
 this.goalScored = goalScored;  
 this.goalReceived = goalReceived;  
 this.date = date;  
 this.opponentClubName = opponentClubName;  
 this.matchStats = matchStats;  
 this.season = season;  
 this.matchType = matchType;  
 this.participatedCLubName = participatedCLubName;  
  
 }  
  
 *// overriding the toString method in order to display the details of the match* @Override  
 public String toString() {  
  
 return "\n Goal Scored = " + goalScored +  
 "\n Goal Received = " + goalReceived +  
 "\n Season = " + season +  
 "\n Date = " + date +  
 "\n Opponent Club Name = " + opponentClubName +  
 matchStats.toString();  
  
 }  
  
 *// SETTERS AND GETTERS FOR THE CLASS  
  
 // gets the date* public DateMatch getDate() {  
 return date;  
 }  
  
 *// sets the date* public void setDate(DateMatch date) {  
 this.date = date;  
 }  
  
 *// getting the opponent club name* public String getOpponentClubName() {  
 return opponentClubName;  
 }  
  
 *// setting the opponent club name* public void setOpponentClubName(String opponentClubName) {  
 this.opponentClubName = opponentClubName;  
 }  
  
 *// get the season* public String getSeason() {  
 return season;  
 }  
  
 *// set the season* public void setSeason(String season) {  
 this.season = season;  
 }  
  
 public MatchStats getMatchStats() {  
 return matchStats;  
 }  
  
 public void setMatchStats(MatchStats matchStats) {  
 this.matchStats = matchStats;  
 }  
  
 public int getGoalScored() {  
 return goalScored;  
 }  
  
 public void setGoalScored(int goalScored) {  
 this.goalScored = goalScored;  
 }  
  
 public int getGoalReceived() {  
 return goalReceived;  
 }  
  
 public void setGoalReceived(int goalReceived) {  
 this.goalReceived = goalReceived;  
 }  
  
 public String getMatchType() {  
 return matchType;  
 }  
  
 public void setMatchType(String matchType) {  
 this.matchType = matchType;  
 }  
  
 public String getParticipatedCLubName() {  
 return participatedCLubName;  
 }  
  
 public void setParticipatedCLubName(String participatedCLubName) {  
 this.participatedCLubName = participatedCLubName;  
 }  
  
 *// overriding the clone method, in order to enable cloning of the match when needed to* @Override  
 protected Object clone() throws CloneNotSupportedException {  
  
 return super.clone();  
  
 }  
}

MatchStats.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class MatchStats implements Serializable  
{  
 *// These are the variables* private int yellowCards;  
 private int redCards;  
 private int shots;  
 private int shotsOfTarget;  
 private int offSides;  
 private int fouls;  
 private int corners;  
 private int passes;  
 private double passAccuracy;  
 private double possession;  
  
 *// Default constructor* public MatchStats() {  
  
 }  
  
 *// Args constructor* public MatchStats(int yellowCards, int redCards, int shots, int shotsOfTarget, int offSides, int fouls,  
 int corners, int passes, double passAccuracy, double possession) {  
  
 this.yellowCards = yellowCards;  
 this.redCards = redCards;  
 this.shots = shots;  
 this.shotsOfTarget = shotsOfTarget;  
 this.offSides = offSides;  
 this.fouls = fouls;  
 this.corners = corners;  
 this.passes = passes;  
 this.passAccuracy = passAccuracy;  
 this.possession = possession;  
  
 }  
  
 *// overriding the toString() to display the details of the statistics of the match* @Override  
 public String toString() {  
  
 return  
 "\n Number of yellow cards = " + yellowCards +  
 "\n Number of red cards = " + redCards +  
 "\n Number of shots = " + shots +  
 "\n Number of target shots = " + shotsOfTarget +  
 "\n Number of offsides = " + offSides +  
 "\n Number of fouls = " + fouls +  
 "\n Number of corner kicks = " + corners +  
 "\n Number of passes = " + passes +  
 "\n Pass Accuracy = " + passAccuracy + "%" +  
 "\n Possession = " + possession + "%";  
  
 }  
  
 *// SETTERS AND GETTERS* public int getYellowCards() {  
 return yellowCards;  
 }  
  
 public void setYellowCards(int yellowCards) {  
 this.yellowCards = yellowCards;  
 }  
  
 public int getRedCards() {  
 return redCards;  
 }  
  
 public void setRedCards(int redCards) {  
 this.redCards = redCards;  
 }  
  
 public int getShots() {  
 return shots;  
 }  
  
 public void setShots(int shots) {  
 this.shots = shots;  
 }  
  
 public int getShotsOfTarget() {  
 return shotsOfTarget;  
 }  
  
 public void setShotsOfTarget(int shotsOfTarget) {  
 this.shotsOfTarget = shotsOfTarget;  
 }  
  
 public int getOffSides() {  
 return offSides;  
 }  
  
 public void setOffSides(int offSides) {  
 this.offSides = offSides;  
 }  
  
 public int getFouls() {  
 return fouls;  
 }  
  
 public void setFouls(int fouls) {  
 this.fouls = fouls;  
 }  
  
 public int getCorners() {  
 return corners;  
 }  
  
 public void setCorners(int corners) {  
 this.corners = corners;  
 }  
  
 public int getPasses() {  
 return passes;  
 }  
  
 public void setPasses(int passes) {  
 this.passes = passes;  
 }  
  
 public double getPassAccuracy() {  
 return passAccuracy;  
 }  
  
 public void setPassAccuracy(double passAccuracy) {  
 this.passAccuracy = passAccuracy;  
 }  
  
 public double getPossession() {  
 return possession;  
 }  
  
 public void setPossession(double possession) {  
 this.possession = possession;  
 }  
  
}

Player.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class Player implements Serializable  
{  
 *// variables used for the Players* private String name;  
 private String preferredFoot;  
 private double shootingAccuracy;  
 private int goalScoredPerMatch;  
 private int passesPerMatch;  
  
 *// The Default Constructor* public Player() {  
  
 }  
  
 *// Argument Constructor* public Player(String name, String preferredFoot, double shootingAccuracy,  
 int goalScoredPerMatch, int passesPerMatch) {  
  
 this.name = name;  
 this.preferredFoot = preferredFoot;  
 this.shootingAccuracy = shootingAccuracy;  
 this.goalScoredPerMatch = goalScoredPerMatch;  
 this.passesPerMatch = passesPerMatch;  
  
 }  
  
 *// GETTERS and SETTERS used* public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
 public String getPreferredFoot() {  
 return preferredFoot;  
 }  
  
 public void setPreferredFoot(String preferredFoot) {  
 this.preferredFoot = preferredFoot;  
 }  
  
 public double getShootingAccuracy() {  
 return shootingAccuracy;  
 }  
  
 public void setShootingAccuracy(double shootingAccuracy) {  
 this.shootingAccuracy = shootingAccuracy;  
 }  
  
 public int getGoalScoredPerMatch() {  
 return goalScoredPerMatch;  
 }  
  
 public void setGoalScoredPerMatch(int goalScoredPerMatch) {  
 this.goalScoredPerMatch = goalScoredPerMatch;  
 }  
  
 public int getPassesPerMatch() {  
 return passesPerMatch;  
 }  
  
 public void setPassesPerMatch(int passesPerMatch) {  
 this.passesPerMatch = passesPerMatch;  
 }  
  
 *// overriding the toString() method to display the details of the players* @Override  
 public String toString() {  
  
 return " ==> \* Name = '" + name + '\'' +  
 "\n ==> \* Preferred Foot = '" + preferredFoot + '\'' +  
 "\n ==> \* Shooting Accuracy = " + shootingAccuracy + " %" +  
 "\n ==> \* Rate Of Goals Scored per Match = " + goalScoredPerMatch +  
 "\n ==> \* Rate of Passes per Match = " + passesPerMatch + "\n";  
  
 }  
}

SchoolFootballClub.java

package entities;  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
  
// Inheritance with the FootballClub*public class SchoolFootballClub extends FootballClub {  
  
 *// These are the private variables for Encapsulation* private String schoolName;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public SchoolFootballClub() {  
  
 }  
  
 *// Argument Constructor* public SchoolFootballClub(String name, String location, String coachName, String schoolName) {  
  
 super(name, location, coachName);  
 this.schoolName = schoolName;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getSchoolName() {  
 return schoolName;  
 }  
  
 public void setSchoolName(String schoolName) {  
 this.schoolName = schoolName;  
 }  
  
 *// overriding the toString() method to display the details of the school* @Override  
 public String toString() {  
  
 return super.toString() + " \* School Name = '" + schoolName + "' ";  
  
 }  
  
}

SportClub.java

package entities;  
import java.io.Serializable;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// public abstract class SportClub, abstract because you can't make an object from the SportsClub class*public abstract class SportClub implements Serializable, Cloneable{  
  
 *// Variables used* private String name;  
 private String location;  
 protected ClubStats clubStatistics;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public SportClub(){  
  
 }  
  
 *// Argument Constructor* public SportClub(String name, String location, ClubStats clubStatistics) {  
  
 this.name = name;  
 this.location = location;  
 this.clubStatistics = clubStatistics;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
 public String getLocation() {  
 return location;  
 }  
  
 public void setLocation(String location) {  
 this.location = location;  
 }  
  
 public ClubStats getClubStatistics() {  
 return clubStatistics;  
 }  
  
 public void setClubStatistics(ClubStats clubStatistics) {  
 this.clubStatistics = clubStatistics;  
 }  
  
 *// overriding the toString() method to display the details of the club* @Override  
 public String toString() {  
  
 return " \* Club Name = '" + name + "'\n \* Club Location = '" + location + "'" + clubStatistics.toString();  
  
 }  
  
}

UniversityFootballClub.java

package entities;  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/  
  
// Inheritance with the FootballClub*public class UniversityFootballClub extends FootballClub {  
  
 *// These are the private variables for Encapsulation* private String universityName;  
  
