```
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import sqlite3
import matplotlib.pyplot as plt
# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory
import os
path = "../input/soccer/database.sqlite"  # Remove the extra slash

# Connect to the SQLite database
try:
    conn = sqlite3.connect(path)
    print("Database connection successful.")
except sqlite3.Error as e:
    print(f"Database connection failed: {e}")
```

```
Database connection successful.
```

```
tables = pd.read_sql("""SELECT *
                        FROM sqlite_master
                        WHERE type = 'table';""", conn)
tables
```

	type	name	tbl_name	rootpage	sql
0	table	sqlite_sequence	sqlite_sequence	4	CREATE TABLE sqlite_sequence(name,seq)
1	table	Player_Attributes	Player_Attributes	11	CREATE TABLE "Player_Attributes" (\n\t`id`\tIN...
2	table	Player	Player	14	CREATE TABLE `Player` (\n\t`id`\tINTEGER PRIMA...
3	table	Match	Match	18	CREATE TABLE `Match` (\n\t`id`\tINTEGER PRIMAR...
4	table	League	League	24	CREATE TABLE `League` (\n\t`id`\tINTEGER PRIMA...
5	table	Country	Country	26	CREATE TABLE `Country` (\n\t`id`\tINTEGER PRIM...
6	table	Team	Team	29	CREATE TABLE "Team" (\n\t`id`\tINTEGER PRIMARY...
7	table	Team_Attributes	Team_Attributes	2	CREATE TABLE `Team_Attributes` (\n\t`id`\tINTE...

```
countries = pd.read_sql("""SELECT *
                        FROM Country;""", conn)
countries
```

	id	name
0	1	Belgium
1	1729	England
2	4769	France
3	7809	Germany
4	10257	Italy
5	13274	Netherlands
6	15722	Poland
7	17642	Portugal
8	19694	Scotland
9	21518	Spain
10	24558	Switzerland

```
countries_n = pd.read_sql("""SELECT COUNT(*)
                        FROM Country;""", conn)
countries_n
```

	COUNT(*)
0	11

```
match = pd.read_sql("""SELECT *
                    FROM match limit 10""", conn)
match
```

	id	country_id	league_id	season	stage	date	match_api_id	home_team_api_id	away_team_api_id	home_team_goal	...	
0	1	1	1	2008/2009	1	2008-08-17 00:00:00	492473	9987	9993	1	...	
1	2	1	1	2008/2009	1	2008-08-16 00:00:00	492474	10000	9994	0	...	
2	3	1	1	2008/2009	1	2008-08-16 00:00:00	492475	9984	8635	0	...	
3	4	1	1	2008/2009	1	2008-08-17 00:00:00	492476	9991	9998	5	...	
4	5	1	1	2008/2009	1	2008-08-16 00:00:00	492477	7947	9985	1	...	
5	6	1	1	2008/2009	1	2008-09-24 00:00:00	492478	8203	8342	1	...	
6	7	1	1	2008/2009	1	2008-08-16 00:00:00	492479	9999	8571	2	...	
7	8	1	1	2008/2009	1	2008-08-16 00:00:00	492480	4049	9996	1	...	
8	9	1	1	2008/2009	1	2008-08-16 00:00:00	492481	10001	9986	1	...	
9	10	1	1	2008/2009	10	2008-11-01 00:00:00	492564	8342	8571	4	...	1

10 rows × 115 columns

```
player = pd.read_sql("""SELECT *
                    FROM player limit 10""", conn)
player
```

	id	player_api_id	player_name	player_fifa_api_id	birthday	height	weight
0	1	505942	Aaron Appindangoye	218353	1992-02-29 00:00:00	182.88	187
1	2	155782	Aaron Cresswell	189615	1989-12-15 00:00:00	170.18	146
2	3	162549	Aaron Doran	186170	1991-05-13 00:00:00	170.18	163
3	4	30572	Aaron Galindo	140161	1982-05-08 00:00:00	182.88	198
4	5	23780	Aaron Hughes	17725	1979-11-08 00:00:00	182.88	154
5	6	27316	Aaron Hunt	158138	1986-09-04 00:00:00	182.88	161
6	7	564793	Aaron Kuhl	221280	1996-01-30 00:00:00	172.72	146
7	8	30895	Aaron Lennon	152747	1987-04-16 00:00:00	165.10	139
8	9	528212	Aaron Lennox	206592	1993-02-19 00:00:00	190.50	181
9	10	101042	Aaron Meijers	188621	1987-10-28 00:00:00	175.26	170

```
Player_Attributes = pd.read_sql("""SELECT *
                                FROM Player_Attributes limit 10""", conn)
Player_Attributes
```

