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CS4D2A - County Gaa Database

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Application Description

For this assignment, the database I have chosen to model is for County Gaelic Football in Ireland.

In Ireland, each county has several GAA divisions (Senior, Intermediate, Junior A, Junior B etc...). A county also has numerous clubs which have teams in one or more of the county's divisions. A player who is a member of a club can only play for one team in that club.

Let's take "Kilmacanogue GAA" as an example club. This club is located in Wicklow and has two teams. It has one team in the Intermediate Division and one team in the Junior B Division. Any player that is a member of Kilmacanogue GAA can only play for one of these teams.

So I started off by building a county table which would have an ID and could be used to find every division, club and team in that county. I also created a board member table as each county has a board which is responsible for organising everything GAA related in the county. This table holds all the information for each board member for every county. I then created a club table which would store details about the club such as its ID, name, town where it is located. I then created the division table which has an ID and a name.

With the club and division table, it is possible to create several teams in team the table for one club. Each team has several attributes which are used to determine their position in the division such as the team's total points, their win, loss, draw record and their score difference.

Every team must have many players and 1 manager. A player table was built to store the details of every player. Their PPS number, the team they play for, phone number, address etc can all be found stored in this table. The manager table consists of very similar data but each manager has been given an ID to identify them. A club will have a manager linked to each of its teams.

Each division has a series of matches where two teams from that division play each other. The match table stores the ID of the two teams playing, their division, the time and date of the match and the pitch it will be played on.

I created a pitch table so that the details of a pitch could be stored and used for many matches. The pitch table contains the pitch ID, the name of the pitch and the address.

Security

To add security to this database, I could create roles for certain people that are stored in the database. For example, I could give control over the matches to the county board members as they they are the ones who decide fixtures.

I could give control of the player teams to a selector as they pick the teams for their matches. I would not have to give them access to players personal details, only the required data. This would hide sensitive details.

Each club would be able to manage their only players but should only have access to their details and not members from other clubs.

To implement these features I would first create the roles using the following commands:

```
CREATE ROLE County_Board_Member;  
CREATE ROLE Club_Admin;  
CREATE ROLE Selector;
```

Once the roles have been created, they must be assigned to the right users using their username.

```
GRANT County_Board_Member TO JohnCullen;  
GRANT Club_Admin TO JoyBurke;  
GRANT Selector TO SeanCreavin;
```

Then the privileges must be assigned to each role.

County_Board_Member

This role must be able to read, write and delete matches from the matches table as a match may need need to be cancelled or rescheduled.

```
GRANT INSERT, SELECT, DELETE, UPDATE ON Match to County_Board_Member
```

Club_Admin

A club admin should have access to all the data for players in their club but not from other clubs. This is why I have made a view which can be seen in the *Creation of Views and Joins* section which list only the players from Kilmac GAA for example. One of these could be made for every club.

```
GRANT INSERT, SELECT, DELETE, UPDATE ON Kilmac_Players to JoyBurke;
```

Selector

A selector should have access to a list of players in their club but should not be able to see all the players details. This is why I have made another view which can be also seen in the *Creation of Views and Joins* section. This view only lets the selector see Kilmac player names and the team that they are on.

```
GRANT INSERT, SELECT, DELETE, UPDATE ON Kilmac_Players_Teams to SeanCreavin;
```

Creating a Trigger

When a match has been played, the results will be updated in the database. To deal with this update I created a trigger which would add the results to the two teams details (ie. Points, Wins, Scores_For etc...). The trigger I created is below. When a match tuple is updated and the scores have been changed, it takes those scores and adds them to the corresponding attributes for the teams needed.

```
CREATE OR REPLACE TRIGGER addPointsToTeam
  AFTER UPDATE ON Match
  FOR EACH ROW
BEGIN
  if :new.Score1 != 0 THEN
    UPDATE TEAM T1
    SET T1.Score_For = T1.Score_For + :new.Score1
    WHERE T1.ID = :new.Team_1_ID;
    UPDATE TEAM T11
    SET T11.Score_Against = T11.Score_Against + :new.Score2
    WHERE T11.ID = :new.Team_1_ID;
    UPDATE TEAM T2
    SET T2.Score_For = T2.Score_For + :new.Score2
    WHERE T2.ID = :new.Team_2_ID;
    UPDATE TEAM T22
    SET T22.Score_Against = T22.Score_Against + :new.Score1
    WHERE T22.ID = :new.Team_2_ID;
  end if;
END;
```

Creation of View and Joins

I created a view which would return each team in the selected division and their results so far.

