CPSC 304 Project Cover Page

Milestone #: 4

Date: December 1, 2023

Group Number: 2

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your email address, and then let us assign you to a TA for your project supervisor.) In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia.

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Project Summary -

The focus of our project will be a sports management system, particularly for Soccer (Football) which can track various entities and attributes throughout the league. We built a website that enables users to perform actions such as editing or deleting athletes, determining game statistics, or simply viewing the current standings & past scores.

Using queries, we were able to present team specific statistics such as championship contender teams, notable coaches and referees, standings for the league, and statistics for recent games. We implemented search options such as finding games by venue, determining sponsors filtered by their attributes and showing tables from the database given any number of attributes. Users are able to see the effects of editing athletes' profiles across the entire website thanks to a controlled approach to foreign keys and cascading deletions.

Changes to the Schema -

Changes to **Statistics**:

- `shot_accuracy` was removed as it could be calculated through the use of an aggregation
- `games_played` and `passing_percent` are also removed by similar reasoning; for example we could obtain passing percent by using a GROUP BY operation on `passes_attempted` and `turnovers`.

Event was renamed to **Game** to be more specific (previously we considered having different types of events such as practices, tournaments, etc.) Additionally, we specify `home` and `away` attributes for each Game so we can keep track of which teams are involved in each game.

The relationship tables (and INSERT statements) of **PlaysFor** and **Coaches** were removed as the structure was altered to be many-to-one.

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The Schema -

Schema for Entities

Person(<u>person_id</u>, name, birthdate, phone_number, email, address, height, weight, date_started)

Athlete(**person_id**, jersey_num, **current_team**, salary)

Coach(<u>person_id</u>, <u>current_team</u>, specialization)

Referee(<u>person_id</u>, certification_level)

Statistics(<u>stats_id</u>, **person_id**, **game_id**, goals, shots_taken, passes_attempted, turnovers, possession_percent)

Awards(<u>award_id</u>, year, award_name)

Sponsor(<u>sponsor_name</u>, sponsor_email, money_granted)

Venue(venue_address, venue_name, capacity)

Game(game_id, home, away, game_date)

Team(<u>team_name</u>, team_owner, **home_venue_address**)

Injury(**person_id**, <u>injury_type</u>, <u>injury_date</u>, injury_status)

Schema for Relationships

ParticipatesIn(game id, home, away)

LocatedIn(game id, venue address)

HasSponsor(<u>team_name</u>, <u>sponsor_name</u>)

GivenBy(sponsor name, award id)

WinsAward(<u>award_id</u>, person_id, team_name)

Referees(person id, game id)

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Location of the single SQL Script

See <u>server/sql-scripts/init.sql</u> in the GitHub repository, or by clicking <u>here</u>.

Comment on Triggers/Assertions for Total Participation

In our database design we have a many-to-one total participation constraint between **Statistics** and **Game**, since **Game** has its own table we would need Assertions to check if all instances of **Game** are also included in **Statistics**. To achieve this, we would need made several changes to ensure total participation holds:

Implement a trigger that does the following:

- 1. Before any insert to the **Game** table, get the game id of that insertion
- 2. Checks if the game id exists in our **Statistics** table
- 3. If it doesn't exist, throw an error that say the insertion will violate our total participation constraint

Implement a second trigger that:

- 1. Before any delete to the **Statistics** table, get the game id of instance we are deleting
- 2. Checks the **Statistics** table to see if there are at least two entries containing that game_id
- 3. If not, throw an error which informs us that our delete operation will violate total participation

We would also need to remove the NOT NULL constraint for game_id in **Statistics** to ensure that the initialization of the table when starting up is possible.

Since this is quite complicated to implement, we will simply ensure that the SQL DDL we wrote obeys total participation rules.

PDF of the Schema and the Data For Each Relation

These can be found in the repo, in the folder <u>milestones/Milestone4/DataBase</u>. We used Excel to process and format the data, and then converted it to PDF format. This <u>link</u> is also clickable.