 *// Default constructor (when ever you create an object the default constructor is called for instantiation)* public UniversityFootballClub() {  
  
 }  
  
 *// Argument Constructor* public UniversityFootballClub(String name, String location, String coachName, String universityName) {  
  
 super(name, location, coachName);  
 this.universityName = universityName;  
  
 }  
  
 *// GETTERS AND SETTERS FOR THE CLASS* public String getUniversityName() {  
 return universityName;  
 }  
  
 public void setUniversityName(String universityName) {  
 this.universityName = universityName;  
 }  
  
 *// overriding the toString() method to display the details of the university* @Override  
 public String toString() {  
  
 return super.toString() + " \* University Name = '" + universityName + "'";  
  
 }  
  
}

**services**

PremierLeagueManager.java

package services;  
import entities.\*;  
  
import java.awt.\*;  
import java.io.\*;  
import java.net.URI;  
import java.net.URISyntaxException;  
import java.util.\*;  
import java.util.stream.Collectors;  
  
*/\*  
 \* @author Nazhim Kalam  
 \* @UowID: w1761265  
 \* @StudentID: SE2019281  
 \* OOP CW 01  
 \* Java version 8 or higher required  
 \*/*public class PremierLeagueManager implements LeagueManager {  
 *// Following the Singleton design pattern, this is because we need to only create a single instance of the  
 // PremierLeagueManager class  
  
 // private variables used* private static ArrayList<FootballClub> *premierLeagueFootballClubList*;  
 private static boolean *matchedAdded*;  
 private static ArrayList<String> *allSeasonAdded*;  
 private static final int *MAXIMUM\_NUMBER\_OF\_CLUBS* = 20;  
 private static int *maximumNumberOfMatchesPerClub*;  
  
 *// We are using the Singleton design pattern because we only need one instance of PremierLeagueManager and not many  
 // used for the singleton design pattern, this is set to "null" for lazy initialization, so we only created the  
 // instance when required only," ---> non lazy way LeagueManager manager = new PremierLeagueManager(); "* private static LeagueManager *manager* = null;  
  
 *// Constructor* private PremierLeagueManager(){  
 *// initializing the variables  
 matchedAdded* = false;  
 *allSeasonAdded* = new ArrayList<>();  
 *premierLeagueFootballClubList*= new ArrayList<>();  
 *maximumNumberOfMatchesPerClub* = 0;  
  
 *// load the previously saved data from the file  
 loadingData*();  
 }  
  
 *// This method is used for the Singleton Design Pattern, inorder to get the single instance of the class* public static LeagueManager getInstance(){  
 *// Double checked locking (due to the double If condition)* if(*manager*==null){  
 *// This is to check if an instance of the manager has already been created or not (For the first time  
 // when the instance needed to be created), before adding the synchronized lock* synchronized (PremierLeagueManager.class){  
 *// makes sure Thread Safe, if 2 instance are to be created at the same time* if(*manager*==null){  
 *// This is for ensuring and checking if another created instance when created it checks with this  
 // null and only return the reference of the first instance than creating another one.  
  
 manager* = new PremierLeagueManager();  
 }  
 }  
 }  
 return *manager*;  
 }  
  
 *// this method is for loading the data from the file* public static void loadingData() {  
 *// Serializing means converting a state into a byte stream  
  
 // text file path* File file = new File("public/resources/dataStorage.txt");  
  
 *// used to read the byte stream data from a source which in this case is a txt file* FileInputStream fileInputStream = null;  
  
 *// used to read object data when its serialized* ObjectInputStream objectInputStream = null;  
  
 *// Cleaning the loading variables before use (this is mainly done for clearing the file problem)  
 premierLeagueFootballClubList* = new ArrayList<>();  
 *matchedAdded* = false;  
 *allSeasonAdded* = new ArrayList<>();  
 *maximumNumberOfMatchesPerClub* = 0;  
  
  
 *// handling the exceptions and loading the data from the file* try {  
 *// At first we read the bytes of data from the file using the FileInputStream and then its filtered  
 // though the ObjectInputStream which converts these bytes into Java Objects  
  
 // creating an instance of FileInputStream and ObjectInputStream* fileInputStream = new FileInputStream(file);  
 objectInputStream = new ObjectInputStream(fileInputStream);  
  
 try {  
 *// reading from the file  
 // we typecast because when reading the object because it doesn't know what type is the object read  
 // from the file  
 premierLeagueFootballClubList* = (ArrayList<FootballClub>) objectInputStream.readObject();  
 *matchedAdded* = (boolean) objectInputStream.readObject();  
 *setAllSeasonAdded*((ArrayList<String>) objectInputStream.readObject());  
 *maximumNumberOfMatchesPerClub* = (int) objectInputStream.readObject();  
  
 } catch (ClassNotFoundException e) {  
 *// Handles exception  
 // System.out.println(" ClassNotFoundException occurred Not able to find the class");;* }  
  
  
 }  
 catch (FileNotFoundException fileNotFoundException){  
 *// Handles exception  
 // System.out.println(" File not found exception occurred!");* }  
 catch (IOException ioException) {  
 *// Handles exception  
 // System.out.println( " Exception when performing read/write operations to the file!" +  
 // "\n No permission to read/write from or to the file");* }  
 finally {  
 *// closing the file once all the data is loaded* try{  
 *// making sure that it is not null, to be closed* if (fileInputStream != null) {  
 fileInputStream.close();  
 }  
  
 *// making sure that it is not null, to be closed* if (objectInputStream != null) {  
 objectInputStream.close();  
 }  
 }  
 catch (IOException ioException) {  
 *// Handles exception  
 // System.out.println( " Exception when performing read/write operations to the file!" +  
 // "\n No permission to read/write from or to the file");* }  
 }  
 *// System.out.println( "\n Successfully loaded all the data\n");* }  
  
 *// Overriding the createClub method from the interface* @Override  
 public String createClub(String clubName, String location, String coachName, String universitySchoolName,  
 String clubType) {  
  
 *// variable used* FootballClub club = null;  
  
 *// this is to create the appropriate instance depending on the user input* switch (clubType) {  
 case "normal":  
 club = new FootballClub(clubName, location, coachName);  
 break;  
  
 case "university":  
 club = new UniversityFootballClub(clubName, location, coachName, universitySchoolName);  
 break;  
  
 case "school":  
 club = new SchoolFootballClub(clubName, location, coachName, universitySchoolName);  
 break;  
 }  
  
 *// Checking if the maximum number of clubs created limit has been reached to add the club or not* if(*premierLeagueFootballClubList*.size()<*MAXIMUM\_NUMBER\_OF\_CLUBS*)  
 {  
 *// adding the club if the maximum limit is not reached  
 premierLeagueFootballClubList*.add(club);  
  
 *// updating the number of matches that can be played by a club  
 maximumNumberOfMatchesPerClub* = (2 \* *premierLeagueFootballClubList*.size()) - 2;  
  
 *// returns a success message to the user* return " Clubs Successfully added!";  
 }  
 return " Sorry there is no room for a new club, the maximum number of club limit has been reached!";  
  
 }  
  
 *// Overriding the deleteCLub method from the interface* @Override  
 public FootballClub deleteCLub(String clubName) {  
  
 *// This loop searches for the club and deletes it from the list* for (int index = 0; index < *premierLeagueFootballClubList*.size(); index++) {  
  
 if(*premierLeagueFootballClubList*.get(index).getName().equalsIgnoreCase(clubName)){  
  
 *// we also update the number of matches played by the club  
 // If there are less than 2 clubs present then we set the maximum number of matches played to 0* if((*premierLeagueFootballClubList*.size()-1) < 2){  
 *maximumNumberOfMatchesPerClub* = 0;  
 }  
  
 *// if the club name is present it is removed* return *premierLeagueFootballClubList*.remove(index);  
  
 }  
 }  
 *// returns null if there is not club present with the given name* return null;  
  
 }  
  
 *// Overriding the displayStats method from the interface* @Override  
 public String displayStats(String clubName) {  
  
 *// variable for checking if the club name is valid or not* boolean clubNameAvailable = false;  
  
 *// This loop searches for the club and displays it's statistics* for (FootballClub footballClub : *premierLeagueFootballClubList*) {  
 if (footballClub.getName().equalsIgnoreCase(clubName)) {  
  
 *// checks if the club name entered is present in the club list* clubNameAvailable = true;  
  
 System.*out*.println("\n ===============> S T A T I S T I C S <===============");  
 System.*out*.println("\n =============> PLAYERS - STATISTICS <=============\n");  
  
 *// loops and displays the player details* for (int index = 0; index < footballClub.getPlayersList().size(); index++) {  
 System.*out*.println(" <------------ Player " + ( index + 1 ) + " ---------------->\n");  
 System.*out*.println(footballClub.getPlayersList().get(index));  
 }  
  
 *// displays the total statistics together from all the seasons together* System.*out*.println("\n =============> FROM ALL SEASONS <=============\n");  
 System.*out*.println(footballClub.toString());  
  
  
 *// sorting the seasons in ascending* Comparator<String> comparator = (season1, season2) -> {  
 if(Integer.*parseInt*(season1.split("-")[0]) > Integer.*parseInt*(season2.split("-")[0])){  
 return 1;  
 }  
 return -1;  
 };  
  
 *// filters the seasons by getting the distinct seasons and sorting them using the comparator, this  
 // will be useful when displaying the GUI for the drop down menu  
 setAllSeasonAdded*((ArrayList<String>) *getAllSeasonAdded*().stream().distinct()  
 .collect(Collectors.*toList*()));  
 *getAllSeasonAdded*().sort(comparator);  
  
 *// Display the total stats by the clubs played in season wise* for (String season : *getAllSeasonAdded*()) {  
 System.*out*.println("\n =============> FOR SEASON (" + season + ") <=============\n");  
 ArrayList<FootballClub> seasonFilteredClubs = new ArrayList<>();  
 try {  
 *// gets the list of football clubs with the filtered matches by season* seasonFilteredClubs = *seasonFilteredFootballCLubList*(season);  
  
