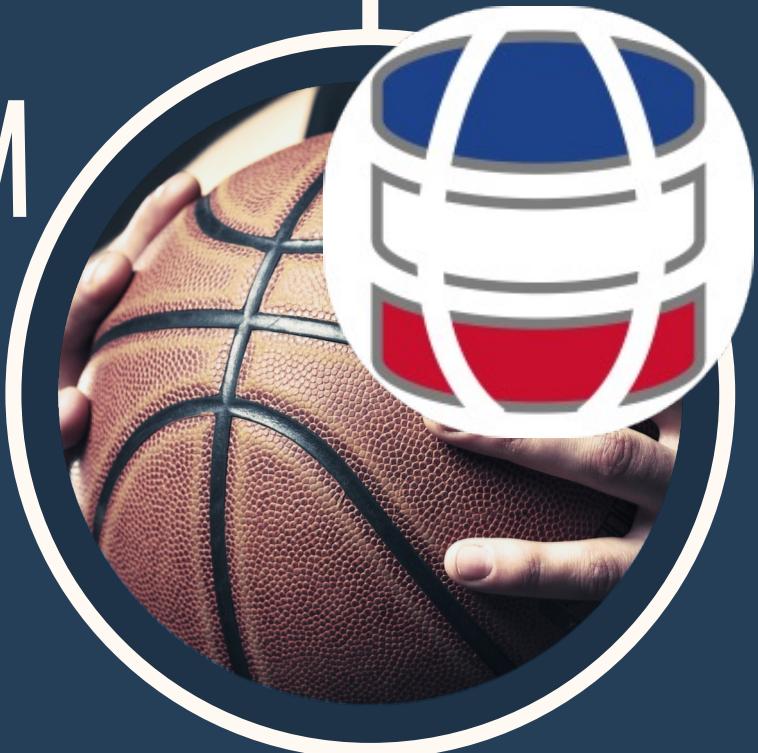


DATABASE SYSTEM FOR NBA PAYROLL DATA SERVICE

SEHH2240 203B
Group 316



Group Member



Wan

Yeung Miu Wan 21000210A



Hugo

Lai Chun Ho 21024140A



Natalie

Wan Hoi Nam 21030030A



Issac

Li Yin Cheung 21132728A



Ada

Kwan Wai Kiu 21023942A

Content

01

Introduction

Ada

02

Business rules

Wan

03

ERD

Wan

04

Logical Design

Natalie

05

Demonstration

Hugo, Issac

06

Conclusion

Issac



01

Introduction

Ada



Our Service

NBA PAYROLL DATA SERVICE

- Salaries
- The performance of individual players
- Taxes
- Contracts



Responsive
WEB
PAGE





PROSPECTIVE CLIENTS TYPE

✓ NBA Organization

NBAstuffer.com
BASKETBALL RESEARCH



✗ Owner or Employees
of NBA team



✗ Coaches



✓ Sponsors



✓ Journalists



✓ Fans





Introduction of NBA

National Basketball Association (the United States and Canada)



- 2 Conference, 30 teams
- Each year has a different salary cap and tax in a season
- Each team will trade the player for each year

Introduction of NBA

The competition of the NBA has 2 seasons

Regular Season:

- Start in mid-October
- End in April
- 82 games for each team

Playoffs season:



- The top 8 players in each Conference
- 7 matches
- The champion of each Conference (final round)

Collective Bargaining Agreement

- **Salary cap:** A limit on the amount of money that the team can spend on player contracts.
- **Hard limit:** The team's total salary must not exceed this amount.
- **Luxury tax line:** If the team exceeds this tax threshold, the team will be fined for the amount exceeded.
- **Trade Except:** During trading, if a team's salary does not exceed the Luxury tax line, at most, 150% of the player's salary traded by the team can be exchanged.

Further terms please refer to reports



02

Business rules

Wan



Business Rules for OUR SERVICE



Pay Once

Lifetime Access



NBA Payroll Data Service

Users from different countries worldwide



Business Rules for **NBA DATA**

NBA 1 Annually holds M Games

Season 1 select $(16,16)$ M Teams
With salary limit



Business Rules for **NBA DATA**

Team 1 $\xrightarrow{(2,2)}$ participate in $\xrightarrow{(1,82)} M$ Games

Team 1 $\xrightarrow{\text{sign}}$ $\xrightarrow{(1,15)} M$ Players

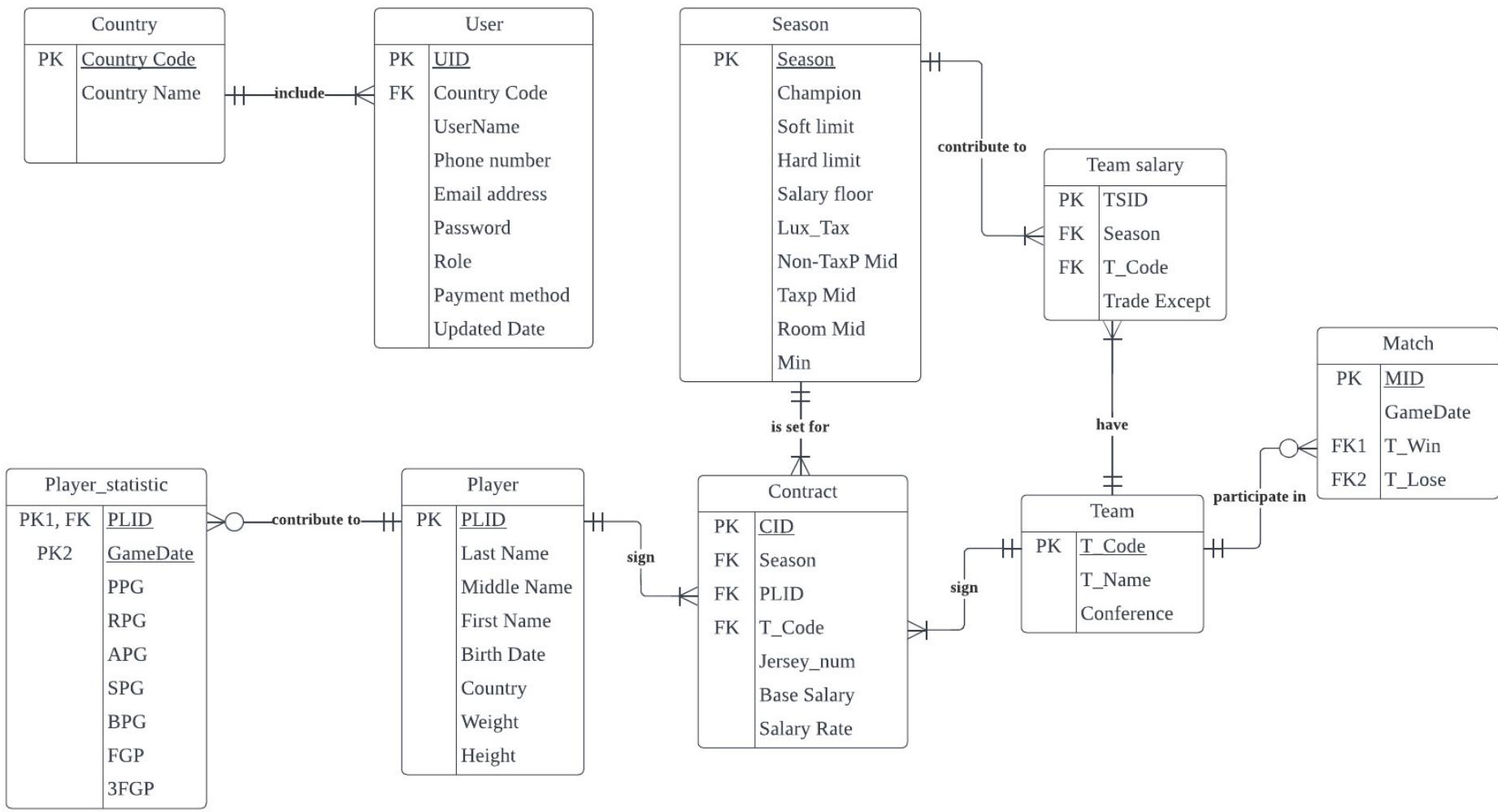
one contract at a time with salary written