Division Standings

```
CREATE VIEW Division1Standings AS
select Name, Points, Won, Drawn, Lost, Score_For, Score_Against
      from Team Join Club
      ON club_ID=Club.ID
      where Team.Division_ID=1
      Order by points ASC;
```

```
CREATE VIEW Division2Standings AS
select Name, Points, Won, Drawn, Lost, Score_For, Score_Against
      from Team Join Club
      ON club_ID=Club.ID
      where Team.Division_ID=2
      Order by points ASC;
```

```
CREATE VIEW Division3Standings AS
select Name, Points, Won, Drawn, Lost, Score_For, Score_Against
      from Team Join Club
      ON club_ID=Club.ID
      where Team.Division_ID=3
      Order by points ASC;
```

When these views are called, it produces the output seen below. It allows the user to see the current standings of a division.

Standings Views Output:

NAME	POINTS	WON	DRAWN	LOST	SCORE_FOR	SCORE_AGAINST

Rathnew GAA	0	0	0	0	0	0
St. Patricks GAA	0	0	0	0	0	0
Kilmacanogue GAA	0	0	0	0	0	0

NAME	POINTS	WON	DRAWN	LOST	SCORE_FOR	SCORE_AGAINST

Kilmacanogue GAA	0	0	0	0	0	0
Kiltegan GAA	0	0	0	0	0	0

NAME	POINTS	WON	DRAWN	LOST	SCORE_FOR	SCORE_AGAINST

Laragh GAA	0	0	0	0	0	0
Kilcoole GAA	0	0	0	0	0	0

Kilmac_Players

This view could be used by the Kilmac GAA Club Admin. They would be able to only see and edit the Kilmac_Players View

```
CREATE VIEW Kilmac_Players AS
select PPS, F_Name, L_Name, Team_ID, Phone_no, Address
  from Player Join Team
    ON Team_ID=Team.ID
 where Team.Club_ID=3
 Order by L_name ASC;
```

Kilmac_Players_Output

PPS	F_NAME	L_NAME	TEAM_ID	PHONE_NO	ADDRESS
200100198	Gavan	Burke	4	8721493322	Killough Upper, Kilmacanogue, Wicklow
100100197	Rob	Conan	3	876672989	Killough Upper, Kilmacanogue, Wicklow
100100106	Simon	Doyle	3	876672989	Killough Upper, Kilmacanogue, Wicklow
100100199	Garry	King	3	876672989	Killough Upper, Kilmacanogue, Wicklow
200100107	Andrew	Molloy	4	8721493322	Killough Upper, Kilmacanogue, Wicklow
100100108	Joey	Molloy	3	876672989	Killough Upper, Kilmacanogue, Wicklow
200100105	Sam	OCallaghan	4	8721493322	Killough Upper, Kilmacanogue, Wicklow
100100104	Ben	OCallaghan	3	876672989	Killough Upper, Kilmacanogue, Wicklow
200100103	Josh	OCallaghan	4	8721493322	Killough Upper, Kilmacanogue, Wicklow
100100102	Luke	OCallaghan	3	876672989	Killough Upper, Kilmacanogue, Wicklow
200100109	Kevin	Redden	4	8721493322	Killough Upper, Kilmacanogue, Wicklow

Kilmac_Players_Teams

This view lists all the players in the club and could be used by selectors to pick players.

```
CREATE VIEW Kilmac_Players_Teams AS
```

```
select F_Name, L_Name, Team_ID
      from Player Join Team
      ON Team_ID=Team.ID
      where Team.Club_ID=3
      Order by L_name ASC;
```

Kilmac_Players_Teams output:

F_NAME	L_NAME	TEAM_ID
Gavan	Burke	4
Rob	Conan	3
Simon	Doyle	3
Garry	King	3
Andrew	Molloy	4
Joey	Molloy	3
Sam	OCallaghan	4
Ben	OCallaghan	3
Josh	OCallaghan	4
Luke	OCallaghan	3
Kevin	Redden	4

Semantic Constraints

For this database, here are the semantic constraints.

The most basic constraint that is implemented is that PPS numbers must be a max length of 9 numbers. This is constrained when it is defined within the table. The line is:

```
PPS NUMBER(9,0)
```

A common constraint within the database is the not null constraint which means a value must be entered into the table where this constraint is placed. It is used a lot in this database as most entities are very dependant on each other.