 } catch (CloneNotSupportedException e) {  
 *// handles exception* e.printStackTrace();  
  
 }  
  
 for (FootballClub club: seasonFilteredClubs){  
  
 if(club.getName().equalsIgnoreCase(clubName)) {  
 *// we search for the club with the name user have given and display the result* System.*out*.println(club);  
 }  
 }  
  
 }  
  
 *// variable* int number = 0;  
  
 *// looping through each played match and displaying their stats* if(footballClub.getMatchesPlayed().size()!=0){  
  
 *// displaying the statistics* System.*out*.println(" =============> FROM ALL SEASONS <=============\n");  
 System.*out*.println(" => Statistics of all the matches played by '"+ clubName + "' so far! <=");  
  
 for (Match match:footballClub.getMatchesPlayed()) {  
 String matchResult = "\n <===============> Match "+ (++number) +" <================>\n "  
 + "\* Opponent team name: '" + match.getOpponentClubName() + "'" + match.getDate()  
 + "\n \* Season: " + match.getSeason() + "\n\n \* Match Type: '" +  
 match.getMatchType() + "'"  
 + "\n \* Number of Goals Scored: " + match.getGoalScored()  
 + "\n \* Number of Goals Received: " + match.getGoalReceived()  
 + "\n \* Number of Goal Difference: " + (match.getGoalScored() - match.getGoalReceived())  
 + "\n \* Number of Yellow Cards: " + match.getMatchStats().getYellowCards()  
 + "\n \* Number of Red Cards: " + match.getMatchStats().getRedCards()  
 + "\n \* Number of Shots: " + match.getMatchStats().getShots()  
 + "\n \* Number of Shots of target: " + match.getMatchStats().getShotsOfTarget()  
 + "\n\n \* Number of off sides: " + match.getMatchStats().getOffSides()  
 + "\n \* Number of fouls: " + match.getMatchStats().getFouls()  
 + "\n \* Number of corners: " + match.getMatchStats().getCorners()  
 + "\n \* Number of passes: " + match.getMatchStats().getPasses()  
 + "\n \* Pass Accuracy: " + match.getMatchStats().getPassAccuracy() + "%"  
 + "\n \* Possession: " + match.getMatchStats().getPossession() + "%"  
 + "\n\n ============================================= \n";  
  
 System.out.println(matchResult);  
 }  
 }  
 }  
 }  
  
 *// checking if the given club name is valid or not and return the appropriate message* if(!clubNameAvailable){  
 return "\n Sorry, there is no club with the given name '" + clubName + "'";  
 }  
  
 return " Result Displayed";  
 }  
  
 *// Overriding the displayLeagueTable method from the interface* @Override  
 public void displayLeagueTable(String seasonPlayed) {  
 *// This method is used to display the Premier League Table in the CLI  
  
 // we add all the football clubs with all the necessary matches related to the season and other removed.* ArrayList<FootballClub> seasonFilteredClubs = new ArrayList<>();  
  
 try {  
 *// Gets the filtered football clubs by season entered* seasonFilteredClubs = seasonFilteredFootballCLubList(seasonPlayed);  
  
 } catch (CloneNotSupportedException e) {  
 *// handles the exception* e.printStackTrace();  
  
 }  
  
 *// This mainly depends on the length of the club name the rest are normal and fixed* if (seasonFilteredClubs.size() != 0){  
  
 *// getting maximum length club name from the list.* int maxClubNameLength = seasonFilteredClubs.get(0).getName().length();  
  
 for (FootballClub footballClub : seasonFilteredClubs) {  
 *// we find the maximum length of the club names from the list of football clubs* if(footballClub.getName().length() > maxClubNameLength){  
 *// this is also used for the CLI table structure because when the club name changes in length  
 // the CLI table will also get spoilt so to prevent this we get the max length of the string  
 // and solve the issue* maxClubNameLength = footballClub.getName().length();  
 }  
 }  
  
 *// Implementing the comparator for sorting  
 /\*  
 \* Comparator is an interface in java which is  
 \* used to sort collections using two objects as its parameter  
 \* inputs.  
 \*/  
 // here we are using an anonymous class to create the comparator.  
 // Sorting the points and goals in descending order for the football clubs* Comparator<FootballClub> comparator = (club1, club2) -> {  
 if(club1.getClubStatistics().getTotalPointsScored() == (club2.getClubStatistics()  
 .getTotalPointsScored())){  
 if(club1.getTotalGoalsScored() < club2.getTotalGoalsScored()){  
 return 1;  
 }  
 }else{  
 if(club1.getClubStatistics().getTotalPointsScored() < club2.getClubStatistics()  
 .getTotalPointsScored()){  
 return 1;  
 }  
 }  
 return -1;  
 };  
  
 *// sorting the list with a new arrayList* seasonFilteredClubs.sort(comparator); *// sorting the clubs  
  
 // function for creating the structure of the table* structuredTable(maxClubNameLength, seasonFilteredClubs);  
 }else{  
 *// creating the empty table when there are no clubs present* structuredTable(0, seasonFilteredClubs);  
 }  
  
 }  
  
 *// This method returns a list of football clubs filtered by season with updated stats for that season only.* public static ArrayList<FootballClub> seasonFilteredFootballCLubList(String seasonPlayed)  
 throws CloneNotSupportedException {  
  
 *// creating a new Football arraylist to collect football clubs for a particular season* ArrayList<FootballClub> footballClubsListSeason = new ArrayList<>();  
  
 *// we add all the clubs, before adding the club remove the matches which aren't related* for (int index = 0; index < premierLeagueFootballClubList.size(); index++) {  
  
 *// here we are cloning the football club in every loop* footballClubsListSeason.add((FootballClub) premierLeagueFootballClubList.get(index).clone());  
  
 int matchIndexLoop = 0;  
  
 *// this loops runs for every single match in each of the football club* while ( matchIndexLoop < footballClubsListSeason.get(index).getMatchesPlayed().size() ){  
  
 *// checks if the match season is equal to the season entered by the user as well and then we proceed* if(!footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop).getSeason()  
 .equalsIgnoreCase(seasonPlayed)){  
  
 *// update the stats before removing the match* int goalScored = footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalScored();  
 int goalReceived = footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalReceived();  
  
 *// updating total goal difference* footballClubsListSeason.get(index).setTotalGoalsDifference(  
 footballClubsListSeason.get(index).getTotalGoalsDifference() - (goalScored - goalReceived)  
 );  
  
 *// updating total goal scored* footballClubsListSeason.get(index).setTotalGoalsScored(  
 footballClubsListSeason.get(index).getTotalGoalsScored() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalScored()  
 );  
  
 *// updating total goal received* footballClubsListSeason.get(index).setTotalGoalsReceived(  
 footballClubsListSeason.get(index).getTotalGoalsReceived() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getGoalReceived()  
 );  
  
 *// updating total yellow cards* footballClubsListSeason.get(index).setTotalYellowCards(  
 footballClubsListSeason.get(index).getTotalYellowCards() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getMatchStats().getYellowCards()  
 );  
  
 *// updating total red cards* footballClubsListSeason.get(index).setTotalRedCards(  
 footballClubsListSeason.get(index).getTotalRedCards() -  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 .getMatchStats().getRedCards()  
 );  
  
 *// update number of matches* footballClubsListSeason.get(index).getClubStatistics().setTotalMatchesPlayed(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalMatchesPlayed() - 1  
 );  
  
 if(goalScored > goalReceived){  
  
 *// update wins and points scored* footballClubsListSeason.get(index).getClubStatistics().setTotalWins(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalWins() - 1  
 );  
  
 footballClubsListSeason.get(index).getClubStatistics().setTotalPointsScored(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalPointsScored() - 3  
 );  
  
 }else if (goalReceived > goalScored){  
 *// update defeats* footballClubsListSeason.get(index).getClubStatistics().setTotalDefeats(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalDefeats() - 1  
 );  
  
 }else{  
  
 *// update draws and points scored* footballClubsListSeason.get(index).getClubStatistics().setTotalDraws(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalDraws() - 1  
 );  
  
 footballClubsListSeason.get(index).getClubStatistics().setTotalPointsScored(  
 footballClubsListSeason.get(index).getClubStatistics().getTotalPointsScored() - 1  
 );  
 }  
  
 *// removing the match from the list* footballClubsListSeason.get(index).getMatchesPlayed().remove(  
 footballClubsListSeason.get(index).getMatchesPlayed().get(matchIndexLoop)  
 );  
 }else{  
 *// incrementing the index to skip that match which should not be removed* matchIndexLoop++;  
 }  
 }  
 }  
  
 *// setting the position value to "00" if all the clubs didnt play for the given season* for (FootballClub footballClub: footballClubsListSeason) {  
 if(footballClub.getClubStatistics().getTotalMatchesPlayed() != 0){  
 *// then we can give positions to all the clubs* matchedAdded = true;  
 break;  
 }else{  
 matchedAdded = false;  
 }  
 }  
  
 return footballClubsListSeason;  
 }  
  
 *// Display the premier league table in a well structured format* public void structuredTable(int lengthOfClubNameTable, ArrayList<FootballClub> seasonFilteredClubs) {  
 */\*  
 \* We take the length of the largest club name, then use this to create the main table width  
 \*/* StringBuilder HORIZONTAL\_DASHES = new StringBuilder();  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE = new StringBuilder();  
  
 if(lengthOfClubNameTable != 0){  
  
 *// creating the table with data  
 // These variables are used to create the structure of the table* int clubNameColSpace = lengthOfClubNameTable + 2;  
 int leftClubColSpace = clubNameColSpace/2;  
 int rightClubColSpace = clubNameColSpace - leftClubColSpace;  
  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT = new StringBuilder();  
 StringBuilder PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT = new StringBuilder();  
 StringBuilder LEFT\_CLUB\_COL\_SPACE = new StringBuilder();  
 StringBuilder RIGHT\_CLUB\_COL\_SPACE = new StringBuilder();  
  
