

GoalAlchemy

Zehra Demir
150200305

Ege Demir
150200319

Havva Eda Körpe
150200029

“all about football”

FALL
2023

BLG 317E
Database Systems

TERM PROJECT

Dataset: Football Data from Transfermarkt

Technologies: Python programming language, Flask web framework, and a relational database (MySql), CSS

Tables:

1. Games
2. Clubs
3. Appearances
4. Players
5. Competitions
6. Club Games

Welcome to
GoalAlchemy

[View
Players](#)

[View
Games](#)

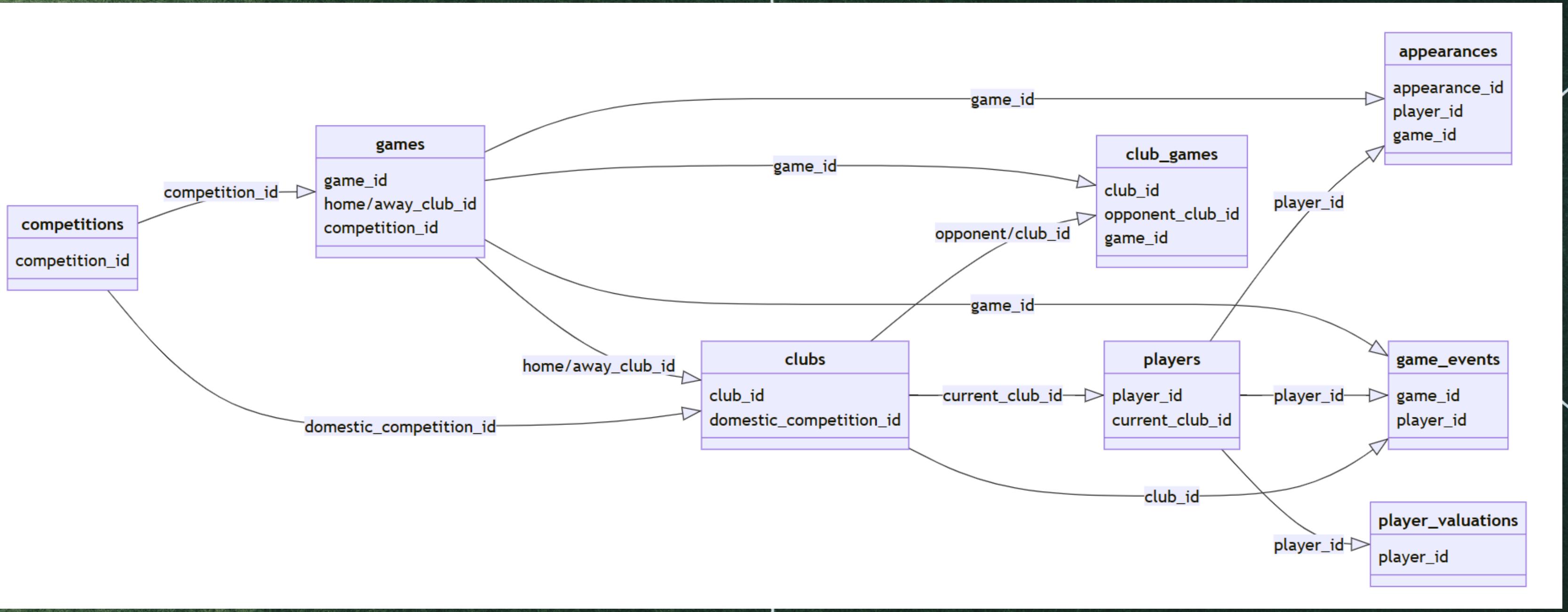
[View
Competitions](#)

[View
Clubs](#)

[View Club
Games](#)

[View
Appearances](#)

KEYS DIAGRAM



1- Clubs

INFORMATION

The table contains general information about clubs such as club name, squad size, domestic competition, stadium name and capacity.

Each row in the table is a club.

KEYS

Primary Key: club_id

Foreign Key:
domestic_competition_id
(references competitions table)

OPERATIONS

add/delete/update club
filter (search) by Club Name, Stadium Name, and Domestic Competition Name
sort clubs by the Number of Stadium Seats, Average Age, Number of National Team Players, and Foreigners Percentage descendingly.