Foreign Keys

Foreign keys were added to the database once the tables has been populated. The foreign keys were added by using the ALTER TABLE command like so:

```
--Club Table
```

```
ALTER TABLE Club
```

```
ADD CONSTRAINT FK_County_Club FOREIGN KEY (County_ID)
```

```
REFERENCES County(ID)
```

```
ON DELETE set null;
```

```
--Team Table
```

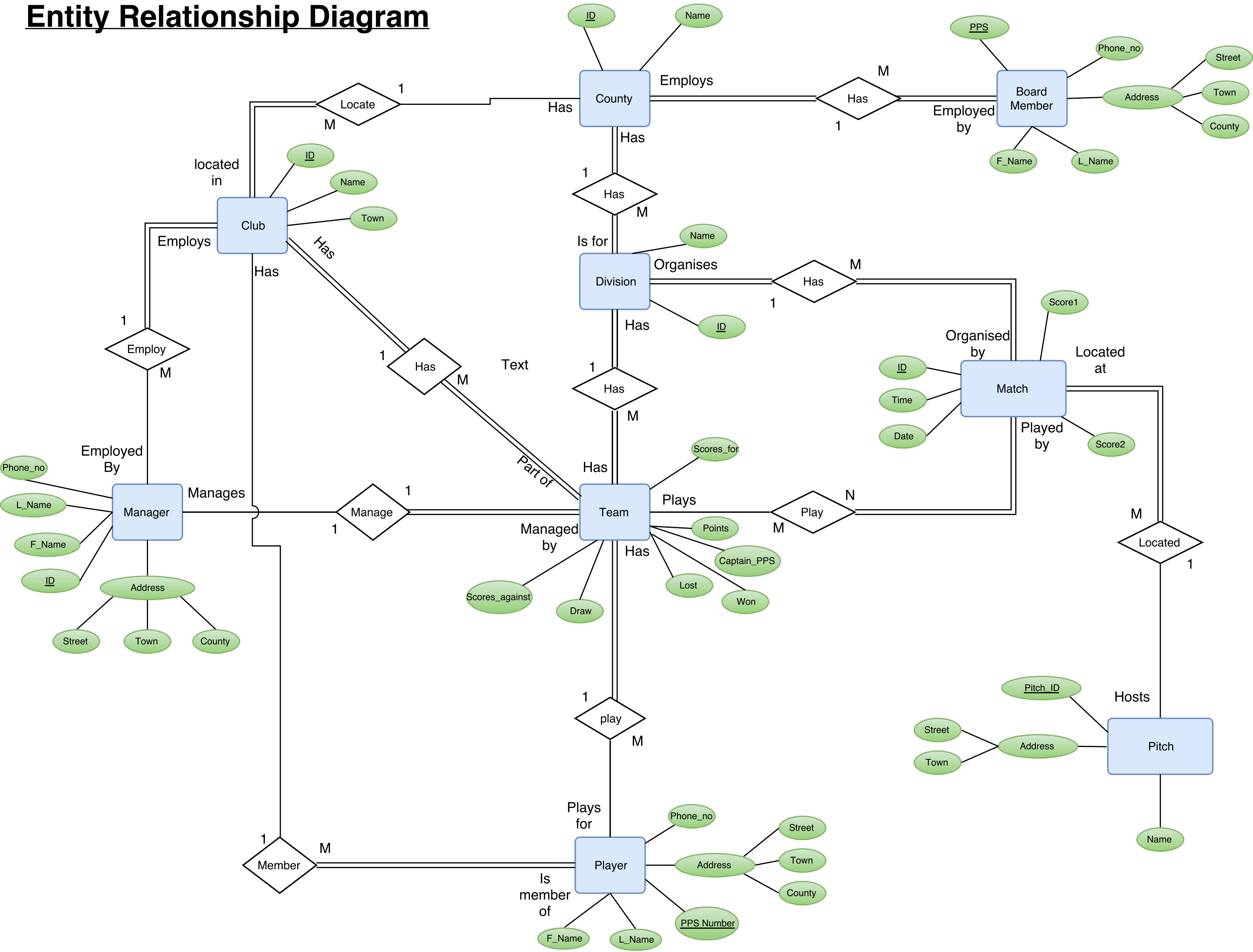
```
ALTER TABLE Team
```

```
ADD CONSTRAINT FK_Division_Team FOREIGN KEY (Division_ID)
```

```
REFERENCES Division(ID)
```

```
ON DELETE set null;
```