 *// All these loops and code block are to just create the CLI table* for (int index = 0; index < 107+lengthOfClubNameTable; index++) {  
 HORIZONTAL\_DASHES.append("-");  
 }  
 for (int index = 0; index < 39 + (lengthOfClubNameTable/2); index++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT.append(" ");  
 }  
 for (int index = 0; index < 39 + (lengthOfClubNameTable - (lengthOfClubNameTable/2)); index++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT.append(" ");  
 }  
 for (int index = 0; index < leftClubColSpace; index++) {  
 LEFT\_CLUB\_COL\_SPACE.append(" ");  
 }  
 for (int index = 0; index < rightClubColSpace; index++) {  
 RIGHT\_CLUB\_COL\_SPACE.append(" ");  
 }  
  
 System.out.println("\n"+HORIZONTAL\_DASHES);  
 System.out.println("|" + PREMIER\_LEAGUE\_SPACE\_TILE\_LEFT + "P R E M I E R - L E A G U E" +  
 PREMIER\_LEAGUE\_SPACE\_TILE\_RIGHT + "|");  
 System.out.println(HORIZONTAL\_DASHES);  
 System.out.println("| Position |" + LEFT\_CLUB\_COL\_SPACE +"Club" + RIGHT\_CLUB\_COL\_SPACE +  
 "| Played | Won | Drawn | Lost | Goal-Scored | Goal-Received " +  
 "| Goal-Difference | Points |");  
 System.out.println(HORIZONTAL\_DASHES);  
  
 *// display the content of the premierLeagueFootball List* for (int index = 0; index < seasonFilteredClubs.size(); index++) {  
 StringBuilder clubNameEndSpace = new StringBuilder();  
  
 for (int innerIndex = 0; innerIndex < 3; innerIndex++) {  
 clubNameEndSpace.append(" ");  
 }  
  
 *// changing the width of the club name for each row* if(seasonFilteredClubs.get(index).getName().length() != lengthOfClubNameTable){  
  
 *// the length of the name will anyways be less than lengthOfClubNameTable* int difference = lengthOfClubNameTable - seasonFilteredClubs.get(index).getName().length();  
 for (int innerIndex = 0; innerIndex < difference; innerIndex++) {  
 clubNameEndSpace.append(" ");  
 }  
  
 }  
  
 */\*  
 \* creating an arraylist with organised data for the table  
 \* The content structure is [position, played match, won, drawn, lost, goal scored, goal received, points,  
 \* goal difference]  
 \*/* ArrayList<String> organisedResultList = new ArrayList<>();  
 if(index<9){  
 organisedResultList.add("0"+(index+1));  
 }else{  
 organisedResultList.add(String.valueOf(index+1));  
 }  
  
 *// getting the stats into an arraylist to organise it* for (int innerIndex = 0; innerIndex < seasonFilteredClubs.get(index).getMainStatistics().size();  
 innerIndex++) {  
  
 if(innerIndex==7){  
  
 *// working with the goal difference* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)>-1){  
  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)<10) {  
 organisedResultList.add("+0"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
  
 }else{  
 organisedResultList.add("+"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
  
 }  
 }else{  
  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)>-10) {  
 organisedResultList.add("-0"+Math.abs(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
  
 }else{  
 organisedResultList.add(String.valueOf(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
  
 }  
 }  
 }else{  
 *// organising the data for the CLI table* if(seasonFilteredClubs.get(index).getMainStatistics().get(innerIndex)<10){  
 organisedResultList.add("0"+seasonFilteredClubs.get(index).getMainStatistics()  
 .get(innerIndex));  
  
 }else{  
 organisedResultList.add(String.valueOf(seasonFilteredClubs.get(index)  
 .getMainStatistics().get(innerIndex)));  
  
 }  
  
 }  
 }  
  
 *// if not matches are added then fixed positions cannot be given for any club until they play a match* if(!matchedAdded){  
 organisedResultList.set(0, "00");  
 }  
  
 *// this is were the table is created* System.out.println("| "+organisedResultList.get(0)+ " | "+ seasonFilteredClubs.get(index).getName()  
 + clubNameEndSpace + "| "+organisedResultList.get(1)+  
 " | "+organisedResultList.get(2)+" | "+  
 organisedResultList.get(3)+" | "+  
 organisedResultList.get(4)+" | "+  
 organisedResultList.get(5)+" | "+  
 organisedResultList.get(6)+" | "+  
 organisedResultList.get(8)+" | "+  
 organisedResultList.get(7)+" |");  
 }  
  
 }else{  
 *// creating the empty table* for (int innerIndex = 0; innerIndex < 106; innerIndex++) {  
 HORIZONTAL\_DASHES.append("-");  
 }  
 for (int innerIndex = 0; innerIndex < 38; innerIndex++) {  
 PREMIER\_LEAGUE\_SPACE\_TILE.append(" ");  
 }  
  
 *// print the table* System.out.println("\n"+HORIZONTAL\_DASHES);  
 System.out.println("|" + PREMIER\_LEAGUE\_SPACE\_TILE + " P R E M I E R - L E A G U E" + PREMIER\_LEAGUE\_SPACE\_TILE + "|");  
 System.out.println(HORIZONTAL\_DASHES);  
 System.out.println("| Position | Club | Played | Won | Drawn | Lost | Goal-Scored " +  
 "| Goal-Difference | Points |");  
 System.out.println(HORIZONTAL\_DASHES);  
  
 *// creating the empty rows* for (int index = 0; index < 10; index++) {  
 System.out.println("| | | | | | | " +  
 " | | |");  
 }  
 }  
 System.out.println("\n\n");  
 }  
  
 *// Overriding the addPlayedMatch method from the interface* @Override  
 public String addPlayedMatch(String seasonPlayed, String clubName\_01, String clubName\_02,  
 int numberGoalScored\_club\_1, int numberGoalScored\_club\_2, DateMatch dateOfMatch,  
 String matchType) {  
  
 *// checking if the maximum number of matches has been reached or not, even if either club reached to the max  
 // then the match is cancelled* boolean club1ReachedMaximumMatches = false;  
 boolean club2ReachedMaximumMatches = false;  
 FootballClub club1 = null;  
 FootballClub club2 = null;  
 int matchCounter = 0;  
  
 *// getting the clubs from the name of club received as the parameter* for (FootballClub club: premierLeagueFootballClubList) {  
  
 if(club.getName().equalsIgnoreCase(clubName\_01)){  
 club1 = club;  
  
 }else if(club.getName().equalsIgnoreCase(clubName\_02)){  
 club2 = club;  
  
 }  
  
 }  
  
 *// if both the entered clubs are valid only we continue* if(club1!=null && club2!=null){  
  
 *// we are checking if the club will reach the maximum limit of matches played per club for (club1)* for (Match match: club1.getMatchesPlayed()) {  
  
 if(match.getSeason().equals(seasonPlayed)){  
 matchCounter++;  
 club1ReachedMaximumMatches = matchCounter >= maximumNumberOfMatchesPerClub;  
 }  
  
 }  
  
 matchCounter = 0;  
 *// we are checking if the club will reach the maximum limit of matches played per club for (club2)* for (Match match: club2.getMatchesPlayed()) {  
  
 if(match.getSeason().equals(seasonPlayed)){  
 matchCounter++;  
 club2ReachedMaximumMatches = matchCounter >= maximumNumberOfMatchesPerClub;  
 }  
  
 }  
  
 }  
  
 *// If both of the clubs didn't the max number to matches limit only we then add the match* if( !club2ReachedMaximumMatches && !club1ReachedMaximumMatches){  
  
 *// check if the enter clubs are real and display msg* boolean club01 = false;  
 boolean club02 = false;  
  
 *// checking if the clubs entered are valid* for (FootballClub footballClub : premierLeagueFootballClubList) {  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)) club01=true;  
 if(footballClub.getName().equalsIgnoreCase(clubName\_02)) club02=true;  
 }  
  
 *// Checking if the entered club names are valid to further proceed* if(club01 && club02){  
 *// Checking if the match has already being played for opponent club depending on the match type  
 // 1 club can play 1 'Home' and 1 'Away' match with 1 opponent club* boolean allGoodToProceed = true;  
 for (FootballClub club: premierLeagueFootballClubList){  
 if( club.getName().equalsIgnoreCase(clubName\_01) ){  
 for (Match match: club.getMatchesPlayed()){  
 if(match.getSeason().equalsIgnoreCase(seasonPlayed) &&  
 match.getOpponentClubName().equalsIgnoreCase(clubName\_02)){  
 if(match.getMatchType().equalsIgnoreCase(matchType)){  
 *// You can further proceed to add the match because,  
 // the match has been already played* allGoodToProceed = false;  
  
 }  
 }  
 }  
 }  
 }  
  
 if(allGoodToProceed){  
 *// THIS SECTION MEANS EVERYTHING IS GOOD TO GO  
 // Adding the played season* allSeasonAdded.add(seasonPlayed);  
  
 *// valid club names so calculating the statistics and add them* calculatingStatistics(clubName\_01, clubName\_02, numberGoalScored\_club\_1, numberGoalScored\_club\_2,  
 dateOfMatch,seasonPlayed, matchType);  
 return "\n Match Successfully added! \n";  
  
 }else{  
 *// This says the user that you cant play a match which has been already played!* return "\n Sorry can't add match, because it's already played for the given teams, season and" +  
 "match type \n";  
  
 }  
  
 }else{  
  
 *// If in valid club names we return an appropriate message to the user* if(!club01 && !club02){  
 return "\n Sorry,there are no clubs with the names '" + clubName\_01 + "' and '" +  
 clubName\_02 + "'";  
  
 }else {  
 if(!club01){  
 System.out.println();  
 return "\n Sorry,there is no club with the given name '" + clubName\_01 + "'";  
  
 }  
 }  
 }  
  
 return "\n Sorry,there is no club with the given name '" + clubName\_02 + "'";  
 }  
  