club_id	club_code	name	domestic_competition_id	total_market_value	squad_size	average_age	foreigners_number	foreigners_percentage	national_team_players
1	3	1-fc-koln	1.FC Köln	L1	(NULL)	34	25	11	32
2	4	1-fc-numberg	(NULL)	L1	(NULL)	33	25	7	21
3	5	ac-mailand	AC Milan	IT1	(NULL)	30	27	24	80
4	6	adanaspor	(NULL)	TR1	(NULL)	10	24	4	40
5	10	arminia-bielefeld	(NULL)	L1	(NULL)	27	25	15	56
6	11	fc-arsenal	Arsenal FC	GB1	(NULL)	23	25	16	70
7	12	as-rom	AS Roma	IT1	(NULL)	28	26	19	68
8	13	atletico-madrid	Atlético de Madrid	ES1	(NULL)	22	29	15	68
9	15	bayer-04-leverkusen	Bayer 04 Leverkusen	L1	(NULL)	27	25	19	70
10	16	borussia-dortmund	Borussia Dortmund	L1	(NULL)	33	25	16	49
11	18	borussia-monchengladbach	Borussia Mönchengladbach	L1	(NULL)	27	26	15	56
12	19	brescia-calcio	(NULL)	IT1	(NULL)	28	25	12	43
13	20	bursaspor	(NULL)	TR1	(NULL)	26	21	0	(NULL)
14	23	eintracht-braunschweig	(NULL)	L1	(NULL)	29	26	9	31
15	24	eintracht-frankfurt	Eintracht Frankfurt	L1	(NULL)	30	25	18	60
16	27	fc-bayern-munchen	Bayern Munich	L1	(NULL)	27	26	16	59

2- Games

INFORMATION

Club names, coach names,
date, score, season
information about games

KEYS

Primary Key: `game_id`

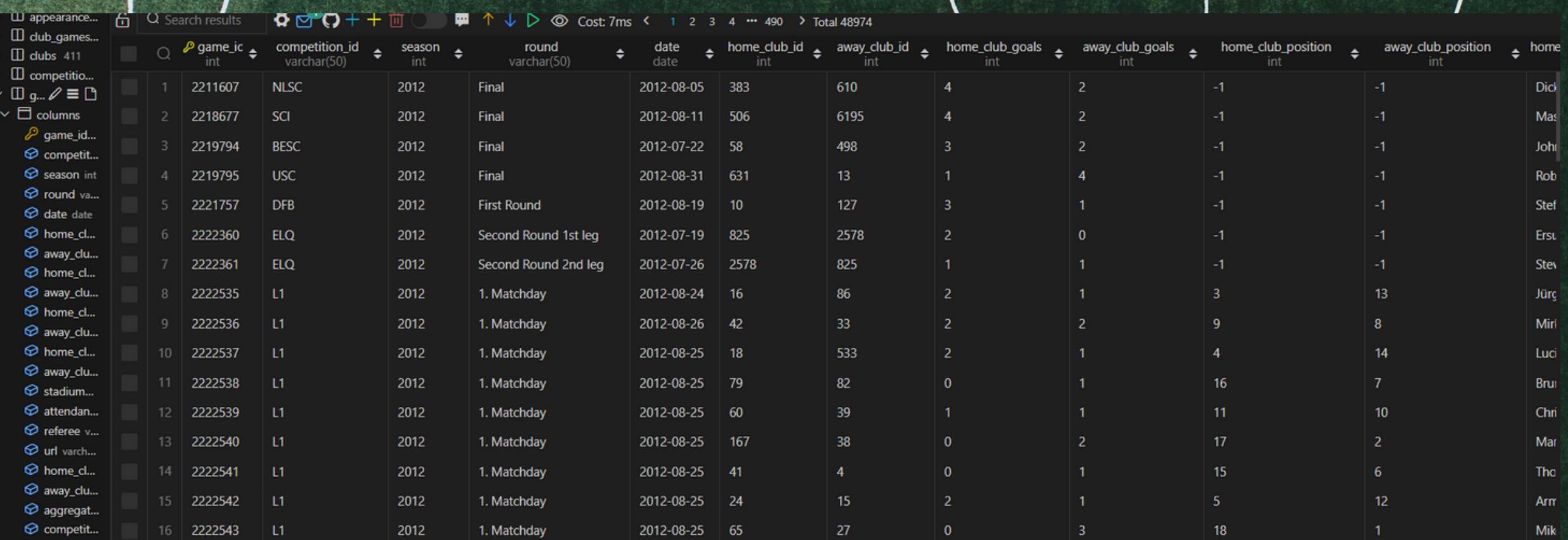
Foreign Keys:
`competition_id`

(references `competitions` table)
`home_club_id` and `away_club_id`
(references `clubs` table)

OPERATIONS

add/delete/update game

Filter (search) games by Competition ID, Round, Manager Name and Club name for both home and away clubs, Aggregate score, Competition Type, and Referee Name



The screenshot shows a database search interface with a table of game results. The table has columns: game_id, competition_id, season, round, date, home_club_id, away_club_id, home_club_goals, away_club_goals, home_club_position, away_club_position, and home_score.

