

UNIVERSIDAD DEL VALLE DE GUATEMALA  
Colegio Universitario



**Proyecto No.01**  
**Desarrollo y consulta de Base de Datos**

José Pablo Kiesling Lange 21581  
Pablo Andrés Zamora Vásquez 21871

Héctor Antonio Hurtarte Estrada  
Base de datos I

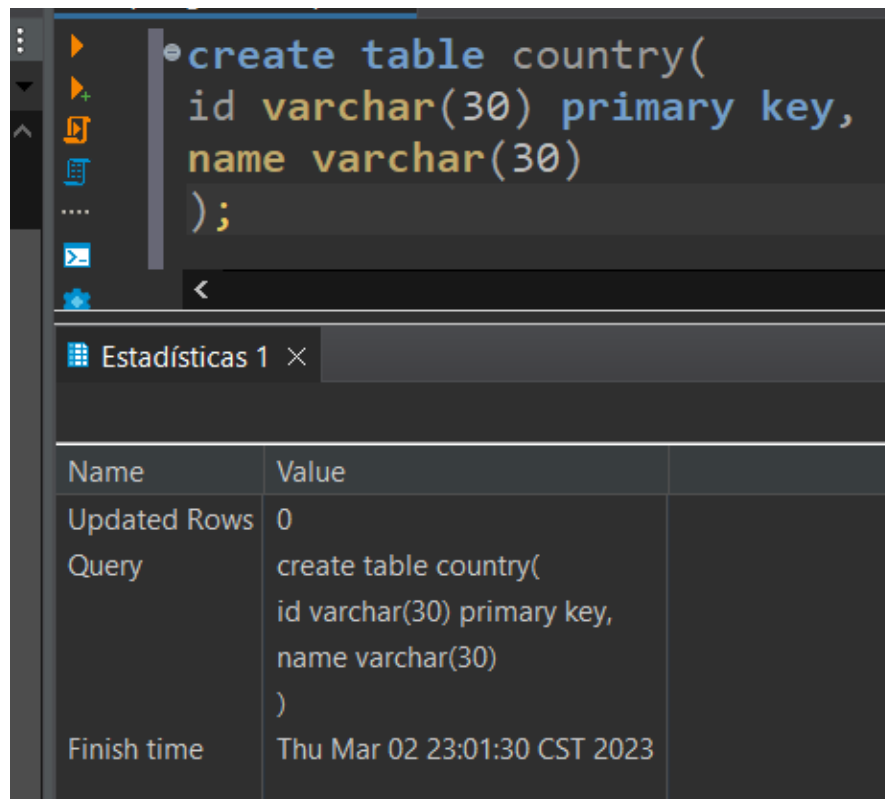
Guatemala 2023

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## Etapa 1

Diseño y construcción de base de datos

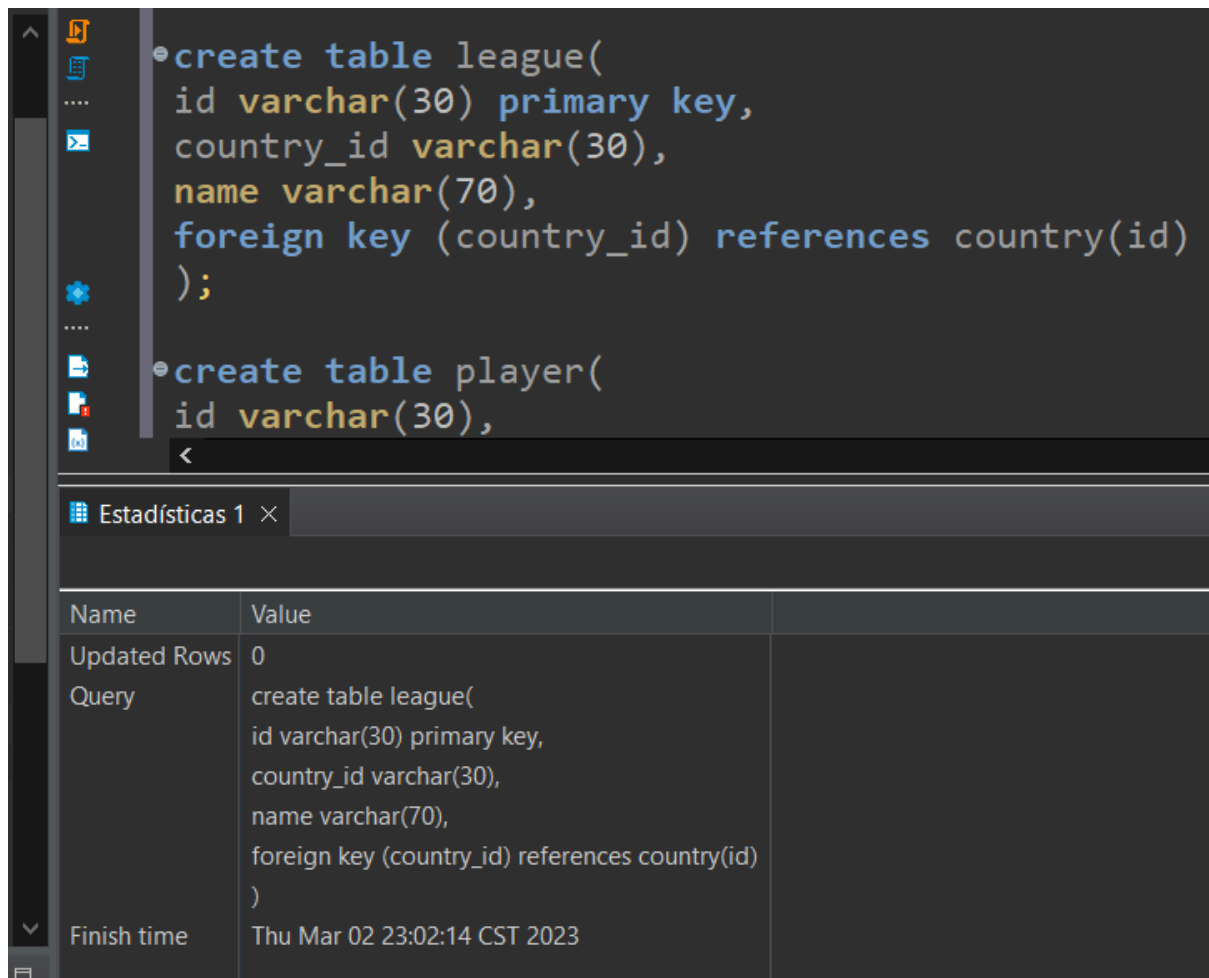


The screenshot displays a database management interface. The top section shows a SQL query in a dark-themed editor:

```
create table country(  
  id varchar(30) primary key,  
  name varchar(30)  
);
```

Below the query editor, a tab labeled "Estadísticas 1" is active, showing a table of execution statistics:

Name	Value
Updated Rows	0
Query	create table country( id varchar(30) primary key, name varchar(30) )
Finish time	Thu Mar 02 23:01:30 CST 2023



The screenshot shows a database IDE with a dark theme. The top pane contains two SQL statements for creating tables. The bottom pane, titled 'Estadísticas 1', displays execution statistics in a table format.

```
create table league(  
  id varchar(30) primary key,  
  country_id varchar(30),  
  name varchar(70),  
  foreign key (country_id) references country(id)  
);  
  
create table player(  
  id varchar(30),
```

Name	Value
Updated Rows	0
Query	create table league( id varchar(30) primary key, country_id varchar(30), name varchar(70), foreign key (country_id) references country(id) )
Finish time	Thu Mar 02 23:02:14 CST 2023

[illegible]

Estadísticas 1 ✕

Name	Value	
Updated Rows	0	
Query	<pre>create table player(   id varchar(30),   player_api_id varchar(30) primary key,   player_name varchar(100),   player_fifa_api_id varchar(30),   birthday timestamp,   height float,   weight integer )</pre>	
Finish time	Thu Mar 02 23:02:34 CST 2023	

create table player\_attributes(  
 id varchar(30) primary key,  
 player\_fifa\_api\_id varchar(30),  
 player\_api\_id varchar(30),  
 foreign key (player\_api\_id) references player(player\_api\_id),  
 date timestamp,  
 overall\_rating integer,  
 potential integer,  
 preferred\_foot varchar(30),  
 attacking\_work\_rate varchar(30),  
 defensive\_work\_rate varchar(30),  
 crossing integer,  
 finishing integer,  
 heading\_accuracy integer,  
 short\_passing integer,  
 volleys integer,  
 dribbling integer,  
 curve integer,

Estadísticas 1 ×

Name	Value
Updated Rows	0
Query	create table player_attributes( id varchar(30) primary key, player_fifa_api_id varchar(30), player_api_id varchar(30), foreign key (player_api_id) references player(player_api_id), date timestamp, overall_rating integer, potential integer, preferred foot varchar(30).

Renovar Save Cancel
 Exportar datos ... 200 1

```
• create table team(  
  id varchar(30),  
  team_api_id varchar(30) primary key,  
  team_fifa_api_id varchar(30),  
  team_long_name varchar(30),  
  team_short_name varchar(30)  
);
```

Estadísticas 1 ×

Name	Value	
Updated Rows	0	
Query	create table team( id varchar(30), team_api_id varchar(30) primary key, team_fifa_api_id varchar(30), team_long_name varchar(30), team_short_name varchar(30) )	
Finish time	Thu Mar 02 23:03:31 CST 2023	

Estadísticas 1

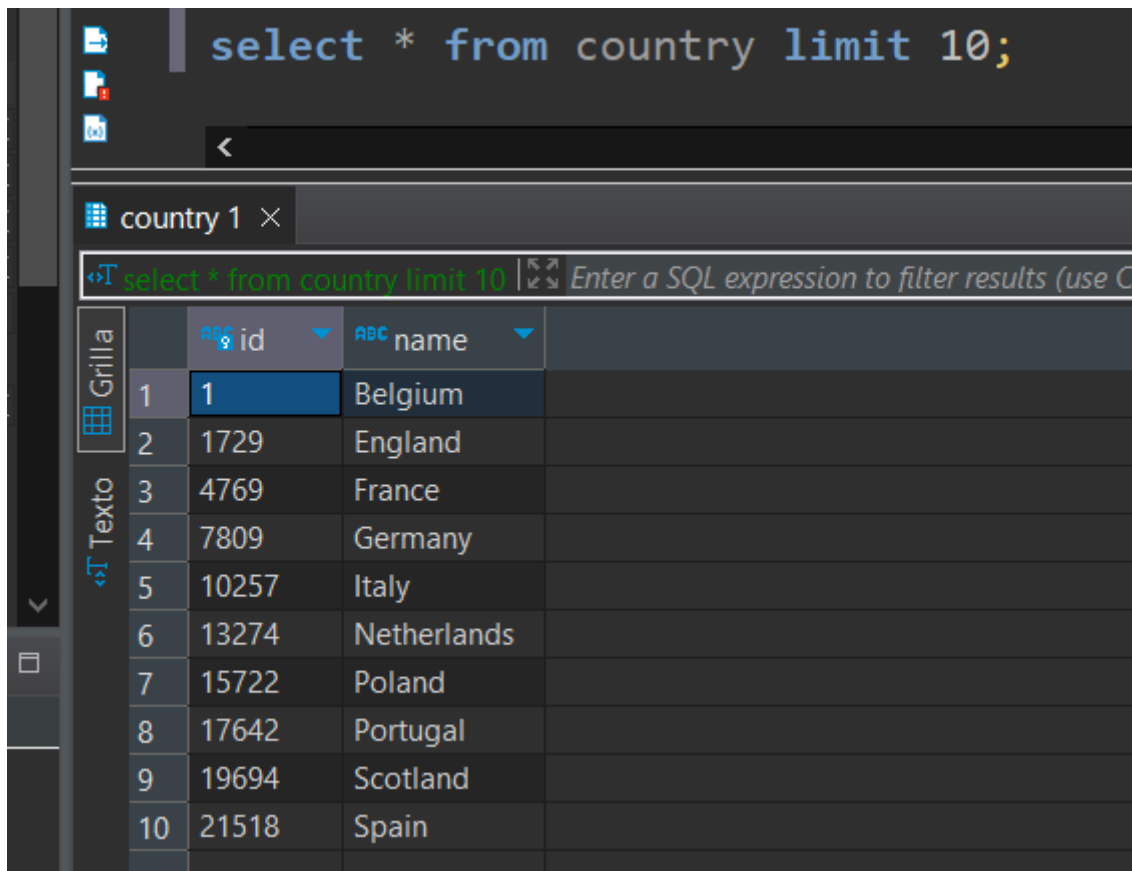
Renovar Save Cancel Exportar datos ... 200







