

# ASSIGNMENT NO 4 - NORMALIZATION

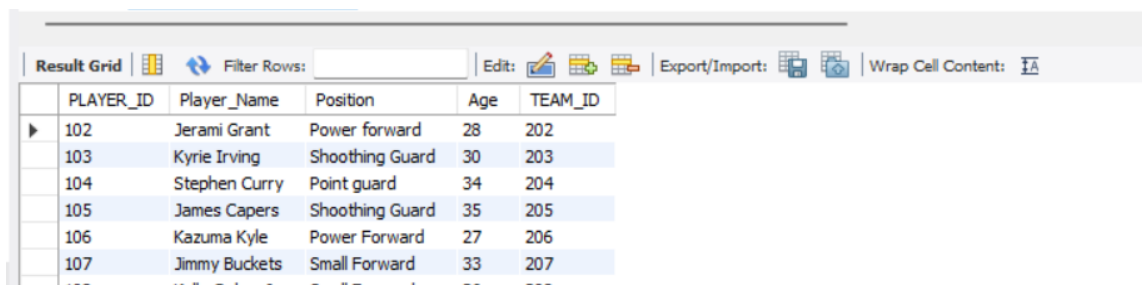
Vikrant Satish Pawar, NUID:002772104

Swapnil Nishikant Bhasgauri, NUID:002752978

## 1NF (FIRST NORMAL FORM):

- Each table cell should contain a single value
- Each record needs to be unique

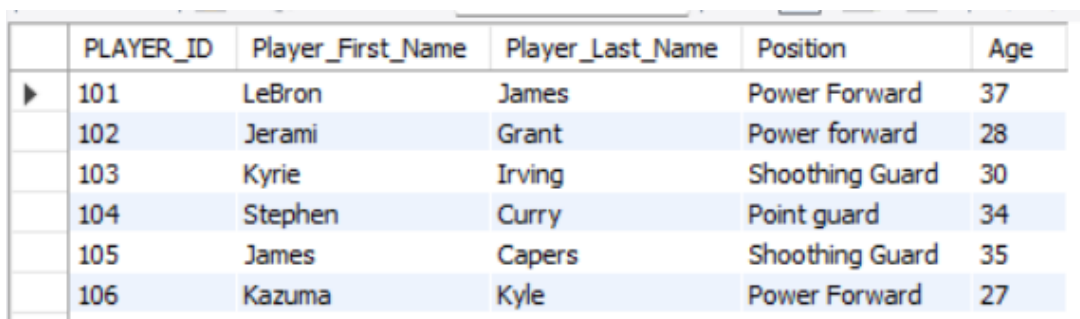
### Before 1NF:



	PLAYER_ID	Player_Name	Position	Age	TEAM_ID
▶	102	Jerami Grant	Power forward	28	202
	103	Kyrie Irving	Shooting Guard	30	203
	104	Stephen Curry	Point guard	34	204
	105	James Capers	Shooting Guard	35	205
	106	Kazuma Kyle	Power Forward	27	206
	107	Jimmy Buckets	Small Forward	33	207

### Steps to bring the table to 1NF:

As each table cells should contain a single value, we divided the 'Player\_Name' column into 'Player\_First\_Name' and 'Player\_Last\_Name'



	PLAYER_ID	Player_First_Name	Player_Last_Name	Position	Age
▶	101	LeBron	James	Power Forward	37
	102	Jerami	Grant	Power forward	28
	103	Kyrie	Irving	Shooting Guard	30
	104	Stephen	Curry	Point guard	34
	105	James	Capers	Shooting Guard	35
	106	Kazuma	Kyle	Power Forward	27

## 2NF (SECOND NORMAL FORM):

- Rule 1- Be in 1NF
- Rule 2- Single Column Primary Key that does not functionally dependant on any subset of candidate key relation
- Our tables are in 1NF.
- We already have all of our tables divided in the database. So there is no partial dependency on any subset of candidate keys.

```
• CREATE TABLE PLAYER(  
  PLAYER_ID VARCHAR(50) Primary Key,  
  Player_First_Name VARCHAR(50),  
  Player_Last_Name VARCHAR(50),  
  Position VARCHAR(50),  
  Age Integer  
);
```

```
CREATE TABLE PLAYER_STATS(  
  PLAYER_ID VARCHAR(50), -- Foreign Key  
  Game Decimal,  
  Game_Started Decimal,  
  Minutes_Played Decimal,  
  Field_Goals Decimal,  
  Field_Goal_Attempts Decimal ,  
  Field_Goal_Percentage Decimal,
```