	game_id	competition_id	season	round	date	home_club_id	away_club_id	home_club_goals	away_club_goals	home_club_position	away_club_position	home_score
1	2211607	NLSC	2012	Final	2012-08-05	383	610	4	2	-1	-1	Didi
2	2218677	SCI	2012	Final	2012-08-11	506	6195	4	2	-1	-1	Mas
3	2219794	BESC	2012	Final	2012-07-22	58	498	3	2	-1	-1	Joh
4	2219795	USC	2012	Final	2012-08-31	631	13	1	4	-1	-1	Rob
5	2221757	DFB	2012	First Round	2012-08-19	10	127	3	1	-1	-1	Stef
6	2222360	ELQ	2012	Second Round 1st leg	2012-07-19	825	2578	2	0	-1	-1	Ersu
7	2222361	ELQ	2012	Second Round 2nd leg	2012-07-26	2578	825	1	1	-1	-1	Stev
8	2222535	L1	2012	1. Matchday	2012-08-24	16	86	2	1	3	13	Jürg
9	2222536	L1	2012	1. Matchday	2012-08-26	42	33	2	2	9	8	Mir
10	2222537	L1	2012	1. Matchday	2012-08-25	18	533	2	1	4	14	Luci
11	2222538	L1	2012	1. Matchday	2012-08-25	79	82	0	1	16	7	Brui
12	2222539	L1	2012	1. Matchday	2012-08-25	60	39	1	1	11	10	Chri
13	2222540	L1	2012	1. Matchday	2012-08-25	167	38	0	2	17	2	Mar
14	2222541	L1	2012	1. Matchday	2012-08-25	41	4	0	1	15	6	Tho
15	2222542	L1	2012	1. Matchday	2012-08-25	24	15	2	1	5	12	Arr
16	2222543	L1	2012	1. Matchday	2012-08-25	65	27	0	3	18	1	Mik

Sort games by the Season, Attendance, Home Club Position, Away Club Position, Home Club Goals, Away Club Goals, and Date

3- Appearances

INFORMATION

This table contains columns like **appearance_id**, **game_id**, **player_id**, **player_club_id**, **player_current_club_id**, **date** etc.

KEYS

Primary key is **appereance_id**

Foreign keys are **player_id** and **game_id**

OPERATIONS

Delete an appearance

Add an appearance

Search using **player_id** etc.

Filtering and sorting using some features

Updating an appearance

The screenshot shows a database interface with a sidebar containing tables and a main area displaying a query result set. The sidebar lists tables such as 'columns', 'appearance...', 'game_id...', 'player_id...', 'player_club...', 'player_current_club...', 'date', 'player_name...', 'competitor...', 'yellow_cards', 'red_cards', 'goals', 'assists', 'minutes', 'index', 'partitions', 'club_games...', 'clubs 411', 'competition...', 'games 501...', 'players 27...', 'Views', 'Procedures', and 'Functions'. The main area shows a query result with the following columns: player_id, first_name, last_name, name, last_season, current_club_id, player_code, country_of_birth, city_of_birth, country_of_citizenship, and date_of_birth. The data includes rows for players like Miroslav Klose, Roman Weidenfeller, Dimitar Berbatov, Lúcio Starke, Tom Dedê, Christoph Metzelder, Tomas Rosicky, Marc Ziegler, Roque Santa Cruz, Gerald Asamoah, Tamás Hajnal, Sladan Peric, Sergio da Silva Pinto, Fabian Ernst, and Tomas Ujfaluši.

player_id	first_name	last_name	name	last_season	current_club_id	player_code	country_of_birth	city_of_birth	country_of_citizenship	date_of_birth
1	10	Miroslav	Klose	Miroslav Klose	2015	398	miroslav-klose	Poland	Opole	Germany 1978-06-09
2	26	Roman	Weidenfeller	Roman Weidenfeller	2017	16	roman-weidenfeller	Germany	Diez	Germany 1980-08-06
3	65	Dimitar	Berbatov	Dimitar Berbatov	2015	1091	dimitar-berbatov	Bulgaria	Blagoevgrad	Bulgaria 1981-01-30
4	77	(NULL)	Lúcio	Lúcio	2012	506	lucio	Brazil	Brasília	Brazil 1978-05-08
5	80	Tom	Starke	Tom Starke	2017	27	tom-starke	East Germany (GDR)	Freital	Germany 1981-03-18
6	109	(NULL)	Dedê	Dedê	2012	825	dede	Brazil	Belo Horizonte	Brazil 1978-04-18
7	123	Christoph	Metzelder	Christoph Metzelder	2012	33	christoph-metzelder	Germany	Haltern	Germany 1980-11-05
8	132	Tomas	Rosicky	Tomas Rosicky	2015	11	tomas-rosicky	CSSR	Praha	Czech Republic 1980-10-04
9	162	Marc	Ziegler	Marc Ziegler	2012	79	marc-ziegler	Germany	Blieskastel	Germany 1976-06-13
10	215	Roque	Santa Cruz	Roque Santa Cruz	2015	1084	roque-santa-cruz	Paraguay	Asunción	Paraguay 1981-08-16
11	258	Gerald	Asamoah	Gerald Asamoah	2013	33	gerald-asamoah	Ghana	Mampong	Germany 1978-10-03
12	264	Tamás	Hajnal	Tamás Hajnal	2012	79	tamas-hajnal	Hungary	Esztergom	Hungary 1981-03-15
13	276	Sladan	Peric	Sladan Peric	2013	20100	sladan-peric	(NULL)	(NULL)	Denmark 1982-04-15
14	277	Sergio	da Silva Pinto	Sergio da Silva Pinto	2013	3368	sergio-da-silva-pinto	Portugal	Vila Nova de Gaia	Germany 1980-10-16
15	299	Fabian	Ernst	Fabian Ernst	2012	10484	fabian-ernst	Germany	Hannover	Germany (NULL)
16	325	Tomas	Ujfaluši	Tomas Ujfaluši	2012	141	tomas-ujfalusi	CSSR	Rýmařov	Czech Republic 1978-03-24

