Assignment 3
DataBase Systems

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CS - C

UEFA Champions League

Introduction

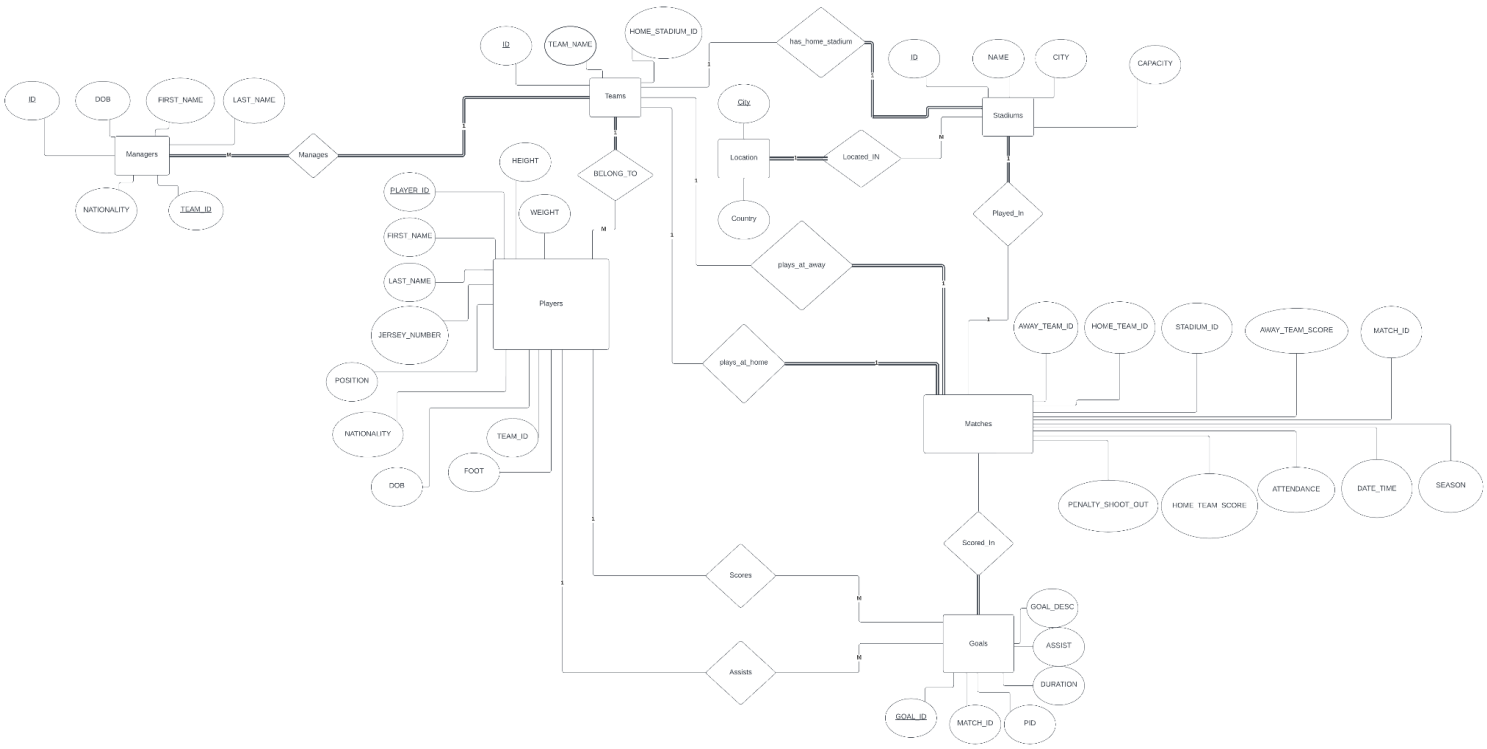
UEFA Champions League (UCL) is one of the biggest football competitions conducted by the Union of European Football Association. Started in 1955, UCL is one of the most viewed and anticipated football tournaments in the world.

This database reflects the data of players, clubs and stadiums which were a part of UEFA Champions League from 2016-2022.

Software Used For Creating Schema: **Lucidchart**

Software used for database creation: **Microsoft SQL Server Management Studio**

ERD Model



Schema and Functional Dependencies:

We have analyzed the given UCL dataset and identified the following entities/tables:

- Team
- Player
- Match
- Stadium
- Goal
- Location
- Manager

Team Table:

The Team table contains information about the club, i.e its stadium etc. It has primary key team id and foreign key home stadium id.

Player Table:

The Player table contains information about the player, such as player_id, player_name, player_position, player_jerseyno. etc. The player_id is the primary key of this table, and player_club_id is the foreign key referencing the team table.

Match Table:

The Match table contains information about the match, such as match_id, match_date, match_time, match_stadium_id, home and away team ids etc. The match_id is the primary key of this table, and match_stadium_id is foreign key from Stadium Table, home and away team ids are foreign keys from the teams table.

Goal Table:

The Goal table contains information about the goals scored in each match, such as goal_id, goal_description, and goal_match_id. The goal_id is the primary key of this table, and goal_match_id is the foreign key referencing the Match table, PID references the player that scored the goal and ASSIST refers to the player who assisted the goal.

Stadium Table:

The stadium table has information about a stadium, its city. Stadium has primary key ID and foreign key city from the Location table.

Manager Table:

The manager table has information about the managers. It has managerID is the primary key and teamID is the foreign key that refers to the team that the manager is managing.

Location Table:

The location table has city as the primary key and country as the foreign key. It can be used to determine the country of a stadium or any other entity.