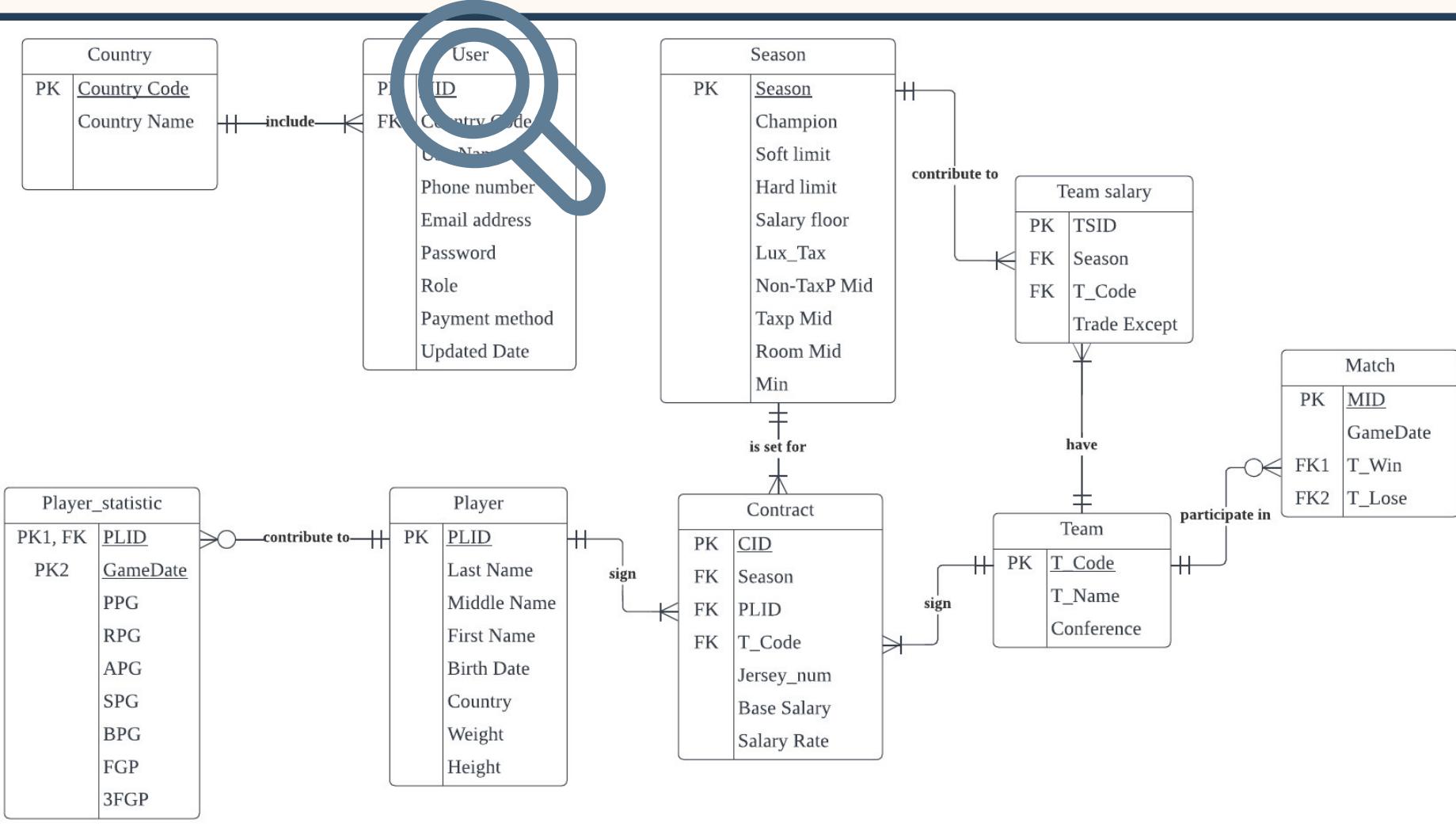


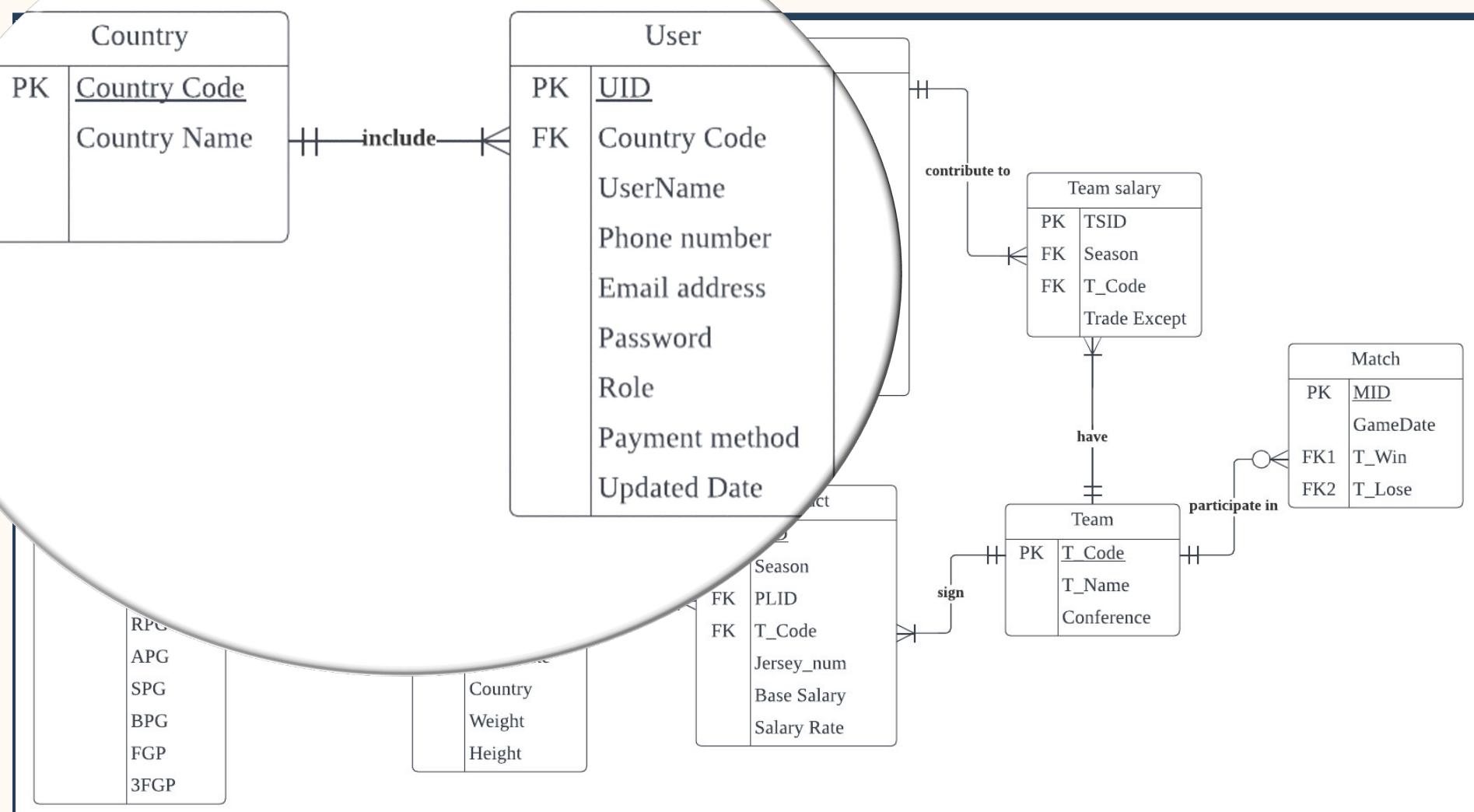
03

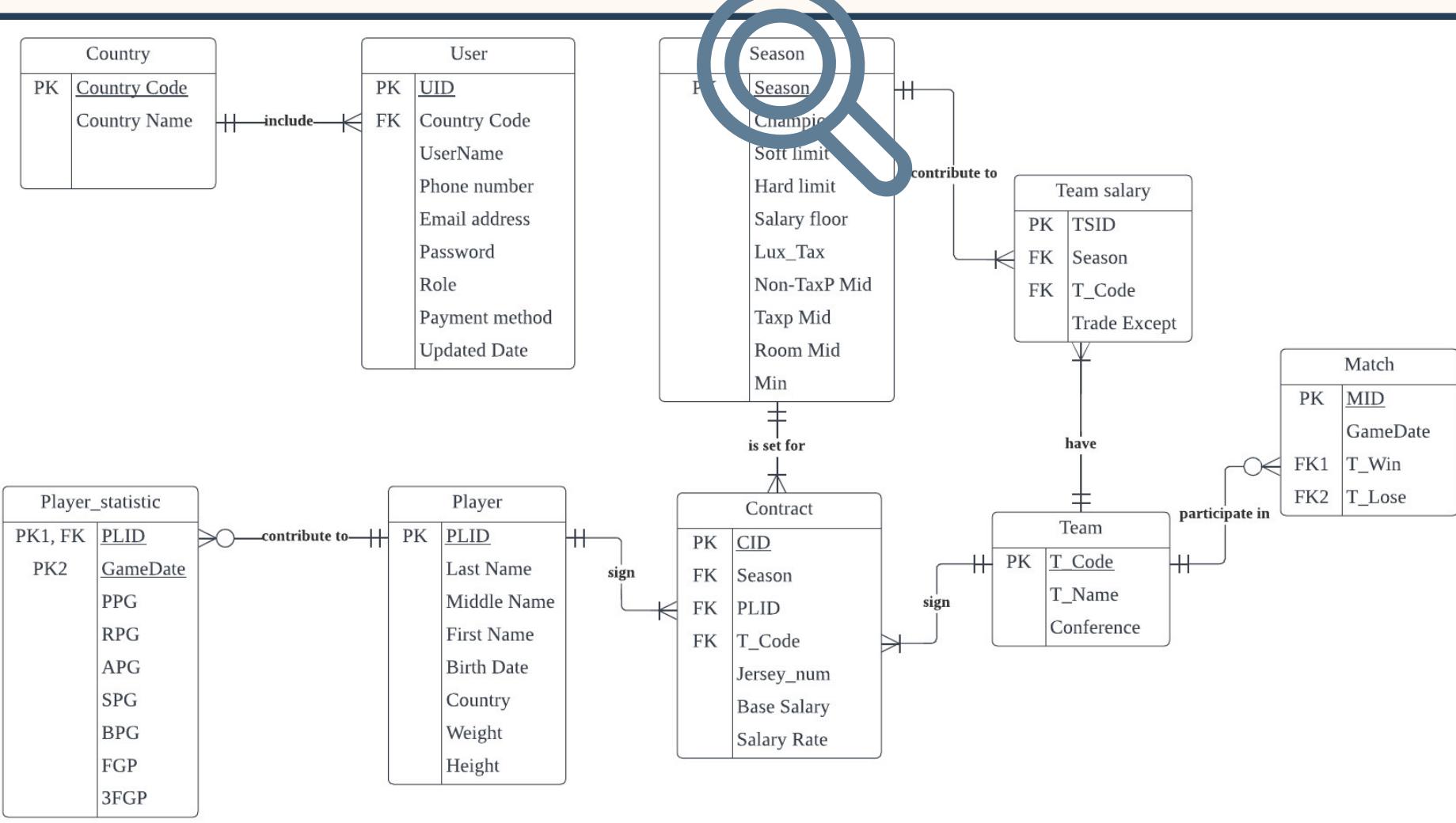
Conceptual model (ERD)

Wan









Country	
PK	Country Code
	Country Name

Season	
PK	Season
	Champion
	Soft limit