4- Players

INFORMATION

This table contains columns like **player_id, first_name, last_name, name, last_season, current_club_id, player_code, country_of_birth, city_of_birth** etc.

KEYS

Primary key is **player_id**

Foreign key is **current_club_id**

OPERATIONS

Delete a player

Add a player

Search using **player_id, name etc.**

Filter and sort using some features

Update a player

Extra: Complex queries for player features

	player_id	first_name	last_name	name	last_season	current_club_id	player_code	country_of_birth	city_of_birth	country_of_citizenship	date
1	10	Miroslav	Klose	Miroslav Klose	2015	398	miroslav-klose	Poland	Opole	Germany	1978
2	26	Roman	Weidenfeller	Roman Weidenfeller	2017	16	roman-weidenfeller	Germany	Diez	Germany	1980
3	65	Dimitar	Berbatov	Dimitar Berbatov	2015	1091	dimitar-berbatov	Bulgaria	Blagoevgrad	Bulgaria	1981
4	77	(NULL)	Lúcio	Lúcio	2012	506	lucio	Brazil	Brasília	Brazil	1978
5	80	Tom	Starke	Tom Starke	2017	27	tom-starke	East Germany (GDR)	Freital	Germany	1981
6	109	(NULL)	Dedê	Dedê	2012	825	dede	Brazil	Belo Horizonte	Brazil	1978
7	123	Christoph	Metzelder	Christoph Metzelder	2012	33	christoph-metzelder	Germany	Haltern	Germany	1980
8	132	Tomas	Rosicky	Tomas Rosicky	2015	11	tomas-rosicky	CSSR	Praha	Czech Republic	1980
9	162	Marc	Ziegler	Marc Ziegler	2012	79	marc-ziegler	Germany	Blieskastel	Germany	1976
10	215	Roque	Santa Cruz	Roque Santa Cruz	2015	1084	roque-santa-cruz	Paraguay	Asunción	Paraguay	1981
11	258	Gerald	Asamoah	Gerald Asamoah	2013	33	gerald-asamoah	Ghana	Mampong	Germany	1978
12	264	Tamás	Hajnal	Tamás Hajnal	2012	79	tamas-hajnal	Hungary	Esztergom	Hungary	1981
13	276	Sladan	Peric	Sladan Peric	2013	20100	sladan-peric	(NULL)	(NULL)	Denmark	1982
14	277	Sergio	da Silva Pinto	Sergio da Silva Pinto	2013	3368	sergio-da-silva-pinto	Portugal	Vila Nova de Gaia	Germany	1980
15	299	Fabian	Ernst	Fabian Ernst	2012	10484	fabian-ernst	Germany	Hannover	Germany	(NL)
16	325	Tomas	Ujfalusi	Tomas Ujfalusi	2012	141	tomas-ujfalusi	CSSR	Rýmařov	Czech Republic	1978

NEXT

5– Competitions

INFORMATION

Table consists of features of each competition such as type, country, and confederation. Each row represents a competition.

KEYS

Primary key: competition_id

OPERATIONS

Search by name, competition code, or competition ID

Add new competition

Update a feature of the competition

Delete a competition from the table

Sort and filter by competition code, name, type, subtype, country, or confederation