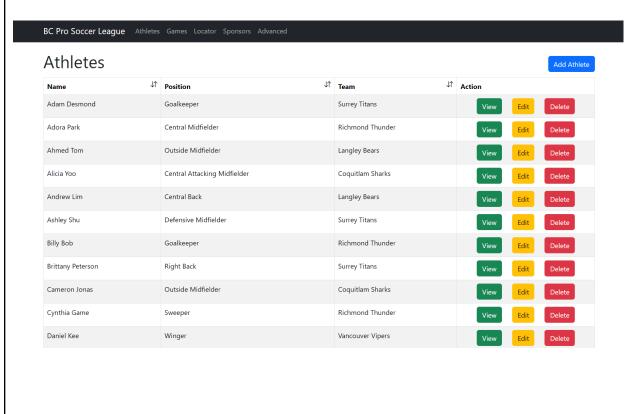
Code Locations and Query Screenshots -

Note that all SQL query-related code can be located in <u>server/dbQueries.js</u>. We will simply refer to this as <u>dbQueries.js</u> for brevity.

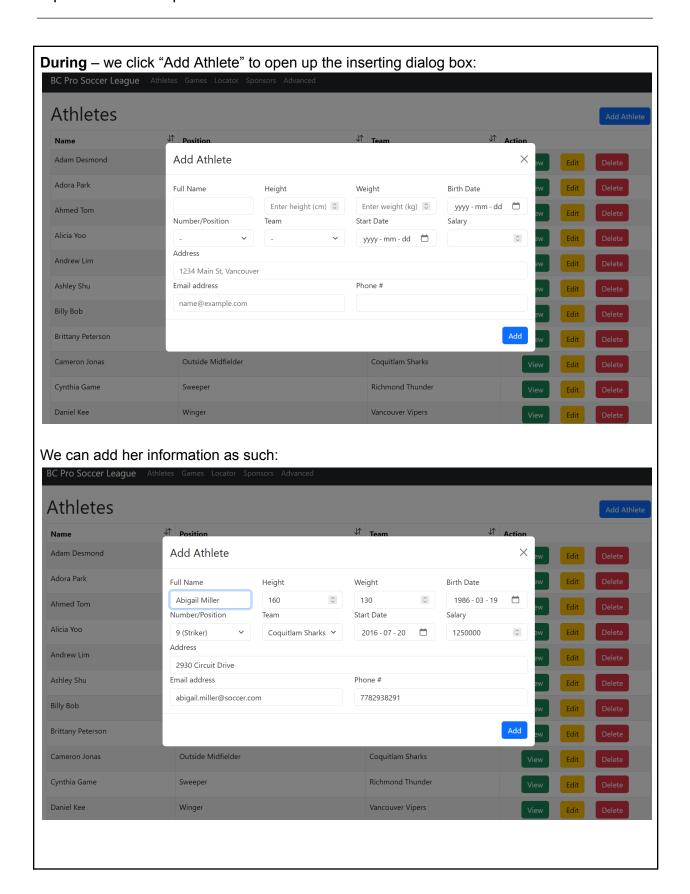
INSERT - dbQueries.js, lines 105 - 117; 68 - 69; 78 - 79

Allows for the insertion of new athletes to the database. For this example we will add a player named **Abigail Miller** to the database in the Athletes tab.

Before – Start from the Athletes page on the top bar. There is no player named Abigail Miller in the database. This is evident as we can sort by alphabetical (first name).

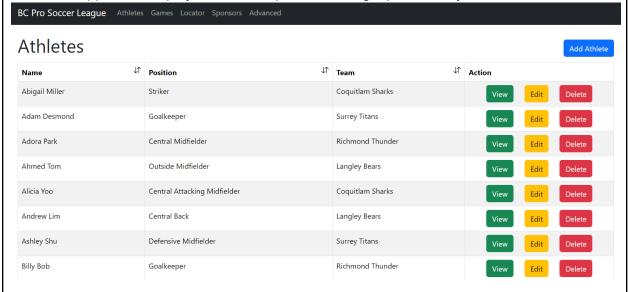


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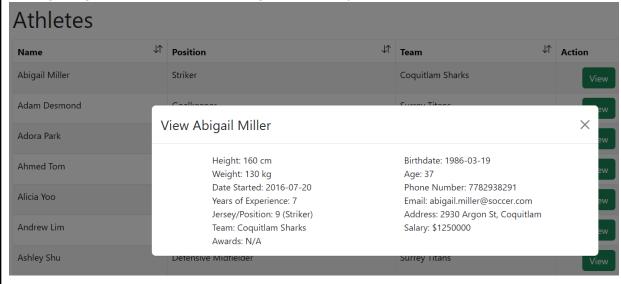


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After – once we click add, we can see she was successfully inserted into the database. Our front end happens to display her at the top when sorting alphabetically.