	id	player_fifa_api_id	player_api_id	date	overall_rating	potential	preferred_foot	attacking_work_rate	defensive_wo
0	1	218353	505942	2016-02-18 00:00:00	67	71	right	medium	
1	2	218353	505942	2015-11-19 00:00:00	67	71	right	medium	
2	3	218353	505942	2015-09-21 00:00:00	62	66	right	medium	
3	4	218353	505942	2015-03-20 00:00:00	61	65	right	medium	
4	5	218353	505942	2007-02-22 00:00:00	61	65	right	medium	
5	6	189615	155782	2016-04-21 00:00:00	74	76	left	high	
6	7	189615	155782	2016-04-07 00:00:00	74	76	left	high	
7	8	189615	155782	2016-01-07 00:00:00	73	75	left	high	
8	9	189615	155782	2015-12-24 00:00:00	73	75	left	high	
9	10	189615	155782	2015-12-17 00:00:00	73	75	left	high	

10 rows × 42 columns

```
league = pd.read_sql("""SELECT  l.id,l.country_id,c.name
                    FROM league l
                    JOIN country as c ON c.id = l.country_id;""", conn)
league
```

	id	country_id	name
0	1	1	Belgium
1	1729	1729	England
2	4769	4769	France
3	7809	7809	Germany
4	10257	10257	Italy
5	13274	13274	Netherlands
6	15722	15722	Poland
7	17642	17642	Portugal
8	19694	19694	Scotland
9	21518	21518	Spain
10	24558	24558	Switzerland

```
leagues = pd.read_sql("""SELECT  l.id,l.country_id,c.name
                    FROM league  as l
                    JOIN country as c ON c.id = l.country_id
                    WHERE l.id =1729;""", conn)
leagues
```