Diseño y construcción de script para procesar archivos CSV y alimentar base de datos



The screenshot shows a database management tool interface. At the top, a SQL query is entered in a text field: `select * from country limit 10;`. Below the query field, there is a tab labeled "country 1" with a close button. Underneath the tab, a filter bar contains the text "select \* from country limit 10" and a placeholder "Enter a SQL expression to filter results (use C". The main area displays a table with 10 rows of data. The table has three columns: "id", "name", and an empty column. The rows are numbered 1 to 10, and the names are Belgium, England, France, Germany, Italy, Netherlands, Poland, Portugal, Scotland, and Spain. On the left side of the table, there is a vertical toolbar with icons for "Grilla" (Table) and "Texto" (Text).

	id	name	
1	1	Belgium	
2	1729	England	
3	4769	France	
4	7809	Germany	
5	10257	Italy	
6	13274	Netherlands	
7	15722	Poland	
8	17642	Portugal	
9	19694	Scotland	
10	21518	Spain	

select \* from league limit 10;

league 1 ×

select \* from league limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	id	country_id	name	
1	1	1	Belgium Jupiler League	
2	1729	1729	England Premier League	
3	4769	4769	France Ligue 1	
4	7809	7809	Germany 1. Bundesliga	
5	10257	10257	Italy Serie A	
6	13274	13274	Netherlands Eredivisie	
7	15722	15722	Poland Ekstraklasa	
8	17642	17642	Portugal Liga ZON Sagres	
9	19694	19694	Scotland Premier League	
10	21518	21518	Spain LIGA BBVA	

select \* from player limit 10;

player 1 ×

select \* from player limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	id	player_api_id	player_name	player_fifa_api_id	birthday	height	weight	
1	1	505942	Aaron Appindangoye	218353	1992-02-29 00:00:00.000	182,88	187	
2	2	155782	Aaron Cresswell	189615	1989-12-15 00:00:00.000	170,18	146	
3	3	162549	Aaron Doran	186170	1991-05-13 00:00:00.000	170,18	163	
4	4	30572	Aaron Galindo	140161	1982-05-08 00:00:00.000	182,88	198	
5	5	23780	Aaron Hughes	17725	1979-11-08 00:00:00.000	182,88	154	
6	6	27316	Aaron Hunt	158138	1986-09-04 00:00:00.000	182,88	161	
7	7	564793	Aaron Kuhl	221280	1996-01-30 00:00:00.000	172,72	146	
8	8	30895	Aaron Lennon	152747	1987-04-16 00:00:00.000	165,1	139	
9	9	528212	Aaron Lennox	206592	1993-02-19 00:00:00.000	190,5	181	
10	10	101042	Aaron Meijers	188621	1987-10-28 00:00:00.000	175,26	170	

select \* from player\_attributes limit 10;

player\_attributes 1 ×

select \* from player\_attributes limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	asc id	asc player_fifa_api_id	asc player_api_id	date	123 overall_rating	123 potential	asc preferred_foot
1	1	218353	505942	2016-02-18 00:00:00.000	67	71	right
2	2	218353	505942	2015-11-19 00:00:00.000	67	71	right
3	3	218353	505942	2015-09-21 00:00:00.000	62	66	right
4	4	218353	505942	2015-03-20 00:00:00.000	61	65	right
5	5	218353	505942	2007-02-22 00:00:00.000	61	65	right
6	6	189615	155782	2016-04-21 00:00:00.000	74	76	left
7	7	189615	155782	2016-04-07 00:00:00.000	74	76	left
8	8	189615	155782	2016-01-07 00:00:00.000	73	75	left
9	9	189615	155782	2015-12-24 00:00:00.000	73	75	left
10	10	189615	155782	2015-12-17 00:00:00.000	73	75	left

select \* from team limit 10;

team 1 ×

select \* from team limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	asc id	asc team_api_id	asc team_fifa_api_id	asc team_long_name	asc team_short_name
1	1	9987	673	KRC Genk	GEN
2	2	9993	675	Beerschot AC	BAC
3	3	10000	15005	SV Zulte-Waregem	ZUL
4	4	9994	2007	Sporting Lokeren	LOK
5	5	9984	1750	KSV Cercle Brugge	CEB
6	6	8635	229	RSC Anderlecht	AND
7	7	9991	674	KAA Gent	GEN
8	8	9998	1747	RAEC Mons	MON
9	9	7947	[NULL]	FCV Dender EH	DEN
10	10	9985	232	Standard de Liège	STL

select \* from team\_attributes limit 10;

team\_attributes 1 ×

select \* from team\_attributes limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	asc id	asc team_fifa_api_id	asc team_api_id	date	123 buildupplayspeed	asc buildupplayspeedclass
1	1	434	9930	2010-02-22 00:00:00.000	60	Balanced
2	2	434	9930	2014-09-19 00:00:00.000	52	Balanced
3	3	434	9930	2015-09-10 00:00:00.000	47	Balanced
4	4	77	8485	2010-02-22 00:00:00.000	70	Fast
5	5	77	8485	2011-02-22 00:00:00.000	47	Balanced
6	6	77	8485	2012-02-22 00:00:00.000	58	Balanced
7	7	77	8485	2013-09-20 00:00:00.000	62	Balanced
8	8	77	8485	2014-09-19 00:00:00.000	58	Balanced
9	9	77	8485	2015-09-10 00:00:00.000	59	Balanced
10	10	614	8576	2010-02-22 00:00:00.000	60	Balanced

select \* from match limit 10;

match 1 ×

select \* from match limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

	asc id	asc country_id	asc league_id	asc season	asc stage	date	asc match_api_id	asc home_team_api_id
1	1	1	1	2008/2009	1	2008-08-17 date: timestamp	473	9987
2	2	1	1	2008/2009	1	2008-08-16 00:00:00.000	492474	10000
3	3	1	1	2008/2009	1	2008-08-16 00:00:00.000	492475	9984
4	4	1	1	2008/2009	1	2008-08-17 00:00:00.000	492476	9991
5	5	1	1	2008/2009	1	2008-08-16 00:00:00.000	492477	7947
6	6	1	1	2008/2009	1	2008-09-24 00:00:00.000	492478	8203
7	7	1	1	2008/2009	1	2008-08-16 00:00:00.000	492479	9999
8	8	1	1	2008/2009	1	2008-08-16 00:00:00.000	492480	4049
9	9	1	1	2008/2009	1	2008-08-16 00:00:00.000	492481	10001
10	10	1	1	2008/2009	10	2008-11-01 00:00:00.000	492564	8342

select \* from foul limit 10;

foul 1 ×

select \* from foul limit 10 | Enter a SQL expression to filter results (use Ctrl+Space)

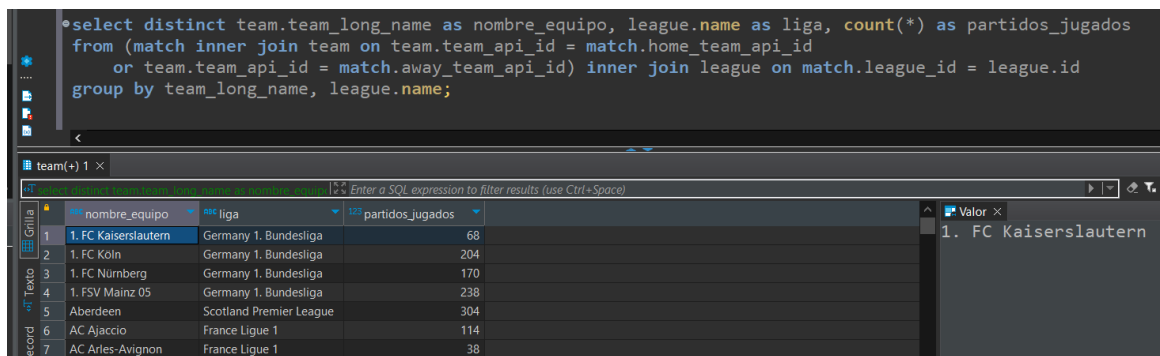
	asc foul_id	asc match_api_id	asc player_responsable_id	asc player_victim_id	asc team_responsable_id
1	378824	489042	25518	32569	10261
2	378826	489042	30929	24157	10261
3	378830	489042	29581	24148	10261
4	378841	489042	30373	40565	10260
5	378894	489042	29581	30829	10261
6	378913	489042	24157	25518	10260
7	378974	489042	24228	30362	10261
8	379035	489042	24157	30360	10260
9	379044	489042	24154	38807	10260
10	379100	489042	34574	32569	10261

## Etapa 2

Diseño de queries iniciales e interacción con base de datos

Según estadísticas

1. La cantidad de juegos jugados en cada temporada por cada equipo, de cada liga (tome en cuenta que cada equipo puede jugar como visitante o como anfitrión).



```
select distinct team.team_long_name as nombre_equipo, league.name as liga, count(*) as partidos_jugados
from (match inner join team on team.team_api_id = match.home_team_api_id
or team.team_api_id = match.away_team_api_id) inner join league on match.league_id = league.id
group by team_long_name, league.name;
```

nombre_equipo	liga	partidos_jugados
1. FC Kaiserslautern	Germany 1. Bundesliga	68
1. FC Köln	Germany 1. Bundesliga	204
1. FC Nürnberg	Germany 1. Bundesliga	170
1. FSV Mainz 05	Germany 1. Bundesliga	238
Aberdeen	Scotland Premier League	304
AC Ajaccio	France Ligue 1	114
AC Arles-Avignon	France Ligue 1	38

2. ¿Quién es el mejor equipo de todas las ligas y de todas las temporadas según las estadísticas?

Parte 1

```
select temporada, liga, equipo,
sum(goles_a_favor) as goles_a_favor,
sum(goles_en_contra) as goles_en_contra,
sum(diferencia_goles) as diferencia_goles
from
(select match.season as temporada,
league.name as liga,
team.team_long_name as equipo,
sum(match.home_team_goal) as goles_a_favor,
sum(match.away_team_goal) as goles_en_contra,
sum(match.home_team_goal - match.away_team_goal) as diferencia_goles
from (match inner join team on team.team_api_id = match.home_team_api_id)
inner join league on match.league_id = league.id
group by team.team_long_name, match.season, league.name
union all
(select match.season as temporada,
league.name as liga,
team.team_long_name as equipo,
sum(match.away_team_goal) as goles_a_favor,
sum(match.home_team_goal) as goles_en_contra,
sum(match.away_team_goal - match.home_team_goal) as diferencia_goles
from (match inner join team on team.team_api_id = match.away_team_api_id)
inner join league on match.league_id = league.id
group by team.team_long_name, match.season, league.name)) foo
group by temporada, liga, equipo;
```

	temporada	liga	equipo	goles_a_favor	goles_en_contra	diferencia_goles
1	2009/2010	France Ligue 1	Toulouse FC	36	36	0
2	2014/2015	Spain LIGA BBV	Córdoba CF	22	68	-46
3	2008/2009	Portugal Liga Z	SC Braga	38	21	17
4	2013/2014	Poland Ekstrakl	Korona Kielce	36	41	-5
5	2012/2013	Italy Serie A	Palermo	34	54	-20
6	2008/2009	England Premie	West Bromwich	36	67	-31
7	2008/2009	Spain LIGA BBV	FC Barcelona	105	35	70
8	2009/2010	Netherlands Ere	Ajax	106	20	86
9	2008/2009	Poland Ekstrakl	Odra Wodzisław	23	40	-17
10	2011/2012	Germany 1. Bur	Bayer 04 Leverk	52	44	8
11	2009/2010	France Ligue 1	Stade Rennais F	52	41	11
12	2013/2014	France Ligue 1	FC Sochaux-Moi	37	61	-24
13	2009/2010	Poland Ekstrakl	Lech Poznań	51	20	31
14	2011/2012	Switzerland Su	Neuchâtel Xam	22	22	0
15	2012/2013	Portugal Liga Z	SL Benfica	77	20	57
16	2011/2012	Spain LIGA BBV	Athletic Club de	49	52	-3
17	2011/2012	Netherlands Ere	FC Groningen	41	61	-20
18	2015/2016	France Ligue 1	Paris Saint-Gern	102	19	83
19	2010/2011	Belgium Jupiler	SV Zulte-Wareg	39	41	-2
20	2015/2016	Germany 1. Bur	Eintracht Frankf	34	52	-18
21	2010/2011	Spain LIGA BBV	Levante UD	41	52	-11
22	2011/2012	Poland Ekstrakl	Śląsk Wrocław	47	31	16