	Hard limit
	Salary floor
	Lux_Tax
	Non-TaxP Mid
	Taxp Mid
	Room Mid
	Min

Player_statistic	
PK1, FK	PLID
PK2	GameDate
	PPG
	RPG
	APG
	SPG
	BPG
	FGP
	3FGP



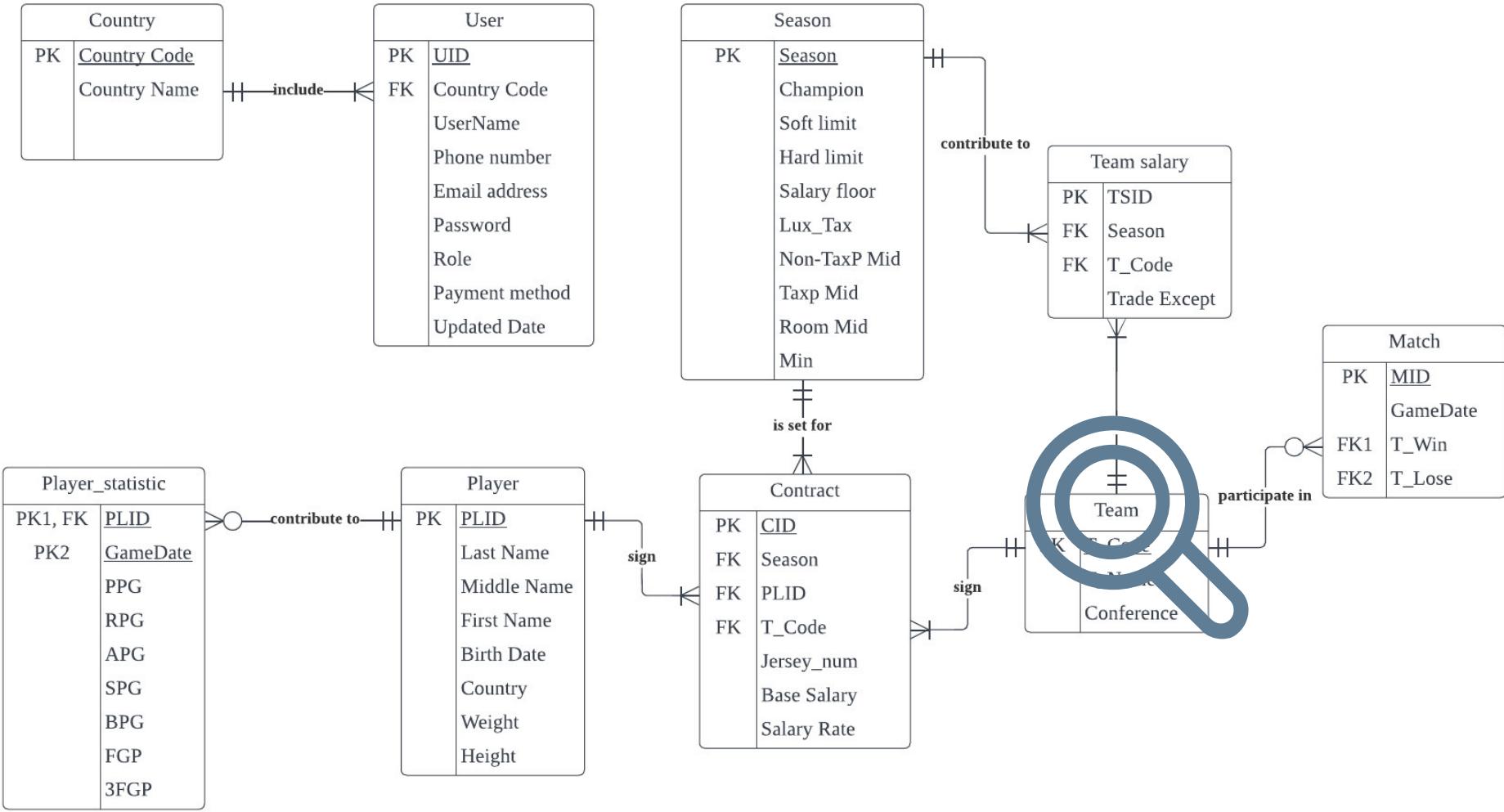
Team salary	
PK	TSID
	Season
	T_Code
	Trade Except

