Project 2

Objectives

Continue with Project 1 and enhance the relational model and database with advanced SQL queries.

Project Description

This project requires you to create a production quality data model, an SQL Server database, and SQL queries to demonstrate the viability of your project and your understanding of the material in this course.

Submission: Use this template and submit the following in <u>one</u> PDF file.

Writeup:

1. Add additional features to your project from Project 1. You should aim to have 10 entities in the final ERD. Describe your <u>complete</u> enhanced project in one concise paragraph.

   Project Description: Our project has been designed for a sports team. There are no specifics about which sport, but it cannot be an individual sport, like tennis or golf. For data entries, we used data from the NBA. This database could be used by organizations like high-schools, universities and more. The rules for the database are as follows: A Coach has many practices and games. The team has many coaches and players. Every player and coach have a contract. Players must attend games and practices. A person on this team may be an employee or player. If they are an employee, they must be a coach or trainer but not both. If they are a player, they must attend games and practices. A team has many sponsors.
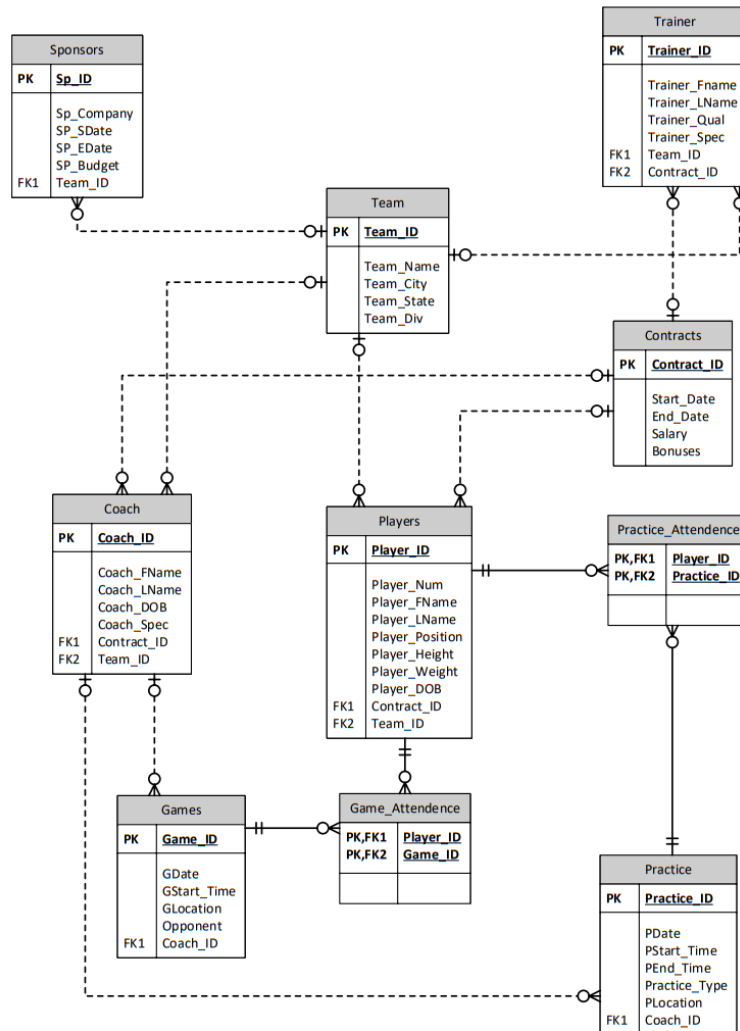
2. Include 5 user stories to describe how your eventual database will be used. (Check out the details of user story here.)
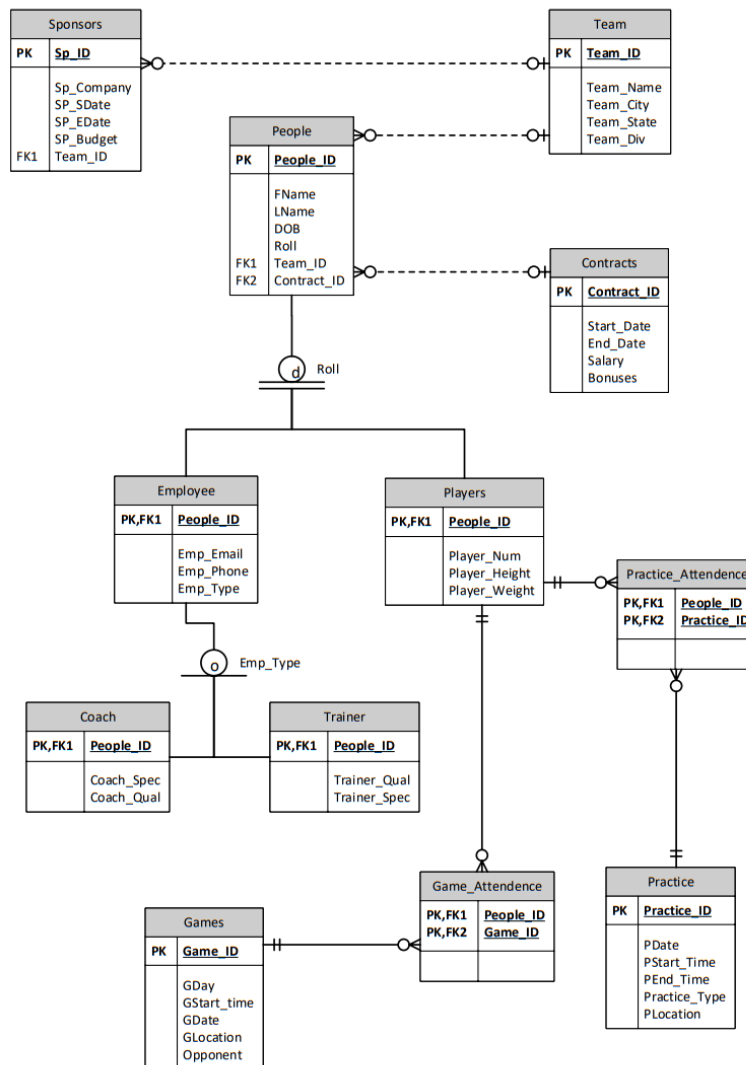
   User Stories:
   - As a coach, I want to get an overview of the players' games and see how they can improve or if they need to attend more practices based on the performance.
   - As a Sponsor I can advertise my products to a team and grow my company through them.
   - As a Player I want to see my opponents for games so that I am well prepared for the upcoming event and can study my opponents' roster.
   - As a Trainer I want to see my teams' statics after each game to see what specific training I must incorporate into their routines to improve them.
   - As a coach I will be able to keep track of my contract with a team in order to find or stay with my current team.