Further, we can confirm all our information (phone #, email, etc.) was successfully inserted by clicking the green "View" button on Abigail's row entry:

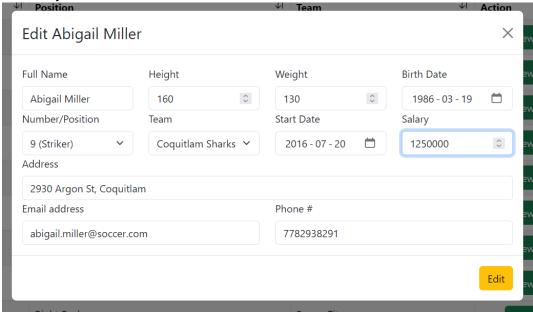


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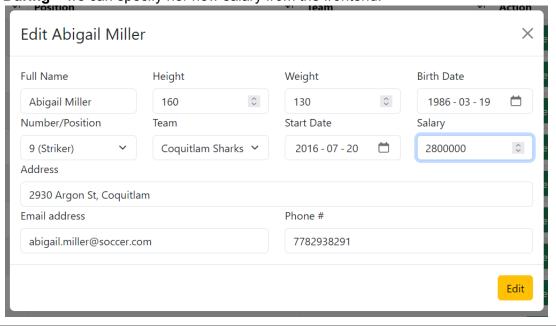
UPDATE – dbQueries.js, lines 184 - 196; 68 - 69; 78 - 79; 156 - 158

Allows for the editing of a player's profile which would go into the database. For this example we will increase **Abigail Miller's** salary from 1.25 million to 2.80 million per year.

Before – Starting from the Athletes page on the top bar, we can click "edit" and observe her old salary of 1.25M –



During – we can specify her new salary from the frontend:



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After – Once we confirm our edit, the UPDATE query will be sent to the backend. We can see our changes go through by clicking "View":

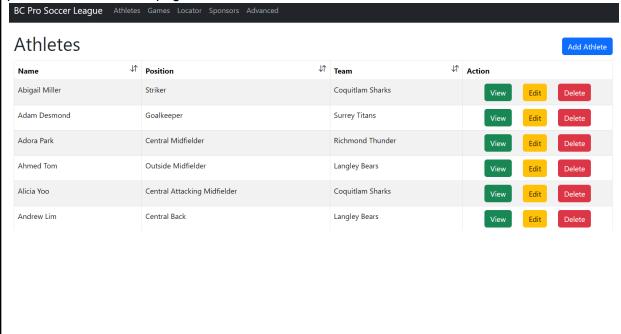


Which shows her salary to now be \$2 800 000.

DELETE - dbQueries.js, lines 142 - 143

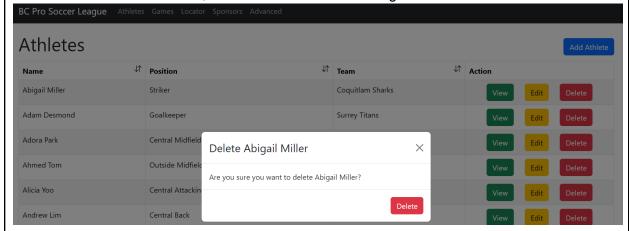
Allows for the deletion of existing athletes from the database. For our example we will delete **Abigail Miller** from our database.