Entity Relationship Diagram

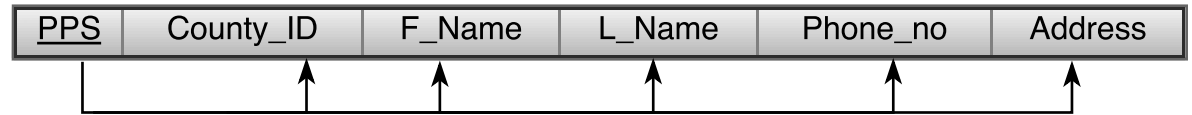


Functional Dependency Diagram

County



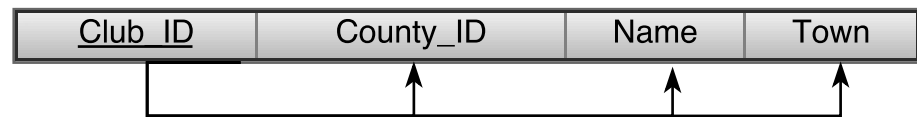
Board Member



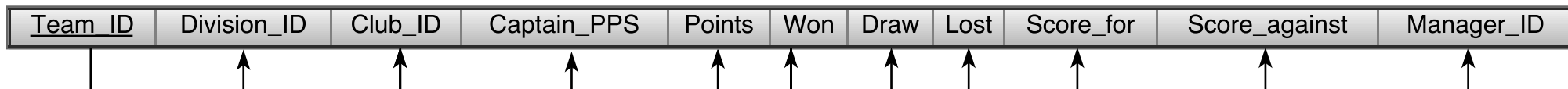
Division



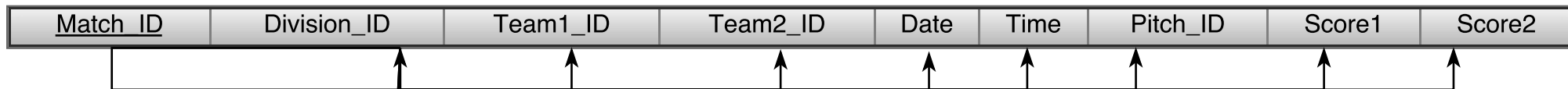
Club



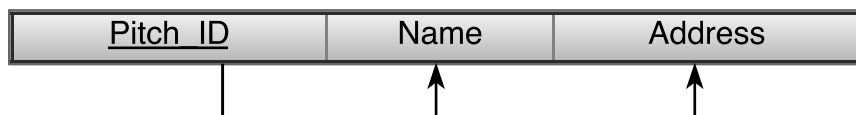
Team



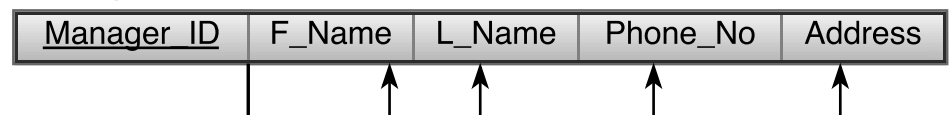
Match



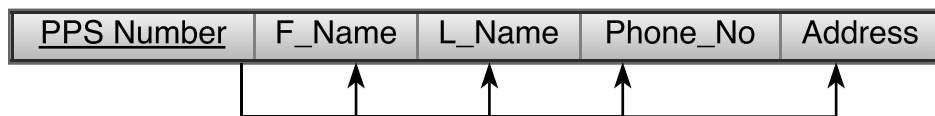
Pitch



Manager



Player



Mapping To Relational Schema

County

<u>County ID</u>	Name
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Board Member

<u>PPS</u>	County_ID	F_Name	L_Name	Phone_no	Address
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Division

<u>Division ID</u>	County_ID	Name
--------------------	-----------	------

Club

<u>Club ID</u>	County_ID	Name	Town
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Team

<u>Team ID</u>	Division_ID	Club_ID	Captain_PPS	Points	Won	Draw	Lost	Score_for	Score_against	Manager_ID
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Match

<u>Match ID</u>	Division_ID	Team1_ID	Team2_ID	Date	Time	Pitch_ID	Score1	Score2
-----------------	-------------	----------	----------	------	------	----------	--------	--------