ERD:

1. Create the ERD for the normalized relational model. If you use EERD for your model, please also submit the implementation model without the extended notations.

ERD:

EERD:

SQL: (You cannot use the same answer for multiple questions.)

1. Create 5 (or more) tables that correspond to the entities in your ERD. Choose tables
    that are in relationship with each other so you can use the tables for the following
    queries. Show the SQL statements. (Do not forget the primary and foreign keys, and
    any appropriate constraints.)

```sql
create table Team
(
    Team_ID         char(4),
    Team_Name       varchar(50) not null,
    Team_City       varchar(30),
    Team_State      char(2),
    Team_Div        char(2),
```

```sql
    CONSTRAINT Teams_PK primary key (Team_ID)
)

create table Contracts
(
    Contract_ID     char(4) not null,
    Start_Date      date not null,
    End_Date        date not null,
    Salary          money,
    Bonuses         money,
    CONSTRAINT Contracts_PK primary key (Contract_ID)
)

create table Coaches
(
    Coach_ID        char(4),
    Coach_FName     varchar(30) not null,
    Coach_LName     varchar(30) not null,
    Coach_DOB       date,
    Coach_Spec      varchar(50),
    Contract_ID     char(4),
    Team_ID         char(4),
    CONSTRAINT Coaches_PK primary key (Coach_ID),
    FOREIGN key (Contract_ID) REFERENCES Contracts(Contract_ID),
    FOREIGN key (Team_ID) REFERENCES Team(Team_ID)
)


create table Players
(
    Player_ID       char(4),
    Player_Num      char(2),
    Player_FName    varchar(30) not null,
    Player_LName    varchar(30) not null,
    Player_Position varchar(30),
    Player_Height   int,
    Player_Weight   int,
    Player_DOB      date not null,
    Contract_ID     char(4),
    Team_ID         char(4),
    CONSTRAINT Players_PK primary key (Player_ID),
    FOREIGN key (Contract_ID) REFERENCES Contracts(Contract_ID),
    FOREIGN key (Team_ID) REFERENCES Team(Team_ID)
)
```

```sql
create table Practice
(
    Practice_ID     char(4),
    PDate           date not null,
    PStart_Time     time not null,
    PEnd_Time       time,
    Practice_Type   varchar(40),
    PLocation       varchar(50),
    CONSTRAINT Practice_PK primary key (Practice_ID)
)

create table Games
(
    Game_ID     char(4),
    GDate       date not null,
    GStart_Time time not null,
    GLocation   char(30),
    Opponent    char(20),
    Coach_ID    char(4)
    CONSTRAINT Game_PK primary key (Game_ID)
)

create table Game_Attendence
(
    Player_ID       char(4),
    Game_ID         char(4),
    CONSTRAINT Game_Attendence_PK primary key (Player_ID, Game_ID),
    FOREIGN KEY (Player_ID) REFERENCES Players(Player_ID),
    foreign key (Game_ID) REFERENCES Games(Game_ID)
)

create table Practice_Attendence
(
    Player_ID       char(4),
    Practice_ID     char(4),
    CONSTRAINT Practice_Attendence_PK primary key (Player_ID,
Practice_ID),
    FOREIGN KEY (Player_ID) REFERENCES Players(Player_ID),
    FOREIGN KEY (Practice_ID) REFERENCES Practice(Practice_ID)
)
```