competition_id	competition_code	name	sub_type	type	country_id	country_name	domestic_league_code	confederation	url
1	BE1	jupiter-pro-league	jupiter-pro-league	first_tier	domestic_league	19	Belgium	BE1	europa
2	BESC	belgian-supercup	belgian-supercup	domestic_super_cup	other	19	Belgium	BE1	europa
3	CDR	copa-del-rey	copa-del-rey	domestic_cup	domestic_cup	157	Spain	ES1	europa
4	CGB	efl-cup	efl-cup	league_cup	other	189	England	GB1	europa
5	CIT	italy-cup	italy-cup	domestic_cup	domestic_cup	75	Italy	IT1	europa
6	CL	uefa-champions-league	uefa-champions-league	uefa_champions_league	international_cup	-1	(NULL)	(NULL)	europa
7	CLQ	uefa-champions-league-qu	uefa-champions-league-qu	uefa_champions_league_qu	international_cup	-1	(NULL)	(NULL)	europa
8	DFB	dfb-pokal	dfb-pokal	domestic_cup	domestic_cup	40	Germany	L1	europa
9	DFL	dfl-supercup	dfl-supercup	domestic_super_cup	other	40	Germany	L1	europa
10	DK1	superligaen	superligaen	first_tier	domestic_league	39	Denmark	DK1	europa
11	DKP	sydbank-pokalen	sydbank-pokalen	domestic_cup	domestic_cup	39	Denmark	DK1	europa
12	ECLQ	uefa-europa-conference-le	uefa-europa-conference-le	uefa_europa_conference_le	international_cup	-1	(NULL)	(NULL)	europa
13	EL	europa-league	europa-league	europa_league	international_cup	-1	(NULL)	(NULL)	europa
14	ELQ	europa-league-qualifikati	europa-league-qualifikati	europa_league_qualifying	international_cup	-1	(NULL)	(NULL)	europa
15	ES1	laliga	laliga	first_tier	domestic_league	157	Spain	ES1	europa
16	FAC	fa-cup	fa-cup	domestic_cup	domestic_cup	189	England	GB1	europa

6- Club Games

INFORMATION

Table consists of features of each club game such as goals, position, manager name, and result. Each row represents the game record for a specific club.

KEYS

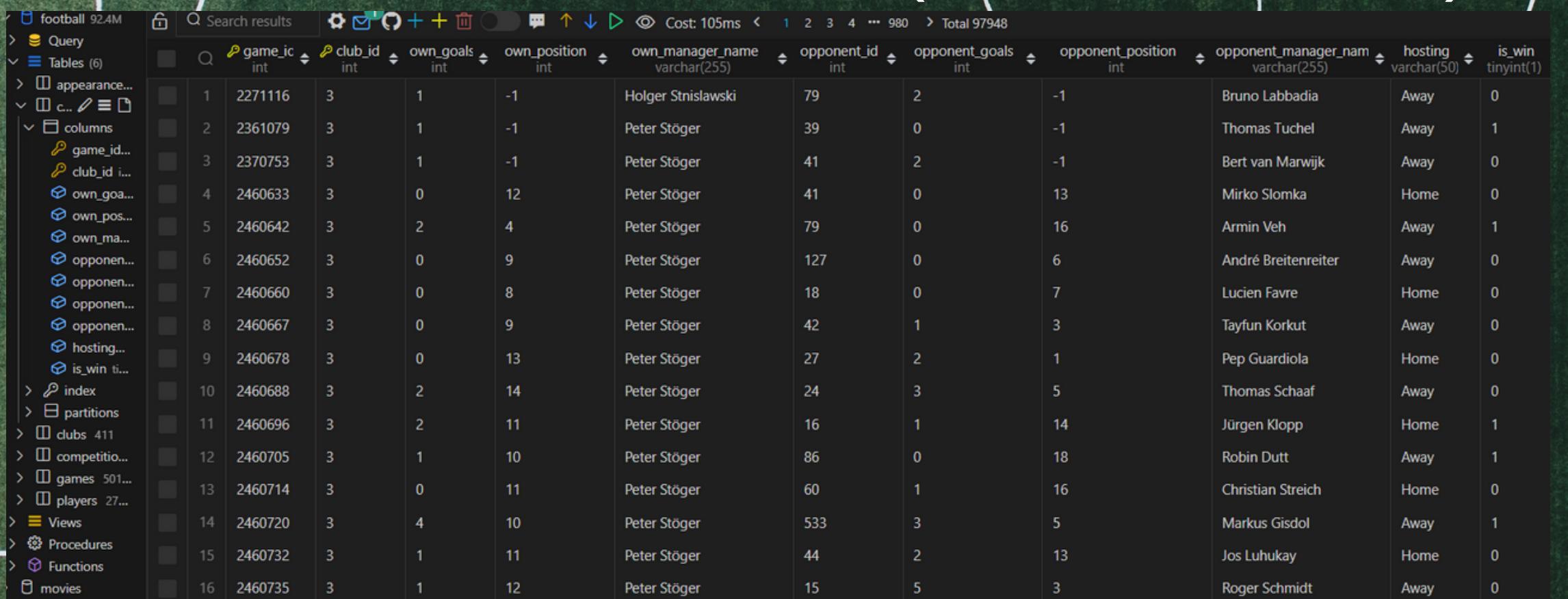
Primary Key:
(club_id, game_id)