Pitch

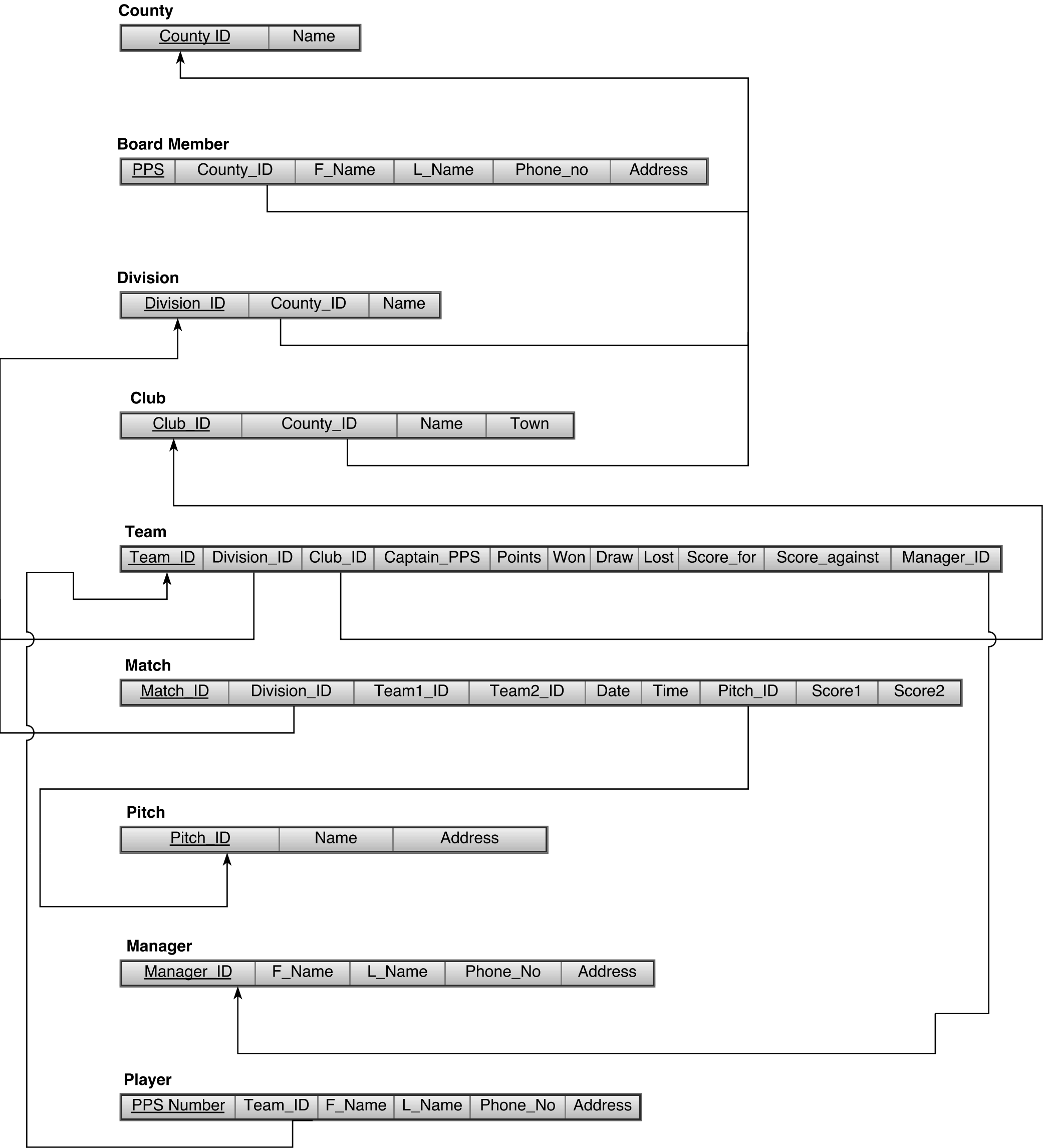
<u>Pitch ID</u>	Name	Address
-----------------	------	---------

Manager

<u>Manager ID</u>	F_Name	L_Name	Phone_No	Address
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Player

<u>PPS Number</u>	Team_ID	F_Name	L_Name	Phone_No	Address
-------------------	---------	--------	--------	----------	---------



Appendix

--County Table

```
CREATE TABLE County(  
    ID INTEGER not null,  
    Name VARCHAR(20) not null,  
    PRIMARY KEY (ID)  
);
```

--Board Member Table

```
CREATE TABLE Board_Member(  
    PPS NUMBER(9,0) not null,  
    County_ID INTEGER not null,  
    F_Name VARCHAR(20) not null,  
    L_Name VARCHAR(20) not null,  
    Phone_no NUMBER(10,0) not null,  
    Address VARCHAR2(50) not null,  
    PRIMARY KEY (PPS)  
);
```