2. Insert some data into each of the tables (at least 10 rows per table). Show the SQL
    statements, and the content of each table after all the tables are being populated.

```sql
INSERT INTO Team VALUES
    ('T001','Golden State Warriors','San Francisco','CA','PA'),
    ('T002','Mavericks','Dallas','TX','SW'),
    ('T003','Bucks','Milwaukee','WI','CE'),
    ('T004','TimberWolves','Minnesota','MI','NW'),
    ('T005','Suns','Phoenix','AZ','PA'),
    ('T006','Jazz','Utah','UT','NW'),
    ('T007','Cavaliers','Cleveland','OH','CE'),
    ('T008','Raptors','Toronto','OT','AT'),
    ('T009','Celtics','Boston','MA','AT'),
    ('T010','Lakers','Los Angeles','CA','PA')

INSERT INTO Contracts VALUES
    ('C001','04-04-2020','04-04-2022',75000000,null),
    ('C002','02-08-2020','02-08-2022',70000000,12000),
    ('C003','01-27-2018','01-27-2022',14000000,31000),
    ('C004','07-15-2020','07-15-2022',9000000,null),
    ('C005','05-03-2018','05-03-2022',17000000,12000),
    ('C006','09-19-2021','07-05-2022',680000000,42000),
    ('C007','05-23-2019','05-03-2022',null,null),
    ('C008','12-03-2017','05-03-2022',140000000,null),
    ('C009','09-26-2018','05-03-2022',null,25000),
    ('C010','03-18-2015','05-03-2022',140000000,null)


INSERT INTO Coaches VALUES
    ('C200','Steve','Kerr','1965-09-27','Head Coach',null,'T001'),
    ('C201','Jason','Kid','1973-03-23','Head Coach','C002','T002'),
    ('C202','Darvin','Ham','1973-02-23','Head Coach','C005','T010'),
    ('C203','Joe','Mazzulla','1988-06-30','Head Coach',null,null),
    ('C204','John-Blair','Bickerstaff','1979-03-19','Head Coach','C001',null),
    ('C205','Galvin','Skett','1968-04-18','Head Coach','C009','T008'),
    ('C206','Zilvia','Thamelt','1977-05-13','Head Coach','C003','T005'),
    ('C207','Joan','Leatherborrow','1987-08-19','Head Coach',null,'T003'),
    ('C208','Roz', 'Winsom','1973-03-03','Assistant Coach','C010','T006'),
    ('C209','Stefania','Wipper','1989-08-07','Head Coach','C005',null)

INSERT INTO Players values
    ('P001','01','Stephen','Curry','Point Guard',190,185,'03-14-1988','C001',null),
    ('P002','30','Luka','Dončić','Point Guard',200,230,'02-28-1999','C004','T002'),
    ('P003','01','LeBron','James','Small Forward',205,250,'12-30-1984','C003','T010'),
```

```sql
    ('P004','72','Jayson','Tatum','Small Forward',203,210,'03-03-1998',null,'T009'),
    ('P005','26','Jarret','Allen','Center',210,243,'04-21-1998','C009','T001'),
    ('P006','10','Fred','VanVleet','Point Guard',190,240,'11-26-1999','C003',null),
    ('P007','41','Deandre','Ayton','Center',200,230,'01-03-1998','C005','T005'),
    ('P008','26','Grayson','Allen','Small Forward',240,230,'09-25-1997',null,'T003'),
    ('P009','10','Jaylen','Agbaji','Point Guard',200,218,'05-06-1998','C008','T007'),
    ('P010','72','Kyle','Anderson','Small Forward',210,235,'09-04-1999','C010','T004'),
    ('P011','24','Tim','Jaylen','Point Guard',null,185,'03-14-1988','C001','T001'),
    ('P012',null,'Luka','Mark','Point Guard',202,230,'02-28-1999',null,null),
    ('P013','32','LeBron','Frank',null,235,250,'12-30-1984','C003','T010'),
    ('P014','73','Charles','Carlos','Small Forward',203,210,'03-03-
1998','C004','T009'),
    ('P015','65','Frank','Austin','Center',210,243,'04-21-1998',null,'T001'),
    ('P016','10','Fred','VanVleet','Point Guard',190,243,'11-26-1999','C003','T008'),
    ('P017','37','Carlos','Blake','Center',190,200,'01-03-1998','C005','T005'),
    ('P018','38','Mark','Jaylen','Small Forward',220,null,'09-25-1997','C001','T003'),
    ('P019','85','Ochai','Adams','Point Guard',220,218,'05-06-1998',null,'T006'),
    ('P020','47','Kyle','Barry','Small Forward',230,235,'09-04-1999','C010','T004'),