	id	country_id	name
0	1729	1729	England

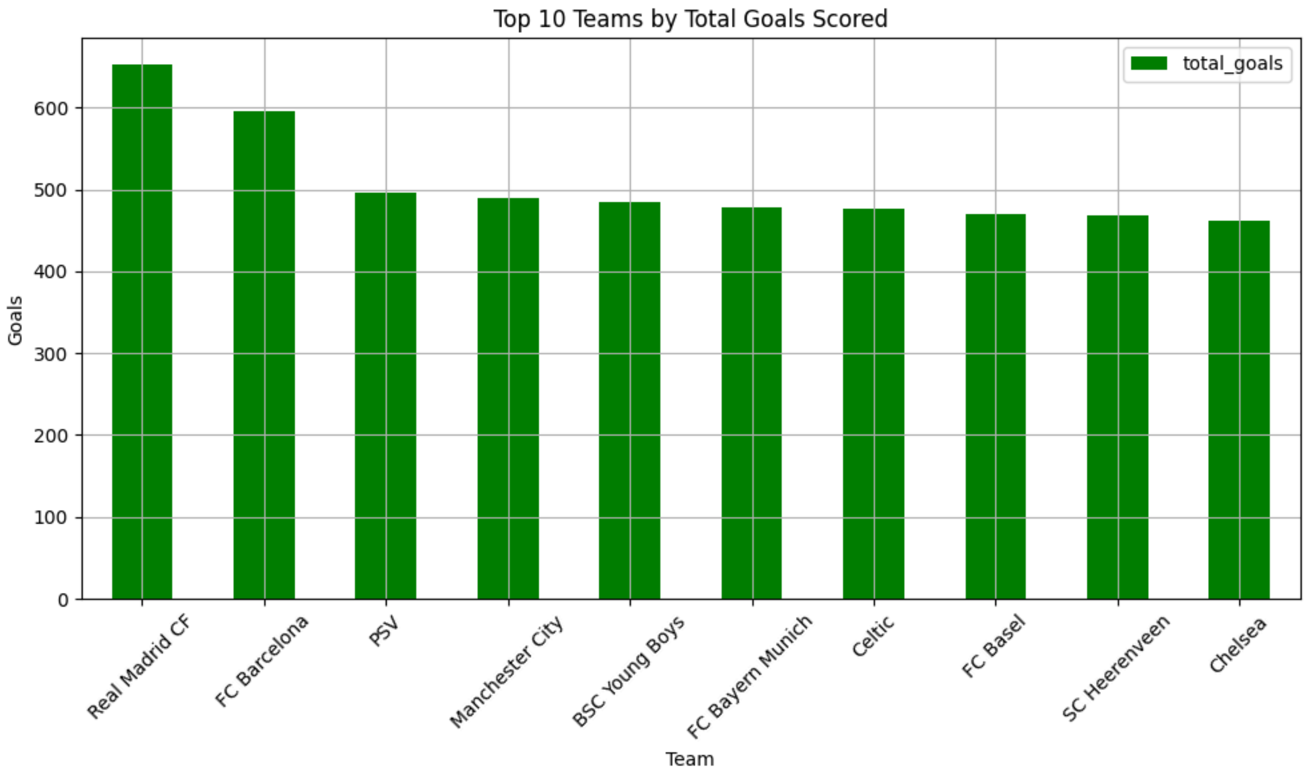
```
teams = pd.read_sql("""SELECT *
                    FROM team
                    order by id
                    limit 10;""", conn)
teams
```

	id	team_api_id	team_fifa_api_id	team_long_name	team_short_name
0	1	9987	673.0	KRC Genk	GEN
1	2	9993	675.0	Beerschot AC	BAC
2	3	10000	15005.0	SV Zulte-Waregem	ZUL
3	4	9994	2007.0	Sporting Lokeren	LOK
4	5	9984	1750.0	KSV Cercle Brugge	CEB
5	6	8635	229.0	RSC Anderlecht	AND
6	7	9991	674.0	KAA Gent	GEN
7	8	9998	1747.0	RAEC Mons	MON
8	9	7947	NaN	FCV Dender EH	DEN
9	10	9985	232.0	Standard de Liège	STL

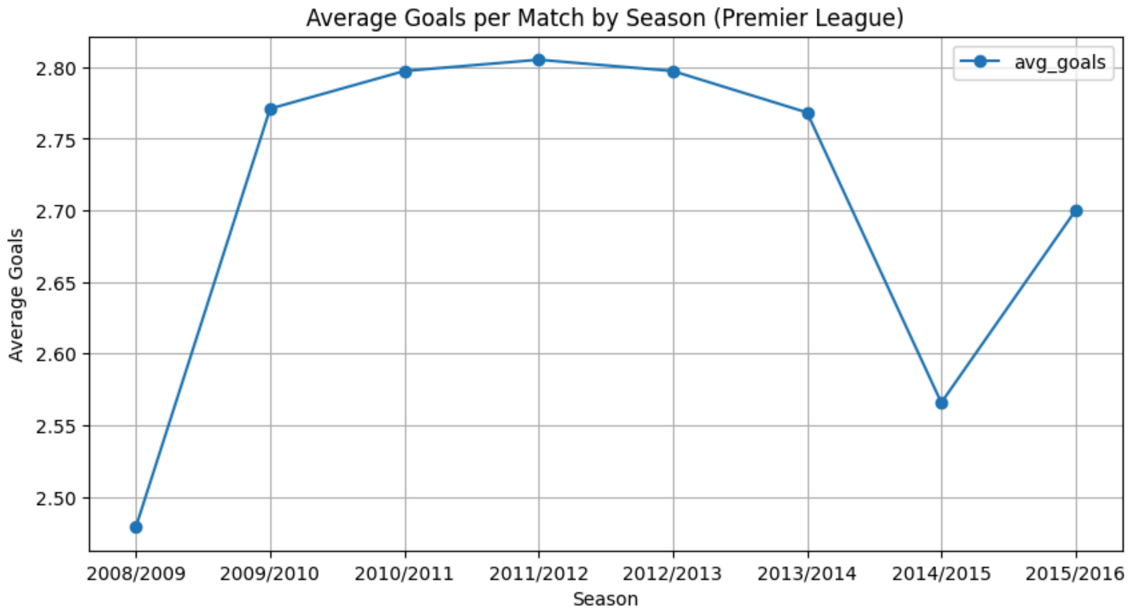
```
detailed_matches = pd.read_sql("""SELECT Match.id,
                                        Country.name AS country_name,
                                        League.name as league_name,
                                        season,
                                        date,
                                        HT.team_long_name as home_team,
                                        AT.team_long_name as away_team,
                                        home_team_goal,
                                        away_team_goal
                                FROM Match
                                JOIN country ON country.id = match.country_id
                                JOIN league ON league.id = match.league_id
                                LEFT JOIN team as ht ON ht.team_api_id = match.home_team_api_id
                                LEFT JOIN team as At ON At.team_api_id = match.away_team_api_id
                                WHERE country_name = 'Spain'
                                ORDER BY date
                                limit 10;""", conn)
detailed_matches
```