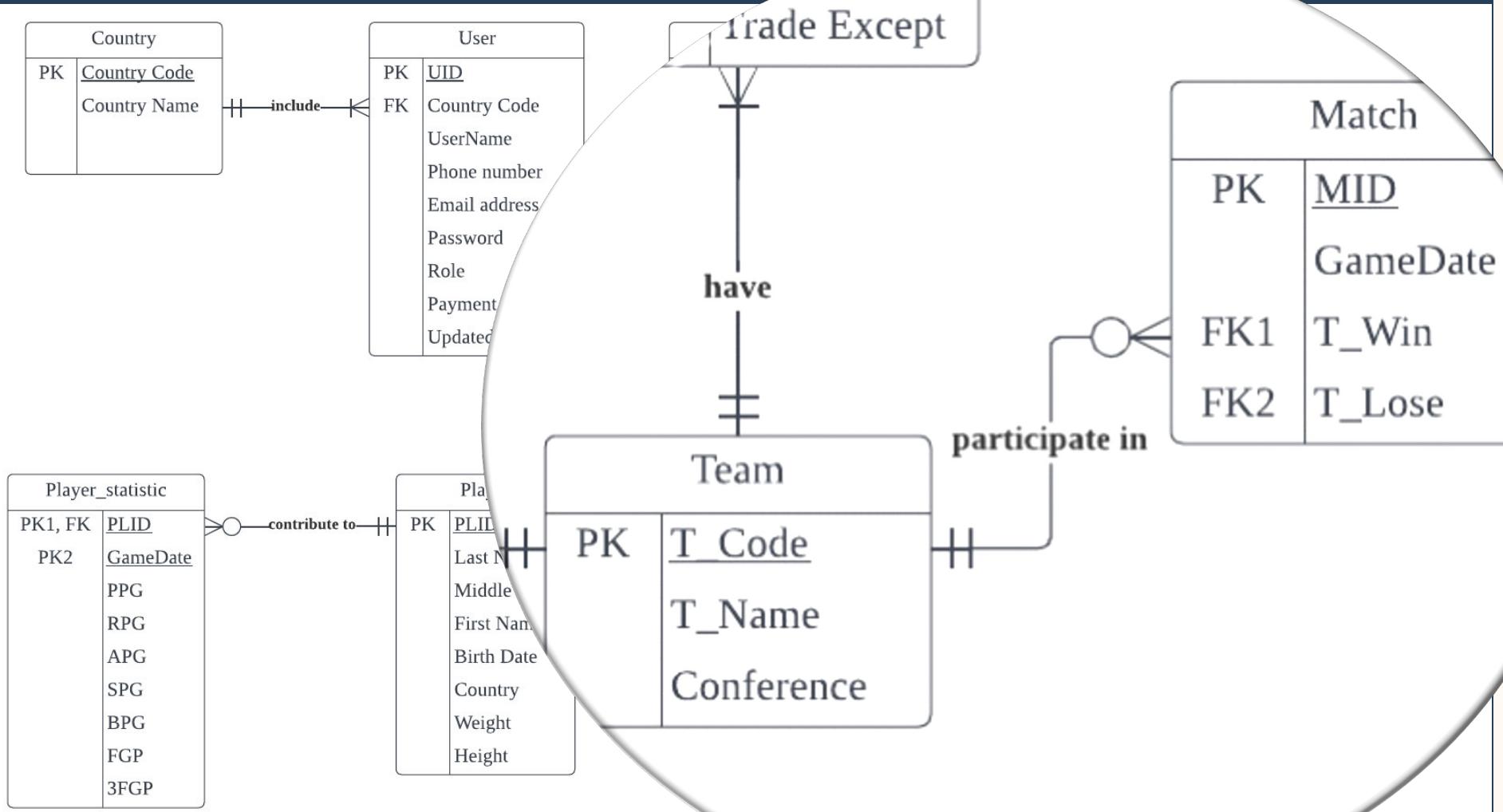


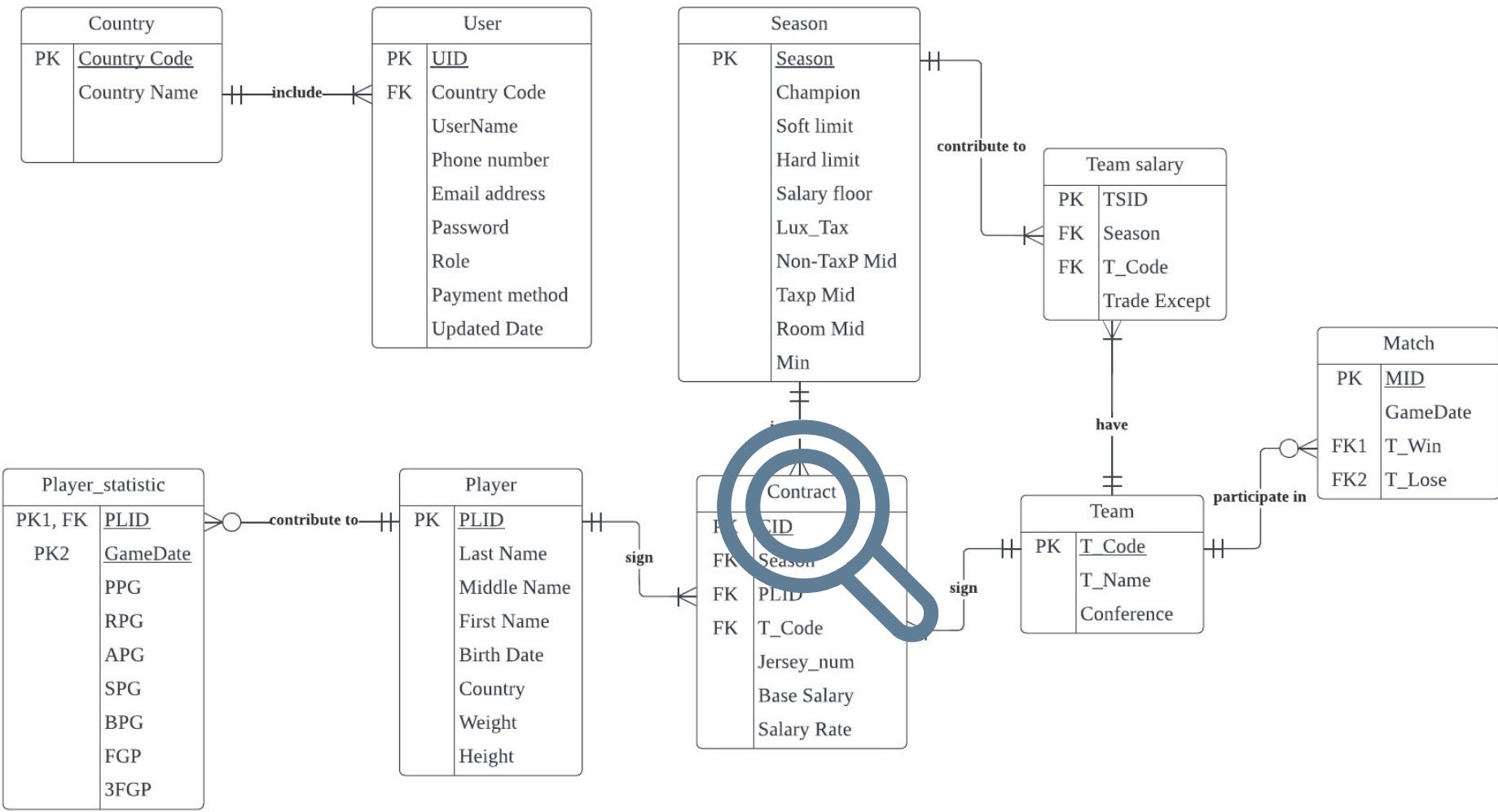
Match	
MID	GameDate
K1	T_Win
K2	T_Lose

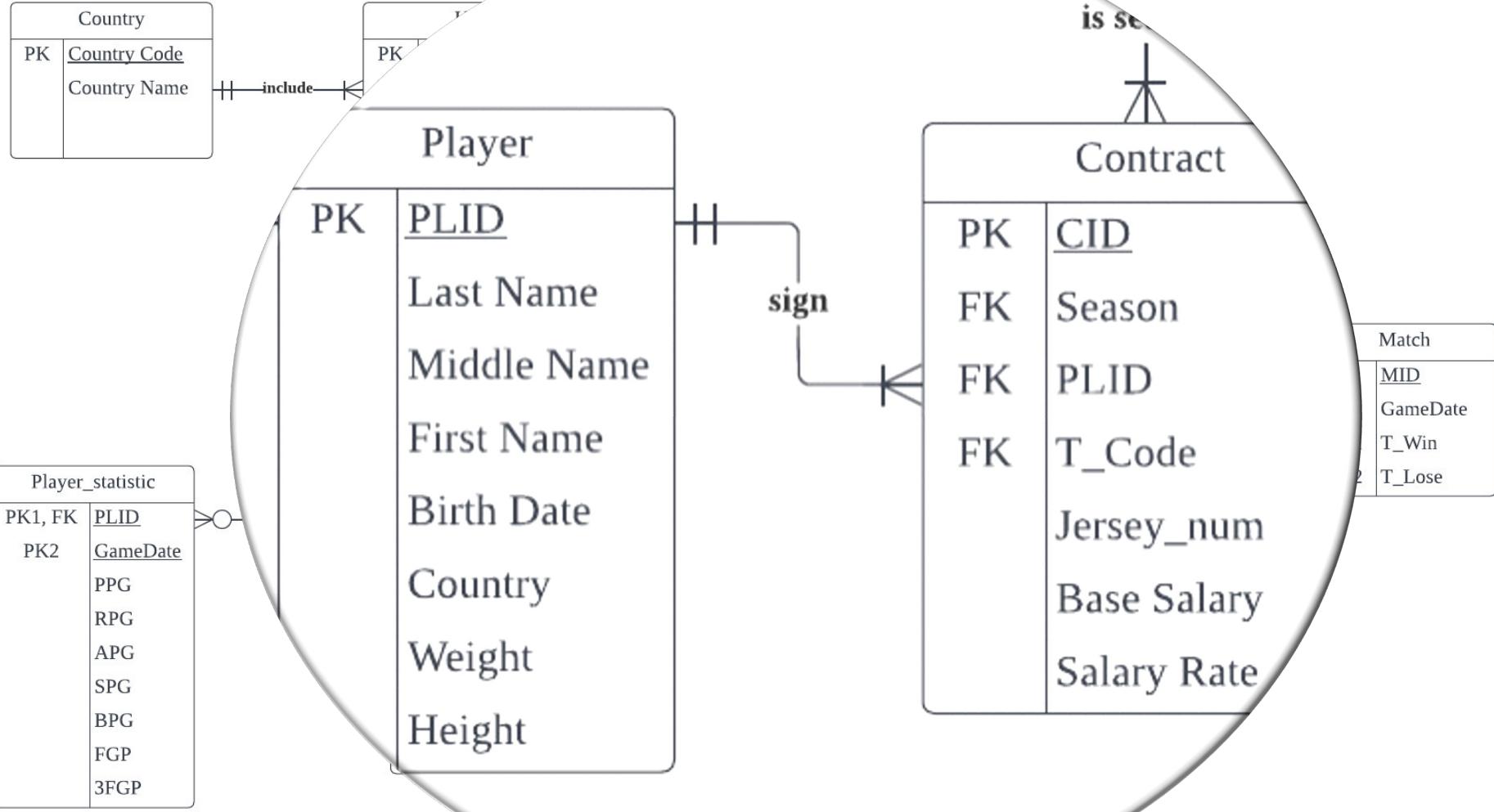
is set for

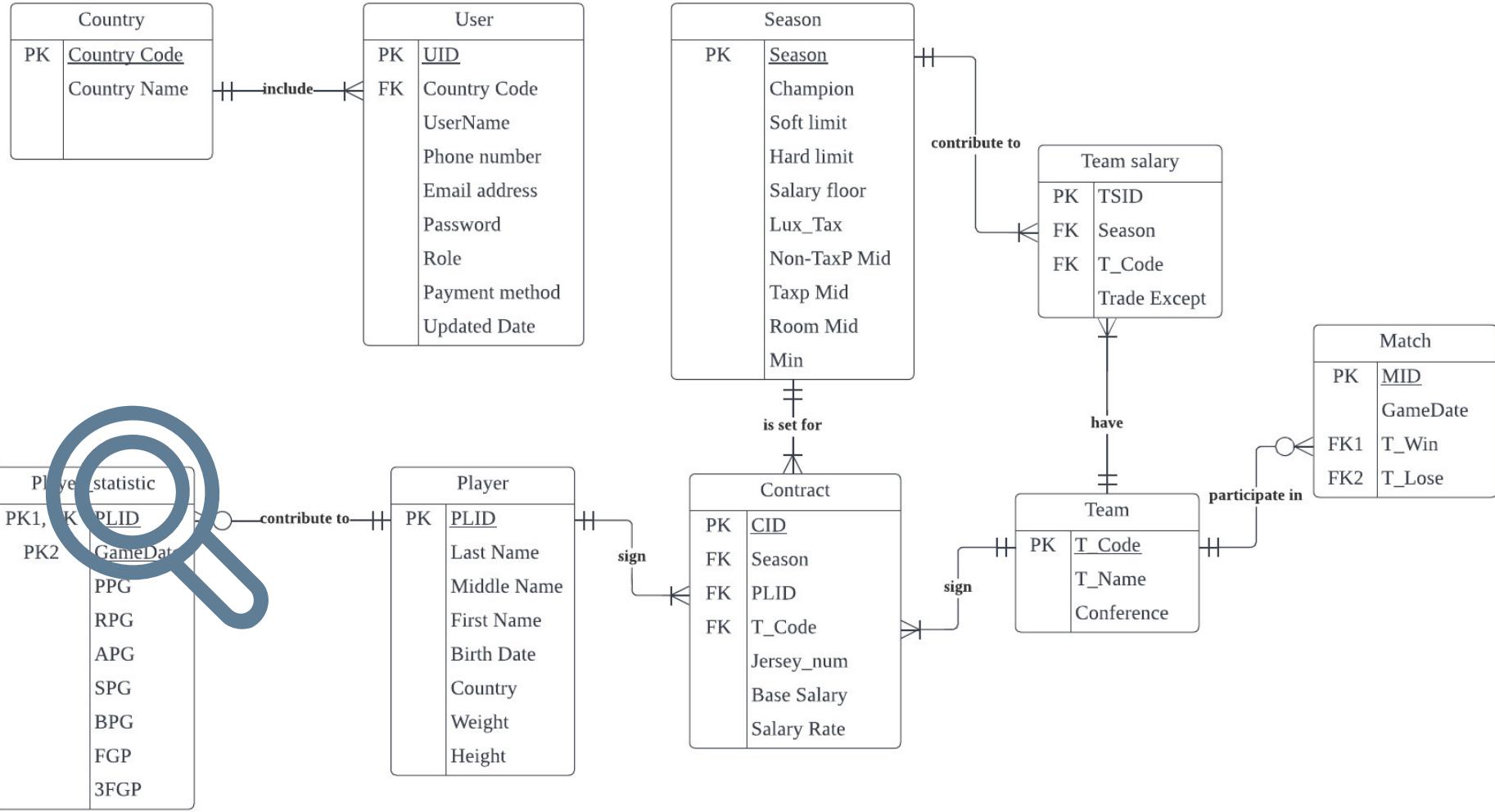
Height



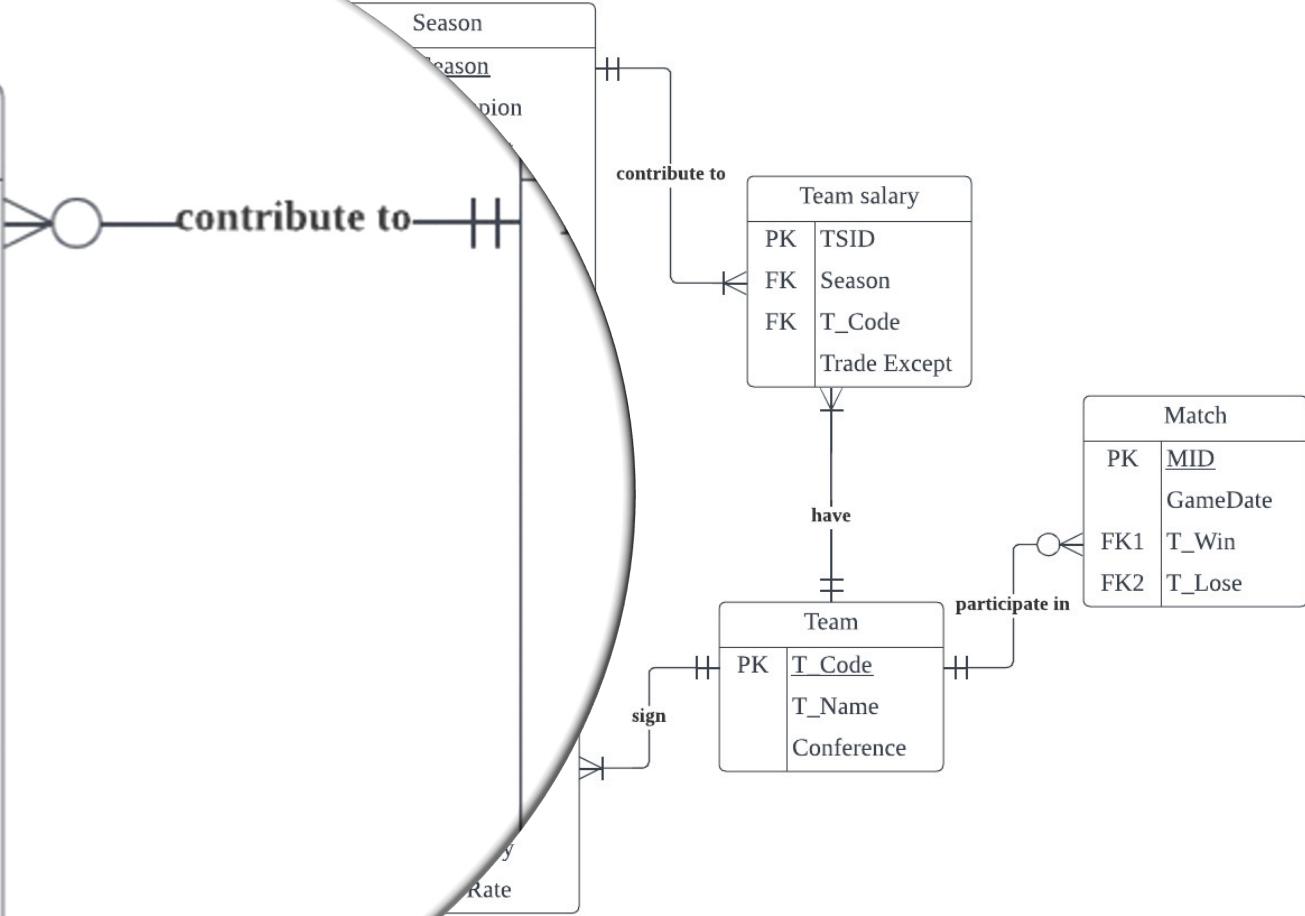


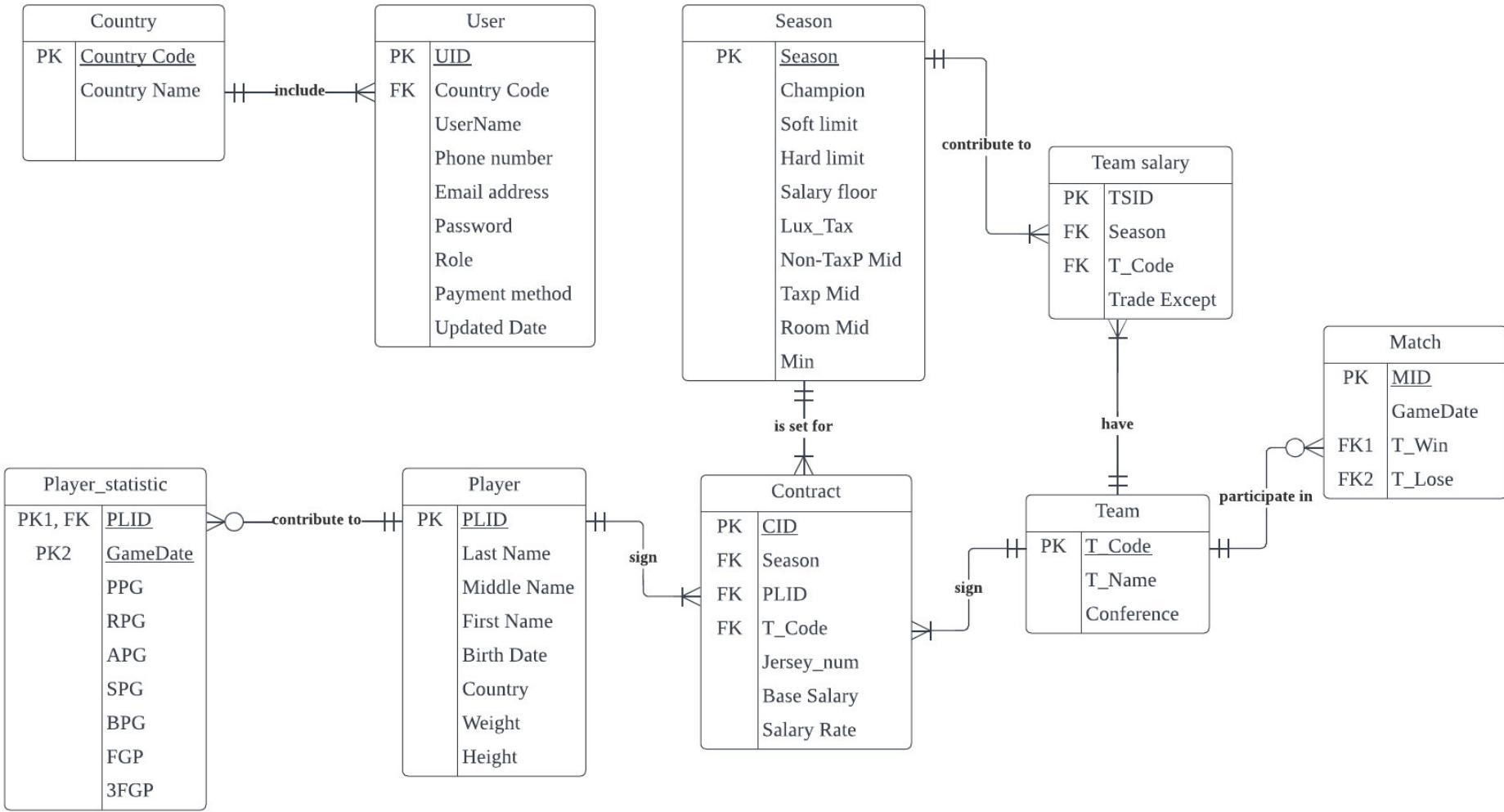






Player_statistic	
PK1, FK	<u>PLID</u>
PK2	<u>GameDate</u>
	PPG
	RPG
	APG
	SPG
	BPG
	FGP
	3FGP







04

Logical Design

Natalie



TABLE STRUCTURE

CREATE TABLE:

- Create Contract table
- Create Country table
- Create Player table
- Create Player statistics table
- Create Team table
- Create Season table
- Create Team Salary table
- Create Match table
- Create Users table



RELATIONSHIP:

- Create a foreign key to Contract table
- Create a foreign key to Player_statistic table
- Create a foreign key to Team salary table
- Create a foreign key to Match table
- Create a foreign key to User table