 *// if maximum number of matches limit has reaches we return an appropriate message to the user* if(club1ReachedMaximumMatches && club2ReachedMaximumMatches){  
 return "\n Sorry, both the clubs have reached the maximum number of matches played!";  
  
 }else if(club1ReachedMaximumMatches){  
 return "\n Sorry, '" + clubName\_01 + "' has reached the maximum number of matches played!";  
  
 }  
  
 *// returns appropriate message* return "\n Sorry, '" + clubName\_02 + "' has reached the maximum number of matches played!";  
  
 }  
  
 *// This method is used to calculate the statistics* public void calculatingStatistics(String clubName\_01, String clubName\_02, int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch date, String seasonPlayed,  
 String matchType) {  
 */\*  
 \* This methods uses the input match details to update the stats for the football clubs respectively  
 \* Stats include No of matches, No of wins, No of draws, No of defeats, Current Points, Goal Difference,  
 \* Total yellow cards, total red cards, Goal scored and Goal Received  
 \*/  
  
 // Number of matches has to get incremented to both the clubs* for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)  
 || footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 *// Number of matches has to get incremented to both the clubs and the session* footballClub.getClubStatistics().setTotalMatchesPlayed(footballClub  
 .getClubStatistics().getTotalMatchesPlayed() + 1);  
  
 }  
  
 *// calculate & update the goal received and goal scored for each club played* int goalDifference = 0;  
 int scored = 0;  
 int received = 0;  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
  
 scored = numberGoalScored\_club\_1;  
 received = numberGoalScored\_club\_2;  
  
 *// calculating the goal difference to club 01* goalDifference = numberGoalScored\_club\_1 - numberGoalScored\_club\_2;  
  
 }else if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 scored = numberGoalScored\_club\_2;  
 received = numberGoalScored\_club\_1;  
  
 *// calculating the goal difference to club 02* goalDifference = numberGoalScored\_club\_2 - numberGoalScored\_club\_1;  
  
 }  
  
 *// setting goals received and scored* footballClub.setTotalGoalsScored(footballClub.getTotalGoalsScored() + scored);  
 footballClub.setTotalGoalsReceived(footballClub.getTotalGoalsReceived() + received);  
  
 *// setting the goal difference* footballClub.setTotalGoalsDifference(footballClub.getTotalGoalsDifference() + goalDifference);  
 }  
  
 *// calculate & update the wins, draws and defeats for each club played* if(numberGoalScored\_club\_1 == numberGoalScored\_club\_2){  
  
 for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)  
 || footballClub.getName().equalsIgnoreCase(clubName\_02)){  
  
 footballClub.getClubStatistics().setTotalDraws(footballClub.getClubStatistics()  
 .getTotalDraws() + 1);  
 }  
 }  
  
 }else if(numberGoalScored\_club\_1 > numberGoalScored\_club\_2){  
 updatingWinsDefeats(clubName\_02, clubName\_01);  
  
 }else{  
 updatingWinsDefeats(clubName\_01, clubName\_02);  
  
 }  
  
 *// calculate & update the current score and goal difference for the clubs* for (FootballClub footballClub: premierLeagueFootballClubList) {  
  
 int totalScore = footballClub.getClubStatistics().getTotalWins() \* 3 +  
 footballClub.getClubStatistics().getTotalDraws();  
 footballClub.getClubStatistics().setTotalPointsScored(totalScore);  
  
 }  
  
 *// creating the Match object and adding for both the clubs played with their own scores* for (FootballClub footballClub: premierLeagueFootballClubList) {  
  
 *// we have added the matched played by each club to their respective list of matches* if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
 addPlayedMatchToClub(clubName\_02, clubName\_01, numberGoalScored\_club\_2, numberGoalScored\_club\_1, date,  
 seasonPlayed, footballClub, matchType);  
  
 }else if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
 addPlayedMatchToClub(clubName\_01, clubName\_02, numberGoalScored\_club\_1, numberGoalScored\_club\_2, date,  
 seasonPlayed, footballClub, matchType);  
  
 }  
 }  
 }  
  
 *// This method is used to add the played match to the club* public void addPlayedMatchToClub(String clubName\_01, String clubName\_02, int numberGoalScored\_club\_1,  
 int numberGoalScored\_club\_2, DateMatch date, String seasonPlayed,  
 FootballClub footballClub, String matchType) {  
  
 *// creating the match statistics object with the data to be stored* MatchStats matchStats = getStatsOfMatch(footballClub);  
  
 *// creating a match object with the data to be stored* Match matchPlayed = new Match(numberGoalScored\_club\_2, numberGoalScored\_club\_1, matchStats, date,  
 clubName\_01, seasonPlayed,matchType, clubName\_02);  
  
 *// adding the played match into the list of matches* footballClub.getMatchesPlayed().add(matchPlayed);  
  
 }  
  
 *// This method is used to get the match statistics which are randomly generated* public MatchStats getStatsOfMatch(FootballClub footballClub) {  
 Random random = new Random();  
  
 *// variables with the random data set to be used for the match statistics* int numberOfYellowCards = random.nextInt(5);  
 int numberOfRedCards = random.nextInt(5);  
 int shots = random.nextInt(20);  
 int shotsOfTarget = random.nextInt(20);  
 int offSides = random.nextInt(30);  
 int fouls = random.nextInt(30);  
 int corners = random.nextInt(30);  
 int passes = random.nextInt(30);  
 double passAccuracy = Math.round(random.nextDouble()\*1000)/10.0;  
 double possession = Math.round(random.nextDouble()\*1000)/10.0;  
  
 *// updating the total red and yellow cards for the club* footballClub.setTotalYellowCards((footballClub.getTotalYellowCards() + numberOfYellowCards));  
 footballClub.setTotalRedCards(footballClub.getTotalRedCards() + numberOfRedCards);  
  
 *// return the matchStat obj with the data parameters* return new MatchStats(numberOfYellowCards, numberOfRedCards, shots, shotsOfTarget, offSides  
 ,fouls, corners, passes, passAccuracy, possession);  
 }  
  
 *// updates the wins and defeats of the played club matches* public void updatingWinsDefeats(String clubName\_01, String clubName\_02) {  
  
 for (FootballClub footballClub : premierLeagueFootballClubList) {  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_02)){  
 footballClub.getClubStatistics().setTotalWins(footballClub.getClubStatistics().getTotalWins() + 1);  
  
 }  
  
 if(footballClub.getName().equalsIgnoreCase(clubName\_01)){  
 footballClub.getClubStatistics().setTotalDefeats(footballClub.getClubStatistics().getTotalDefeats() + 1);  
  
 }  
 }  
 }  
  
 *// Overriding the saveDataIntoFile method from the interface* @Override  
 public String saveDataIntoFile() {  
 */\*  
 \* If we need to write and object of a Class into a file, we have to make that class to implement the interface  
 \* Serializable.  
 \* This is because Serializable interface gives the permission to save the objects  
 \*/  
  
 // Serializing means converting a state into a byte stream  
  
 // getting the path to save the data* File file = new File("public/resources/dataStorage.txt");  
  
 *// This is an out stream which is used to write data into a file* FileOutputStream fileOutputStream = null;  
  
 *// This encodes the java objects into byte streams which can be stored into the file* ObjectOutputStream objectOutputStream = null;  
  
 *// handling the exceptions and saving the data from the file* try {  
 *// saving the data into the file  
  
 // creating an instance of FileInputStream and ObjectInputStream* fileOutputStream = new FileOutputStream(file);  
 objectOutputStream = new ObjectOutputStream(fileOutputStream);  
  
 *// writing the objects into the file* objectOutputStream.writeObject(premierLeagueFootballClubList);  
 objectOutputStream.writeObject(matchedAdded);  
 objectOutputStream.writeObject(getAllSeasonAdded());  
 objectOutputStream.writeObject(maximumNumberOfMatchesPerClub);  
  
 }  
 catch (FileNotFoundException fileNotFoundException) {  
 *// Handles the exception* return " File not found exception occurred when saving!";  
  
 }  
 catch (IOException ioException) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
 }  
 catch (Exception e){  
 *// Handles the exception* return " An exception occurred!";  
  
 }  
 finally {  
 *// once all the data is saved into the file we close it* try {  
 *// making sure that it is not null, to be closed* if (fileOutputStream != null) {  
 fileOutputStream.close();  
 }  
  
 *// making sure that it is not null, to be closed* if (objectOutputStream != null) {  
 objectOutputStream.close();  
 }  
 }  
 catch (IOException e) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
 }  
 }  
  
 *// returns a success message if everything goes well* return "\n Saving the data . . .\n Successfully saved!";  
 }  
  
 *// Overriding the readDataFromFile method from the interface* @Override  
 public String clearDataFile() {  
 *// If the user needs to empty the text file details he has the option to do it as well  
 /\*  
 \* This makes sure that the file is empty, by overriding the content of the file with a single ""  
 \*/  
  
 // using file write the data won't be converted into any byte stream it will directly set the exact string what  
 // you are setting* FileWriter file = null;  
 try {  
 file = new FileWriter("public/resources/dataStorage.txt");  
  
 *// clearing the content of the file by overriding with an empty string* file.write("");  
  
 }  
 catch (FileNotFoundException fileNotFoundException) {  
 *// Handles the exception* return " File not found exception occurred when clearing the file!";  
  
 }  
 catch (IOException ioException) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
  
  
 }  
 catch (Exception e){  
 *// Handles the exception* return " An exception occurred!";  
  
 }  
 finally {  
 *// closes the file once all the operations are completed* try {  
 if (file != null) {  
 file.close();  
 }  
 }  
 catch (IOException e) {  
 *// Handles the exception* return " Exception when performing read/write operations to the file!" +  
 "\n No permission to read/write from or to the file";  
 }  
 }  
  
 *// returns a success message if everything goes well* return "\n Clearing the contents of the file . . .\n Successfully cleared the file details!";  
  
 }  
  
 *// Overriding the displayGUI() method to display the GUI* @Override  
 public String displayGUI(){  
  