	id	country_name	league_name	season	date	home_team	away_team	home_team_goal	away_team_goal
0	21518	Spain	Spain LIGA BBVA	2008/2009	2008-08-30 00:00:00	Valencia CF	RCD Mallorca	3	0
1	21525	Spain	Spain LIGA BBVA	2008/2009	2008-08-30 00:00:00	RCD Espanyol	Real Valladolid	1	0
2	21519	Spain	Spain LIGA BBVA	2008/2009	2008-08-31 00:00:00	CA Osasuna	Villarreal CF	1	1
3	21520	Spain	Spain LIGA BBVA	2008/2009	2008-08-31 00:00:00	RC Deportivo de La Coruña	Real Madrid CF	2	1
4	21521	Spain	Spain LIGA BBVA	2008/2009	2008-08-31 00:00:00	CD Numancia	FC Barcelona	1	0
5	21522	Spain	Spain LIGA BBVA	2008/2009	2008-08-31 00:00:00	Racing Santander	Sevilla FC	1	1
6	21523	Spain	Spain LIGA BBVA	2008/2009	2008-08-31 00:00:00	Real Sporting de Gijón	Getafe CF	1	2

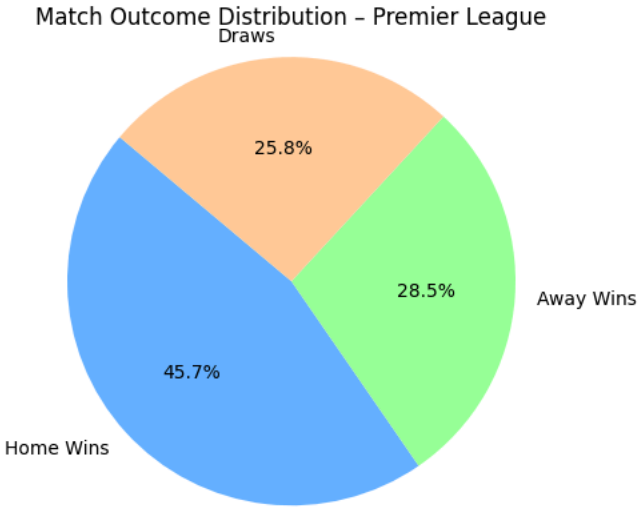
```
top_goals = pd.read_sql("""
    SELECT team_long_name, SUM(home_team_goal + away_team_goal) as total_goals
    FROM match m
    JOIN team t ON m.home_team_api_id = t.team_api_id
    GROUP BY team_long_name
    ORDER BY total_goals DESC
    LIMIT 10;
    """,conn)

top_goals.plot(kind='bar', x = 'team_long_name', y='total_goals', figsize=(10, 6), color='green')
plt.title('Top 10 Teams by Total Goals Scored')
plt.ylabel('Goals')
plt.xlabel('Team')
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()
```



```
avg_goals = pd.read_sql("""
    SELECT season, AVG(home_team_goal + away_team_goal) as avg_goals
    FROM match
    WHERE league_id = 1729  -- Premier League
    GROUP BY season
    ORDER BY season;
""", conn)

avg_goals.plot(kind='line', x='season', y='avg_goals', marker='o', figsize=(10, 5))
plt.title('Average Goals per Match by Season (Premier League)')
plt.xlabel('Season')
plt.ylabel('Average Goals')
plt.grid(True)
plt.show()
```