Example: 'Match' table

MID	GameDate	T_Win	T_Lose
1	11/1/2021 AH	PP	
2	26/1/2021 AH	LA	
3	12/2/2021 SS	AH	
4	13/2/2021 IP	AH	

```
CREATE TABLE [Match] (
    MID AUTOINCREMENT PRIMARY KEY,
    GameDate DATE,
    T_Win VARCHAR (2) NOT NULL,
    T_Lose VARCHAR (2) NOT NULL
);
```

```
ALTER TABLE [Match]
ADD FOREIGN KEY (T_Win) REFERENCES Team (T_Code);
```

```
ALTER TABLE [Match]
ADD FOREIGN KEY (T_Lose) REFERENCES Team(T_Code);
```



QUERIES DESIGN



For Player

- Show the statistics of a player
- Comparison between player and his teammates
- Player status in average



For Team

- Show the performance of a team
- Show the weakness of players
- Team status in average

Example :

T_Name	GameDate	T_PPG
Oklahoma City Thunder	28/3/2019	78

```
SELECT T_Name, ps.GameDate,
       SUM(PPG) AS T_PPG, SUM(RPG) AS T_RPG, SUM(APG) AS
       T_APG,
       SUM(SPG) AS T_SPG, SUM(BPG) AS T_BPG,
       Format(AVG(FGP), "#.00") AS T_FGP,
       Format(AVG([3FGP]), "#.00") AS T_3FGP
  FROM Team AS t, [Match] AS m, Player AS p,
       Player_statistic AS ps, Contract AS c
 WHERE c.T_Code = t.T_Code
   AND p.PLID = ps.PLID
   AND ps.PLID = c.PLID
   AND T_Name =[Enter the Team Name:]
 GROUP BY T_Name, ps.GameDate
 HAVING ps.GameDate =[Enter the GameDate:];
```

For Fans

- Show the favorite team of NBA team

For Organization

- Analyzation of the strength of teams

For Sport journalist

- The ability of players
- The basic information of players

Example :

T_Name	T_Lose	GameDate
Oklahoma City Thunder	PB	3/28/2019

```
SELECT T_Name, M.T_Lose, PS.GameDate, SUM(PPG) AS  
T_PPG, SUM(RPG) AS T_RPG, SUM(APG) AS T_APG, SUM(SPG)  
AS T_SPG, SUM(BPG) AS T_BPG,  
Format(AVG(FGP), "#.00") AS T_FGP,  
Format(AVG([3FGP]), "#.00") AS T_3FGP FROM  
Team AS T, [Match] AS M, Player AS P, Player_statistic  
AS PS, Contract AS C WHERE C.T_Code = T.T_Code AND  
M.T_Win = T.T_Code AND P.PLID = PS.PLID  
AND PS.PLID = C.PLID AND T_Name =[Enter  
the Team Name:]  
AND PS.GameDate =[Enter the GameDate:]  
GROUP BY T_Name, M.T_Lose, PS.GameDate;
```



For SPONSOR AND ADVERTISER

- Sponsoring the potential players
- Sponsoring the potential teams



For OWNER AND GM

- Perform the calculation of maximum of player salary
- Perform the calculation of Luxury tax
- Perform the behavior of team

Example :

FirstName	MiddleName	LastName	Maximum salary	Season
Steven	Funaki	Adams	48962831.85	19-20
Steven	Funaki	Adams	45738969.2	18-19
Steven	Funaki	Adams	43414106.55	17-18
Steven	Funaki	Adams	22054732.51	16-17

```
SELECT FirstName, MiddleName, LastName,
       [Base Salary]+[Base Salary]*[Salary
Rate]+Soft_limit*0.2 AS [Maximum salary],
c.Season
FROM Player AS a, Contract AS c, Season AS d
WHERE a.PLID = c.PLID
      AND c.Season = d.Season
      AND a.PLID = [Enter the player's ID:];
```

For Report...

For SALARY CAP

- Soft limit trend within 10 years
- Hard limit trend within 10 years
- Salary Floor trend within 10 years
- Luxury Tax trend within 10 years
- Non-Taxpayer Mid-Level trend within 10 years
- Taxpayer Mid-Level trend within 10 years
- Room Mid-Level trend within 10 years
- Minimum salary trend within 10 years

For STAFFS

- Counting the total amount of users depend on their role

For COUNTING TEAM WIN RATE

- Show the team win rate

For COACHES

- Listing the height of players
- Player height in average

For SHOWING PLAYER STATISTICS INDIVIDUALLY

- Show the 3FGP of a player individually
- Show the APG of a player individually
- Show the BPG of a player individually
- Show the FGP of a player individually
- Show the PPG of a player individually
- Show the RPG of a player individually
- Show the SPG of a player individually



APPLICATIONS

Forms & Reports



Main Menu: Data Entry



A screenshot of the NBA Payroll Data Entry main menu. The header features a globe icon, the title "NBA Payroll Data Entry", and a "User Register Website" button. Below the header, there are three tabs: "Start of Season", "Middle of Season" (which is selected), and "End of Season". A central message says "All the NBA games has ended! What data you want to enter?". Below this are two red buttons: "Result" and "Data Analysis". The footer shows the date "12/4/2022", time "20:54", and the text "SEHH2240 203B Group316".

- For Our service

Start of season

- The start of new season
 - Add a New Team
- Player signed a New Contract
- A New Player is signed



Middle of season

- Results of NBA games
- Player's Statistic of a match



End of season





Examples



Welcome New User!

[Sign up](#) [Login](#) [X](#)

UserName

Phone

Email

Password* *****

Where do you come from? Hong Kong

Who are you? Fans

How would you like to pay? Paypal

Joined Date* 2022/3/28 上午 04:33:36

Tell Us Something about You...

Season

Team Code

Player ID

Base Salary

Salary Rate

Jersey num of Player

[Save Record](#) [Next](#)

2022/3/29 16:09



Player signed a New Contract

SEHH2240 203B Group316



Main Menu: Data Analysis



The screenshot shows a user interface for NBA Payroll Data Analysis. At the top, there is a navigation bar with a globe icon, the title "NBA Payroll Data Analysis", and two red buttons labeled "User Information" and "User Role Proportion". Below the navigation bar, there are three tabs: "Player Statistic" (selected), "NBA Salary Statistic", and "Team Statistic". A large central area asks "What NBA salary information are you interested in?" and lists seven categories in red buttons: "Luxury tax line", "Minimum", "Non-Tax Mid-Level", "Room Mid-Level", "Salary_floor", "Soft_limit", and "Taxpayer Mid-Level". At the bottom, there is a red button labeled "Data Entry".