Normalization

We have analyzed each table's functional dependencies and classified them as full functional or partial functional dependencies except for the redundancy that occurred by using city and country names again and again in teams and stadiums. We tackled this by creating a location table with city as primary key and this allowed us to just refer to the country of a team by knowing its stadium. Based on this analysis, we have identified that after our configuration of the schema, all tables are in the third normal form (3NF). Hence, we do not need to apply any further normalization to remove bad relations.

Queries

Query 1

```
1  -- q1 All players that have played under Julian Nagelsman
2
3  select Players.LAST_NAME as Players_Nagelsmann
4  from Teams
5  inner join Players on Teams.ID=Players.TEAM_ID
6  inner join Managers on Managers.TEAM_ID =Teams.ID
7  where Managers.FIRST_NAME='Julian' and Managers.LAST_NAME='Nagelsmann'
```

89 %

Results | Messages

	Players_Nagelsmann
23	Sané
24	Tel
25	Tapalovic
26	Broich
27	Kerth
28	Martinello
29	Schlösser
30	Wilhelmi
31	Angerer
32	Cuper
33	Luckner
34	Reiter
35	Schwab
36	Stey
37	Niemeyer
38	Pelka

Query 2

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```
--q2 All mathches that have been played in Spain
select Matches.MATCH_ID as Matches_IN_SPAIN,Teams.TEAM_NAME as AWAY_TEAM,Location.CITY
from Matches
inner join Stadiums on Stadiums.ID=Matches.STADIUM_ID
inner join Teams on  Teams.ID =Matches.AWAY_TEAM_ID
inner join Location on Stadiums.CITY =location.CITY
where Location.COUNTRY='Spain'

--q3 All teams that have won more than 3 games
select
```

89 %

Results | Messages

	Matches_IN_SPAIN	AWAY_TEAM	CITY
101	mt691	Borussia Dortmund	Madrid
102	mt707	Olympique Lyon	Sevilla
103	mt711	Dinamo Zagreb	Sevilla
104	mt713	Juventus	Sevilla
105	mt718	SSC Napoli	Madrid
106	mt723	Leicester City	Sevilla
107	mt727	Paris Saint-Germain	Barcelona
108	mt73	RB Salzburg	Sevilla
109	mt731	Bayer Leverkusen	Madrid
110	mt734	Leicester City	Madrid
111	mt737	Bayern München	Madrid
112	mt738	Juventus	Barcelona
113	mt740	Atlético Madrid	Madrid
114	mt743	Real Madrid	Madrid
115	mt80	Lille OSC	Sevilla
116	mt82	VfL Wolfsburg	Sevilla

Query 3

```
--q3 All teams that have won more than 3 games
select Teams.TEAM_NAME as Wins_Greaterthan_3
from Matches
inner join Teams on  Teams.ID =Matches.HOME_TEAM_ID
where HOME_TEAM_SCORE>AWAY_TEAM_SCORE
group by HOME_TEAM_ID,Teams.TEAM_NAME
having count(*)>3
```

89 %

Results | Messages

	Wins_Greaterthan_3
1	AFC Ajax
2	Atlético Madrid
3	Bayern München
4	Borussia Dortmund
5	Chelsea FC
6	FC Barcelona
7	FC Porto
8	Inter
9	Juventus
10	Liverpool FC
11	Manchester City
12	Manchester United
13	Paris Saint-Germain
14	RB Leipzig
15	RB Salzburg
16	Real Madrid
17	Sevilla FC

Query executed successfully.

Query 4

farazQueries.sql -...uhammad Faraz (65))

```
1
2
3  --query 4 teams with foreign managers
4
5
6  select Teams.TEAM_NAME, teams.ID, concat(Managers.FIRST_NAME, ' ' ,Managers.LAST_NAME) AS ManagerName, Managers.NATIONALITY
7  from Teams
8  inner join Stadiums on Teams.HOME_STADIUM_ID=Stadiums.ID
9  inner join Location on Location.CITY=Stadiums.CITY
10 inner join Managers on Managers.TEAM_ID=TEAM_ID
11 where Managers.NATIONALITY!=Location.COUNTRY and Managers.TEAM_ID= teams.ID;
12
13 --query 5 stadiums having capacity greater than 60,000
14
15 select Matches.MATCH_ID, Stadiums.NAME,Stadiums.CAPACITY from
16 Matches
```

100 %

Results | Messages

	TEAM_NAME	ID	ManagerName	NATIONALITY
1	Atlético Madrid	4	Diego Simeone	Argentina
2	Besiktas	6	Valérien Ismaël	France
3	Dinamo Kiev	11	Mircea Lucescu	Romania
4	FC Sheriff	14	Stjepan Tomas	Croatia
5	Lille OSC	17	Paulo Fonseca	Portugal
6	Liverpool FC	18	Jürgen Klopp	Germany
7	Malmö FF	19	Åge Hareide	Norway
8	Manchester City	20	Pep Guardiola	Spain
9	Manchester United	21	Erik ten Hag	Netherlands
10	Real Madrid	25	Carlo Ancelotti	Italy
11	Shakhtar Donetsk	27	Igor Jovicevic	Croatia
12	SL Benfica	28	Roger Schmidt	Germany
13	VfL Wolfsburg	30	Niko Kovac	Croatia
14	FC Midtjylland	34	Albert Capellas	Spain
15	Ferencvárosi TC	35	Stanislav Cherchesov	Russia
16	Lokomotiv Moskva	39	Joe Zinnbauer	Germany
17	Olympiakos Piraeus	40	Carlos Corberán	Spain
18	Olympiakos Piraeus	40	Michel	Spain

Query executed successfully.

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Query 5