--Division Table

```
CREATE TABLE Division(  
    ID INTEGER not null,  
    Name VARCHAR(30) not null,  
    County_ID INTEGER not null,  
    PRIMARY KEY (ID)  
);
```

--Club Table

```
CREATE TABLE Club(  
    ID INTEGER not null,  
    County_ID INTEGER not null,  
    Name VARCHAR(20) not null,  
    Town VARCHAR(20) not null,  
    PRIMARY KEY (ID)  
);
```

--Team Table

```
CREATE TABLE Team(  
    ID INTEGER not null,  
    Division_ID INTEGER not null,  
    Club_ID INTEGER not null,  
    Manager_ID INTEGER not null,  
    Captain_PPS NUMBER(9,0) not null,  
    Points INTEGER not null,  
    Won INTEGER not null,  
    Drawn INTEGER not null,  
    Lost INTEGER not null,  
    Score_For INTEGER not null,  
    Score_Against INTEGER not null,  
    PRIMARY KEY (ID)  
);
```

```

--Pitch Table
CREATE TABLE Pitch(
    ID INTEGER not null,
    Name VARCHAR(20) not null,
    Address VARCHAR(50) not null,
    PRIMARY KEY(ID)
);

--Match Table
CREATE TABLE Match(
    ID INTEGER not null,
    Match_date DATE not null,
    Match_time VARCHAR(5) not null,
    Team_1_ID INTEGER not null,
    Team_2_ID INTEGER not null,
    Pitch_ID INTEGER not null,
    Score1 INTEGER not null,
    Score2 INTEGER not null,
    PRIMARY KEY (ID)
);

--Manager Table
CREATE TABLE Manager(
    ID INTEGER not null,
    F_Name VARCHAR(20) not null,
    L_Name VARCHAR(20) not null,
    Address VARCHAR(50),
    Phone_no INTEGER,
    PRIMARY KEY (ID)
);

--Player Table
CREATE TABLE Player(
    PPS NUMBER(9,0) not null,
    F_Name VARCHAR(20) not null,
    L_Name VARCHAR(20) not null,
    Team_ID INTEGER not null,
    Phone_no NUMBER(10,0),
    Address VARCHAR(50),
    PRIMARY KEY (PPS)
);

--Board Member
ALTER TABLE Board_Member
ADD CONSTRAINT FK_County_Board FOREIGN KEY (County_ID)
REFERENCES County(ID)
ON DELETE set null;

--Division
ALTER TABLE Division
ADD CONSTRAINT FK_County_Division FOREIGN KEY (County_ID)
REFERENCES County(ID)
ON DELETE set null;

```

```

--Club Table
ALTER TABLE Club
ADD CONSTRAINT FK_County_Club FOREIGN KEY (County_ID)
    REFERENCES County(ID)
    ON DELETE set null;

--Team Table
ALTER TABLE Team
ADD CONSTRAINT FK_Division_Team FOREIGN KEY (Division_ID)
    REFERENCES Division(ID)
    ON DELETE set null;

--Team Table
ALTER TABLE Team
ADD CONSTRAINT FK_Club_Team FOREIGN KEY (Club_ID)
    REFERENCES Club(ID)
    ON DELETE set null;

--Team Table
ALTER TABLE Team
ADD CONSTRAINT FK_Manager_Team FOREIGN KEY (Manager_ID)
    REFERENCES Manager(ID)
    ON DELETE set null;

--Team Table
ALTER TABLE Team
ADD CONSTRAINT FK_Captain_Team FOREIGN KEY (Captain_PPS)
    REFERENCES Captain(PPS)
    ON DELETE set null;

--Match Table
ALTER TABLE Match
ADD CONSTRAINT FK_Team1_Match FOREIGN KEY (Team_1_ID)
    REFERENCES Team(ID)
    ON DELETE cascade;

--Match Table
ALTER TABLE Match
ADD CONSTRAINT FK_Team2_Match FOREIGN KEY (Team_2_ID)
    REFERENCES Team(ID)
    ON DELETE cascade;

--Match Table
ALTER TABLE Match
ADD CONSTRAINT FK_Pitch_Match FOREIGN KEY (Pitch_ID)
    REFERENCES Pitch(ID)
    ON DELETE NO ACTION;

--Player Table
ALTER TABLE
ADD CONSTRAINT FK_Team_Player FOREIGN KEY (Team_ID)
    REFERENCES Team(ID)
    ON DELETE set null;