Foreign Key:
game_id
(references games table)

club_id and opponent_id
(references clubs table)

OPERATIONS

Search by game ID, club ID, or club name
Add new club game
Update a feature of the club game
Delete a club game from the table
Sort by goals and position
Filter by manager name, hosting, or game result



The screenshot shows a database interface with a sidebar containing tables like 'clubs', 'appearances', 'players', etc., and a main area displaying a table of club game records. The table has columns: game_id, club_id, own_goals, own_position, own_manager_name, opponent_id, opponent_goals, opponent_position, opponent_manager_name, hosting, and is_win. The data shows various managers like Peter Stöger, Holger Stnislawski, Bruno Labbadia, Thomas Tuchel, Bert van Marwijk, Mirko Slomka, Armin Veh, André Breitenreiter, Lucien Favre, Tayfun Korkut, Pep Guardiola, Thomas Schaaf, Jürgen Klopp, Robin Dutt, Christian Streich, Markus Gisdol, Jos Luhukay, and Roger Schmidt across different positions and host clubs.

	game_id	club_id	own_goals	own_position	own_manager_name	opponent_id	opponent_goals	opponent_position	opponent_manager_name	hosting	is_win
1	2271116	3	1	-1	Holger Stnislawski	79	2	-1	Bruno Labbadia	Away	0
2	2361079	3	1	-1	Peter Stöger	39	0	-1	Thomas Tuchel	Away	1
3	2370753	3	1	-1	Peter Stöger	41	2	-1	Bert van Marwijk	Away	0
4	2460633	3	0	12	Peter Stöger	41	0	13	Mirko Slomka	Home	0
5	2460642	3	2	4	Peter Stöger	79	0	16	Armin Veh	Away	1
6	2460652	3	0	9	Peter Stöger	127	0	6	André Breitenreiter	Away	0
7	2460660	3	0	8	Peter Stöger	18	0	7	Lucien Favre	Home	0
8	2460667	3	0	9	Peter Stöger	42	1	3	Tayfun Korkut	Away	0
9	2460678	3	0	13	Peter Stöger	27	2	1	Pep Guardiola	Home	0
10	2460688	3	2	14	Peter Stöger	24	3	5	Thomas Schaaf	Away	0
11	2460696	3	2	11	Peter Stöger	16	1	14	Jürgen Klopp	Home	1
12	2460705	3	1	10	Peter Stöger	86	0	18	Robin Dutt	Away	1
13	2460714	3	0	11	Peter Stöger	60	1	16	Christian Streich	Home	0
14	2460720	3	4	10	Peter Stöger	533	3	5	Markus Gisdol	Away	1
15	2460732	3	1	11	Peter Stöger	44	2	13	Jos Luhukay	Home	0
16	2460735	3	1	12	Peter Stöger	15	5	3	Roger Schmidt	Away	0

Search by name or player ID...

Sort and Filter Players

Add Player

Players

Player ID	First Name	Last Name	Full Name	Last Season	Current Club Name	Player Code	Country of Birth	City of Birth	Country of Citizenship	Date of Birth	Sub Position	Position
10	Miroslav	Klose	Miroslav Klose	2015	SS Lazio	miroslav-klose	Poland	Opole	Germany	1978-06-09	Centre-Forward	Attack
26	Roman	Weidenfeller	Roman Weidenfeller	2017	Borussia Dortmund	roman-weidenfeller	Germany	Diez	Germany	1980-08-06	Goalkeeper	Goalkeeper
65	Dimitar	Berbatov	Dimitar Berbatov	2015	PAOK Thessaloniki	dimitar-berbatov	Bulgaria	Blagoevgrad	Bulgaria	1981-01-30	Centre-Forward	Attack
77	None	Lúcio	Lúcio	2012	Juventus FC	lucio	Brazil	Brasília	Brazil	1978-05-08	Centre-Back	Defender
80	Tom	Starke	Tom Starke	2017	Bayern Munich	tom-starke	East Germany (GDR)	Freital	Germany	1981-03-18	Goalkeeper	Goalkeeper
109	None	Dedê	Dedê	2012	None	dede	Brazil	Belo Horizonte	Brazil	1978-04-18	Left-Back	Defender

VIEW AND SEARCH

After clicking one of the buttons in the main page, table about the related subject appears on the screen. Each row represents a record about this subject and the search bar above can be used to reach specific records easily.

INSERT

Clicking on the “Add” button, new records can be added to related table. Properties with the red star symbols must be filled to insert the new row.