```
12
13  --query 5 stadiums having capacity greater than 60,000
14
15  select Matches.MATCH_ID, Stadiums.NAME,Stadiums.CAPACITY from
16  Matches
17  join Stadiums on Matches.STADIUM_ID=Stadiums.ID
18  where Stadiums.CAPACITY>60000
19   order by stadiums.CAPACITY asc;
20
21    --query 9 season with greatest number of left foot goals
22
```

100 %

Results | Messages

	MATCH_ID	NAME	CAPACITY
1	mt299	Diego Maradona	60240
2	mt306	Diego Maradona	60240
3	mt309	Diego Maradona	60240
4	mt352	Diego Maradona	60240
5	mt401	Diego Maradona	60240
6	mt403	Diego Maradona	60240
7	mt397	Diego Maradona	60240
8	mt558	Diego Maradona	60240
9	mt561	Diego Maradona	60240
10	mt563	Diego Maradona	60240
11	mt635	Diego Maradona	60240
12	mt637	Diego Maradona	60240
13	mt641	Diego Maradona	60240
14	mt724	Diego Maradona	60240
15	mt725	Emirates Stadium	60704
16	mt622	Emirates Stadium	60704
17	mt624	Emirates Stadium	60704
18	mt628	Emirates Stadium	60704

Query executed successfully.

Query 6

```
25  --q6 All Goals made without an assist in 2020 by players having height greater than 180cm
26  select Goals.GOAL_ID, Players.LAST_NAME
27  from goals
28  join Players on goals.PID = players.PLAYER_ID
29  join Matches on Goals.MATCH_ID = Matches.MATCH_ID
30  where GOALs.ASSIST is null
31  and Matches.DATE_TIME like '_____20%'
32  and players.HEIGHT>180
```

89 %

Results | Messages

	GOAL_ID	LAST_NAME
31	gl536	Rakitic
32	gl543	Giroud
33	gl549	Rutter
34	gl551	Horvath
35	gl554	Hitz
36	gl564	Haaland
37	gl568	Haaland
38	gl574	Immobile
39	gl575	Ketelaere
40	gl576	Vanaken
41	gl583	Immobile
42	gl585	Morata
43	gl605	Dvali
44	gl621	Ronaldo
45	gl623	Ronaldo
46	gl627	Martial
47	gl663	Konaté

Query 7

```sql
--q7
select home.TEAM_NAME as Teams_150, count(*) as total_matches,SUM(CASE WHEN homeL.COUNTRY = 'Russia'
AND Matches.HOME_TEAM_SCORE > Matches.AWAY_TEAM_SCORE THEN 1 WHEN awayL.COUNTRY = 'Russia' AND
AWAY_TEAM_SCORE > HOME_TEAM_SCORE THEN 1 ELSE 0 END) as total_wins
from Matches
inner join Teams as home on  home.ID =Matches.HOME_TEAM_ID
inner join Teams as away on away.ID =Matches.AWAY_TEAM_SCORE
inner join Stadiums as homeS on home.HOME_STADIUM_ID=homeS.ID
inner join Stadiums as awayS on away.HOME_STADIUM_ID=awayS.ID
inner join Location as homeL on homeS.CITY = homeL.CITY
inner join Location as awayL on awayS.CITY = awayL.CITY
where homeL.COUNTRY='Russia'
group by HOME_TEAM_ID,home.TEAM_NAME
HAVING (ROUND((SUM(CASE WHEN homeL.COUNTRY = 'Russia' AND Matches.HOME_TEAM_SCORE > Matches.AWAY_TEAM_SCORE THEN 1
                        WHEN awayL.COUNTRY = 'Russia' AND AWAY_TEAM_SCORE > HOME_TEAM_SCORE THEN 1
                        ELSE 0 END) / CAST(COUNT(*) AS FLOAT)) * 100, 2) < 50);
```

89 %

Results | Messages

	Teams_l50	total_matches	total_wins
1	Zenit St. Petersburg	7	1
2	FK Krasnodar	2	0
3	Lokomotiv Moskva	8	0
4	CSKA Moskva	7	0
5	Spartak Moskva	3	1
6	FK Rostov	3	1

Query 8

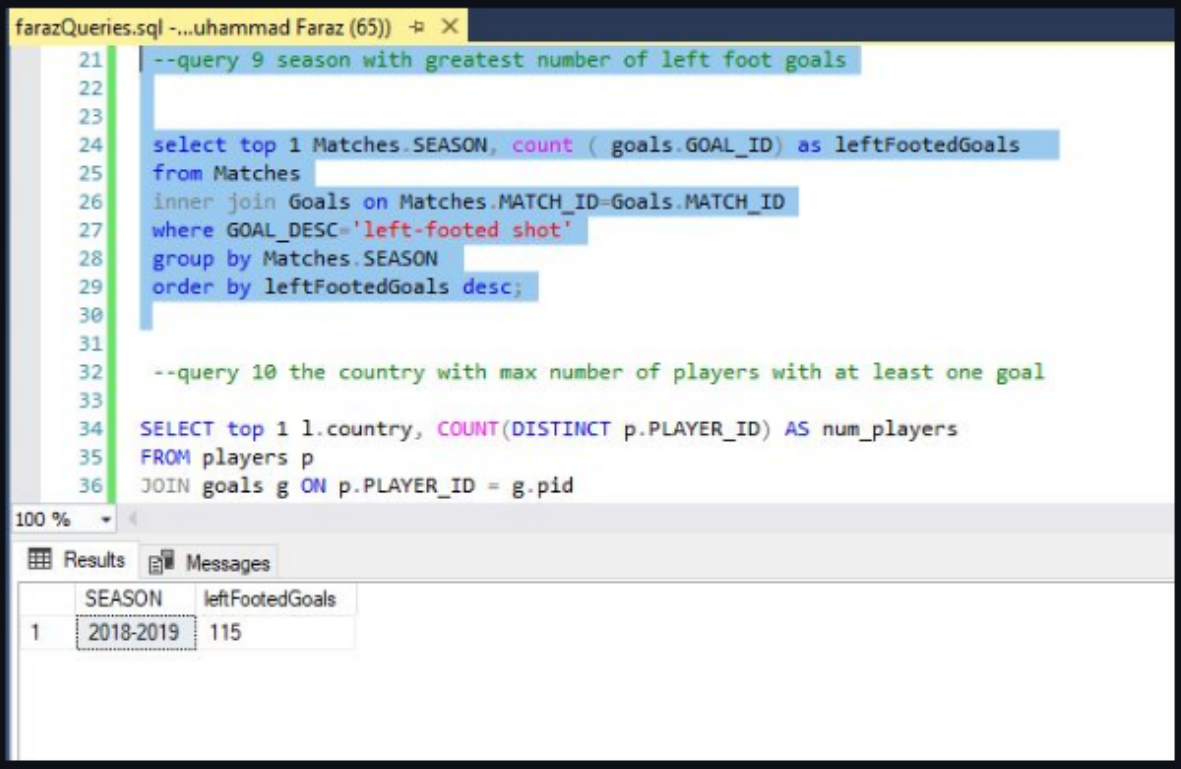
```sql
--q8