```

```

--Trigger
CREATE OR REPLACE TRIGGER addPointsToTeam
    AFTER UPDATE ON Match
    FOR EACH ROW
BEGIN
    if :new.Score1 != 0 THEN
        UPDATE TEAM T1
        SET T1.Score_For = T1.Score_For + :new.Score1
        WHERE T1.ID = :new.Team_1_ID;

        UPDATE TEAM T11
        SET T11.Score_Against = T11.Score_Against + :new.Score2
        WHERE T11.ID = :new.Team_1_ID;

        UPDATE TEAM T2
        SET T2.Score_For = T2.Score_For + :new.Score2
        WHERE T2.ID = :new.Team_2_ID;

        UPDATE TEAM T22
        SET T22.Score_Against = T22.Score_Against + :new.Score1
        WHERE T22.ID = :new.Team_2_ID;

    end if;
END;

--Populating Tables!--

--County(County ID, Name)
INSERT INTO County Values(1, 'Wicklow');
INSERT INTO County Values(2, 'Dublin');
INSERT INTO County Values(3, 'Kildare');
INSERT INTO County Values(4, 'Carlow');
INSERT INTO County Values(5, 'Cork');
INSERT INTO County Values(6, 'Meath');
INSERT INTO County Values(7, 'Mayo');

--Board_Member(PPS Number, County ID, Name, Phone Number, Address)
INSERT INTO Board_Member Values(100000000, 1, 'John', 'Smith', 0871234567, '1 main road,
Kilmac, Wicklow');
INSERT INTO Board_Member Values(100000001, 2, 'April', 'Long', 0871234267, '10 left road,
Dalkey, Dublin');
INSERT INTO Board_Member Values(100000002, 3, 'Dan', 'Tilley', 0871524567, '63 Dark lane,
Leixslip, Kildare');
INSERT INTO Board_Member Values(100000003, 4, 'Paul', 'Freehy', 0871238267, 'Number 6,
Borris, Carlow');
INSERT INTO Board_Member Values(100000004, 5, 'Andrew', 'Byrne', 0861234567, 'Howardshore,
Ballyhea, Cork');
INSERT INTO Board_Member Values(100000005, 6, 'Damien', 'Rice', 0871234907, 'Damiens
Castle, Trim, Meath');
INSERT INTO Board_Member Values(100000006, 7, 'Dermot', 'Kennedy', 0871239007, 'Eoins Den,
Westport, Mayo');

--Division(ID, Name, County ID)