 *// used to open the external browser with the URL "http://localhost:4200" to open the GUI* Desktop desktop = Desktop.*getDesktop*();  
 try {  
 desktop.browse(new URI(("http://localhost:4200")));  
 return " Opening the GUI at localhost: 4200\n";  
  
 } catch (IOException | URISyntaxException ioException) {  
 *// Handling caught exception* return "Error when opening the browser! ";  
 }  
 }  
  
 *// Setters and Getters* public static ArrayList<FootballClub> getPremierLeagueFootballClubList() {  
 return premierLeagueFootballClubList;  
 }  
  
 public static void setPremierLeagueFootballClubList(ArrayList<FootballClub> premierLeagueFootballClubList) {  
 PremierLeagueManager.premierLeagueFootballClubList = premierLeagueFootballClubList;  
 }  
  
 public static int getMaximumNumberOfMatchesPerClub() {  
 return maximumNumberOfMatchesPerClub;  
 }  
  
 public static void setMaximumNumberOfMatchesPerClub(int maximumNumberOfMatchesPerClub) {  
 PremierLeagueManager.maximumNumberOfMatchesPerClub = maximumNumberOfMatchesPerClub;  
 }  
 public static ArrayList<String> getAllSeasonAdded() {  
 return allSeasonAdded;  
 }  
  
 public static void setAllSeasonAdded(ArrayList<String> allSeasonAdded) {  
 PremierLeagueManager.allSeasonAdded = allSeasonAdded;  
 }  
}

**utils**

PremierLeagueUtil.java

package utils;  
  
import entities.DateMatch;  
import entities.FootballClub;  
import entities.Match;  
import entities.LeagueManager;  
import services.PremierLeagueManager;  
  
import java.util.ArrayList;  
import java.util.Comparator;  
import java.util.Random;  
import java.util.stream.Collectors;  
  
public class PremierLeagueUtil {  
  
 private static ArrayList<FootballClub> *guiSeasonFilteredClubs*;  
  
 public static ArrayList<String> allSeasons(){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// sort the seasons using the comparator* Comparator<String> comparator = (season1, season2) -> {  
  
 if(Integer.*parseInt*(season1.split("-")[0]) > Integer.*parseInt*(season2.split("-")[0])){  
 return 1;  
 }  
 return -1;  
  
 };  
  
 *// setting the seasons with distinct seasons only* PremierLeagueManager.*setAllSeasonAdded*((ArrayList<String>)  
 PremierLeagueManager.*getAllSeasonAdded*().stream().distinct().collect(Collectors.*toList*()));  
  
 *// sorting the seasons* PremierLeagueManager.*getAllSeasonAdded*().sort(comparator);  
  
 *// getting the seasons and return them* return PremierLeagueManager.*getAllSeasonAdded*();  
 }  
  
 public static ArrayList<FootballClub> sortByPoints(String season){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// filters the football clubs according to the season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 *// sorting by points only in descending order  
 guiSeasonFilteredClubs* = *sortClubsByPoints*(*guiSeasonFilteredClubs*);  
  
 return *guiSeasonFilteredClubs*;  
 }  
  
 *// This function is to return the listOfClubs filtered by season* public static ArrayList<FootballClub> getGuiSeasonFilteredClubs(String season){  
  
 try {  
 *// get the clubs filtered by season  
 guiSeasonFilteredClubs* = PremierLeagueManager.*seasonFilteredFootballCLubList*(season);  
  
 } catch (CloneNotSupportedException e) {  
 *// Handles the exception* e.printStackTrace();  
  
 }  
 return *guiSeasonFilteredClubs*;  
  
 }  
  
 *// This function is used to sort the matches of a football club in a season by descending order of points* public static ArrayList<FootballClub> sortClubsByPoints(ArrayList<FootballClub> guiSeasonFilteredClubs) {  
  
 // comparator to sort the clubs by points

Comparator<FootballClub> comparator = (club1, club2) -> {

if(club1.getClubStatistics().getTotalPointsScored() < club2.getClubStatistics().getTotalPointsScored()){

return 1;

if(club1.getClubStatistics().getTotalPointsScored() == (club2.getClubStatistics()

.getTotalPointsScored())){

if(club1.getTotalGoalsScored() < club2.getTotalGoalsScored()){

return 1;

}

}else{

if(club1.getClubStatistics().getTotalPointsScored() < club2.getClubStatistics()

.getTotalPointsScored()){

return 1;

}

}

return -1;

};

*// sorting only if there are clubs to sort* if (guiSeasonFilteredClubs != null) {  
 guiSeasonFilteredClubs.sort(comparator);  
  
 }  
 return guiSeasonFilteredClubs;  
  
 }  
  
 public static ArrayList<FootballClub> sortByWins(String season){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// filters the football clubs according to the season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 *// sorting by points only in descending order of wins  
 guiSeasonFilteredClubs* = *sortClubsByWins*(*guiSeasonFilteredClubs*);  
  
 return *guiSeasonFilteredClubs*;  
 }  
  
 *// sorting by points only in descending order of wins* public static ArrayList<FootballClub> sortClubsByWins(ArrayList<FootballClub> guiSeasonFilteredClubs) {  
  
 *// comparator to sort the clubs in descending order of the their wins* Comparator<FootballClub> comparator = (club1, club2) -> {  
  
 if(club1.getClubStatistics().getTotalWins() < club2.getClubStatistics().getTotalWins()){  
 return 1;  
 }  
 return -1;  
 };  
  
 *// sorting only if there are clubs to sort* if (guiSeasonFilteredClubs != null) {  
 guiSeasonFilteredClubs.sort(comparator);  
  
 }  
  
 return guiSeasonFilteredClubs;  
 }  
  
 public static ArrayList<FootballClub> sortByGoals(String season){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// filters the football clubs according to the season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 *// sorting by points only in descending order goal scored  
 guiSeasonFilteredClubs* = *sortClubsByGoals*(*guiSeasonFilteredClubs*);  
  
 return *guiSeasonFilteredClubs*;  
 }  
  
 *// sorting by points only in descending order goal scored* public static ArrayList<FootballClub> sortClubsByGoals(ArrayList<FootballClub> guiSeasonFilteredClubs) {  
  
 *// comparator for sorting* Comparator<FootballClub> comparator = (club1, club2) -> {  
  
 if(club1.getTotalGoalsScored() < club2.getTotalGoalsScored()){  
 return 1;  
 }  
 return -1;  
 };  
  
 *// checks if clubs are present to sort* if (guiSeasonFilteredClubs != null) {  
 guiSeasonFilteredClubs.sort(comparator);  
  
 }  
 return guiSeasonFilteredClubs;  
 }  
  
 public static ArrayList<Match> allMatches(String season){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// getting the clubs with the filtered matches by season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 *// getting the matches filtered by season* ArrayList<Match> matchesDisplayed = *getMatchesForSeason*(*guiSeasonFilteredClubs*);  
  
 return matchesDisplayed;  
 }  
  
 *// This returns a list of matches for a given season* public static ArrayList<Match> getMatchesForSeason(ArrayList<FootballClub> seasonBasedClub){  
  
 *// these both arrayList will be of the same size* ArrayList<Match> matchesDisplayed = new ArrayList<>();  
 ArrayList<Match> allMatches = new ArrayList<>();  
  
 *// populating the allMatches list will all the matches from the seasonBasedClub  
 // adding all the matches played for that season inside the allMatches list* for (FootballClub footballClub: seasonBasedClub) {  
 allMatches.addAll(footballClub.getMatchesPlayed());  
 }  
  
 *// sort the matches in ascending order of the date* Comparator<Match> sortByDate = (match1, match2) -> {  
 if(match1.getDate().getYear() == match2.getDate().getYear()){  
 if (match1.getDate().getMonth() == match2.getDate().getMonth()) {  
 if (match1.getDate().getDay() > match2.getDate().getDay()) {  
 return 1;  
 }  
 } else if (match1.getDate().getMonth() > match2.getDate().getMonth()) {  
 return 1;  
 }  
 }else if (match1.getDate().getYear() > match2.getDate().getYear()) {  
 return 1;  
 }  
  
 return -1;  
 };  
 allMatches.sort(sortByDate); *// sorting the matches according to the date  
  
 // MAIN CODE FOR EXTRACTING THE NECESSARY SET OF MATCHES (NO DUPLICATES)* for (Match match : allMatches) {  
  
 boolean matchNotAvailable = true;  
  
 *// NOTE THAT THIS IS TO PREVENT THE REPEATING OF MATCHES IN ALL CLUBS WHICH IS DUPLICATING* for (Match value : matchesDisplayed) {  
 if (match.getOpponentClubName().equalsIgnoreCase(value.getParticipatedCLubName())) {  
 *// NOTE: goal scored from the club is equal to goal received from the opponent club* if (  
 (value.getGoalReceived() == match.getGoalScored()) &&  
 (value.getGoalScored() == match.getGoalReceived()) &&  
 (value.getMatchType().equalsIgnoreCase(match.getMatchType())) &&  
 (value.getDate().equals(match.getDate()))  
 ) {  
 matchNotAvailable = false;  
 }  
 }  
 }  
 *// WE ADD THE NON DUPLICATED MATCHES INTO THIS LIST AND SEND IT TO THE VIEWS* if (matchNotAvailable) {  
 matchesDisplayed.add(match);  
 }  
 }  
 return matchesDisplayed;  
 }  
  
 public static ArrayList<Match> matchesByDate(String date, String season){  
  
 *// loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// getting the clubs with the filtered matches by season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 ArrayList<FootballClub> filteredClubsByDateForSeason;  
 ArrayList<Match> filteredMatchedOnDate = null;  
  
 try {  
 *// returns the clubs with the filtered matches by date* filteredClubsByDateForSeason = *filterMatchesByDate*(*guiSeasonFilteredClubs*, date);  
  
 *// returns the matches form the filtered club by date* filteredMatchedOnDate = *getMatchesForSeason*(filteredClubsByDateForSeason);  
  