select s.NAME as stadium_wrl50, SUM(case when home.ID =Matches.HOME_TEAM_ID and HOME_TEAM_SCORE>AWAY_TEAM_SCORE then 1
    when AWAY_TEAM_ID=Matches.AWAY_TEAM_ID and AWAY_TEAM_SCORE>HOME_TEAM_SCORE then 1
    else 0 END) as total_matches_won
from Matches
join Teams as home on home.ID =HOME_TEAM_ID
join Teams as away on away.ID = AWAY_TEAM_ID
join Stadiums as s on s.ID = home.ID
where s.ID in (select STADIUM_ID from Matches group by STADIUM_ID having count(*)>6)
group by STADIUM_ID,s.NAME
having (round((SUM(case when home.ID =Matches.HOME_TEAM_ID and HOME_TEAM_SCORE>AWAY_TEAM_SCORE then 1
    when AWAY_TEAM_ID=Matches.AWAY_TEAM_ID and AWAY_TEAM_SCORE>HOME_TEAM_SCORE then 1
    else 0 END)/count(*))*100,2)<50);
```

89 %

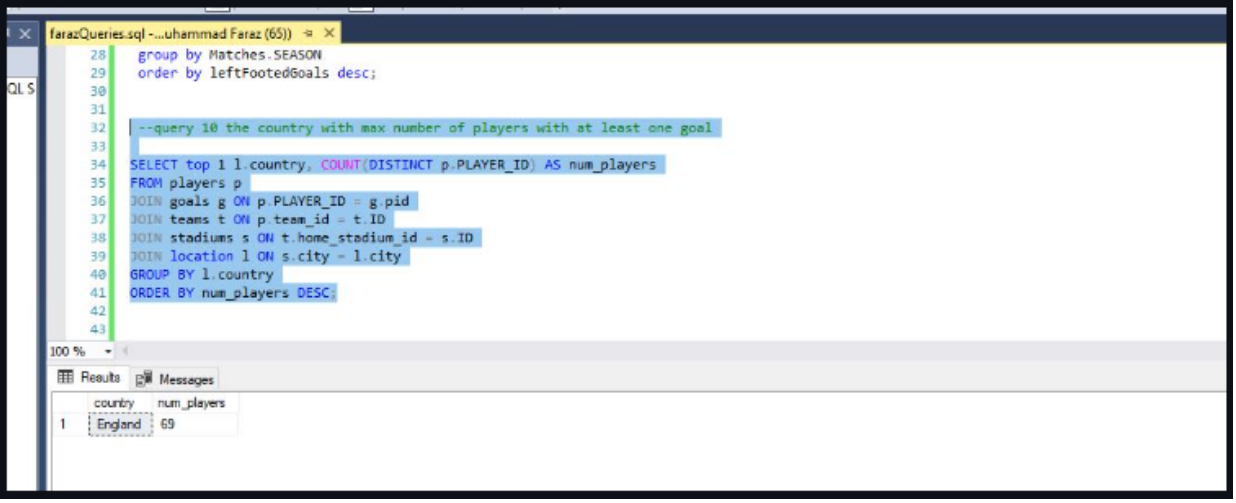
Results | Messages

	stadium_wrl50	total_matches_won
25	Red Bull Arena	22
26	Santiago Bernabéu	10
27	Signal Iduna Park	18
28	Spotify Camp Nou	23
29	St. Jakob-Park	1
30	Stade Louis II	3
31	Stade Pierre Mauroy	24
32	Stamford Bridge	12
33	Vodafone Park	5
34	Wanda Metropolitano	12
35	Wanda Metropolitano	5
36	Wembley Stadium	6

Query 9



Query 10



Query 11