## Parte 2

```

select temporada, liga, equipo,
       sum(goles_a_favor) as goles_a_favor,
       sum(goles_en_contra) as goles_en_contra,
       sum(diferencia_goles) as diferencia_goles_total,
       rank() over (
         order by sum(diferencia_goles) desc) ranking
from
  (select match.season as temporada,
         league.name as liga,
         team.team_long_name as equipo,
         sum(match.home_team_goal) as goles_a_favor,
         sum(match.away_team_goal) as goles_en_contra,
         sum(match.home_team_goal - match.away_team_goal) as diferencia_goles
   from (match inner join team on team.team_api_id = match.home_team_api_id)
        inner join league on match.league_id = league.id
   group by team.team_long_name, match.season, league.name)
union all
  (select match.season as temporada,
         league.name as liga,
         team.team_long_name as equipo,
         sum(match.away_team_goal) as goles_a_favor,
         sum(match.home_team_goal) as goles_en_contra,
         sum(match.away_team_goal - match.home_team_goal) as diferencia_goles
   from (match inner join team on team.team_api_id = match.away_team_api_id)
        inner join league on match.league_id = league.id
   group by team.team_long_name, match.season, league.name)) foo
group by temporada, liga, equipo;

```



	temporada	liga	equipo	goles_a_favor	goles_en_contra	diferencia_goles_total	ranking
1	2014/2015	Spain LIGA BBVA	FC Barcelona	110	21	89	1
2	2011/2012	Spain LIGA BBVA	Real Madrid CF	121	32	89	1
3	2009/2010	Netherlands Eredivisie	Ajax	106	20	86	3
4	2011/2012	Spain LIGA BBVA	FC Barcelona	114	29	85	4
5	2015/2016	France Ligue 1	Paris Saint-Germain	102	19	83	5
6	2015/2016	Spain LIGA BBVA	FC Barcelona	112	29	83	5
7	2014/2015	Spain LIGA BBVA	Real Madrid CF	118	38	80	7
8	2012/2013	Germany 1. Bundesliga	FC Bayern Múnich	98	18	80	7
9	2013/2014	Scotland Premier League	Celtic	102	25	77	9
10	2015/2016	Spain LIGA BBVA	Real Madrid CF	110	34	76	10
11	2012/2013	Spain LIGA BBVA	FC Barcelona	115	40	75	11
12	2009/2010	Spain LIGA BBVA	FC Barcelona	98	24	74	12
13	2010/2011	Spain LIGA BBVA	FC Barcelona	95	21	74	12
14	2013/2014	Germany 1. Bundesliga	FC Bayern Múnich	94	23	71	14
15	2009/2010	England Premier League	Chelsea	103	32	71	14
16	2014/2015	Portugal Liga ZON Sagres	SL Benfica	86	16	70	16
17	2008/2009	Spain LIGA BBVA	FC Barcelona	105	35	70	16

	temporada	liga	equipo	goles_a_favor	goles_en_contra	diferencia_goles_total	ranking
1	2014/2015	Spain LIGA BBVA	FC Barcelona	110	21	89	1

## Según apuestas

- Realice un promedio de las probabilidades de todas las casas de apuesta por temporada, liga y equipo (elimine aquellos equipos que no tienen estadísticas en ninguna casa de apuesta (casas de apuesta como B36, IW, LB, PSH, etc).

```

select team_long_name as equipo,
       season as temporada,
       name as liga,
       avg(promedio_B365) as B365,
       avg(promedio_BW) as BW,
       avg(promedio_IW) as IW,
       avg(promedio_LB) as LB,
       avg(promedio_PS) as PS,
       avg(promedio_WH) as WH,
       avg(promedio_SJ) as SJ,
       avg(promedio_VC) as VC,
       avg(promedio_GB) as GB,
       avg(promedio_BS) as BS
from
  ((select team.team_long_name, match.season, league.name,
    avg(1/B365H) as promedio_B365,
    avg(1/BWH) as promedio_BW,
    avg(1/IWH) as promedio_IW,
    avg(1/LBH) as promedio_LB,
    avg(1/PSH) as promedio_PS,
    avg(1/WHH) as promedio_WH,
    avg(1/SJH) as promedio_SJ,
    avg(1/VCH) as promedio_VC,
    avg(1/GBH) as promedio_GB,
    avg(1/BSH) as promedio_BS
  from (match inner join team on team.team_api_id = match.home_team_api_id)
  inner join league on match.league_id = league.id

```

```

where B365H is not null or
      BWH is not null or
      IWH is not null or
      LBH is not null or
      PSH is not null or
      WHH is not null or
      SJH is not null or
      VCH is not null or
      GBH is not null or
      BSH is not null
group by team.team_long_name, match.season, league.name)
union
(select team.team_long_name, match.season, league.name,
      avg(1/B365A) as promedio_B365,
      avg(1/BWA) as promedio_BW,
      avg(1/IWA) as promedio_IW,
      avg(1/LBA) as promedio_LB,
      avg(1/PSA) as promedio_PS,
      avg(1/WHA) as promedio_WH,
      avg(1/SJA) as promedio_SJ,
      avg(1/VCA) as promedio_VC,
      avg(1/GBA) as promedio_GB,
      avg(1/BSA) as promedio_BS
from (match inner join team on team.team_api_id = match.home_team_api_id)
      inner join league on match.league_id = league.id

```

```

where B365A is not null or
      BWA is not null or
      IWA is not null or
      LBA is not null or
      PSA is not null or
      WHA is not null or
      SJA is not null or
      VCA is not null or
      GBA is not null or
      BSA is not null
      group by team.team_long_name, match.season, league.name)) bet_table
group by team_long_name, season, name;

```

	equipo	temporada	liga	b365	bw	iw	lb	ps	wh
1	1. FC Kaiserslautern	2010/2011	Germany 1. Bundesliga	0,3867182247	0,3951811961	0,4015744928	0,3886308464	[NULL]	0,3855207848
2	1. FC Kaiserslautern	2011/2012	Germany 1. Bundesliga	0,3866272483	0,3882328731	0,4011774075	0,3882132228	[NULL]	0,3847777678
3	1. FC Köln	2008/2009	Germany 1. Bundesliga	0,3852788179	0,3960145443	0,3962156447	0,4077730911	[NULL]	0,4017752987
4	1. FC Köln	2009/2010	Germany 1. Bundesliga	0,3857726496	0,390882995	0,391685458	0,4065927187	[NULL]	0,3998208547
5	1. FC Köln	2010/2011	Germany 1. Bundesliga	0,3863180281	0,3938333716	0,399987471	0,3886679706	[NULL]	0,3854985168
6	1. FC Köln	2011/2012	Germany 1. Bundesliga	0,3886728727	0,3890721978	0,4019991861	0,3908725346	[NULL]	0,387413746
7	1. FC Köln	2014/2015	Germany 1. Bundesliga	0,3854220678	0,3863004965	0,3918335174	0,3863494355	704274312	0,3807318902
8	1. FC Köln	2015/2016	Germany 1. Bundesliga	0,3863101271	0,3923244639	0,3954249518	0,3884280393	741419412	0,3839031772
9	1. FC Nürnberg	2009/2010	Germany 1. Bundesliga	0,3890262561	0,3941024997	0,3948127458	0,4127560445	[NULL]	0,4034181693
10	1. FC Nürnberg	2010/2011	Germany 1. Bundesliga	0,3885737027	0,3943396197	0,4013385056	0,3892050333	[NULL]	0,3895484485
11	1. FC Nürnberg	2011/2012	Germany 1. Bundesliga	0,3876462495	0,3907172709	0,4001434501	0,3887027702	[NULL]	0,3859515739
12	1. FC Nürnberg	2012/2013	Germany 1. Bundesliga	0,3879231947	0,3909400805	0,3961288515	0,3909645243	730496582	0,3842677075
13	1. FC Nürnberg	2013/2014	Germany 1. Bundesliga	0,393216696	0,3974073343	0,3968431941	0,3934914872	771231099	0,3873736019
14	1. FSV Mainz 05	2009/2010	Germany 1. Bundesliga	0,3848566363	0,3898493637	0,3912248592	0,4085771857	[NULL]	0,399586301
15	1. FSV Mainz 05	2010/2011	Germany 1. Bundesliga	0,3891463166	0,3934347863	0,4004627007	0,391638827	[NULL]	0,3895042863

4. ¿Quién es el mejor equipo de todas las ligas y de todas las temporadas según las apuestas?

```
*select equipo,
        temporada,
        liga,
        (B365 + BW + IW + LB + PS + WH + SJ + VC + GB+ BS)/10 as promedio_apuestas,
        rank() over (
            order by (B365 + BW + IW + LB + PS + WH + SJ + VC + GB+ BS)/10 desc) ranking
from
    (select team_long_name as equipo,
        season as temporada,
        name as liga,
        coalesce(avg(promedio_B365),0) as B365,
        coalesce(avg(promedio_BW),0) as BW,
        coalesce(avg(promedio_IW),0) as IW,
        coalesce(avg(promedio_LB),0) as LB,
        coalesce(avg(promedio_PS),0) as PS,
        coalesce(avg(promedio_WH),0) as WH,
        coalesce(avg(promedio_SJ),0) as SJ,
        coalesce(avg(promedio_VC),0) as VC,
        coalesce(avg(promedio_GB),0) as GB,
        coalesce(avg(promedio_BS),0) as BS
    from
        ((select team.team_long_name, match.season, league.name,
            avg(1/B365H) as promedio_B365,
            avg(1/BWH) as promedio_BW,
            avg(1/IWH) as promedio_IW,
            avg(1/LBH) as promedio_LB,
            avg(1/PSH) as promedio_PS,
            avg(1/WHH) as promedio_WH,
            avg(1/SJH) as promedio_SJ,
            avg(1/VCH) as promedio_VC,
            avg(1/GBH) as promedio_GB,
            avg(1/BSH) as promedio_BS
```

```

from (match inner join team on team.team_api_id = match.home_team_api_id)
      inner join league on match.league_id = league.id
where B365H is not null or
      BWH is not null or
      IWH is not null or
      LBH is not null or
      PSH is not null or
      WHH is not null or
      SJH is not null or
      VCH is not null or
      GBH is not null or
      BSH is not null
group by team.team_long_name, match.season, league.name)
union
(select team.team_long_name, match.season, league.name,
      avg(1/B365A) as promedio_B365,
      avg(1/BWA) as promedio_BW,
      avg(1/IWA) as promedio_IW,
      avg(1/LBA) as promedio_LB,
      avg(1/PSA) as promedio_PS,
      avg(1/WHA) as promedio_WH,
      avg(1/SJA) as promedio_SJ,
      avg(1/VCA) as promedio_VC,
      avg(1/GBA) as promedio_GB,
      avg(1/BSA) as promedio_BS
from (match inner join team on team.team_api_id = match.home_team_api_id)
      inner join league on match.league_id = league.id

```

```

      where B365A is not null or
            BWA is not null or
            IWA is not null or
            LBA is not null or
            PSA is not null or
            WHA is not null or
            SJA is not null or
            VCA is not null or
            GBA is not null or
            BSA is not null
      group by team.team_long_name, match.season, league.name)) bet_table
group by team_long_name, season, name) avg_bet_table
group by equipo, temporada, liga, B365, BW, IW, LB, PS, WH, SJ, VC, GB, BS;

```

	equipo	temporada	liga	123 promedio_apuestas	123 ranking
1	FC Barcelona	2012/2013	Spain LIGA BBVA	0,4621723444	1
2	Real Madrid CF	2012/2013	Spain LIGA BBVA	0,4554125227	2
3	PSV	2012/2013	Netherlands Eredivisie	0,4520193317	3
4	FC Bayern Munich	2012/2013	Germany 1. Bundesliga	0,4516918315	4
5	FC Porto	2012/2013	Portugal Liga ZON Sagres	0,450510357	5
6	Ajax	2012/2013	Netherlands Eredivisie	0,4483050417	6
7	SL Benfica	2012/2013	Portugal Liga ZON Sagres	0,4467950192	7
8	Celtic	2012/2013	Scotland Premier League	0,4439711315	8
9	RSC Anderlecht	2012/2013	Belgium Jupiler League	0,436654641	9
10	Borussia Dortmund	2012/2013	Germany 1. Bundesliga	0,4301034646	10
11	FC Twente	2012/2013	Netherlands Eredivisie	0,4283167726	11
12	Paris Saint-Germain	2012/2013	France Ligue 1	0,4282817474	12
13	Manchester United	2012/2013	England Premier League	0,426606995	13
14	Feyenoord	2012/2013	Netherlands Eredivisie	0,4265448854	14
15	Manchester City	2012/2013	England Premier League	0,4262414081	15

	equipo	temporada	liga	123 promedio_apuestas	123 ranking
1	FC Barcelona	2012/2013	Spain LIGA BBVA	0,4621723444	1