    ('P021','48','Ron','Ayton','Center',220,230,'01-03-1998','C005','T005'),
    ('P028',null,'Aldrich','Baxter','Small Forward',210,234,'09-25-1997','C001',null),
    ('P039','01','Jaylen','Aldrich','Point Guard',200,218,'05-06-1998','C008','T006'),
    ('P030','38','Barry','Jamel','Small Forward',250,235,'09-04-1999','C010','T007'),
    ('P031','48','Tim','Carmelo','Point Guard',190,185,'03-14-1988',null,'T001'),
    ('P032','48','Luka','Blake','Point Guard',202,230,'02-28-1999','C004','T002'),
    ('P033','49','Carmelo','Baxter','Small Forward',235,250,'12-30-
1984','C003','T010'),
    ('P034','52','Charles','Mark','Small Forward',203,null,'03-03-1998','C004','T009'),
    ('P042','24','Luka','Mark','Point Guard',202,230,'02-28-1999','C004','T002'),
    ('P053','93','LeBron','Carmelo','Small Forward',235,250,'12-30-
1984','C003','T010'),
    ('P044','74','Malik','Ron','Small Forward',203,210,'03-03-1998',null,'T009'),
    ('P055',null,'Frank','Austin','Center',210,243,'04-21-1998','C009','T001'),
    ('P046','13','Fred','Malik','Point Guard',190,243,'11-26-1999','C003','T007'),
    ('P047','36','Carmelo','Ron','Center',190,200,'01-03-1998','C005','T005'),
    ('P048','73','Mark','Malik','Small Forward',220,220,'09-25-1997','C001','T003'),
    ('P059','10','Ochai','Barry','Point Guard',220,218,'05-06-1998','C008','T006'),
    ('P060','37','Carmelo','Adams','Small Forward',230,235,'09-04-1999',null,'T004')


INSERT INTO Practice VALUES
    ('PR01','05-23-2022','13:30:00','16:30:00','Conditioning','Chase Center'),
    ('PR02','06-01-2022','08:00:00','10:30:00','Shooting','Madison Square Garden'),
    ('PR03','05-10-2022','16:00:00','18:00:00','Dribbling','Chase Center'),
    ('PR04','06-10-2022','09:30:00','11:30:00',null,'Rocket Mortgage FieldHouse'),
```

```sql
    ('PR05','06-01-2022','13:30:00','16:30:00','Shooting','OVO Center'),
    ('PR06','07-24-2022','14:30:00','13:30:00','Conditioning','Madison Square Garden'),
    ('PR07','06-14-2022','18:30:00','19:30:00','Dribbling','Chase Center'),
    ('PR08','02-24-2022','11:30:00','15:30:00','Shooting','Vivint Arena'),
    ('PR09','08-28-2022','14:30:00','23:30:00','Scrimmage','Rocket Mortgage
FieldHouse'),
    ('PR10','09-13-2022','15:30:00','18:30:00','Shooting','Vivint Arena')


INSERT INTO Games VALUES
    ('G001','16:00:00','18:00:00','Chase Centre','Nets','C201'),
    ('G002','18:30:00','20:30:00','American Airlines Center','Knicks','C202'),
    ('G003','10:00:00','12:00:00','Crypto.com Arena','Heat', 'C202'),
    ('G004','12:00:00','14:00:00','TD Garden','Nuggets', 'C205'),
    ('G005','14:00:00','16:00:00','Rocket Mortgage FieldHouse','Spurs', 'C205'),
    ('G006','16:00:00','18:00:00','Scotia Bank Arena','Raptors', 'C206'),
    ('G007','18:00:00','20:00:00','Footprint Center','Suns', 'C207'),
    ('G008','20:00:00','22:00:00','Fiserv Forum','Bucks', 'C208'),
    ('G009','12:00:00','16:00:00','Vivint Area','Jazz', 'C209'),
    ('G010','14:00:00','16:00:00','United Centre','Kings', 'C208'),
    ('G011','20:00:00','22:00:00','Target Centre','TimberWolves', 'C200')

INSERT INTO Game_Attendence VALUES
    ('P001','G001'),
    ('P005','G001'),
    ('P011','G001'),
    ('P015','G001'),
    ('P031','G001'),
    ('P002','G003'),
    ('P012','G003'),
    ('P032','G003'),
    ('P042','G003'),
    ('P003','G004'),
    ('P013','G004'),
    ('P033','G004'),
    ('P053','G004')

INSERT INTO Practice_Attendence VALUES
    ('P004','PR03'),
    ('P014','PR03'),
    ('P034','PR03'),
    ('P044','PR03'),
    ('P007','PR06'),
    ('P017','PR06'),
    ('P021','PR06'),
```

```
    ('P047','PR06'),
    ('P010','PR07'),
    ('P020','PR07'),
    ('P030','PR07'),
    ('P060','PR07')
```