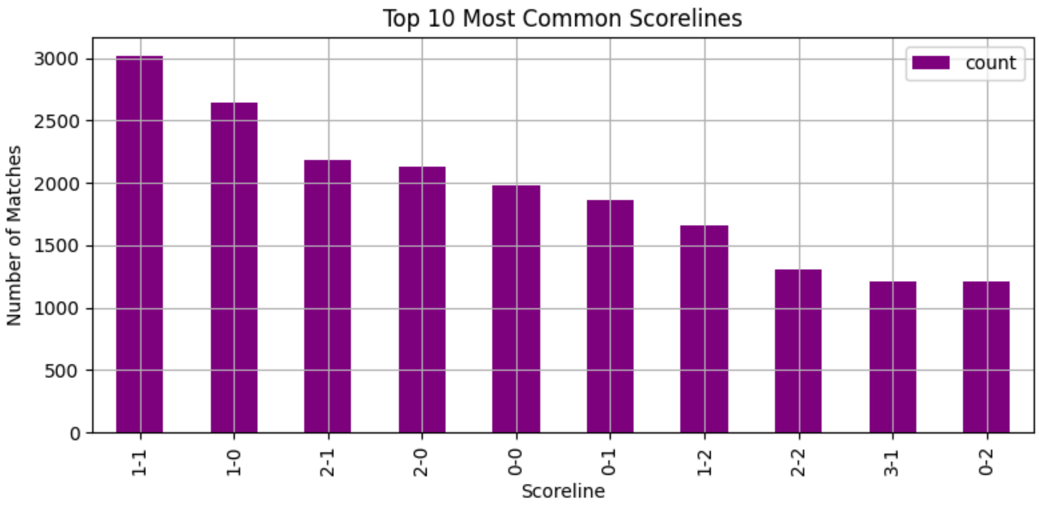


```
result = pd.read_sql("""
    SELECT
        SUM(CASE WHEN home_team_goal > away_team_goal THEN 1 ELSE 0 END) as home_wins,
        SUM(CASE WHEN home_team_goal < away_team_goal THEN 1 ELSE 0 END) as away_wins,
        SUM(CASE WHEN home_team_goal = away_team_goal THEN 1 ELSE 0 END) as draws
    FROM match
    WHERE league_id = 1729;
""", conn)

labels = ['Home Wins', 'Away Wins', 'Draws']
sizes = [result.loc[0, 'home_wins'], result.loc[0, 'away_wins'], result.loc[0, 'draws']]
colors = ['#66b3ff', '#99ff99', '#ffcc99']

plt.pie(sizes, labels=labels, colors=colors, autopct='%1.1f%%', startangle=140)
plt.axis('equal')
plt.title('Match Outcome Distribution – Premier League')
plt.show()
```



```
scorelines = pd.read_sql("""
    SELECT CONCAT(home_team_goal, '-', away_team_goal) as scoreline,
           COUNT(*) as count
    FROM match
    GROUP BY scoreline
    ORDER BY count DESC
    LIMIT 10;
""", conn)
```

```
scorelines.plot(kind='bar', x='scoreline', y='count', color='purple', figsize=(8, 4))
plt.title('Top 10 Most Common Scorelines')
plt.xlabel('Scoreline')
plt.ylabel('Number of Matches')
plt.grid(True)
plt.tight_layout()
plt.show()
```


Top 10 Most Common Scorelines
count
Number of Matches
Scoreline