## Otros

- ¿Quiénes son los jugadores de cada liga y cada temporada que tienen los mejores atributos – características de juego? ¿De acuerdo a este inciso y comparándolo con el inciso 2 y 4 anteriores, alguno de los jugadores más valiosos se encuentra dentro del mejor equipo?

```

select
    match.season,
    player.player_api_id as id_jugador,
    player.player_name as nombre_jugador,
    league.name as liga,
    team.team_long_name as equipo,
    avg(overall_rating) as calificacion_global
from (match inner join player on player.player_api_id = match.home_player_1
      or player.player_api_id = match.home_player_2
      or player.player_api_id = match.home_player_3
      or player.player_api_id = match.home_player_4
      or player.player_api_id = match.home_player_5
      or player.player_api_id = match.home_player_6
      or player.player_api_id = match.home_player_7
      or player.player_api_id = match.home_player_8
      or player.player_api_id = match.home_player_9
      or player.player_api_id = match.home_player_10
      or player.player_api_id = match.home_player_11
      or player.player_api_id = match.away_player_1
      or player.player_api_id = match.away_player_2
      or player.player_api_id = match.away_player_3
      or player.player_api_id = match.away_player_4
      or player.player_api_id = match.away_player_5
      or player.player_api_id = match.away_player_6)

```

```

or player.player_api_id = match.away_player_7
or player.player_api_id = match.away_player_8
or player.player_api_id = match.away_player_9
or player.player_api_id = match.away_player_10
or player.player_api_id = match.away_player_11)
    inner join league on match.league_id = league.id
    inner join player_attributes on player_attributes.player_api_id = player.player_api_id
    and extract(year from match."date") = extract(year from player_attributes.date)
    inner join team on team.team_api_id = match.home_team_api_id and (
        player.player_api_id = match.home_player_1
        or player.player_api_id = match.home_player_2
        or player.player_api_id = match.home_player_3
        or player.player_api_id = match.home_player_4
        or player.player_api_id = match.home_player_5
        or player.player_api_id = match.home_player_6
        or player.player_api_id = match.home_player_7
        or player.player_api_id = match.home_player_8
        or player.player_api_id = match.home_player_9
        or player.player_api_id = match.home_player_10
        or player.player_api_id = match.home_player_11
    )
)
or
    team.team_api_id = match.away_team_api_id and (
        player.player_api_id = match.away_player_1
        or player.player_api_id = match.away_player_2
        or player.player_api_id = match.away_player_3
        or player.player_api_id = match.away_player_4
        or player.player_api_id = match.away_player_5
        or player.player_api_id = match.away_player_6
        or player.player_api_id = match.away_player_7
        or player.player_api_id = match.away_player_8
        or player.player_api_id = match.away_player_9
        or player.player_api_id = match.away_player_10
        or player.player_api_id = match.away_player_11
    )
)
group by player.player_api_id, player.player_name, match.season, league.name, team.team_long_name
order by avg(overall_rating) desc;

```

	season	id_jugador	nombre_jugador	liga	equipo	calificacion_global
1	2012/2013	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	94
2	2013/2014	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	93,6448598131
3	2015/2016	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	93,4285714286
4	2014/2015	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	93,4051282051
5	2011/2012	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	93,1666666667
6	2015/2016	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	92,6
7	2014/2015	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	92,3913043478
8	2012/2013	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	92
9	2013/2014	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	92
10	2011/2012	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	91,3918918919
11	2010/2011	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	91,0967741935
12	2008/2009	30657	Iker Casillas	Spain LIGA BBVA	Real Madrid CF	90,6333333333
13	2012/2013	39854	Xavi Hernandez	Spain LIGA BBVA	FC Barcelona	90,0588235294
14	2015/2016	27299	Manuel Neuer	Germany 1. Bundesliga	FC Bayern Munich	90
15	2009/2010	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	90
16	2008/2009	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	90
17	2011/2012	30955	Andres Iniesta	Spain LIGA BBVA	FC Barcelona	90
18	2011/2012	39854	Xavi Hernandez	Spain LIGA BBVA	FC Barcelona	89,9615384615
19	2008/2009	30893	Cristiano Ronaldo	England Premier League	Manchester United	89,9375
20	2009/2010	30657	Iker Casillas	Spain LIGA BBVA	Real Madrid CF	89,8947368421
21	2012/2013	30924	Franck Ribery	Germany 1. Bundesliga	FC Bayern Munich	89,8888888889
22	2013/2014	22543	Radamel Falcao	France Ligue 1	AS Monaco	89,8709677419
23	2012/2013	30955	Andres Iniesta	Spain LIGA BBVA	FC Barcelona	89,847826087
24	2013/2014	30924	Franck Ribery	Germany 1. Bundesliga	FC Bayern Munich	89,8
25	2015/2016	30834	Arjen Robben	Germany 1. Bundesliga	FC Bayern Munich	89,75
26	2010/2011	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	89,75
27	2013/2014	30955	Andres Iniesta	Spain LIGA BBVA	FC Barcelona	89,4615384615
28	2014/2015	35724	Zlatan Ibrahimovic	France Ligue 1	Paris Saint-Germain	89,4545454545
29	2013/2014	35724	Zlatan Ibrahimovic	France Ligue 1	Paris Saint-Germain	89,3818181818

Según las respuestas 2 y 4, el mejor equipo es el FC Barcelona. Como se puede observar, Lionel Messi es el mejor jugador y se encuentra en dicho equipo. Él posee las mejores calificaciones de los primeros 5 puestos, lo cual tiene sentido, ya que él ganó por 4 años seguidos el *Balón de Oro*, y el año en el que obtuvo la mayor calificación es donde anotó 91 goles. Asimismo, Xavi Hernández y Andrés Iniesta también aparecen entre los 30 mejores en las temporadas en las que pertenecían al FC Barcelona.

#### 6. Muestre el top 10 de los jugadores más veloces de las ligas europeas en todas las temporadas

```

select
    id_jugador,
    nombre_jugador,
    avg(sprint_speed) as velocidad_general
from
    (select player.player_api_id as id_jugador,
        player.player_name as nombre_jugador,
        match.season as temporada,
        sprint_speed
    from (match inner join player on player.player_api_id = match.home_player_1
        or player.player_api_id = match.home_player_2
        or player.player_api_id = match.home_player_3
        or player.player_api_id = match.home_player_4
        or player.player_api_id = match.home_player_5
        or player.player_api_id = match.home_player_6
        or player.player_api_id = match.home_player_7
        or player.player_api_id = match.home_player_8
        or player.player_api_id = match.home_player_9
        or player.player_api_id = match.home_player_10
        or player.player_api_id = match.home_player_11
        or player.player_api_id = match.away_player_1
        or player.player_api_id = match.away_player_2
        or player.player_api_id = match.away_player_3
        or player.player_api_id = match.away_player_4
        or player.player_api_id = match.away_player_5
        or player.player_api_id = match.away_player_6
        or player.player_api_id = match.away_player_7
        or player.player_api_id = match.away_player_8
        or player.player_api_id = match.away_player_9
        or player.player_api_id = match.away_player_10
        or player.player_api_id = match.away_player_11)
        inner join player_attributes on player.player_api_id = player_attributes.player_api_id
        and extract(year from match."date") = extract(year from player_attributes.date))
    group by player.player_api_id, player.player_name, match.season, sprint_speed) foo
group by nombre_jugador, id_jugador
order by velocidad_general desc
limit 10;

```



	ABC id_jugador	ABC nombre_jugador	123 velocidad_general
1	120428	Mathis Bolly	96
2	38243	David Odonkor	95,5
3	31013	Theo Walcott	94,9230769231
4	346379	Mauricio Cuero	94
5	40686	Jonathan Biabiany	93,5
6	30893	Cristiano Ronaldo	93,5
7	172644	Victor Ibarbo	93,1818181818
8	432040	DeAndre Yedlin	93
9	212715	David Amoo	93
10	245422	Ryo Miyaichi	93

7. ¿Cuáles son las características/atributos de los equipos que han sido los líderes de sus ligas en las distintas temporadas? ¿Sus comportamientos son similares?

```

select temporada,
       liga,
       equipo_id,
       equipo,
       diferencia_goles_total,
       ranking,
       avg(coalesce(buildupplayspeed,0)) as velocidad_creacion,
       avg(coalesce(buildupplaydribbling,0)) as velocidad_driblaje,
       avg(coalesce(buildupplaypassing,0)) as velocidad_pases,
       avg(coalesce(chancecreationpassing,0)) as creacion_pases,
       avg(coalesce(chancecreationcrossing,0)) as creacion_centros,
       avg(coalesce(chancecreationshooting,0)) as creacion_tiros,
       avg(coalesce(defencepressure,0)) as presion_defensa,
       avg(coalesce(defenceaggression,0)) as agresividad_defensa,
       avg(coalesce(defenceteamwidth,0)) as alcance_defensa
from
  (select temporada, liga, equipo_id, equipo,
         sum(goles_a_favor) as goles_a_favor,
         sum(goles_en_contra) as goles_en_contra,
         sum(diferencia_goles) as diferencia_goles_total,
         rank() over(partition by temporada, liga order by sum(diferencia_goles) desc) as ranking
  )

```

```

from ((select match.season as temporada,
             league.name as liga,
             team.team_api_id as equipo_id,
             team.team_long_name as equipo,
             match.home_team_goal as goles_a_favor,
             match.away_team_goal as goles_en_contra,
             (match.home_team_goal - match.away_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.home_team_api_id)
        inner join league on match.league_id = league.id)
 union all
 (select match.season as temporada,
         league.name as liga,
         team.team_api_id as equipo_id,
         team.team_long_name as equipo,
         match.away_team_goal as goles_a_favor,
         match.home_team_goal as goles_en_contra,
         (match.away_team_goal - match.home_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.away_team_api_id)
        inner join league on match.league_id = league.id)) foo1
group by temporada, liga, equipo_id, equipo) foo2 inner join team_attributes ta on foo2.equipo_id = ta.team_api_id
where ranking = 1
group by temporada, liga, equipo_id, equipo, diferencia_goles_total, ranking;

```



	temporada	liga	equipo_id	equipo	diferencia_goles_total	ranking	velocidad_creacion	velocidad_driblaje	velocidad_pases	creacion_pases
1	2008/2009	Belgium Jupiler League	8635	RSC Anderlecht	45	1	51.3333333333	15.3333333333	45.1666666667	
2	2008/2009	England Premier League	8650	Liverpool	50	1	57.6666666667	18	44.3333333333	41.33333333
3	2008/2009	France Ligue 1	8592	Olympique de Marseille	32	1	53	23.1666666667	45.1666666667	55.16666666
4	2008/2009	Germany 1. Bundesliga	8721	VfL Wolfsburg	39	1	61.3333333333	18.6666666667	51.3333333333	
5	2008/2009	Italy Serie A	8636	Inter	38	1	57.8333333333	19.5	57.1666666667	
6	2008/2009	Netherlands Eredivisie	10229	AZ	44	1	51.6666666667	14	42.6666666667	54.33333333
7	2008/2009	Poland Ekstraklasa	8673	Legia Warszawa	35	1	57.1666666667	16.3333333333	42	
8	2008/2009	Portugal Liga ZON Sagres	9773	FC Porto	43	1	51	16.6666666667	48.6666666667	55.66666666
9	2008/2009	Scotland Premier League	8548	Rangers	49	1	51	17	45.5	
10	2008/2009	Spain LIGA BBVA	8634	FC Barcelona	70	1	35.8333333333	11.6666666667	34	45.16666666
11	2008/2009	Switzerland Super League	10243	FC Zürich	44	1	56.8333333333	16.3333333333	50	
12	2009/2010	Belgium Jupiler League	8635	RSC Anderlecht	42	1	51.3333333333	15.3333333333	45.1666666667	
13	2009/2010	England Premier League	8455	Chelsea	71	1	61.6666666667	15.5	45	49.83333333
14	2009/2010	France Ligue 1	8592	Olympique de Marseille	33	1	53	23.1666666667	45.1666666667	55.16666666
15	2009/2010	Germany 1. Bundesliga	9823	FC Bayern Munich	41	1	48.6666666667	9.6666666667	35.1666666667	
16	2009/2010	Italy Serie A	8636	Inter	41	1	57.8333333333	19.5	57.1666666667	
17	2009/2010	Netherlands Eredivisie	8593	Ajax	86	1	35.1666666667	13.8333333333	33.8333333333	50.66666666
18	2009/2010	Poland Ekstraklasa	2182	Lech Poznań	31	1	60.3333333333	17.5	49	56.66666666

Para determinar los equipos líderes, se tomó en cuenta la diferencia de goles encontrada en el inciso 2. Usando técnicas estadísticas, se puede determinar el rango de los equipos encontrados como líderes. Como se puede apreciar en la *Figura 1*, las características defensivas de los equipos líderes están en un rango entre [45-62.5]. En cuanto a las características de creación de los equipos, estas tienen un rango más extenso, comprendido entre [42.5-65]. Por último, las características de velocidad cuentan una mayor varianza entre los datos, ya que su rango [25-52.5] es el más extenso de las tres categorías. Por lo tanto, podría afirmarse que los equipos líderes cuentan con características defensivas y de creación bastantes similares; sin embargo, varían bastante en cuanto a sus características de velocidad.