```sql
--q11 stadium having more left footed shots than right footed shots
select Stadiums.NAME, COUNT(case when Goals.GOAL_DESC='left-footed shot' then 1 END) as left_footed_shots, COUNT(case when Goals.GOAL_DESC='right-footed shot' then 1 END) as right_footed_shots
from Stadiums
join Matches on Matches.STADIUM_ID=stadiums.ID
join Goals on Matches.MATCH_ID=Goals.MATCH_ID
Group by Stadiums.NAME
having   COUNT(case when Goals.GOAL_DESC='left-footed shot' then 1 END)>COUNT(case when Goals.GOAL_DESC='right-footed shot' then 1 END)
```

67 %

Results | Messages

	NAME	left_footed_shots	right_footed_shots
1	Gewiss Stadium	10	9
2	Vodafone Park	13	4
3	Wembley Stadium	16	14
4	Arena Na?ionala	1	0
5	Vicente Calderón	4	3
6	VEB Arena	5	4
7	Stadion Wankdorf	9	6
8	Spotify Camp Nou	33	30
9	Sinobo Stadium	4	3
10	Johan Cruijff ArenA	20	12
11	Vélodrome	3	2
12	Fatih Terim Stadi...	5	4
13	Vasil Levski	6	1
14	Volkswagen Arena	4	3
15	Puskás Aréna	6	5
16	Telia Parken	2	0

Query 12

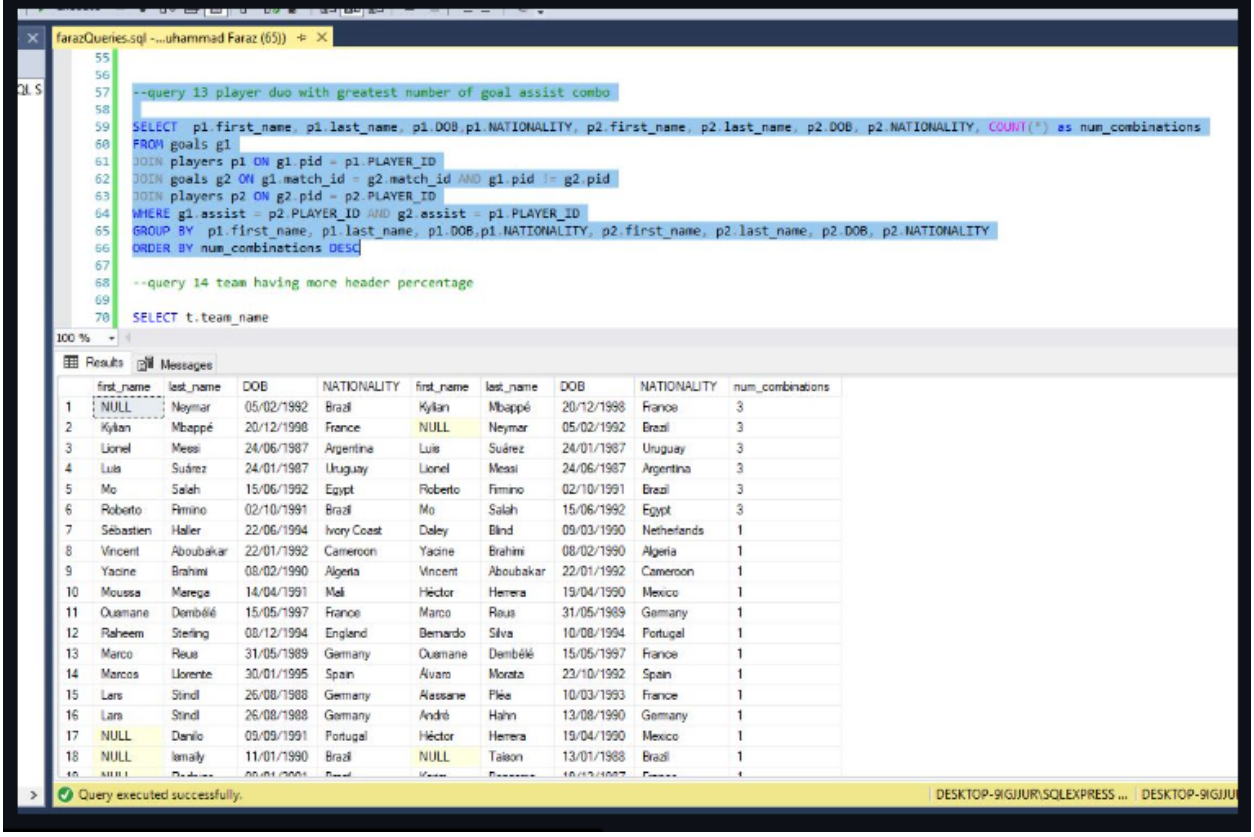
```
select Matches.MATCH_ID, Matches.DATE_TIME,Stadiums.NAME,Location.COUNTRY,SUM(Stadiums.CAPACITY) as total_capacity
from Matches
join Stadiums on Matches.STADIUM_ID=Stadiums.ID
join Location on Stadiums.CITY = Location.CITY
group by Location.COUNTRY,Matches.MATCH_ID,Matches.DATE_TIME,Stadiums.NAME,Stadiums.CAPACITY
having SUM(Stadiums.CAPACITY) =(
    select top 1(Stadiums.CAPACITY)
    from (
        select SUM(Stadiums.CAPACITY) as total_capacity
        from Stadiums
        Join Location on STADIUMS.CITY=Location.CITY
        group by Location.COUNTRY
        ) as commulative_capacity
        order by total_capacity desc
        )
order by Matches.DATE_TIME desc
```

81 %

Results | Messages

	MATCH_ID	DATE_TIME	NAME	COUNTRY	total_capacity
11	mt52	29-SEP-21 08.00.00.000000000 PM	Allianz Arena	Germany	75024
12	mt64	29-SEP-21 08.00.00.000000000 PM	Old Trafford	England	74140
13	mt75	29-SEP-21 08.00.00.000000000 PM	Red Bull Arena	Germany	42558
14	mt76	29-SEP-21 08.00.00.000000000 PM	Volkswagen Arena	Germany	30000
15	mt88	29-SEP-21 08.00.00.000000000 PM	Allianz Stadium	Italy	41254
16	mt87	29-SEP-21 05.45.00.000000000 PM	Gazprom Arena	Russia	68134
17	mt63	29-SEP-21 05.45.00.000000000 PM	Gewiss Stadium	Italy	26562
18	mt250	29-MAY-21 08.00.00.000000000 PM	Estádio do Dragão	Portugal	54378
19	mt28	28-SEP-21 08.00.00.000000000 PM	Signal Iduna Park	Germany	81365
20	mt3	28-SEP-21 08.00.00.000000000 PM	Parc des Princes	France	48712

Query 13

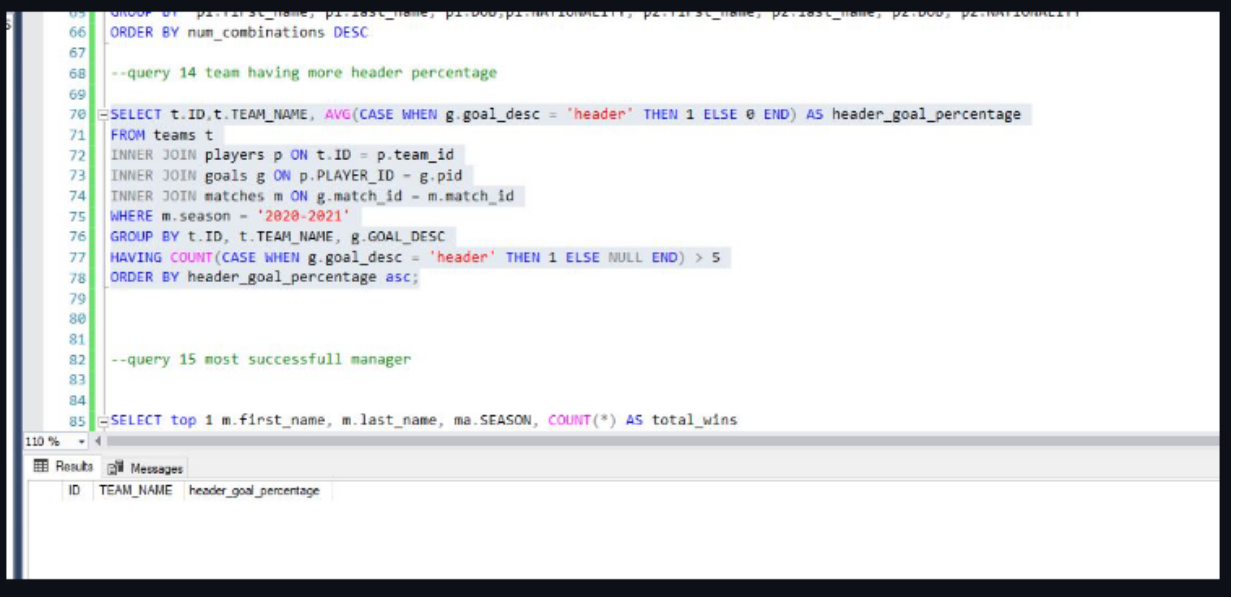