CREATE TABLE TEAM(  
TEAM\_ID VARCHAR(50) Primary Key,  
Team\_Name VARCHAR(50),  
Win Integer,  
Loss Integer,  
Win\_Loss\_Percent Integer,  
Points\_Per\_Game Decimal,  
Opponents\_Points\_Per\_Game Decimal,  
SRS Decimal  
);

CREATE TABLE STADIUM(  
STADIUM\_ID VARCHAR(50) Primary Key,  
Stadium\_Name VARCHAR(50),  
Size Integer,  
Location VARCHAR(50)  
);

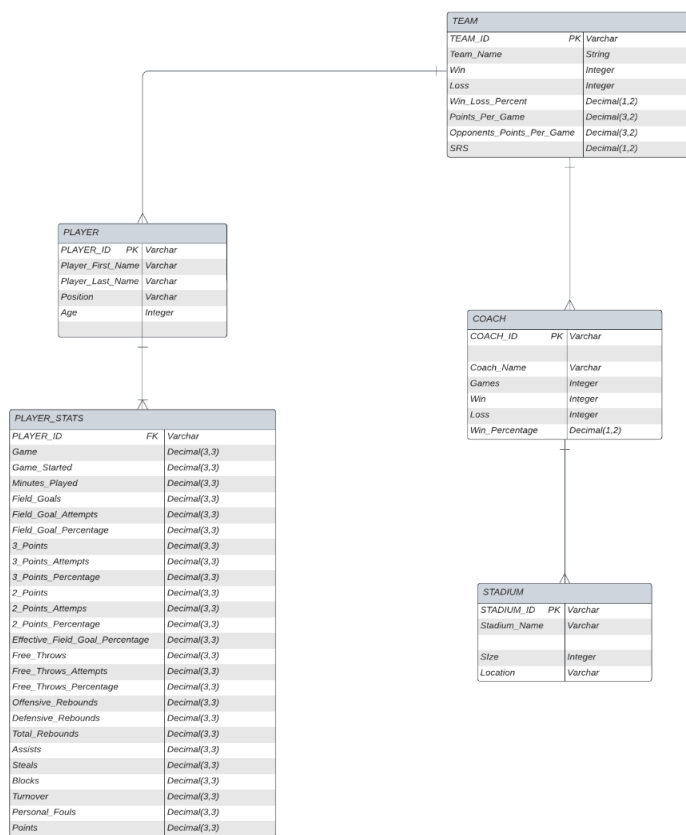
CREATE TABLE COACH(  
COACH\_ID VARCHAR(50),  
Coach\_Name VARCHAR(50),  
Games Integer,  
Win Integer,  
Loss Integer,  
Win\_Percentage Decimal  
);

## 3NF (THIRD NORMAL FORM):

- Rule 1- Be in 2NF
- Rule 2- Has no transitive functional dependencies

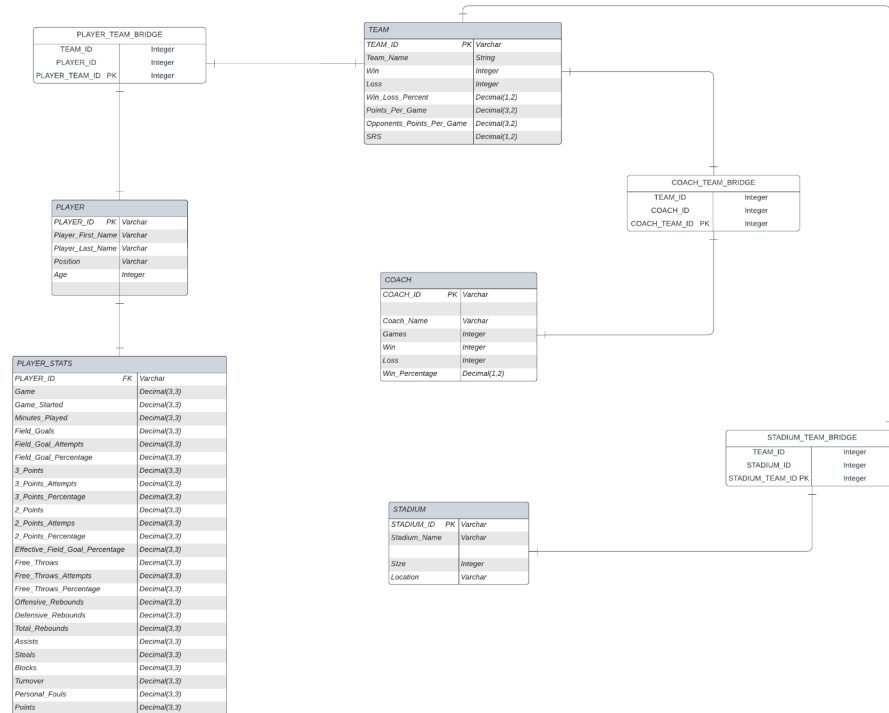
Before 3NF:

### ENTITY RELATIONSHIP DIAGRAM OF NBA STATS



## Steps to bring the table to 3NF:

### ENTITY RELATIONSHIP DIAGRAM OF NBA STATS



We made a bridge table between the following tables to remove transitive dependencies.

### 1. Player and Team

```
CREATE TABLE PLAYER_TEAM_BRIDGE (  
    TEAM_ID VARCHAR(50),  
    PLAYER_ID VARCHAR(50),  
    PLAYER_TEAM_ID VARCHAR(50) -- Surrogate KEY  
);
```

### 2. Team and Coach

```
CREATE TABLE COACH_TEAM_BRIDGE (  
    TEAM_ID VARCHAR(50),  
    COACH_ID VARCHAR(50),  
    COACH_TEAM_ID VARCHAR(50) -- Surrogate KEY  
);
```

### 3. Team and Stadium

```
CREATE TABLE STADIUM_TEAM_BRIDGE (  
    TEAM_ID VARCHAR(50),  
    STADIUM_ID VARCHAR(50),  
    STADIUM_TEAM_ID VARCHAR(50) -- Surrogate KEY  
);
```

The bridge table contains the primary keys of each respective table and a surrogate key to uniquely identify each row in the bridge table.

## VIEWS

1.Which players are playing for the team with highest srs?

```
270 • CREATE VIEW USE_CASE_11 AS
271 SELECT P.Player_First_Name, P.Player_Last_Name, MAX(SRS)
272 FROM PLAYER_TEAM_BRIDGE PTB
273 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
274 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
275 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
276 GROUP BY Team_Name;
277
```

	Player_First_Name	Player_Last_Name	MAX(SRS)
▶	LeBron	James	-8
	Jerami	Grant	3
	Kyrie	Irving	3
	Stephen	Curry	-5
	James	Capers	0
	Kazuma	Kyle	111

2.Which player has the highest field goal percentage for a season and represents which team?

```
280 • CREATE VIEW USE_CASE_12 AS
281 SELECT P.Player_First_Name, P.Player_Last_Name, MAX(Effective_Field_Goal_Percentage), Team_Name
282 FROM PLAYER_TEAM_BRIDGE PTB
283 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
284 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
285 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID;
286
```

	Player_First_Name	Player_Last_Name	MAX(Effective_Field_Goal_Percentage)	Team_Name
▶	LeBron	James	1	Los Angeles Lakers

3. Which players have the 3 pointer percentage greater than 0.4 and which team they belong to?

```

289 • CREATE VIEW USE_CASE_13 AS
290 SELECT P.Player_First_Name, P.Player_Last_Name, Team_Name ,3_Points_Attempts
291 FROM PLAYER_TEAM_BRIDGE PTB
292 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
293 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
294 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
295 WHERE 3_Points_Attempts > 5;

```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	Team_Name	3_Points_Attempts
▶	LeBron	James	Los Angeles Lakers	8
	Kyrie	Irving	Brooklyn Nets	8
	Stephen	Curry	Golden State Warriors	12
	James	Capers	Miami Heat	8
	Kazuma	Kyle	Washington Wizards	8
	Kelly	Oubre Jr	Charlotte Hornets	8