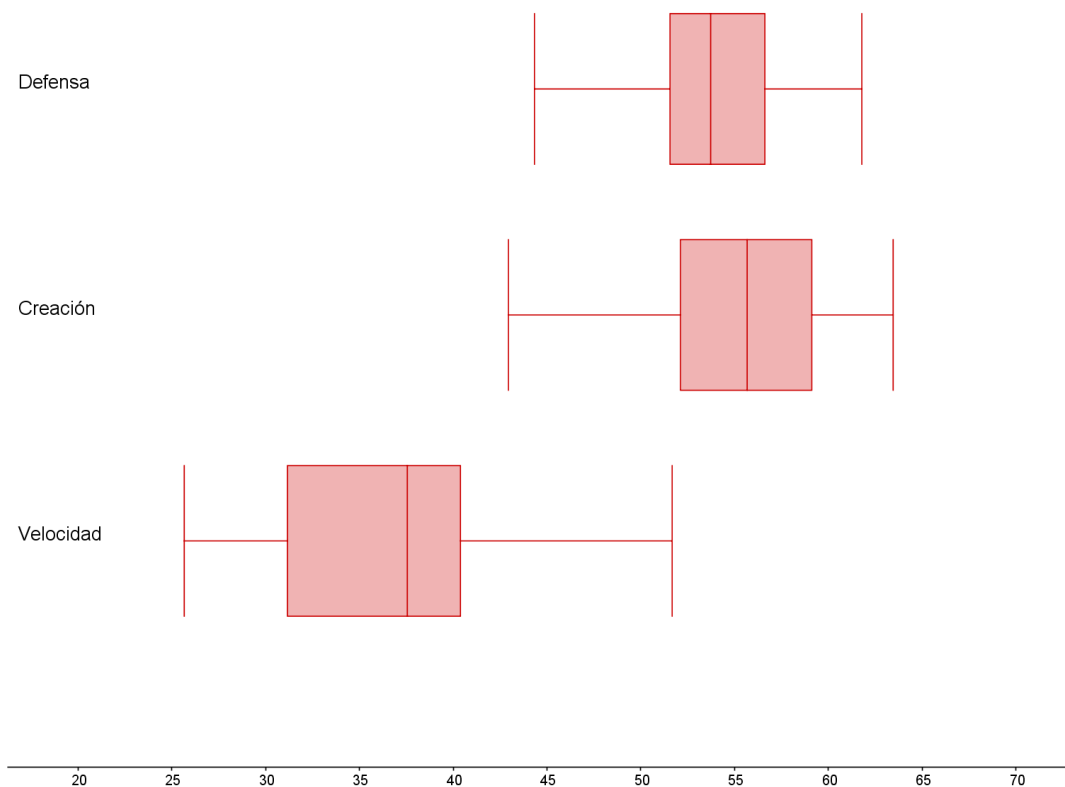


Figura 1. Diagrama de caja de las características de los equipos líderes de cada temporada de cada liga.

## 8. ¿Quiénes son los 3 países líderes según apuestas y según estadísticas?

```

select pais, sum(sum_ranking)
from(
  (select liga, sum(ranking) as sum_ranking, codigo_pais, country.name as pais
  from(
    select temporada, liga, equipo, codigo_pais,
      sum(goles_a_favor) as goles_a_favor,
      sum(goles_en_contra) as goles_en_contra,
      sum(diferencia_goles) as diferencia_goles_total,
      rank() over (
        order by sum(diferencia_goles) desc) ranking
    from
      (select match.season as temporada,
        league.name as liga,
        league.country_id as codigo_pais,
        team.team_long_name as equipo,
        sum(match.home_team_goal) as goles_a_favor,
        sum(match.away_team_goal) as goles_en_contra,
        sum(match.home_team_goal - match.away_team_goal) as diferencia_goles
      from (match inner join team on team.team_api_id = match.home_team_api_id)
      inner join league on match.league_id = league.id
      group by team.team_long_name, match.season, league.name, league.country_id
      union all
      (select match.season as temporada,
        league.name as liga,
        league.country_id as codigo_pais,
        team.team_long_name as equipo,
        sum(match.away_team_goal) as goles_a_favor,
        sum(match.home_team_goal) as goles_en_contra,
        sum(match.away_team_goal - match.home_team_goal) as diferencia_goles

```

```

sum(match.home_team_goals - match.away_team_goals) as diferencia_goles)
from (match inner join team on team.team_api_id = match.away_team_api_id)
inner join league on match.league_id = league.id
group by team.team_long_name, match.season, league.name, league.country_id)) foo
group by temporada, liga, equipo, codigo_pais) foo1
inner join country on country.id = codigo_pais
group by liga, codigo_pais, country.name
order by sum(ranking) desc)
union all
(select liga, sum(ranking) as sum_ranking, codigo_pais, country.name
from(
select equipo,
temporada,
codigo_pais,
liga,
(B365 + BW + IW + LB + PS + WH + SJ + VC + GB+ BS)/10 as promedio_apuestas,
rank() over (
order by (B365 + BW + IW + LB + PS + WH + SJ + VC + GB+ BS)/10 desc) ranking
from
(select team_long_name as equipo,
season as temporada,
codigo_pais,
name as liga,
coalesce(avg(promedio_B365),0) as B365,
coalesce(avg(promedio_BW),0) as BW,
coalesce(avg(promedio_IW),0) as IW,
coalesce(avg(promedio_LB),0) as LB,
coalesce(avg(promedio_PS),0) as PS,
coalesce(avg(promedio_WH),0) as WH,
coalesce(avg(promedio_SJ),0) as SJ,
coalesce(avg(promedio_VC),0) as VC,
coalesce(avg(promedio_GB),0) as GB,

```

```

        coalesce(avg(promedio_BS),0) as BS
from
((select team.team_long_name, match.season, league.name, league.country_id as codigo_pais,
    avg(1/B365H) as promedio_B365,
    avg(1/BWH) as promedio_BW,
    avg(1/IWH) as promedio_IW,
    avg(1/LBH) as promedio_LB,
    avg(1/PSH) as promedio_PS,
    avg(1/WHH) as promedio_WH,
    avg(1/SJH) as promedio_SJ,
    avg(1/VCH) as promedio_VC,
    avg(1/GBH) as promedio_GB,
    avg(1/BSH) as promedio_BS
from (match inner join team on team.team_api_id = match.home_team_api_id)
    inner join league on match.league_id = league.id
where B365H is not null or
    BWH is not null or
    IWH is not null or
    LBH is not null or
    PSH is not null or
    WHH is not null or
    SJH is not null or
    VCH is not null or
    GBH is not null or
    BSH is not null
group by team.team_long_name, match.season, league.name, league.country_id)
union
(select team.team_long_name, match.season, league.name, league.country_id as codigo_pais,
    avg(1/B365A) as promedio_B365,
    avg(1/BWA) as promedio_BW,

```

```

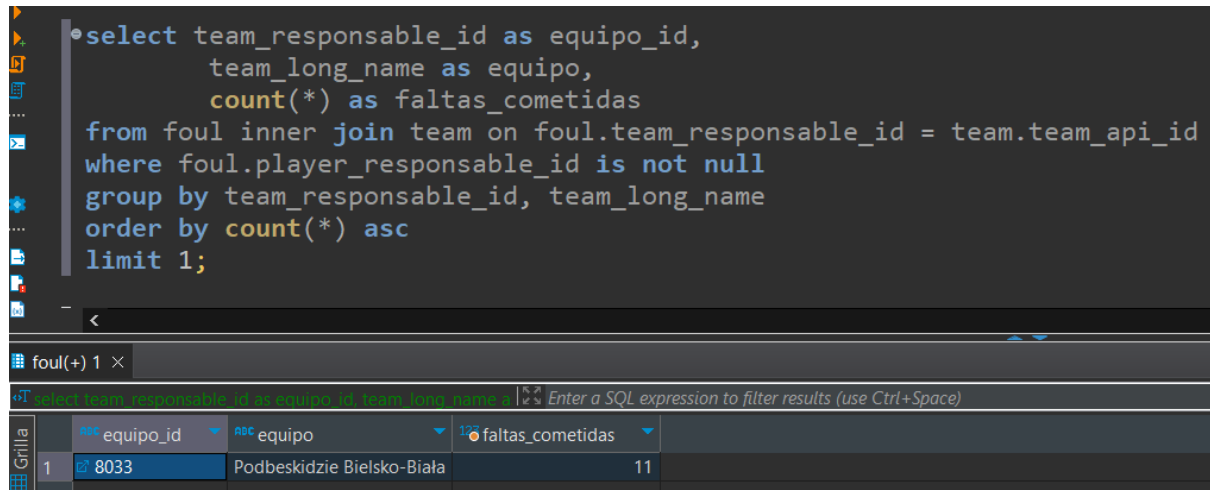
    avg(1/IWA) as promedio_IW,
    avg(1/LBA) as promedio_LB,
    avg(1/PSA) as promedio_PS,
    avg(1/WHA) as promedio_WH,
    avg(1/SJA) as promedio_SJ,
    avg(1/VCA) as promedio_VC,
    avg(1/GBA) as promedio_GB,
    avg(1/BSA) as promedio_BS
from (match inner join team on team.team_api_id = match.home_team_api_id)
    inner join league on match.league_id = league.id
where B365A is not null or
    BWA is not null or
    IWA is not null or
    LBA is not null or
    PSA is not null or
    WHA is not null or
    SJA is not null or
    VCA is not null or
    GBA is not null or
    BSA is not null
group by team.team_long_name, match.season, league.name, league.country_id)) bet_table
group by team_long_name, season, name, codigo_pais) avg_bet_table
group by equipo, temporada, liga, B365, BW, IW, LB, PS, WH, SJ, VC, GB, BS, codigo_pais) foo
    inner join country on country.id = codigo_pais
group by liga, codigo_pais, country.name
order by sum(ranking) desc)) tabla_final
group by pais
order by sum(sum_ranking) desc;

```

	ASC pais	123 sum
1	France	235.210
2	Italy	230.794
3	England	229.045

La metodología usada en este inciso fue ordenar por ranking todos los equipos de cada temporada basándose en la diferencia de goles (estadística) y sumar todos los rankings de los equipos del mismo país. Del mismo modo se realizó con las apuestas. Por consiguiente, al sumar ambos rankings entre sí, se puede ordenar los tres mejores países, los cuales son Francia, Italia e Inglaterra.