 } catch (CloneNotSupportedException e) {  
 *// Handles the exception* e.printStackTrace();  
  
 }  
 return filteredMatchedOnDate;  
 }  
  
 *// This will return an arraylist which will filter all the matches of the club by date* public static ArrayList<FootballClub> filterMatchesByDate(ArrayList<FootballClub> seasonBasedClub,  
 String dateEntered)  
 throws CloneNotSupportedException {  
  
 ArrayList<FootballClub> filteredClubListByDate = new ArrayList<>();  
  
 *// removing unwanted zeros from date and month* String[] splitDate = dateEntered.split("-");  
 dateEntered = Integer.*parseInt*(splitDate[0]) + "-" + Integer.*parseInt*(splitDate[1]) + "-"  
 + Integer.*parseInt*(splitDate[2]);  
  
 *// we are cloning or creating a copy of the arraylist which has to be filtered* for (FootballClub footballClub : seasonBasedClub) {  
 filteredClubListByDate.add((FootballClub) footballClub.clone());  
 }  
  
 *// check and split the date entered by the user* if(!dateEntered.isEmpty()){  
  
 *// looping through the clubs checking for matches without the match with the given date and removing them* for (FootballClub club: filteredClubListByDate) {  
 int numberOfMatchesPlayed = club.getMatchesPlayed().size();  
 int index = 0;  
 while(index < numberOfMatchesPlayed){  
  
 int matchDay = club.getMatchesPlayed().get(index).getDate().getDay();  
 int matchMonth = club.getMatchesPlayed().get(index).getDate().getMonth();  
 int matchYear = club.getMatchesPlayed().get(index).getDate().getYear();  
 String matchDate = matchYear + "-" + matchMonth + "-" + matchDay;  
  
 *// checking if the data is not equal and then remove the match respectively* if(!dateEntered.trim().equalsIgnoreCase(matchDate.trim())){  
 club.getMatchesPlayed().remove(club.getMatchesPlayed().get(index));  
 numberOfMatchesPlayed--;  
 }else{  
 index++;  
 }  
 }  
 }  
 }  
 return filteredClubListByDate;  
 }  
  
 public static ArrayList<Match> generateMatch(String season){  
  
 *// creating an instance of the premier league manager service* LeagueManager premierLeagueManagerService = PremierLeagueManager.*getInstance*();  
 int numberOfClubsPresent = PremierLeagueManager.*getPremierLeagueFootballClubList*().size();  
  
 *// This condition is to make sure that there is at least 2 clubs to play a match* if(numberOfClubsPresent > 1){  
  
 *// there 2 or more clubs present so we can generate a match  
 // loading the data from the file* PremierLeagueManager.*loadingData*();  
  
 *// getting the clubs with the filtered matches by season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 Random random = new Random();  
  
 *// step 01: randomly select 2 clubs* int randomClub\_01 = random.nextInt(*guiSeasonFilteredClubs*.size());  
 FootballClub selectedClub\_O1 = *guiSeasonFilteredClubs*.get(randomClub\_01);  
 int randomClub\_02 = random.nextInt(*guiSeasonFilteredClubs*.size());  
  
 *// This is to make sure that the same club is not selected again for the match* while (randomClub\_02==randomClub\_01){  
 randomClub\_02 = random.nextInt(*guiSeasonFilteredClubs*.size());  
 }  
 FootballClub selectedClub\_O2 = *guiSeasonFilteredClubs*.get(randomClub\_02);  
  
 *// step 02: randomly generate the necessary data* int numberGoalScored\_club\_1 = random.nextInt(7);  
 int numberGoalScored\_club\_2 = random.nextInt(7);  
  
 *// setting the random date and random season depending on the randomly selected year* int[] possibleYears = new int[2];  
  
 int seasonYear = Integer.*parseInt*(season.split("-")[0]);  
  
 possibleYears[0] = seasonYear;  
 possibleYears[1] = seasonYear + 1;  
  
 *// making sure that the months are in given range for the year select for the season  
 // premier league happens every year from August to next May* int day = random.nextInt(30)+1;  
 int randomYearIndexSelected = random.nextInt(2);  
 int year = possibleYears[randomYearIndexSelected];  
 int month;  
  
 *// if randomYearIndexSelected = 0, then the months have to be in the range from 8 to 12 else 1 to 5* if(randomYearIndexSelected==0){  
 *// 8 to 12* month = random.nextInt(5) + 8;  
  
 }else{  
 *// 1 to 5* month = random.nextInt(5) + 1;  
  
 }  
  
 DateMatch date = new DateMatch(day, month, year);  
 String[] matchTypes = new String[]{"Home", "Away"};  
 String matchType = matchTypes[random.nextInt(2)];  
  
 *// step 03: call the addPlayedMatch() wisely by passing all the generated random data* premierLeagueManagerService.addPlayedMatch(season,selectedClub\_O1.getName(), selectedClub\_O2.getName(),  
 numberGoalScored\_club\_1, numberGoalScored\_club\_2, date, matchType);  
  
 *// step 04: call the save file method* premierLeagueManagerService.saveDataIntoFile();  
  
 *// step 05: call the load file method* PremierLeagueManager.*loadingData*();  
  
 *// getting the clubs with the filtered matches by season  
 guiSeasonFilteredClubs* = *getGuiSeasonFilteredClubs*(season);  
  
 *// getting the matches for a season and returning* return *getMatchesForSeason*(*guiSeasonFilteredClubs*);  
 }  
 *// if there are less than 2 clubs we can't generate a match* return null;  
 }  
}

**conf**

application.conf

play.http.secret.key = "myappsecret"

play.filters {

enabled += "play.filters.gzip.GzipFilter"  
csrf {  
 cookie.name = "Csrf-Token"  
  
}

headers {  
 contentSecurityPolicy = null   
}

}

play.filters.enabled += "play.filters.cors.CORSFilter"

routes

*# Routes  
# This file defines all application routes (Higher priority routes first)  
# ~~~~  
  
# Serve index page from public directory*GET */* controllers.FrontendController.index()  
  
*# Map static resources from the /public folder to the /assets URL path*GET */*assets*/\**file controllers.Assets.versioned(path="/public", file: Asset)  
  
*# GET Requests routes  
  
# returns a list of all the seasons played so far*GET */*seasons*/*all controllers.PremierLeagueController.allSeasons  
  
*# retuens clubs sorted by points in a season*GET */*records*/*sortPoints*/:*season controllers.PremierLeagueController.sortByPoints(season: String)  
  
*# retruns clubs sorted by wins in a season*GET */*records*/*sortWins*/:*season controllers.PremierLeagueController.sortByWins(season: String)  
  
*# returns clubs sorted by goals in a season*GET */*records*/*sortGoals*/:*season controllers.PremierLeagueController.sortByGoals(season: String)  
  
*# returns matches by season seleted*GET */*matches*/*season*/:*season controllers.PremierLeagueController.allMatches(season: String)  
  
*# returns matches on a date of a season*GET */*matches*/*season*/:*season*/*date*/:*date controllers.PremierLeagueController.matchesByDate(date: String, season: String)  
  
*# generates a match for a specific season*GET */*matches*/*season*/*match*/*generate*/:*season controllers.PremierLeagueController.generateMatch(season: String)

build.sbt

name := """Backend"""  
organization := "com.nazhim"  
  
version := "1.0-SNAPSHOT"  
  
lazy val root = (project in file(".")).enablePlugins(PlayJava)  
  
scalaVersion := "2.13.3"  
  
libraryDependencies += guice

ui-build.sbt

import scala.sys.process.Process  
  
*/\*  
 \* UI Build hook Scripts  
 \*/  
  
// Execution status success.*val Success = 0  
  
*// Execution status failure.*val Error = 1  
  
*// Run angular serve task when Play runs in dev mode, that is, when using 'sbt run'  
// https://www.playframework.com/documentation/2.8.x/SBTCookbook*PlayKeys.*playRunHooks* += *baseDirectory*.map(FrontendRunHook.*apply*).value  
  
*// True if build running operating system is windows.*val isWindows = System.*getProperty*("os.name").toLowerCase().contains("win")  
  
*// Execute on commandline, depending on the operating system. Used to execute npm commands.*def runOnCommandline(script: String)(implicit dir: File): Int = {  
 if(isWindows){ Process("cmd /c " + script, dir) } else { Process(script, dir) } }!  
  
*// Check of node\_modules directory exist in given directory.*def isNodeModulesInstalled(implicit dir: File): Boolean = (dir / "node\_modules").exists()  
  
*// Execute `npm install` command to install all node module dependencies. Return Success if already installed.*def runNpmInstall(implicit dir: File): Int =  
 if (isNodeModulesInstalled) Success else runOnCommandline(FrontendCommands.*dependencyInstall*)  
  
*// Execute task if node modules are installed, else return Error status.*def ifNodeModulesInstalled(task: => Int)(implicit dir: File): Int =  
 if (runNpmInstall == Success) task  
 else Error  
  
*// Execute frontend test task. Update to change the frontend test task.*def executeUiTests(implicit dir: File): Int = ifNodeModulesInstalled(runOnCommandline(FrontendCommands.*test*))  
  
*// Execute frontend prod build task. Update to change the frontend prod build task.*def executeProdBuild(implicit dir: File): Int = ifNodeModulesInstalled(runOnCommandline(FrontendCommands.*build*))  
  
  
*// Create frontend build tasks for prod, dev and test execution.*lazy val `ui-test` = taskKey[Unit]("Run UI tests when testing application.")  
  
`ui-test` := {  
 implicit val userInterfaceRoot = *baseDirectory*.value / "ui"  
 if (executeUiTests != Success) throw new Exception("UI tests failed!")  
}  
  
lazy val `ui-prod-build` = taskKey[Unit]("Run UI build when packaging the application.")  
  