```sql
--query 13 player duo with greatest number of goal assist combo

SELECT  p1.first_name, p1.last_name, p1.DOB,p1.NATIONALITY, p2.first_name, p2.last_name, p2.DOB, p2.NATIONALITY, COUNT(*) as num_combinations
FROM goals g1
JOIN players p1 ON g1.pid = p1.PLAYER_ID
JOIN goals g2 ON g1.match_id = g2.match_id AND g1.pid != g2.pid
JOIN players p2 ON g2.pid = p2.PLAYER_ID
WHERE g1.assist = p2.PLAYER_ID AND g2.assist = p1.PLAYER_ID
GROUP BY  p1.first_name, p1.last_name, p1.DOB,p1.NATIONALITY, p2.first_name, p2.last_name, p2.DOB, p2.NATIONALITY
ORDER BY num_combinations DESC

--query 14 team having more header percentage

SELECT t.team_name
```

	first_name	last_name	DOB	NATIONALITY	first_name	last_name	DOB	NATIONALITY	num_combinations
1	NULL	Neymar	05/02/1992	Brazil	Kylian	Mbappé	20/12/1998	France	3
2	Kylian	Mbappé	20/12/1998	France	NULL	Neymar	05/02/1992	Brazil	3
3	Lionel	Messi	24/06/1987	Argentina	Luis	Suárez	24/01/1987	Uruguay	3
4	Luis	Suárez	24/01/1987	Uruguay	Lionel	Messi	24/06/1987	Argentina	3
5	Mo	Salah	15/06/1992	Egypt	Roberto	Firmino	02/10/1991	Brazil	3