**Extra: ¿Cuál es el equipo cuyos jugadores han incurrido en menos faltas?**



```
select team_responsable_id as equipo_id,
       team_long_name as equipo,
       count(*) as faltas_cometidas
from foul inner join team on foul.team_responsable_id = team.team_api_id
where foul.player_responsable_id is not null
group by team_responsable_id, team_long_name
order by count(*) asc
limit 1;
```

foul(+) 1 ×

Enter a SQL expression to filter results (use Ctrl+Space)

	equipo_id	equipo	faltas_cometidas
1	8033	Podbeskidzie Bielsko-Biała	11

## Etapa 3

Diseño de preguntas preguntas propias y queries para responderlas

¿Cuáles son los 10 equipos que más veces han salido campeones de sus respectivas ligas en todas las temporadas?

```
•select liga, equipo, count(*) as campeonatos_ganados
from(
  select temporada, liga, equipo_id, equipo, sum(puntos) as puntos,
         rank() over (partition by liga, temporada order by sum(puntos) desc) as ranking
  from
    ((select temporada, liga, equipo_id, equipo,
       sum(
         case
           when diferencia_goles > 0 --gano partido
           then 3
           when diferencia_goles = 0 --empate
           then 1
           when diferencia_goles < 0
           then 0
         end) as puntos
     from
       (select match.season as temporada,
            league.name as liga,
            team.team_api_id as equipo_id,
            team.team_long_name as equipo,
            match.home_team_goal as goles_a_favor,
            match.away_team_goal as goles_en_contra,
            (match.home_team_goal - match.away_team_goal) as diferencia_goles
         from (match inner join team on team.team_api_id = match.home_team_api_id)
         inner join league on match.league_id = league.id) foo1
     group by temporada, liga, equipo_id, equipo)
    union all
```

```
  (select temporada, liga, equipo_id, equipo,
       sum(
         case
           when diferencia_goles > 0 --gano partido
           then 3
           when diferencia_goles = 0 --empate
           then 1
           when diferencia_goles < 0
           then 0
         end) as puntos
     from
       (select match.season as temporada,
            league.name as liga,
            team.team_api_id as equipo_id,
            team.team_long_name as equipo,
            match.away_team_goal as goles_a_favor,
            match.home_team_goal as goles_en_contra,
            (match.away_team_goal - match.home_team_goal) as diferencia_goles
         from (match inner join team on team.team_api_id = match.away_team_api_id)
         inner join league on match.league_id = league.id) foo2
     group by temporada, liga, equipo_id, equipo)) foo3
  group by temporada, liga, equipo, equipo_id
  order by temporada, liga, sum(puntos) desc) foo4
where ranking = 1
group by liga, equipo
order by count(*) desc
limit 10;
```

	ABC liga	ABC equipo	123 campeonatos_ganados
1	Switzerland Super League	FC Basel	7
2	Spain LIGA BBVA	FC Barcelona	6
3	Belgium Jupiler League	RSC Anderlecht	5
4	Italy Serie A	Juventus	5
5	Scotland Premier League	Celtic	5
6	Germany 1. Bundesliga	FC Bayern Munich	5
7	Portugal Liga ZON Sagres	FC Porto	4
8	Portugal Liga ZON Sagres	SL Benfica	4
9	Netherlands Eredivisie	Ajax	4
10	France Ligue 1	Paris Saint-Germain	4



Figura 2. Frecuencia de los equipos que han ganado más veces la liga de su respectivo país.

¿Qué equipos tienen la mejor cantidad media de puntos generados por partido por los equipos de todas las ligas en todas las temporadas?

```
•select liga,
       equipo_id,
       equipo,
       sum(puntos) as puntos,
       sum(partidos_jugados) as partidos_jugados,
       (sum(puntos)/sum(partidos_jugados)) as media_puntos_partido
from
  ((select temporada, liga, equipo_id, equipo,
        sum(
          case
            when diferencia_goles > 0 --gano partido
            then 3
            when diferencia_goles = 0 --empate
            then 1
            when diferencia_goles < 0
            then 0
          end) as puntos, count(1) as partidos_jugados
    from
      (select match.season as temporada,
              league.name as liga,
              team.team_api_id as equipo_id,
              team.team_long_name as equipo,
              match.home_team_goal as goles_a_favor,
              match.away_team_goal as goles_en_contra,
              (match.home_team_goal - match.away_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.home_team_api_id)
        inner join league on match.league_id = league.id) foo1
    group by temporada, liga, equipo_id, equipo)
  union all
  (select temporada, liga, equipo_id, equipo,
        sum(
          case
            when diferencia_goles > 0 --gano partido
            then 3
            when diferencia_goles = 0 --empate
            then 1
            when diferencia_goles < 0
            then 0
          end) as puntos, count(1) as partidos_jugados
    from
      (select match.season as temporada,
              league.name as liga,
              team.team_api_id as equipo_id,
              team.team_long_name as equipo,
              match.away_team_goal as goles_a_favor,
              match.home_team_goal as goles_en_contra,
              (match.away_team_goal - match.home_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.away_team_api_id)
        inner join league on match.league_id = league.id) foo2
    group by temporada, liga, equipo_id, equipo)) foo3
group by liga, equipo, equipo_id
order by media_puntos_partido desc;
```



	ABC liga	ABC equipo_id	ABC equipo	123 puntos	123 partidos_jugados	123 media_puntos_partido
1	Spain LIGA BBVA	8634	FC Barcelona	745	304	2,4506578947
2	Portugal Liga ZON Sagr	9773	FC Porto	591	248	2,3830645161
3	Portugal Liga ZON Sagr	9772	SL Benfica	591	248	2,3830645161
4	Spain LIGA BBVA	8633	Real Madrid CF	720	304	2,3684210526
5	Scotland Premier Leagu	9925	Celtic	704	304	2,3157894737
6	Scotland Premier Leagu	8548	Rangers	349	152	2,2960526316
7	Germany 1. Bundesliga	9823	FC Bayern Munich	623	272	2,2904411765
8	Netherlands Eredivisie	8593	Ajax	602	272	2,2132352941
9	Belgium Jupiler League	8635	RSC Anderlecht	457	212	2,1556603774
10	Netherlands Eredivisie	8640	PSV	581	272	2,1360294118
11	Switzerland Super Leagu	9931	FC Basel	604	286	2,1118881119
12	Italy Serie A	9885	Juventus	633	301	2,1029900332
13	England Premier League	10260	Manchester United	633	304	2,0822368421
14	Portugal Liga ZON Sagr	9768	Sporting CP	492	248	1,9838709677
15	France Ligue 1	9847	Paris Saint-Germain	601	304	1,9769736842
16	England Premier League	8455	Chelsea	598	304	1,9671052632
17	Germany 1. Bundesliga	9789	Borussia Dortmund	533	272	1,9595588235
18	Belgium Jupiler League	8342	Club Brugge KV	409	212	1,929245283
19	England Premier League	8456	Manchester City	586	304	1,9276315789
20	Poland Ekstraklasa	8673	Legia Warszawa	461	240	1,9208333333
21	England Premier League	9825	Arsenal	583	304	1,9177631579
22	Netherlands Eredivisie	8611	FC Twente	503	272	1,8492647059
23	Italy Serie A	8686	Roma	559	303	1,8448844884
24	Spain LIGA BBVA	9906	Atlético Madrid	560	304	1,8421052632
25	Poland Ekstraklasa	2182	Lech Poznań	432	240	1,8

¿Qué equipos han tenido un cambio positivo significativo en puntos en las últimas tres temporadas?

```
select puntos_2015.liga, puntos_2015.equipo, sum(puntos_2015.puntos - puntos_2013.puntos) as puntos_mejora
from
  (select temporada, liga, equipo_id, equipo, sum(puntos) as puntos, sum(1) as temporadas_jugadas
   from
     ((select temporada, liga, equipo_id, equipo,
        sum(
          case
            when diferencia_goles > 0 --gano partido
            then 3
            when diferencia_goles = 0 --empate
            then 1
            when diferencia_goles < 0
            then 0
          end) as puntos
      from
        (select match.season as temporada,
            league.name as liga,
            team.team_api_id as equipo_id,
            team.team_long_name as equipo,
            match.home_team_goal as goles_a_favor,
            match.away_team_goal as goles_en_contra,
            (match.home_team_goal - match.away_team_goal) as diferencia_goles
         from (match inner join team on team.team_api_id = match.home_team_api_id)
         inner join league on match.league_id = league.id) puntos_local_2015
      inner join league on match.league_id = league.id) puntos_visitantes_2015
   group by temporada, liga, equipo_id, equipo)
 union all
  (select temporada, liga, equipo_id, equipo,
     sum(
       case
         when diferencia_goles > 0 --gano partido
         then 3
         when diferencia_goles = 0 --empate
         then 1
         when diferencia_goles < 0
         then 0
       end) as puntos
   from
     (select match.season as temporada,
        league.name as liga,
        team.team_api_id as equipo_id,
        team.team_long_name as equipo,
        match.away_team_goal as goles_a_favor,
        match.home_team_goal as goles_en_contra,
        (match.away_team_goal - match.home_team_goal) as diferencia_goles
      from (match inner join team on team.team_api_id = match.away_team_api_id)
      inner join league on match.league_id = league.id) puntos_visitantes_2015
   group by temporada, liga, equipo_id, equipo)) foo1
 where temporada = '2015/2016' and puntos is not null
```

```

group by temporada, liga, equipo, equipo_id) puntos_2015
inner join
(select temporada, liga, equipo_id, equipo, sum(puntos) as puntos, sum(1) as temporadas_jugadas
from
    ((select temporada, liga, equipo_id, equipo,
        sum(
            case
                when diferencia_goles > 0 --gano partido
                then 3
                when diferencia_goles = 0 --empate
                then 1
                when diferencia_goles < 0
                then 0
            end) as puntos
        from
            (select match.season as temporada,
                league.name as liga,
                team.team_api_id as equipo_id,
                team.team_long_name as equipo,
                match.home_team_goal as goles_a_favor,
                match.away_team_goal as goles_en_contra,
                (match.home_team_goal - match.away_team_goal) as diferencia_goles
            from (match inner join team on team.team_api_id = match.home_team_api_id)
            inner join league on match.league_id = league.id) puntos_local_2013

```

```

group by temporada, liga, equipo_id, equipo)
union all
(select temporada, liga, equipo_id, equipo,
    sum(
        case
            when diferencia_goles > 0 --gano partido
            then 3
            when diferencia_goles = 0 --empate
            then 1
            when diferencia_goles < 0
            then 0
        end) as puntos
    from
        (select match.season as temporada,
            league.name as liga,
            team.team_api_id as equipo_id,
            team.team_long_name as equipo,
            match.away_team_goal as goles_a_favor,
            match.home_team_goal as goles_en_contra,
            (match.away_team_goal - match.home_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.away_team_api_id)
        inner join league on match.league_id = league.id) puntos_visita_2013
    group by temporada, liga, equipo_id, equipo)) foo2
where temporada = '2013/2014' and puntos is not null

```

```

where temporada = '2013/2014' and puntos is not null
group by temporada, liga, equipo, equipo_id) puntos_2013
on puntos_2015.equipo = puntos_2013.equipo
group by puntos_2015.liga, puntos_2015.equipo
order by sum(puntos_2015.puntos - puntos_2013.puntos) desc;

```

	ABC liga	ABC equipo	123 puntos_mejora
1	Belgium Jupiler League	KAA Gent	50
2	Belgium Jupiler League	KV Oostende	35
3	Belgium Jupiler League	Waasland-Beveren	29
4	Italy Serie A	Sassuolo	27
5	Scotland Premier League	Heart of Midlothian	27
6	Netherlands Eredivisie	PSV	25
7	Portugal Liga ZON Sagres	FC Paços de Ferreira	25
8	Poland Ekstraklasa	Piast Gliwice	24
9	Portugal Liga ZON Sagres	FC Arouca	23
10	England Premier League	West Ham United	22
11	France Ligue 1	OGC Nice	21
12	Portugal Liga ZON Sagres	SC Braga	21
13	Spain LIGA BBVA	Real Betis Balompié	20
14	Portugal Liga ZON Sagres	Sporting CP	19
15	Portugal Liga ZON Sagres	Rio Ave FC	18
16	Poland Ekstraklasa	Zagłębie Lubin	16
17	Netherlands Eredivisie	N.E.C.	16
18	Germany 1. Bundesliga	Hamburger SV	14
19	Italy Serie A	Chievo Verona	14
20	Netherlands Eredivisie	Heracles Almelo	14
21	Portugal Liga ZON Sagres	SL Benfica	14
22	Italy Serie A	Bologna	13
23	Portugal Liga ZON Sagres	CF Os Belenenses	13
24	Netherlands Eredivisie	AZ	12
25	Portugal Liga ZON Sagres	FC Porto	12
26	Netherlands Eredivisie	FC Utrecht	12
27	Switzerland Super League	FC Basel	11
28	Netherlands Eredivisie	Ajax	11
29	Spain LIGA BBVA	RC Celta de Vigo	11