Our Service

- User Information
- User Role Proportion

Player statistic

- Height
- Overall performance

Team statistic

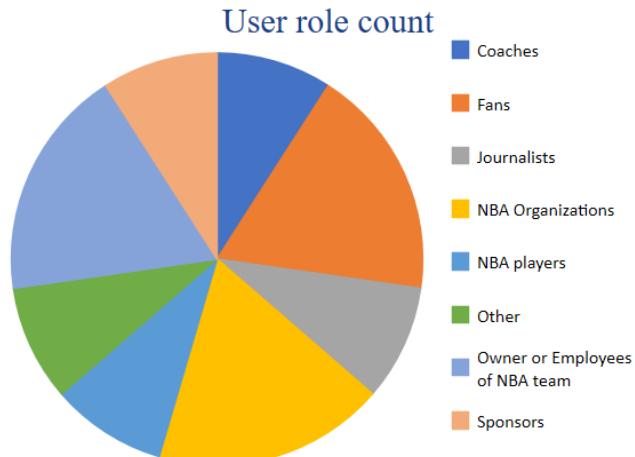
- Winning Count
- Overall performance

Salary Cap



Examples

Users role count



Thursday, April 14, 2022

7:00:04 AM

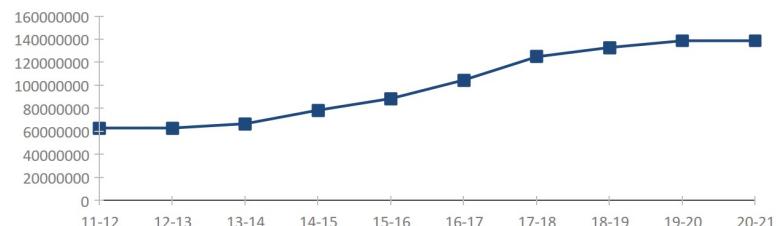


Hard_limit trend for 10 seasons

2022年4月11日
17:20:47

Hard_Limit Trend

SumOfHard_limit



Role

Coaches

Quan

Season	Hard_limit
20-21	\$138,928,000.00



05

Demonstration

Hugo, Issac



Using Forms



as a user

Hugo



Registering a user account

The screenshot shows a Microsoft Access application window titled "SEHH2240_203B20220415 (1) 資料庫 - C:\Users\Uyen\Desktop\SEHH2240_203B20220415 (1).accdb (Access 2007 - 2016 檢查後) - Access". The main title bar says "Welcome New User!". The form has fields for "UserName", "Password*", "Where do you come from?", "Who are you?", "How would you like to pay?", and "Joined Date*". The "UserName" field contains "lloveLukaForever", "Password*" contains "67652441", "Where do you come from?" is "HK", "Who are you?" is "Fans", "How would you like to pay?" is "Mastercard", and "Joined Date*" is "10/4/2022 5:45:43". A message box at the bottom right says "Added record." The status bar at the bottom shows "13/4/2022 23:23".

UserName: lloveLukaForever

Phone number: 67652441

Email: Lukaforever@gmail.com

Password: Mav41ifeLK

Where do you come from?: HK

What is your role?: Fans

How would you like to pay?:

Paypal



Using Forms



as a staff

Hugo



At the start of the season, some teams may sign in some players. For any new season, the rules on salary will be different.





Entering the salary cap for a new season

The Start of New Season

SEHH2240 203B Group316

Start Date of New Season	
Soft limit	
Hard limit	
Salary floor	
Luxury tax line	
Non-Taxpayer Mid-Level	
Taxpayer Mid-Level	
Room Mid-Level	
Minimum	

[Add a New Team](#)

[Save Record](#)

▶

Start Date of New Season: 21-22

Soft limit: 112414000

Hard limit: 142925000

Salary floor: 99226000

Luxury tax line: 135627000

Non-Taxpayer Mid-Level: 9258000

Taxpayer Mid-Level: 5728000

Room Mid-Level: 4777000

Minimum: 898310

Entering a new team enrolled in a new season

Add a New Team

SEHH2240 203B Group 316

Team Code	<input type="text"/>
Full Name	<input type="text"/>
Conference	<input type="text"/> <input type="button" value="▼"/>
TSID	<input type="text"/>
Season	<input type="text"/>
Salary	<input type="text"/>
Trade Except	<input type="checkbox"/>

Save Record **▶**

Team Code: DM

Full Name: Dallas Mavericks

Conference: Western

TSID: 12

Season: 20-21

Salary: 112,414,000

Trade Except: Tick



Entering a New Player (for new player)

A New Player is signed
SEHH2240 203B Group316

Season	<input type="text"/>
Team Code	<input type="text"/>
Player ID	<input type="text"/>
Last Name	<input type="text"/>
Middle Name	<input type="text"/>
First Name	<input type="text"/>
Birth Date	<input type="text"/>
Country	<input type="text"/>
Weight (lb)	<input type="text"/>
Height (cm)	<input type="text"/>
Base Salary	<input type="text"/>
Salary Rate	<input type="text"/>
Jersey num of Player	<input type="text"/>

Save Record 

Season: 20-21

Team Code: DM

Player ID:19

Last Name: Doncic

Middle Name:

First Name: Luka

Birth Date: 28 -2 -1999

Country: Slovenija

Weight (lb):230

Height (cm):201

Base Salary: 7,683,360

Salary Rate: 0.05

Jersey num of Player:77

Entering a New Player (for existed player)

 **Player signed a New Contract**
SEHH2240 203B Group316

Season

Team Code

Player ID

Base Salary

Salary Rate

Jersey num of Player

Save Record 

Season: 21-22

Team Code: DM

Player ID:18

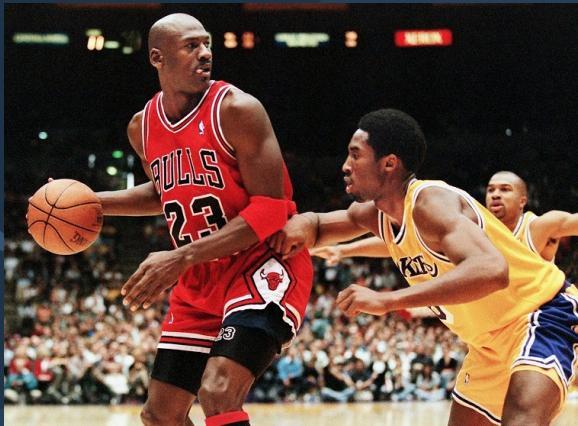
Base Salary:8049360

Salary Rate:0.05

Jersey num of Player:10



At the middle of the season, teams will be matched up with each other. The game result and player's performance will be updated.





Entering a game result

The result of NBA game X

The result of NBA game

SEHH2240 203B Group316

GameDate

T_Win

T_Lose

GameDate: 7/6/2021

T_Win: AH

T_Lose: PP



Entering a player's performance

Player's Statistic of a match X

Player's Statistic of a match

SEHH2240 203B Group316

GameDate	<input type="text"/>
Player ID	<input type="text"/>
Points	<input type="text"/>
Rebounds	<input type="text"/>
Assists	<input type="text"/>
Steals	<input type="text"/>
Blocks	<input type="text"/>
Field Goal Percentage	<input type="text"/>
3-Point Field Goal Percentage	<input type="text"/>

Save Record

GameDate: 12/3/2022

Player ID: 12

Points: 23

Rebounds: 10

Assists: 4

Steals: 0

Blocks: 1

Field Goal Percentage:

30.4

3-Point Field Goal

Percentage: 37.5



At the end of the season, one of the teams will win the league and be the champion!



Updating a record of champion



End of a season

SEHH2240 203B Group316

Season

Champion

Save Record 

Season: 21-22

Champion: DM



Using Reports

as a staff



Issac



Check User info and role of User

Main Menu

NBA Payroll Data Analysis

User Information User Role Proportion

Player Statistic NBA Salary Statistic

What play... you interested in?

3FGP FPG APG BPG
RPG SPG PPG

Data Entry

12/4/2022 0.45

Record: 1 of 10 | No Filter | Search

A large black circular overlay with a white play button icon is centered over the video player area.

<https://youtu.be/TNVDZeunz2M>



Using Reports

as a owner of team

Issac





Check salary trend

The screenshot shows a software window titled "NBA Payroll Data Analysis". The main title bar has a globe icon and the text "Main Menu". Below the title bar are two red buttons: "User Information" and "User Role Proportion". The main content area features a large play button icon overlaid on a white rectangular box. Inside this box, the text "What NBA statistic would you like to see?" is visible. Below the text are several red buttons with white text: "Luxury tax line", "Mid-Tax Line", "Tax Mid-Level", "Room Mid-Level", "Salary_floor", "Soft_limit", and "Taxpayer Mid-". At the bottom of the window, there is a red navigation bar with icons for back, forward, and search, and a timestamp "12/4/2022 1:10". The footer contains the text "Data Entry", "SEHH2240 203B", and "Group 316".

https://youtu.be/YKUFib6M_X4



Check Players / Team statistic

Main Menu

NBA Payroll Data Analysis

User Information User Role Proportion

Player Statistic NBA Salary Statistic

What player statistic are you interested in?

3FGP FPG APG BPG

RPG SPG PPG

Data Entry

12/4/2022 0:45

Record: 1 of 10 | No Filter | Search

A large play button icon is overlaid on the screenshot.

https://youtu.be/YKUFib6M_X4



06

Conclusion

Issac

“Our NBA integrated database system could provide a marvelous experience to various of client while the system has reduced many human-made error and improve the data consistency.”

—CONCLUSION



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THANKS for Listening

Q&A: Do you have any questions?