6	Roberto	Firmino	02/10/1991	Brazil	Mo	Salah	15/06/1992	Egypt	3
7	Sébastien	Haller	22/06/1994	Ivory Coast	Daley	Blind	09/03/1990	Netherlands	1
8	Vincent	Aboubakar	22/01/1992	Cameroon	Yacine	Brahimi	08/02/1990	Algeria	1
9	Yacine	Brahimi	08/02/1990	Algeria	Vincent	Aboubakar	22/01/1992	Cameroon	1
10	Moussa	Marega	14/04/1991	Mali	Héctor	Herrera	19/04/1990	Mexico	1
11	Ousmane	Dembélé	15/05/1997	France	Marco	Reus	31/05/1989	Germany	1
12	Raheem	Sterling	08/12/1994	England	Bernardo	Silva	10/08/1994	Portugal	1
13	Marco	Reus	31/05/1989	Germany	Ousmane	Dembélé	15/05/1997	France	1
14	Marcos	Llorente	30/01/1995	Spain	Álvaro	Morata	23/10/1992	Spain	1
15	Lars	Stindl	26/08/1988	Germany	Alassane	Plea	10/03/1993	France	1
16	Lars	Stindl	26/08/1988	Germany	André	Hahn	13/08/1990	Germany	1
17	NULL	Danilo	09/09/1991	Portugal	Héctor	Herrera	19/04/1990	Mexico	1
18	NULL	Ismaily	11/01/1990	Brazil	NULL	Taison	13/01/1988	Brazil	1

Query executed successfully.

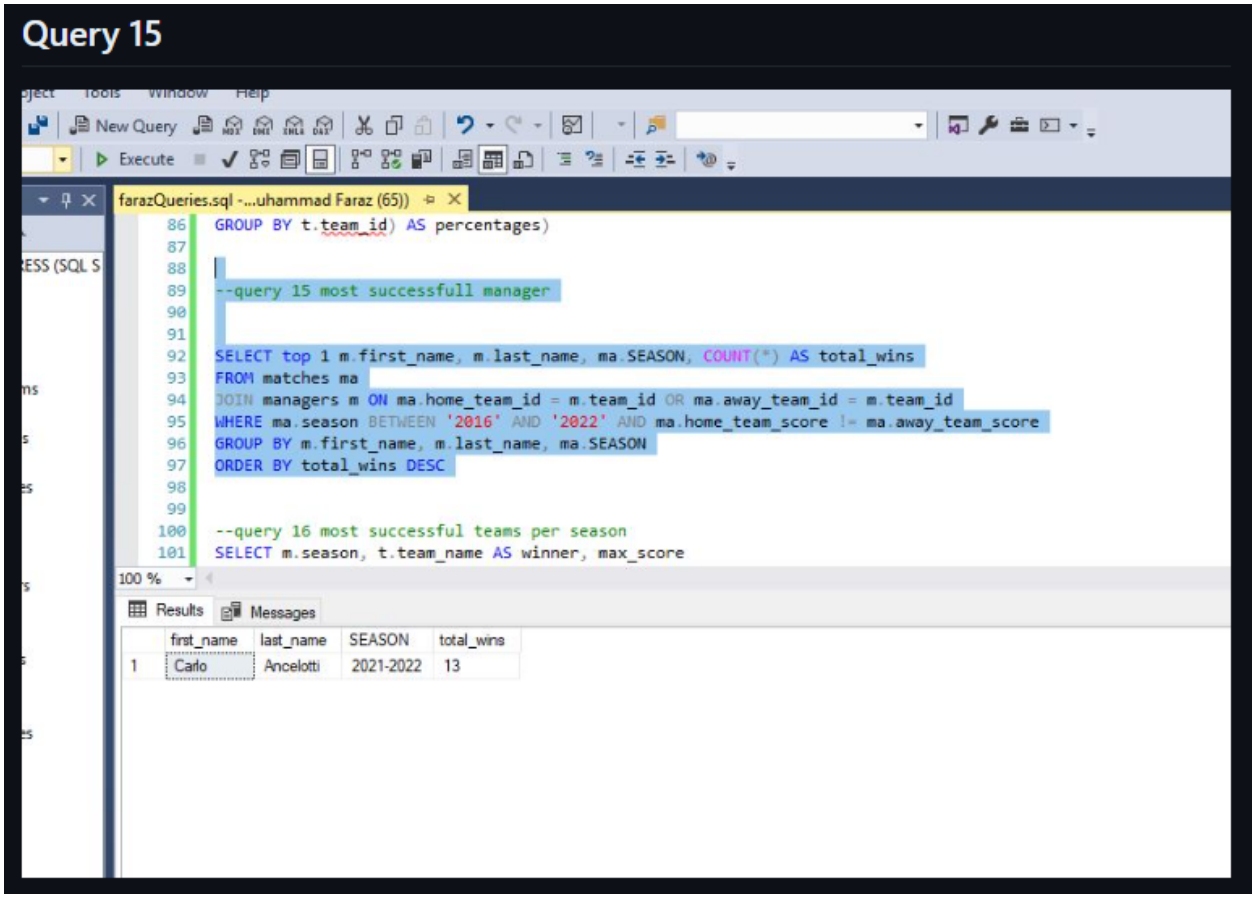
Query 14



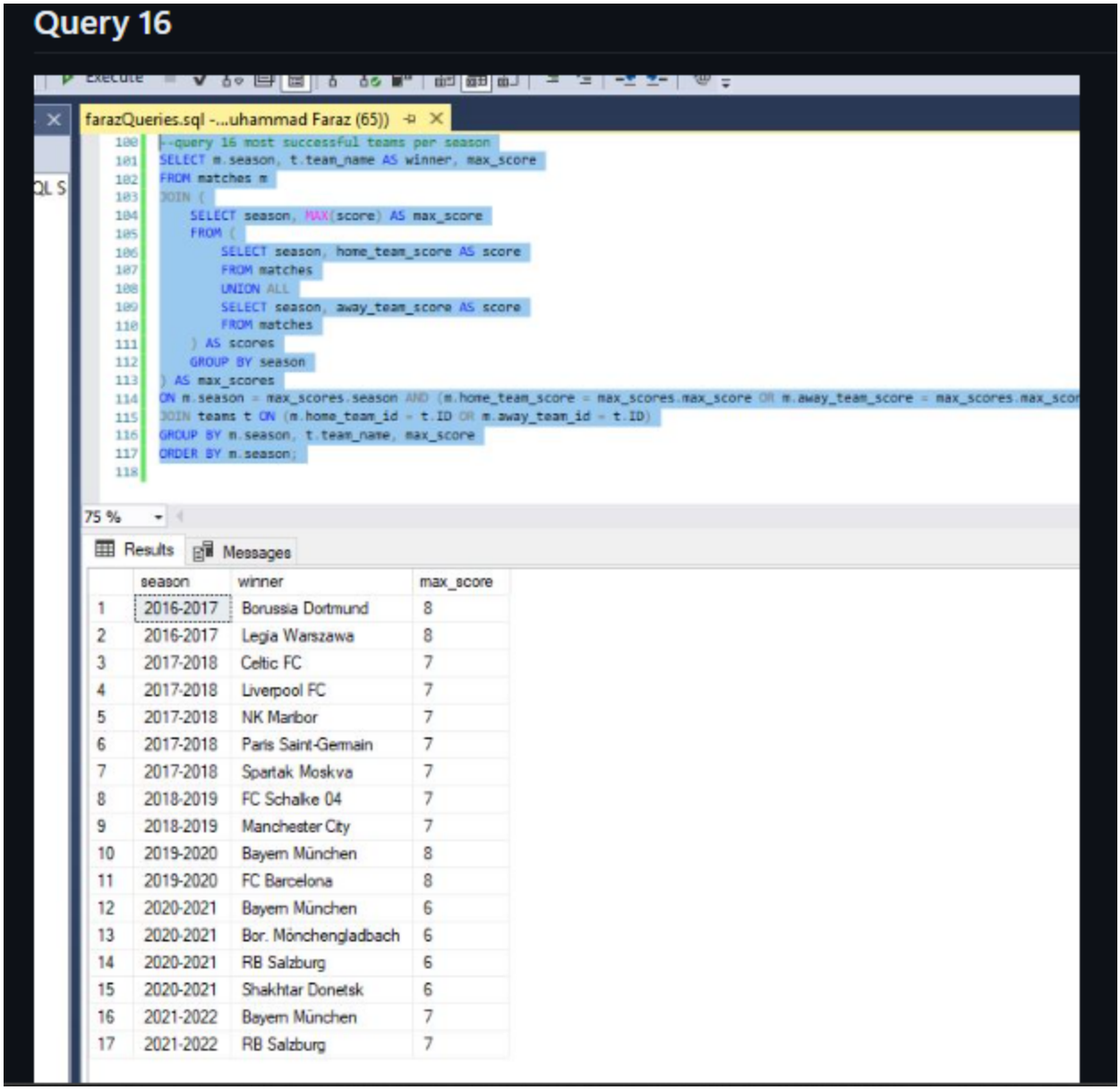
```sql
ORDER BY num_combinations DESC