¿Quiénes son los jugadores que tienen un potencial alto en la última temporada?

```
select match.season as temporada,
       player.player_api_id as id_jugador,
       player.player_name as nombre_jugador,
       league.name as liga,
       team.team_long_name as equipo,
       avg(potential) as potencial
from (match inner join player on player.player_api_id = match.home_player_1
     or player.player_api_id = match.home_player_2
     or player.player_api_id = match.home_player_3
     or player.player_api_id = match.home_player_4
     or player.player_api_id = match.home_player_5
     or player.player_api_id = match.home_player_6
     or player.player_api_id = match.home_player_7
     or player.player_api_id = match.home_player_8
     or player.player_api_id = match.home_player_9
     or player.player_api_id = match.home_player_10
     or player.player_api_id = match.home_player_11
     or player.player_api_id = match.away_player_1
     or player.player_api_id = match.away_player_2
     or player.player_api_id = match.away_player_3
     or player.player_api_id = match.away_player_4
     or player.player_api_id = match.away_player_5
     or player.player_api_id = match.away_player_6
     or player.player_api_id = match.away_player_7
     or player.player_api_id = match.away_player_8
     or player.player_api_id = match.away_player_9
     or player.player_api_id = match.away_player_10
     or player.player_api_id = match.away_player_11)
inner join league on match.league_id = league.id
inner join player_attributes on player_attributes.player_api_id = player.player_api_id
and extract(year from match."date") = extract(year from player_attributes.date)
inner join team on team.team_api_id = match.home_team_api_id and (
    player.player_api_id = match.home_player_1
    or player.player_api_id = match.home_player_2
    or player.player_api_id = match.home_player_3
    or player.player_api_id = match.home_player_4
    or player.player_api_id = match.home_player_5
    or player.player_api_id = match.home_player_6
    or player.player_api_id = match.home_player_7
    or player.player_api_id = match.home_player_8
    or player.player_api_id = match.home_player_9
    or player.player_api_id = match.home_player_10
    or player.player_api_id = match.home_player_11
)
or
team.team_api_id = match.away_team_api_id and (
    player.player_api_id = match.away_player_1
    or player.player_api_id = match.away_player_2
    or player.player_api_id = match.away_player_3
    or player.player_api_id = match.away_player_4
    or player.player_api_id = match.away_player_5
    or player.player_api_id = match.away_player_6
    or player.player_api_id = match.away_player_7
    or player.player_api_id = match.away_player_8
    or player.player_api_id = match.away_player_9
    or player.player_api_id = match.away_player_10
    or player.player_api_id = match.away_player_11
)

where match.season = '2015/2016'
group by player.player_api_id, player.player_name, match.season, league.name, team.team_long_name
order by avg(potential) desc;
```

	temporada	id_jugador	nombre_jugador	liga	equipo	potencial
1	2015/2016	30981	Lionel Messi	Spain LIGA BBVA	FC Barcelona	94,4285714286
2	2015/2016	19533	Neymar	Spain LIGA BBVA	FC Barcelona	93,7083333333
3	2015/2016	164684	James Rodríguez	Spain LIGA BBVA	Real Madrid CF	92,7741935484
4	2015/2016	30893	Cristiano Ronaldo	Spain LIGA BBVA	Real Madrid CF	92,6
5	2015/2016	248453	Paul Pogba	Italy Serie A	Juventus	91,1666666667
6	2015/2016	107417	Eden Hazard	England Premier League	Chelsea	90,3595505618
7	2015/2016	31921	Gareth Bale	Spain LIGA BBVA	Real Madrid CF	90,1186440678
8	2015/2016	170323	Thibaut Courtois	England Premier League	Chelsea	90
9	2015/2016	27299	Manuel Neuer	Germany 1. Bundesliga	FC Bayern Munic	90
10	2015/2016	40636	Luis Suarez	Spain LIGA BBVA	FC Barcelona	89,8571428571
11	2015/2016	30834	Arjen Robben	Germany 1. Bundesliga	FC Bayern Munic	89,75
12	2015/2016	177714	Mario Goetze	Germany 1. Bundesliga	FC Bayern Munic	89,2173913043
13	2015/2016	190972	Marco Verratti	France Ligue 1	Paris Saint-Gerr	89,1914893617
14	2015/2016	95078	Toni Kroos	Spain LIGA BBVA	Real Madrid CF	89,1630434783
15	2015/2016	35724	Zlatan Ibrahimovic	France Ligue 1	Paris Saint-Gerr	89
16	2015/2016	362694	Luke Shaw	England Premier League	Manchester Unit	89
17	2015/2016	182917	David De Gea	England Premier League	Manchester Unit	88,905982906
18	2015/2016	465960	Youri Tielemans	Belgium Jupiler League	RSC Anderlecht	88,8090909091
19	2015/2016	395154	Alen Halilovic	Spain LIGA BBVA	Real Sporting de	88,8085106383
20	2015/2016	184138	Antoine Griezmann	Spain LIGA BBVA	Atlético Madrid	88,6914893617
21	2015/2016	93447	Robert Lewandowski	Germany 1. Bundesliga	FC Bayern Munic	88,6228070175
22	2015/2016	230982	Raphael Varane	Spain LIGA BBVA	Real Madrid CF	88,6
23	2015/2016	191315	Isco	Spain LIGA BBVA	Real Madrid CF	88,4347826087
24	2015/2016	36183	Jerome Boateng	Germany 1. Bundesliga	FC Bayern Munic	88,4158415842
25	2015/2016	37412	Sergio Aguero	England Premier League	Manchester City	88,1009174312

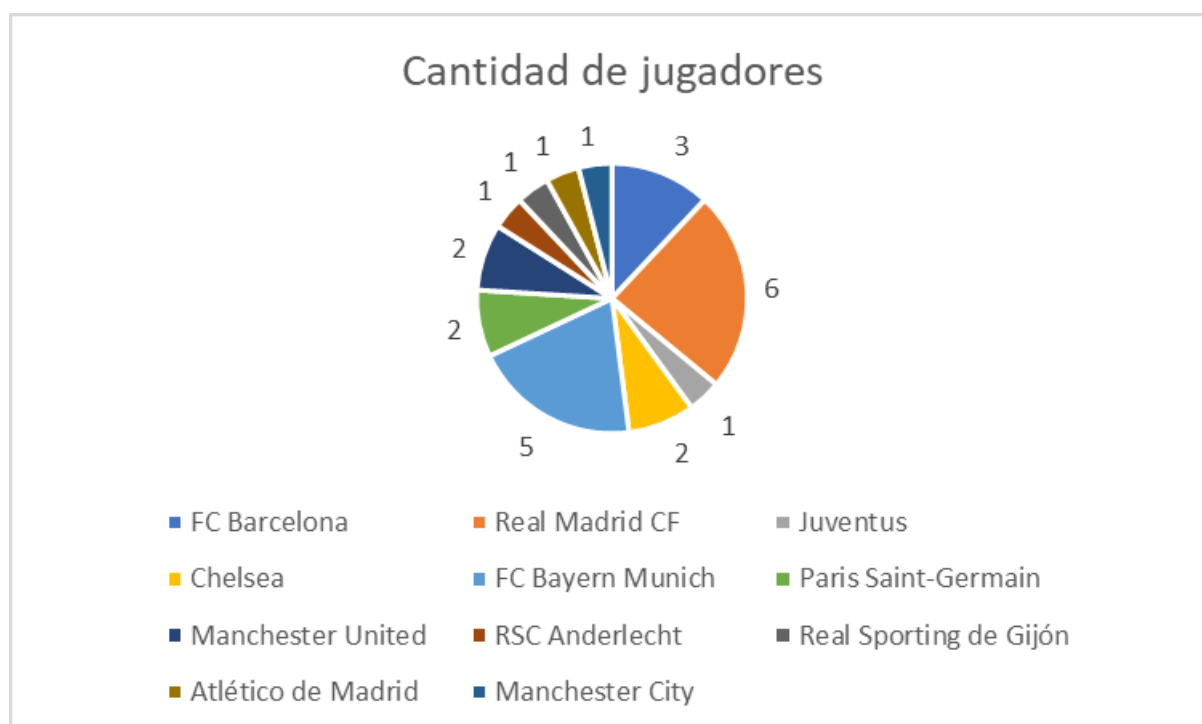


Figura 3. Distribución de los equipos que poseen a los 25 jugadores con mayor potencial de la última temporada.

## ¿Cuáles son los mejores diez porteros en la última temporada?

```
*select match.season as temporada,
       player.player_api_id as id_portero,
       player.player_name as nombre_portero,
       league.name as liga,
       team.team_long_name as equipo,
       avg((gk_handling + gk_diving + gk_kicking + gk_positioning + gk_reflexes)/5) as promedio_atributos
from (match inner join player on player.player_api_id = match.home_player_1
     or player.player_api_id = match.home_player_2
     or player.player_api_id = match.home_player_3
     or player.player_api_id = match.home_player_4
     or player.player_api_id = match.home_player_5
     or player.player_api_id = match.home_player_6
     or player.player_api_id = match.home_player_7
     or player.player_api_id = match.home_player_8
     or player.player_api_id = match.home_player_9
     or player.player_api_id = match.home_player_10
     or player.player_api_id = match.home_player_11
     or player.player_api_id = match.away_player_1
     or player.player_api_id = match.away_player_2
     or player.player_api_id = match.away_player_3
     or player.player_api_id = match.away_player_4
     or player.player_api_id = match.away_player_5
     or player.player_api_id = match.away_player_6
     or player.player_api_id = match.away_player_7
     or player.player_api_id = match.away_player_8
     or player.player_api_id = match.away_player_9
     or player.player_api_id = match.away_player_10
     or player.player_api_id = match.away_player_11)
```

```
inner join league on match.league_id = league.id
inner join player_attributes on player_attributes.player_api_id = player.player_api_id
and extract(year from match."date") = extract(year from player_attributes.date)
inner join team on team.team_api_id = match.home_team_api_id and (
  player.player_api_id = match.home_player_1
  or player.player_api_id = match.home_player_2
  or player.player_api_id = match.home_player_3
  or player.player_api_id = match.home_player_4
  or player.player_api_id = match.home_player_5
  or player.player_api_id = match.home_player_6
  or player.player_api_id = match.home_player_7
  or player.player_api_id = match.home_player_8
  or player.player_api_id = match.home_player_9
  or player.player_api_id = match.home_player_10
  or player.player_api_id = match.home_player_11
)
or
team.team_api_id = match.away_team_api_id and (
  player.player_api_id = match.away_player_1
  or player.player_api_id = match.away_player_2
  or player.player_api_id = match.away_player_3
  or player.player_api_id = match.away_player_4
  or player.player_api_id = match.away_player_5
  or player.player_api_id = match.away_player_6
  or player.player_api_id = match.away_player_7
  or player.player_api_id = match.away_player_8
  or player.player_api_id = match.away_player_9
  or player.player_api_id = match.away_player_10
  or player.player_api_id = match.away_player_11
)
```

```
where match.season = '2015/2016'
and gk_handling is not null
and gk_diving is not null
and gk_kicking is not null
and gk_positioning is not null
and gk_reflexes is not null
group by player.player_api_id, player.player_name, match.season, league.name, team.team_long_name
order by promedio_atributos desc
limit 10;
```

	temporada	id_portero	nombre_portero	liga	equipo	promedio_atributos
1	2015/2016	27299	Manuel Neuer	Germany 1. Bundesliga	FC Bayern Munich	87,875
2	2015/2016	182917	David De Gea	England Premier League	Manchester United	84,7435897436
3	2015/2016	37421	Claudio Bravo	Spain LIGA BBVA	FC Barcelona	83
4	2015/2016	215168	Bernd Leno	Germany 1. Bundesliga	Bayer 04 Leverkusen	82,75
5	2015/2016	170323	Thibaut Courtois	England Premier League	Chelsea	82
6	2015/2016	31432	Joe Hart	England Premier League	Manchester City	81,7553956835
7	2015/2016	41097	Stephane Ruffier	France Ligue 1	AS Saint-Étienne	81,75
8	2015/2016	30859	Petr Cech	England Premier League	Arsenal	81,4411764706
9	2015/2016	184554	Marc-Andre ter Stegen	Spain LIGA BBVA	FC Barcelona	81
10	2015/2016	11319	Benoit Costil	France Ligue 1	Stade Rennais FC	81

¿Qué equipo tiene la mejor media en características de velocidad en la última temporada?

```

select match.season as temporada,
       team.team_api_id as equipo_id,
       team.team_long_name as equipo,
       league.name as liga,
       ((avg(coalesce(buildupplayspeed,0)) +
        avg(coalesce(buildupplaydribbling,0)) +
        avg(coalesce(buildupplaypassing,0)))/3) as promedio_atributos_velocidad
from (match inner join team on team.team_api_id = match.home_team_api_id or team.team_api_id = match.away_team_api_id)
     inner join league on match.league_id = league.id
     inner join team_attributes on team_attributes.team_api_id = team.team_api_id
     and extract(year from match."date") = extract(year from team_attributes.date)
where match.season = '2015/2016'
group by match.season, league.name, team.team_api_id, team.team_long_name
order by promedio_atributos_velocidad desc
limit 1;

```

	temporada	equipo_id	equipo	liga	promedio_atributos_velocidad
1	2015/2016	208931	Carpi	Italy Serie A	63,3333333333