`ui-prod-build` := {  
 implicit val userInterfaceRoot = *baseDirectory*.value / "ui"  
 if (executeProdBuild != Success) throw new Exception("Oops! UI Build crashed.")  
}  
  
*// Execute frontend prod build task prior to play dist execution.  
dist* := (*dist* dependsOn `ui-prod-build`).value  
  
*// Execute frontend prod build task prior to play stage execution.  
stage* := (*stage* dependsOn `ui-prod-build`).value  
  
*// Execute frontend test task prior to play test execution.  
test* := ((*test* in *Test*) dependsOn `ui-test`).value

* + 1. Testing Code
       1. Junit Testing Code

**tests**

GUITester.java

package tests;  
import entities.DateMatch;  
import entities.FootballClub;  
import entities.Match;  
import org.junit.After;  
import org.junit.Before;  
import org.junit.Test;  
import entities.LeagueManager;  
import services.PremierLeagueManager;  
import utils.PremierLeagueUtil;  
  
import java.util.ArrayList;  
import java.util.Comparator;  
import static org.junit.Assert.*assertEquals*;  
  
*// MAKE SURE THAT THE TXT FILE IS EMPTY BEFORE RUNNING THIS JUNIT TEST (if any errors occur)*public class GUITester {  
  
 @Before  
 public void addingDataToFile(){  
 LeagueManager premierLeagueManager = PremierLeagueManager.*getInstance*();  
  
 *// cleaning the file and making this empty before running the test* premierLeagueManager.clearDataFile();  
  
 *// before testing we add data into the Txt file using the @Before annotation* PremierLeagueManager.*loadingData*(); *// load all the data first* DateMatch date = new DateMatch(14,12,2020);  
  
 *// creating 4 clubs* premierLeagueManager.createClub("Barca","Spain","Nazhim",null,  
 "normal");  
 premierLeagueManager.createClub("Juventus","India","Aladin","IIT",  
 "university");  
 premierLeagueManager.createClub("Titan FC","USA","Hashim","RI",  
 "school");  
 premierLeagueManager.createClub("Onco","Africa","Abdul","RI",  
 "school");  
  
 *// Add the necessary match which can show difference when ur sorting the data* premierLeagueManager.addPlayedMatch("2020-21","Barca","Juventus",  
 18,6,date,"Home");  
  
 premierLeagueManager.addPlayedMatch("2020-21","Titan FC","Juventus",  
 5,4,date,"Home");  
  
 premierLeagueManager.addPlayedMatch("2020-21","Titan FC","Juventus",  
 5,3,date,"Home");  
  
 premierLeagueManager.addPlayedMatch("2020-21","Titan FC","Onco",  
 5,2,date,"Home");  
  
 premierLeagueManager.addPlayedMatch("2020-21","Juventus","Onco",  
 1,0,date,"Home");  
  
 premierLeagueManager.addPlayedMatch("2020-21","Juventus","Onco",  
 2,1,date,"Home");  
 premierLeagueManager.addPlayedMatch("2019-20","Juventus","Onco",  
 2,1,date,"Home");  
  
 *// saving the records into the file* premierLeagueManager.saveDataIntoFile();  
  
 }  
  
 @Test  
 public void testingGetGuiSeasonFilteredClubs(){  
 *// testing the getGuiSeasonFilteredClubs() method  
  
 // loading the records from the file* PremierLeagueManager.*loadingData*();  
  
 ArrayList<FootballClub> seasonList = null;  
 try {  
 *// getting the clubs based on the season* seasonList = PremierLeagueManager.*seasonFilteredFootballCLubList*("2020-21");  
  
 } catch (CloneNotSupportedException e) {  
 *// Handle exception* e.printStackTrace();  
  
 }  
 *// testing  
 assertEquals*(PremierLeagueManager.*getPremierLeagueFootballClubList*().size(),seasonList.size());  
  
 }  
  
 @Test  
 public void testSortingByPoints() {  
 *// testing the sortClubsByPoints() method to make sure that the return list of clubs are in sorted order of  
 // points  
  
 // getting the sorted matches by points from* ArrayList<FootballClub> sortClubsByPoints = PremierLeagueUtil.*sortClubsByPoints*(PremierLeagueManager.  
 *getPremierLeagueFootballClubList*());  
  
 *// Comparator to sort by points* Comparator<FootballClub> comparatorPoints = (club1, club2) -> {  
 if(club1.getClubStatistics().getTotalPointsScored() < club2.getClubStatistics().getTotalPointsScored()){  
 return 1;  
 }  
  
 return -1;  
 };  
  
 *// sort only if there are clubs present* if (PremierLeagueManager.*getPremierLeagueFootballClubList*() != null) {  
 PremierLeagueManager.*getPremierLeagueFootballClubList*().sort(comparatorPoints);  
 }  
  
 *// testing  
 assertEquals*(PremierLeagueManager.*getPremierLeagueFootballClubList*(),sortClubsByPoints);  
  
 }  
  
 @Test  
 public void testSortingByWins() {  
 *// Testing sortClubsByWins() method, if the clubs are sorted my wins or not  
  
 // getting the sorted matches by wins from* ArrayList<FootballClub> sortClubsByWins = PremierLeagueUtil.*sortClubsByWins*(  
 PremierLeagueManager.*getPremierLeagueFootballClubList*());  
  
 *// comparator to sort the clubs by descending order of wins* Comparator<FootballClub> comparatorByWins = (club1, club2) -> {  
 if(club1.getClubStatistics().getTotalWins() < club2.getClubStatistics().getTotalWins()){  
 return 1;  
 }  
  
 return -1;  
 };  
  
 *// check is the club list is not empty and then only sorts* if (PremierLeagueManager.*getPremierLeagueFootballClubList*() != null) {  
 PremierLeagueManager.*getPremierLeagueFootballClubList*().sort(comparatorByWins);  
 }  
  
 *// testing  
 assertEquals*(PremierLeagueManager.*getPremierLeagueFootballClubList*(),sortClubsByWins);  
  
 }  
  
 @Test  
 public void testSortingByGoals() {  
 *// testing sortClubsByGoals() method, which is used to sort the clubs in descending order of the goal scored* ArrayList<FootballClub> sortClubsByGoals = PremierLeagueUtil.*sortClubsByGoals*(  
 PremierLeagueManager.*getPremierLeagueFootballClubList*());  
  
 *// This comparator is used to sort the clubs in descending order of goals* Comparator<FootballClub> comparatorByGoals = (club1, club2) -> {  
 if(club1.getTotalGoalsScored() < club2.getTotalGoalsScored()){  
 return 1;  
 }  
  
 return -1;  
 };  
  
 *// check is the club list is not empty and then only sorts* if (PremierLeagueManager.*getPremierLeagueFootballClubList*() != null) {  
 PremierLeagueManager.*getPremierLeagueFootballClubList*().sort(comparatorByGoals);  
 }  
  
 *// testing  
 assertEquals*(PremierLeagueManager.*getPremierLeagueFootballClubList*(),sortClubsByGoals);  
 }  
  
 @Test  
 public void testAllSeasons(){  
 *// testing the allSeasons() method  
  
 // we call this method first because it will do the sorting and filtering of distinct season and setting them.* PremierLeagueUtil.*allSeasons*();  
  
 *// setting the expected seasons* ArrayList<String> expectedSeasons = new ArrayList<>();  
 expectedSeasons.add("2019-20");  
 expectedSeasons.add("2020-21");  
  
 *// testing  
 assertEquals*(expectedSeasons,PremierLeagueManager.*getAllSeasonAdded*());  
 }  
  
 @Test  
 public void testAllMatches(){  
 *// testing the method which is used to get all the matches for the GUI  
  
 // getting the actual list of matches* ArrayList<Match> actualMatches = PremierLeagueUtil.  
 *getMatchesForSeason*(PremierLeagueManager.*getPremierLeagueFootballClubList*());  
  
 *// getting the expected list of matches* ArrayList<Match> expectedMatches = new ArrayList<>();  
 for (FootballClub club: PremierLeagueManager.*getPremierLeagueFootballClubList*()) {  
 expectedMatches.addAll(club.getMatchesPlayed());  
 }  
  
 *// we divide by 2 because in total 1 match is played by the 2 teams not 2 matches  
 // testing  
 assertEquals*(expectedMatches.size()/2, actualMatches.size());  
 }  
  
 @Test  
 public void testMatchesByDate(){  
  
 *// testing the method which is used to get the matches by date and sort in ascending order of the date* ArrayList<FootballClub> actualClubsWithMatchesByDate = new ArrayList<>();  
 try {  
 *// getting the actual list of clubs filtered with the matches for the given date* actualClubsWithMatchesByDate = PremierLeagueUtil.*filterMatchesByDate*(  
 PremierLeagueManager.*getPremierLeagueFootballClubList*(), "2020-12-14"  
 );  
  
 } catch (CloneNotSupportedException e) {  
 *// Handling the exception* e.printStackTrace();  
  
 }  
  
 *// getting the actual list of matches for a given date* ArrayList<Match> allActualMatchesByDate = new ArrayList<>();  
  
 *// getting the list of expected matches for a given date* ArrayList<Match> allExpectedMatchesByDate = new ArrayList<>();  
  
 *// setting the actual values* for (FootballClub club: actualClubsWithMatchesByDate) {  
 allActualMatchesByDate.addAll(club.getMatchesPlayed());  
 }  
  
 *// setting the expected values* for (FootballClub club: PremierLeagueManager.*getPremierLeagueFootballClubList*()) {  
 allExpectedMatchesByDate.addAll(club.getMatchesPlayed());  
 }  
  
 *// testing  
 assertEquals*(allExpectedMatchesByDate.size(), allActualMatchesByDate.size());  
  
 }  
  
 @After  
 public void completedTesting(){  
 *// this runs when test is over* System.*out*.println("Testing completed!");  
 }  
}

*// References used  
// https://www.youtube.com/playlist?list=PLqq-6Pq4lTTa4ad5JISViSb2FVG8Vwa4o*

* + - 1. Junit Testing Output Screenshots



Name: Nazhim Kalam

Student ID: 2019281

UoW ID: w1761265

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