Add Player

Player ID: * e.g. 1234

First Name: * e.g. John

Last Name: * e.g. Smith

Last Season: e.g. 2017

Current Club ID: e.g. 2345

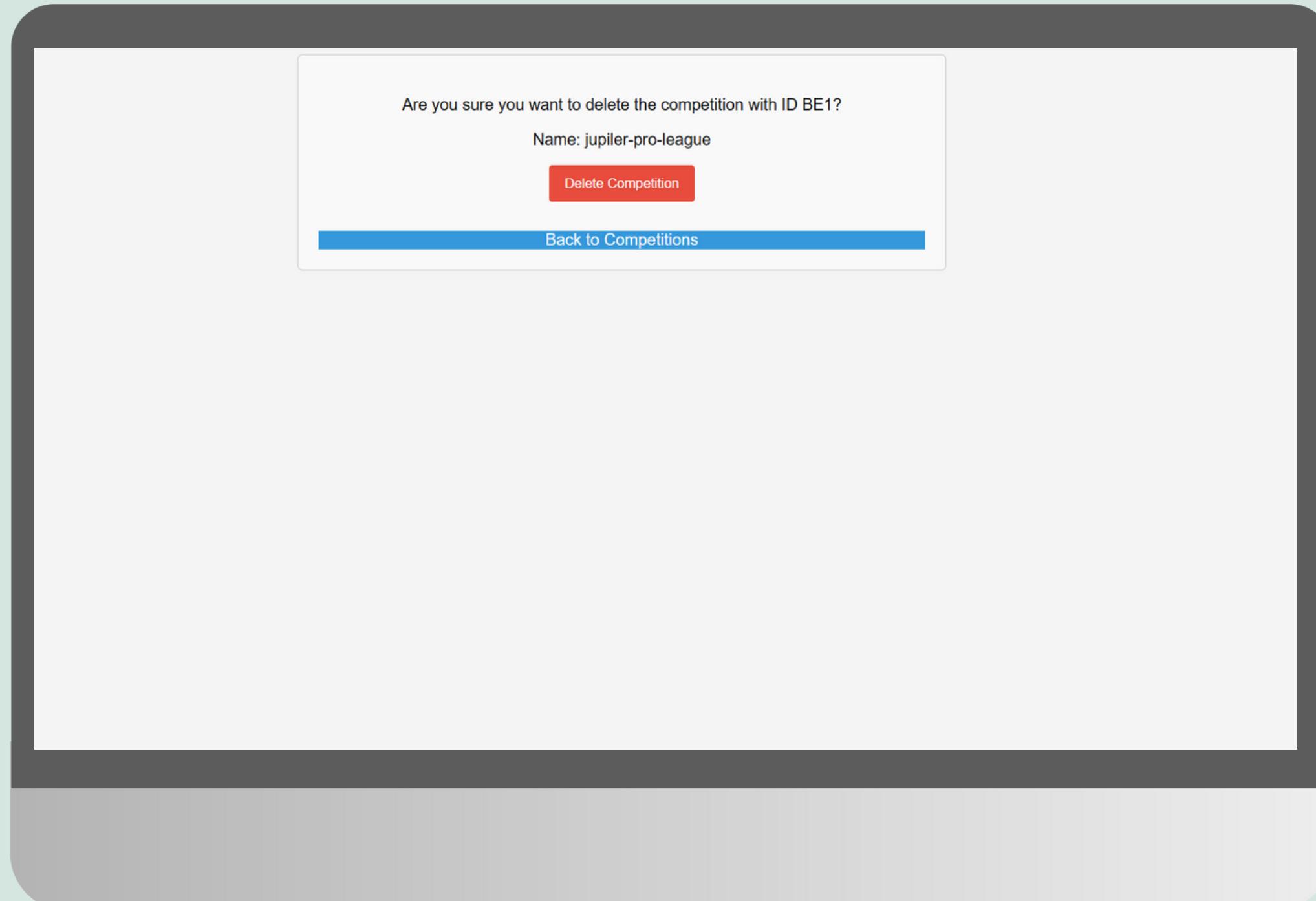
Player Code: e.g. john-smith

Country of Birth: e.g. England

City of Birth: e.g. London

DELETE

Using the cross button which can be seen in the right of the each row, a specific record can be removed from the table.



UPDATE

Using the “pen” button which can be seen in the right of the each row, some of the properties of a record can be changed.

Update Club Game

Own Goals:

Own Position:

Own Manager Name: Holger Stnislawski

Opponent Goals:

Opponent Position:

Opponent Manager Name: Bruno Labbadia

Hosting: Away

Is Win:

[Back to Competitions](#)

Sort and Filter Competitions

Competition Code: Name: Subtype: Type:

Country Name: Confederation: Sort By: Competition Code

Competition ID	Competition Code	Name	Subtype	Type	Country ID	Country Name	Domestic League Code
BE1	jupiler-pro-league	jupiler-pro-league	first_tier	domestic_league	19	Belgium	BE1
BESC	belgian-supercup	belgian-supercup	domestic_super_cup	other	19	Belgium	BE1
CDR	copa-del-rey	copa-del-rey	domestic_cup	domestic_cup	157	Spain	ES1
CGB	efl-cup	efl-cup	league_cup	other	189	England	GB1
CIT	italy-cup	italy-cup	domestic_cup	domestic_cup	75	Italy	IT1
CL	uefa-champions-league	uefa-champions-league	uefa_champions_league	international_cup	-1	None	None
CLQ	uefa-champions-league-qualifikation	uefa-champions-league-qualifikation	uefa_champions_league_qualifying	international_cup	-1	None	None
DFB	dfb-pokal	dfb-pokal	domestic_cup	domestic_cup	40	Germany	L1
DFL	dfl-supercup	dfl-supercup	domestic_super_cup	other	40	Germany	L1

SORT-FILTER

After clicking the “Sort and Filter” button, specific records can be reached by their some properties. In each table there are different options for sorting and filtering.

COMPLEX QUERIES

CLUBS TABLE

```
query = """SELECT c.*,
    REPLACE(comp.name, '-', ' ') AS competition_name
FROM clubs c
LEFT JOIN competitions comp
ON c.domestic_competition_id = comp.domestic_league_code
WHERE comp.type LIKE 'domestic_league'
ORDER BY club_id ASC
LIMIT %s OFFSET %s"""
```

In this query, we join clubs table with competitions table so we can use competition name instead of competition ID. Also its important to only join them when competition type is domestic league to prevent multiple clubs, and update competition name for clean result.

COMPLEX QUERIES

GAMES TABLE

```
query = """SELECT g.*,
    REPLACE(comp.name, '-', ' ') AS competition_name,
    CONCAT(CAST(g.home_club_goals AS CHAR), '-', CAST(g.away_club_goals AS CHAR)) AS score,
    home_club.name AS home_club_name,
    away_club.name AS away_club_name
FROM games g
LEFT JOIN competitions comp ON g.competition_id = comp.competition_id
LEFT JOIN clubs home_club ON g.home_club_id = home_club.club_id
LEFT JOIN clubs away_club ON g.away_club_id = away_club.club_id
ORDER BY g.game_id ASC
LIMIT %s OFFSET %s
"""
```

In this query, we join games table with competitions table, and clubs so we can use competition name instead of competition ID and club names instead of club IDs. Also we merge home_club_goals and away_club_goals as 'score' column.

```
query = """SELECT p.player_id, p.name, SUM(a.goals) AS total_goals  
FROM players p  
LEFT JOIN appearances a ON p.player_id = a.player_id  
GROUP BY p.player_id, p.name  
ORDER BY total_goals DESC  
LIMIT %s OFFSET %s"""
```

COMPLEX QUERIES

PLAYERS TABLE

This query shows total goals of players by joining tables appearance and player and using group by.

COMPLEX QUERIES

APPEARANCES

TABLE

```
query = """SELECT c.club_id, c.name, AVG(a.goals) AS avg_goals_per_game
FROM clubs c
JOIN appearances a ON c.club_id = a.player_club_id
GROUP BY c.club_id, c.name
HAVING AVG(a.goals) > 0.15
ORDER BY avg_goals_per_game DESC
LIMIT %s OFFSET %s
"""
```

This query shows average goals of clubs which are greater than 0.15 by joining appearances and clubs table and grouping the clubs.

COMPLEX QUERIES CLUB GAMES TABLE

```
query = """SELECT g.home_club_name, g.away_club_name,  
    SUM(CG.own_goals + CG.opponent_goals) AS total_goals  
FROM club_games CG  
JOIN games g ON CG.game_id = g.game_id  
GROUP BY g.home_club_name, g.away_club_name  
HAVING g.home_club_name IS NOT NULL AND g.away_club_name IS NOT NULL  
ORDER BY total_goals DESC  
LIMIT 10"""
```

This query lists top 10 competitors which has maximum goal count. The list consists of home club name, away club name, and sum of the goal counts so far.

COMPLEX QUERIES

CLUB GAMES

TABLE

```
query = """SELECT cg.game_id, cg.club_id, c1.name, cg.own_goals, cg.own_position,
    cg.own_manager_name, cg.opponent_id, c2.name, cg.opponent_goals,
    cg.opponent_position, cg.opponent_manager_name, cg.hosting, cg.is_win
FROM club_games cg
LEFT JOIN clubs c1 ON cg.club_id = c1.club_id
LEFT JOIN clubs c2 ON cg.opponent_id = c2.club_id
WHERE cg.game_id = %s OR cg.club_id = %s OR
cg.opponent_id = %s OR c1.name LIKE %s OR c2.name LIKE %s
ORDER BY cg.game_id DESC LIMIT %s OFFSET %s"""
```

In this query, we join club games table with clubs table to use club name and opponent club game instead of club IDs. Then, we order by the game ID.



THANK YOU