¿Qué equipo tiene la mejor media en características de creación en la última temporada?

```

select match.season as temporada,
       team.team_api_id as equipo_id,
       team.team_long_name as equipo,
       league.name as liga,
       ((avg(coalesce(chancecreationpassing,0)) +
        avg(coalesce(chancecreationcrossing,0)) +
        avg(coalesce(chancecreationshooting,0)))/3) as promedio_atributos_creacion
from (match inner join team on team.team_api_id = match.home_team_api_id or team.team_api_id = match.away_team_api_id)
     inner join league on match.league_id = league.id
     inner join team_attributes on team_attributes.team_api_id = team.team_api_id
     and extract(year from match."date") = extract(year from team_attributes.date)
where match.season = '2015/2016'
group by match.season, league.name, team.team_api_id, team.team_long_name
order by promedio_atributos_creacion desc
limit 1;

```

	temporada	equipo_id	equipo	liga	promedio_atributos_creacion
1	2015/2016	8543	Lazio	Italy Serie A	73,3333333333



¿Qué equipo tiene la mejor media en características de defensa en la última temporada?

```
*select match.season as temporada,
       team.team_api_id as equipo_id,
       team.team_long_name as equipo,
       league.name as liga,
       ((avg(coalesce(defencepressure,0)) +
        avg(coalesce(defenceaggression,0)) +
        avg(coalesce(defenceteamwidth,0)))/3) as promedio_atributos_defensa
  from (match inner join team on team.team_api_id = match.home_team_api_id or team.team_api_id = match.away_team_api_id)
       inner join league on match.league_id = league.id
       inner join team_attributes on team_attributes.team_api_id = team.team_api_id
     and extract(year from match."date") = extract(year from team_attributes.date)
 where match.season = '2015/2016'
 group by match.season, league.name, team.team_api_id, team.team_long_name
 order by promedio_atributos_defensa desc
 limit 1;
```

	temporada	equipo_id	equipo	liga	promedio_atributos_defensa
1	2015/2016	8634	FC Barcelona	Spain LIGA BBVA	63,6666666667

## Análisis de resultados y presentación de solución a pregunta de negocio

En la Etapa 2, se obtuvieron diferentes estadísticas de los equipos. Gracias a ellas, se encontró que los equipos con mayor diferencia de goles en todas las temporadas fueron el FC Barcelona y el Real Madrid CF, con 89 goles de diferencia cada uno. Asimismo, se analizaron las probabilidades calculadas por todas las casas de apuestas, y se encontró nuevamente que ambos equipos españoles lideran las probabilidades de ganar.

En cuanto al análisis de jugadores, se encontró que el FC Barcelona posee a varios jugadores que han tenido un rendimiento alto en las últimas temporadas, entre los que sobresale Lionel Messi, con las cinco mejores calificaciones de los últimos 8 años. Por ello, se puede afirmar que existe un dominio por parte de los equipos españoles con respecto a clubes de otros países; no obstante, al analizar los países líderes en cuanto a estadísticas y apuestas de sus equipos, se encontró que España no aparece en los primeros tres puestos. La razón por la cual puede ocurrir esto es porque hay un gran dominio por parte del FC Barcelona y el Real Madrid CF en la liga española, provocando que los otros equipos de su liga posean bajos números estadísticos y probabilísticos en comparación a otros clubes de otras ligas.

Por otro lado, ya en la Etapa 3, se determinó, en primer lugar, que los equipos con la mayor cantidad de campeonatos de liga ganados en ocho temporadas fueron el FC Basel con 7 campeonatos; el FC Barcelona con 6 campeonatos; el RSC Anderlecht, la Juventus, el Celtic y el FC Bayern Munich con 5 campeonatos y el FC Porto, el SL Benfica, el Ajax y el Paris Saint-Germain con 4 campeonatos, tal como puede observarse en la *figura 2*.

Luego, se determinó la media de puntos por partido de liga que obtuvo cada equipo en todas las temporadas analizadas. Se realizó este análisis debido a que en algunas ligas hay menor cantidad de clubes que en otras, lo que genera que se jueguen menos partidos (como en Alemania, por ejemplo, en donde se juegan 34 partidos por temporada, en comparación a otras ligas donde se juegan 38 partidos por temporada). Se obtuvo que el FC Barcelona es el líder en este aspecto, con una media de 2.45 puntos por partido. También destacan casos como el de los equipos portugueses FC Porto y SL Benfica que tienen una media de 2.38 puntos. El Real Madrid CF aparece en tercer lugar, con una media de 2.36 puntos; sin embargo, este solo ganó un campeonato de liga en las últimas ocho temporadas, lo que permite concluir que, a pesar de que se encuentra en excelente forma, no es suficiente para ser líderes en su país.

Como tercer punto, se hizo un análisis de los equipos que han tenido una mejora en las últimas tres temporadas. Resalta el caso del KAA Gent que posee un cambio de 50 puntos. No obstante, muchos equipos poseen un gran cambio debido a que han ascendido de la liga inferior, por lo que no hay registro de ellos anteriormente en la liga de primera división, haciendo que sus cambios siempre sean positivos.

En el caso de los jugadores, se consideró importante analizar el potencial que poseen. Este atributo proporciona una calificación estimada de un jugador basándose en su calificación actual y su edad. Es por ello que este valor es alto en jugadores jóvenes o que han tenido un buen desempeño en los últimos años. En el resultado obtenido, nuevamente se

encuentra Lionel Messi como líder, jugador del FC Barcelona. Varios clubes tienen jugadores con un valor elevado de potencial y dicha distribución se puede observar en la *figura 3*. Los equipos Real Madrid CF y FC Barcelona son los equipos con mayor cantidad de jugadores con un potencial elevado, contando con 6 y 3 jugadores, respectivamente.

A su vez, en cuanto a los jugadores, se analizaron los diez mejores porteros en la última temporada. Nuevamente, el FC Barcelona sobresale, dado que posee dos porteros en la lista presentada, Claudio Bravo y Marc-Andre ter Stegen. El club en esta temporada se caracterizaba por usar un portero en la liga doméstica y al otro portero en las competiciones de copa, por lo que ambos podían mantener su buena forma.

Por último, al analizar las características de los equipos en la última temporada, se pudo encontrar que el mejor equipo en cuanto a atributos de velocidad es el Carpi, de la Serie A; en términos de defensa es el FC Barcelona y en cuanto a atributos de creación aparece el Lazio, también perteneciente a la liga italiana.

En conclusión, teniendo en cuenta que el FC Barcelona cuenta con la mayor diferencia de goles en las últimas 8 temporadas junto con el Real Madrid CF, así como con las mayores probabilidades de ganar según las casas de apuestas y varios de los jugadores con las mejores calificaciones, tanto de campo como porteros, incluido el jugador mejor calificado en los últimos 8 años, Lionel Messi, y que posee la mayor media de puntos por partido de liga, 3 de los jugadores con mayor potencial y los mejores atributos de defensa como equipo, es seguro afirmar que este es el equipo más conveniente para apostar en la Champions League para la temporada 2016/2017 según estadísticas y probabilidades.

### ¿Cómo ha sido el rendimiento del FC Barcelona en las últimas ocho temporadas?

```
*select temporada, liga, equipo_id, equipo, sum(puntos) as puntos
from
  ((select temporada, liga, equipo_id, equipo,
    sum(
      case
        when diferencia_goles > 0 --gano partido
        then 3
        when diferencia_goles = 0 --empate
        then 1
        when diferencia_goles < 0
        then 0
      end) as puntos
    from
      (select match.season as temporada,
        league.name as liga,
        team.team_api_id as equipo_id,
        team.team_long_name as equipo,
        match.home_team_goal as goles_a_favor,
        match.away_team_goal as goles_en_contra,
        (match.home_team_goal - match.away_team_goal) as diferencia_goles
        from (match inner join team on team.team_api_id = match.home_team_api_id)
```

```

        inner join league on match.league_id = league.id) foo1
group by temporada, liga, equipo_id, equipo)
union all
(select temporada, liga, equipo_id, equipo,
    sum(
        case
            when diferencia_goles > 0 --gano partido
            then 3
            when diferencia_goles = 0 --empate
            then 1
            when diferencia_goles < 0
            then 0
        end) as puntos
from
    (select match.season as temporada,
        league.name as liga,
        team.team_api_id as equipo_id,
        team.team_long_name as equipo,
        match.away_team_goal as goles_a_favor,
        match.home_team_goal as goles_en_contra,
        (match.away_team_goal - match.home_team_goal) as diferencia_goles

```

```

        from (match inner join team on team.team_api_id = match.away_team_api_id)
        inner join league on match.league_id = league.id) foo2
    group by temporada, liga, equipo_id, equipo)) foo3
where equipo = 'FC Barcelona'
group by temporada, liga, equipo, equipo_id
order by temporada, liga, sum(puntos) desc;

```

	temporada	liga	equipo_id	equipo	puntos
1	2008/2009	Spain LIGA BBVA	8634	FC Barcelona	87
2	2009/2010	Spain LIGA BBVA	8634	FC Barcelona	99
3	2010/2011	Spain LIGA BBVA	8634	FC Barcelona	96
4	2011/2012	Spain LIGA BBVA	8634	FC Barcelona	91
5	2012/2013	Spain LIGA BBVA	8634	FC Barcelona	100
6	2013/2014	Spain LIGA BBVA	8634	FC Barcelona	87
7	2014/2015	Spain LIGA BBVA	8634	FC Barcelona	94
8	2015/2016	Spain LIGA BBVA	8634	FC Barcelona	91

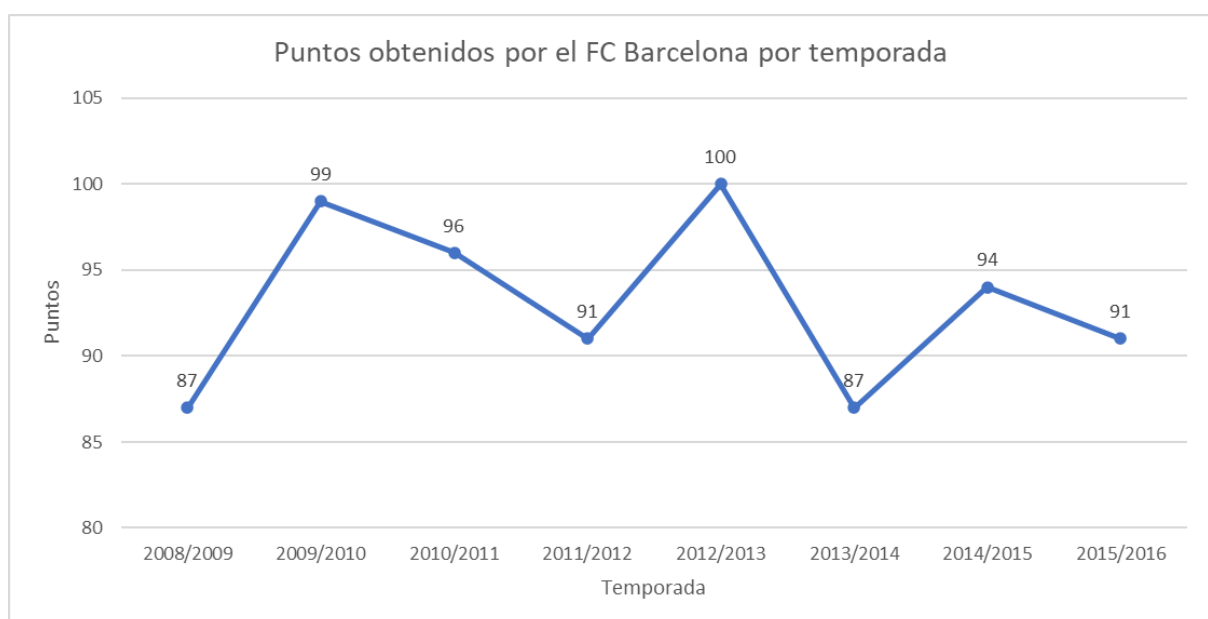


Figura 4. Comportamiento de puntos del FC Barcelona en las últimas ocho temporadas.

Finalmente, para determinar si es buena opción apostar por el FC Barcelona, se calculó la cantidad de puntos que han obtenido en las últimas ocho temporadas. Como se puede observar en la *figura 4*, el rendimiento del club se ha mantenido constante, lo que le ha permitido ganar 6 campeonatos de liga en las últimas ocho temporadas. Esto permite confirmar la decisión realizada con respecto a apostar por el FC Barcelona en la siguiente temporada.