```



```

INSERT INTO Division Values(1, 'Senior', 1);
INSERT INTO Division Values(2, 'Intermediate', 1);
INSERT INTO Division Values(3, 'Junior', 1);
INSERT INTO Division Values(4, 'Senior', 2);
INSERT INTO Division Values(5, 'Senior', 3);
INSERT INTO Division Values(6, 'Intermediate', 3);

--Club(ID, County ID, Name, Town)
INSERT INTO Club Values(1, 1, 'Rathnew GAA', 'Rathnew');
INSERT INTO Club Values(2, 1, 'St. Patricks GAA', 'Wicklow Town');
INSERT INTO Club Values(3, 1, 'Kilmacanogue GAA', 'Kilmacanogue');
INSERT INTO Club Values(4, 1, 'Kiltegan GAA', 'Kiltegan');
INSERT INTO Club Values(5, 1, 'Laragh GAA', 'Laragh');
INSERT INTO Club Values(6, 1, 'Kilcoole GAA', 'Kilcoole');
INSERT INTO Club Values(7, 2, 'St. Vincents GAA', 'Marino');
INSERT INTO Club Values(8, 2, 'Cuala GAA', 'Dalkey');

--Team(ID, Division ID, Club ID, Manager ID, Captain_PPS Points, Won, Drawn, Lost,
Score_For, Score_Against)
INSERT INTO Team Values(1, 1, 1, 4, 600100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(2, 1, 2, 2, 700100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(3, 1, 3, 9, 100100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(4, 2, 3, 1, 200100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(5, 2, 4, 5, 500100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(6, 3, 5, 8, 300100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(7, 3, 6, 6, 400100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(8, 4, 7, 7, 800100100, 0, 0, 0, 0, 0, 0);
INSERT INTO Team Values(9, 4, 8, 3, 900100100, 0, 0, 0, 0, 0, 0);

--Pitch(ID, Name, Address)
INSERT INTO Pitch Values(1, 'Fitzimons Park', 'Quill Road, Kilmacanogue, Wicklow');
INSERT INTO Pitch Values(2, 'Parc Ui Greystones', 'Killcarrig, Greystones, Wicklow');
INSERT INTO Pitch Values(3, 'Caraguna Stadium', 'Blackrock GAA Grounds, Dublin');
INSERT INTO Pitch Values(4, 'Cork Pitch', 'Charleville, Cork');
INSERT INTO Pitch Values(5, 'Wesport Stadium', 'Quayside, Westport, Mayo');
INSERT INTO Pitch Values(6, 'Coolkenno Park', 'Coolkenno, Wicklow');

--Match(ID, Match Date, Match Time, First Team ID, Second Team ID, Pitch ID)
INSERT INTO match Values(1, TO_DATE('01/09/17', 'DD/MM/YY'), '16:00', 3, 2, 2, 0, 0);
INSERT INTO match Values(2, TO_DATE('12/09/17', 'DD/MM/YY'), '14:00', 3, 1, 1, 0, 0);
INSERT INTO match Values(3, TO_DATE('25/10/17', 'DD/MM/YY'), '12:00', 4, 3, 6, 0, 0);
INSERT INTO match Values(4, TO_DATE('03/08/17', 'DD/MM/YY'), '11:00', 6, 7, 2, 0, 0);
INSERT INTO match Values(5, TO_DATE('10/09/17', 'DD/MM/YY'), '10:00', 7, 6, 1, 0, 0);
INSERT INTO match Values(6, TO_DATE('10/09/17', 'DD/MM/YY'), '13:00', 9, 8, 3, 0, 0);

--Manager(Manager ID, Name, Address, Phone_no)
INSERT INTO Manager Values(1, 'Gerry', 'Tuohy', 'Ardmore Heights, Bray, Wicklow',
0876573050);
INSERT INTO Manager Values(2, 'Paul', 'Daly', 'Blessington Road, Wicklow', 0865435555);
INSERT INTO Manager Values(3, 'Niall', 'King', 'Main Road, Dublin', 0876543212);
INSERT INTO Manager Values(4, 'John', 'Kennedy', 'Not main Road, Tallaght, Dublin',
0876432121);
INSERT INTO Manager Values(5, 'Eoin', 'Rea', 'Hollywood, Wicklow', 0823412022);

```

```

INSERT INTO Manager Values(6, 'Edward' , 'Rafferty', 'Avalon, Westport, Wicklow',
0884325566);
INSERT INTO Manager Values(7, 'Nicola', 'Sturgeon', 'Edinburgh Road, Westport, Wicklow',
0841231231);
INSERT INTO Manager Values(8, 'Kenny', 'Koldrick', '1 Dalkey Road, Dalkey, Dublin',
0876671199);
INSERT INTO Manager Values(9, 'Ste', 'Long', '2nd place, Charleville, Cork', 0848889299);

--Player(PPS NUMBER, Name, Team_ID, Phone number, Address)
INSERT INTO Player Values(100100100, 'Donal', 'Tuohy', 3, 0876672989, 'Killough Upper,
Kilmacanogue, Wicklow');
INSERT INTO Player Values(200100100, 'Eoin', 'Tuohy', 4, 08721493322, 'Killough Upper,
Kilmacanogue, Wicklow');
INSERT INTO Player Values(300100100, 'Marcus', 'Rafferty', 6, 0870870871, 'Kilbarrack Road,
Kilmacanogue, Wicklow');
INSERT INTO Player Values(400100100, 'Cian', 'Rafferty', 7, 0856676234, 'Kilbarrack Road,
Kilmacanogue, Wicklow');
INSERT INTO Player Values(500100100, 'Marc', 'Lennon', 5, 0853421212, '1 Main Street,
Rathnew, Wicklow');
INSERT INTO Player Values(600100100, 'John', 'Star', 1, 0843128429, '2 Main Street,
Rathnew, Wicklow');
INSERT INTO Player Values(700100100, 'Gerry', 'McCartney', 2, 0838254682, '3 Main Street,
Rathnew, Wicklow');
INSERT INTO Player Values(800100100, 'Gerry', 'Paul', 8, 0838252082, '5 Main Street,
Rathnew, Wicklow');
INSERT INTO Player Values(900100100, 'Ger', 'Lister', 9, 0838254322, '8 Main Street,
Rathnew, Wicklow');

```