4. Which team has players of age group 25 to 30 and what are their particular points?

```

299 • CREATE VIEW USE_CASE_14 AS
300 SELECT P.Player_First_Name, P.Player_Last_Name, Age, Team_Name
301 FROM PLAYER_TEAM_BRIDGE PTB
302 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
303 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
304 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
305 WHERE Age between 25 AND 30;

```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	Age	Team_Name
▶	Jerami	Grant	28	Portland Trail Blazers
	Kyrie	Irving	30	Brooklyn Nets
	Kazuma	Kyle	27	Washington Wizards
	Kelly	Oubre Jr	26	Charlotte Hornets



5. Which all players are playing at Power Forward position for the team?

```
309 • CREATE VIEW USE_CASE_15 AS
310 SELECT P.Player_First_Name, P.Player_Last_Name, position, Team_Name
311 FROM PLAYER_TEAM_BRIDGE PTB
312 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
313 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
314 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
315 WHERE position = 'Power Forward';
```

Result Grid	Filter Rows:	Export:	Wrap Cell Content:
Player_First_Name	Player_Last_Name	position	Team_Name
LeBron	James	Power Forward	Los Angeles Lakers
Jerami	Grant	Power forward	Portland Trail Blazers
Kazuma	Kyle	Power Forward	Washington Wizards

6. Which player has the highest minutes played and for which team?

```
319 • CREATE VIEW USE_CASE_16 AS
320 SELECT P.Player_First_Name, P.Player_Last_Name, Team_Name, MAX(Minutes_Played)
321 FROM PLAYER_TEAM_BRIDGE PTB
322 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
323 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
324 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID;
```

Result Grid	Filter Rows:	Export:	Wrap Cell Content:
Player_First_Name	Player_Last_Name	Team_Name	MAX(Minutes_Played)
LeBron	James	Los Angeles Lakers	38

7. Which all players are playing at Shooting Guard position for the team with highest srs?

```
328 • CREATE VIEW USE_CASE_17 AS
329 SELECT DISTINCT P.Player_First_Name, P.Player_Last_Name, Team_Name, MAX(SRS)
330 FROM PLAYER_TEAM_BRIDGE PTB
331 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
332 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
333 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
334 WHERE Position = 'Shooting Guard';
335
```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	Team_Name	MAX(SRS)
▶	Kyrie	Irving	Brooklyn Nets	3

8. Which is the youngest player who has played the most games?

```
338 • CREATE VIEW USE_CASE_18 AS
339 SELECT DISTINCT P.Player_First_Name, P.Player_Last_Name, MIN(Age), MAX(Game)
340 FROM PLAYER_TEAM_BRIDGE PTB
341 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
342 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
343 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID;
344
```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	MIN(Age)	MAX(Game)
▶	LeBron	James	24	64

9. Which all teams have srs greater than 3 and who all are playing under them?

```

347 • CREATE VIEW USE_CASE_19 AS
348 SELECT DISTINCT P.Player_First_Name, P.Player_Last_Name, SRS
349 FROM PLAYER_TEAM_BRIDGE PTB
350 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
351 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
352 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
353 WHERE SRS > 3;

```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	SRS
▶	Kazuma	Kyle	111

10. Which players have the highest points from each team?

```

357 • CREATE VIEW USE_CASE_20 AS
358 SELECT DISTINCT P.Player_First_Name, P.Player_Last_Name ,MAX(Points), Team_Name
359 FROM PLAYER_TEAM_BRIDGE PTB
360 JOIN Player P ON P.PLAYER_ID = PTB.PLAYER_ID
361 JOIN Team T ON T.TEAM_ID = PTB.TEAM_ID
362 JOIN Player_Stats PS ON PS.PLAYER_ID = PTB.PLAYER_ID
363 GROUP BY Team_Name;
364

```

Result Grid | Filter Rows:  | Export: | Wrap Cell Content:

	Player_First_Name	Player_Last_Name	MAX(Points)	Team_Name
▶	LeBron	James	30	Los Angeles Lakers
	Jerami	Grant	19	Portland Trail Blazers
	Kyrie	Irving	27	Brooklyn Nets
	Stephen	Curry	26	Golden State Warriors
	James	Capers	25	Miami Heat
	Kazuma	Kyle	27	Washington Wizards