3. Come up with one query of your database that requires an inner join of at least two tables. State the purpose of the query, show the SQL statement and the output.

Show how much players who go to a practice make. List the players first and last as play name from the players table and their Salary from contracts only if the player is attending a practice:

	Player Name	Salary
1	Deandre, Ayton	17000000.00
2	Kyle, Anderson	140000000.00
3	Charles, Carlos	9000000.00
4	Carlos, Blake	17000000.00
5	Kyle, Barry	140000000.00
6	Ron, Ayton	17000000.00
7	Barry, Jamel	140000000.00
8	Charles, Mark	9000000.00
9	Carmelo, Ron	17000000.00

```sql
select concat(players.Player_FName, ', ', players.Player_LName) as
'Player Name', Contracts.Salary
from Players
INNER join Contracts on players.Contract_ID = Contracts.Contract_ID
inner join Practice_Attendence on players.Player_ID =
Practice_Attendence.Player_ID
```

4. Come up with one query of your database that requires an outer join of at least two tables. State the purpose of the query, show the SQL statement and the output.

Show how much coaches have in bonuses. List all coaches first name and last name from the coaches table and their team name from the team table and bonuses from the contract table where the coach is part of a team

	Coach Name	Team_Name	Bonuses
1	Steve, Kerr	Golden State W...	*NULL*
2	Jason, Kid	Mavericks	12000.00
3	Darvin, Ham	Lakers	12000.00
4	Galvin, Skett	Raptors	25000.00
5	Zilvia, Thamelt	Suns	31000.00
6	Joan, Leatherb...	Bucks	*NULL*
7	Roz, Winsom	Jazz	*NULL*

```sql
select concat(coaches.Coach_FName, ', ', coaches.Coach_LName) as
'Coach Name', Team.Team_Name, Contracts.Bonuses
from Coaches
left outer join Team on Coaches.Team_ID = Team.Team_ID
left outer join Contracts on Coaches.Contract_ID = Contracts.Contract_ID
where Coaches.Team_ID is not null
```

5. Come up with one query of your database that requires a subquery. State the purpose of the query, show the SQL statement and the output.

    List all players that do not have a game.

	Player Name
1	Jayson, Tatum
2	Fred, VanVleet
3	Deandre, Ayton
22	Frank, Austin
23	Ochai, Barry
24	Carmelo, Adams

```sql
select concat(Player_FName, ', ', Player_LName) as 'Player Name'
from Players
where Player_ID not in (
    select player_ID
    from Game_Attendence
)
```

6. Come up with one query of your database that requires an aggregate function. State the purpose of the query, show the SQL statement and the output.

How many people are on each team, list the Team name and count of players:

	Team_Name	Total Amount
1	Bucks	3
2	Cavaliers	3
3	Celtics	4
4	Golden State W...	5
5	Jazz	3
6	Lakers	4
7	Mavericks	3
8	Raptors	1
9	Suns	4
10	TimberWolves	3

```sql
select Team.Team_Name, count(Player_ID) as 'Total Amount'
from Team
join Players on Team.Team_ID = Players.Team_ID
group by Team.Team_Name
```

7. Come up with one query of your database that requires the OVER clause. State the purpose of the query, show the SQL statement and the output.

Find the amount of bonuses for each team. List the players on each team from the teams table, their team's name from the team table, and the total amount in bonuses for each team from the contracts table.

	Player Name	Team_Name	Total Amount b...
1	Mark, Jaylen	Bucks	NULL
2	Mark, Malik	Bucks	NULL
3	Fred, Malik	Cavaliers	31000.00
24	Carmelo, Ron	Suns	48000.00
25	Kyle, Anderson	TimberWolves	NULL
26	Kyle, Barry	TimberWolves	NULL

```
select  concat(players.player_Fname, ', ',Players.Player_LName) as 'Player
Name',Team.Team_Name, sum(Contracts.Bonuses) over
(PARTITION by Team.Team_Name) as 'Total Amount by Team'
from Contracts
join Players on Contracts.Contract_ID = players.Contract_ID
join Team on players.Team_ID = Team.Team_ID
```

8. Come up with a view of your database that limits the user's access to specific rows and columns. State the purpose of the view, show the SQL statement, an example of how the view is invoked, and the output.

Roster of players on the Warriors team. List the Players name and number on team from San Francisco:

	Player Name	Player_Num
1	Jarret, Allen	26
2	Tim, Jaylen	24
3	Frank, Austin	65
4	Tim, Carmelo	48
5	Frank, Austin	NULL

```
create view Warriors_Roster
as
select concat(players.Player_FName, ', ', players.Player_LName) as 'Player
Name', players.Player_Num
from Players
join Team on players.Team_ID = team.Team_ID
where team.Team_City = 'San Francisco'
```

Effort Expectation:

ERD   40%
SQL   40%
Writeup   20%