--query 14 team having more header percentage

SELECT t.ID,t.TEAM_NAME, AVG(CASE WHEN g.goal_desc = 'header' THEN 1 ELSE 0 END) AS header_goal_percentage
FROM teams t
INNER JOIN players p ON t.ID = p.team_id
INNER JOIN goals g ON p.PLAYER_ID = g.pid
INNER JOIN matches m ON g.match_id = m.match_id
WHERE m.season = '2020-2021'
GROUP BY t.ID, t.TEAM_NAME, g.GOAL_DESC
HAVING COUNT(CASE WHEN g.goal_desc = 'header' THEN 1 ELSE NULL END) > 5
ORDER BY header_goal_percentage asc;



--query 15 most successfull manager


SELECT top 1 m.first_name, m.last_name, ma.SEASON, COUNT(*) AS total_wins
```

ID	TEAM_NAME	header_goal_percentage

Query 15


New Query
Execute
farazQueries.sql -...uhammad Faraz (65))
GROUP BY t.team_id) AS percentages)
--query 15 most successfull manager
SELECT top 1 m.first_name, m.last_name, ma.SEASON, COUNT(*) AS total_wins
FROM matches ma
JOIN managers m ON ma.home_team_id = m.team_id OR ma.away_team_id = m.team_id
WHERE ma.season BETWEEN '2016' AND '2022' AND ma.home_team_score != ma.away_team_score
GROUP BY m.first_name, m.last_name, ma.SEASON
ORDER BY total_wins DESC
--query 16 most successful teams per season
SELECT m.season, t.team_name AS winner, max_score
100 %
Results
Messages
first_name
last_name
SEASON
total_wins
1
Carlo
Ancelotti
2021-2022
13

Query 16



farazQueries.sql -...uhammad Faraz (65))

```
--query 16 most successful teams per season
SELECT m.season, t.team_name AS winner, max_score
FROM matches m
JOIN (
    SELECT season, MAX(score) AS max_score
    FROM (
        SELECT season, home_team_score AS score
        FROM matches
        UNION ALL
        SELECT season, away_team_score AS score
        FROM matches
    ) AS scores
    GROUP BY season
) AS max_scores
ON m.season = max_scores.season AND (m.home_team_score = max_scores.max_score OR m.away_team_score = max_scores.max_scor
JOIN teams t ON (m.home_team_id = t.ID OR m.away_team_id = t.ID)
GROUP BY m.season, t.team_name, max_score
ORDER BY m.season;
```

75 %

Results | Messages

	season	winner	max_score
1	2016-2017	Borussia Dortmund	8
2	2016-2017	Legia Warszawa	8
3	2017-2018	Celtic FC	7
4	2017-2018	Liverpool FC	7
5	2017-2018	NK Maribor	7
6	2017-2018	Paris Saint-Germain	7
7	2017-2018	Spartak Moskva	7
8	2018-2019	FC Schalke 04	7
9	2018-2019	Manchester City	7
10	2019-2020	Bayern München	8
11	2019-2020	FC Barcelona	8
12	2020-2021	Bayern München	6
13	2020-2021	Bor. Mönchengladbach	6
14	2020-2021	RB Salzburg	6
15	2020-2021	Shakhtar Donetsk	6
16	2021-2022	Bayern München	7
17	2021-2022	RB Salzburg	7