Before – Start from the Athletes page on the top bar. We can observe that Abigail Miller is still present in our athletes page:

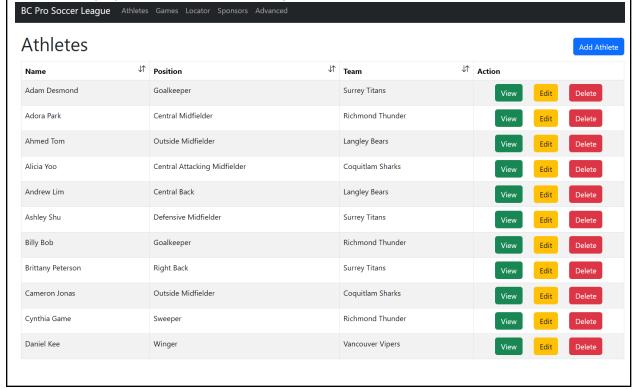


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During – We can click the red "delete" button, and this dialog box will appear asking for confirmation. Once confirmed, the DELETE statement will go to our database.



After – The delete is confirmed, and Abigail is removed from the database. If we sort alphabetically by first name, she is no longer present.

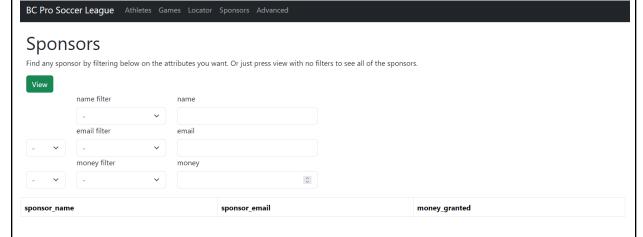


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SELECTION - dbQueries.js, lines 612 - 614

Allows for filtering the sponsors list by name, email, or money granted. For this example we will find sponsors who have **Sponsor Name** as **UBC**, or have **granted at least \$60 000**.

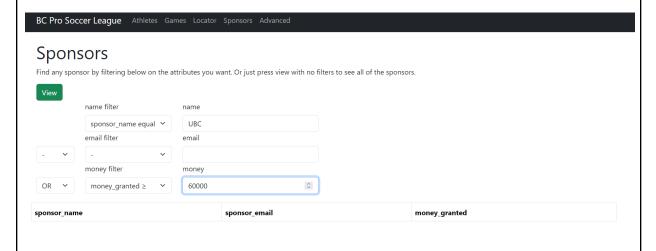
Before – Open the Sponsors tab from the top menu. We observe that our criteria is blank and no result tables are present:



During -

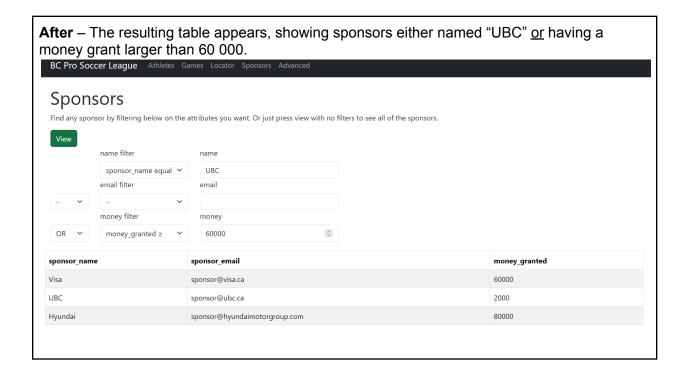
We will set the conditions for our example query:

- Name = "UBC", <u>OR</u>
- Money ≥ 60 000



Note that we can leave the "email filter" blank as we are not using it for this example. Now we can click "view" to proceed with the Selection.

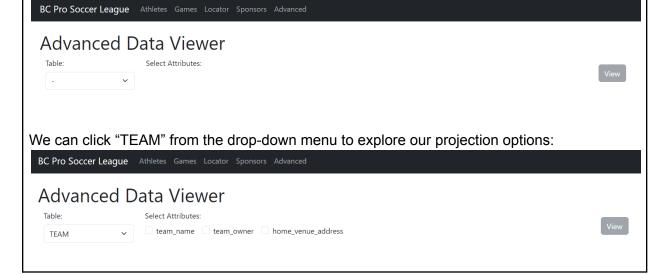
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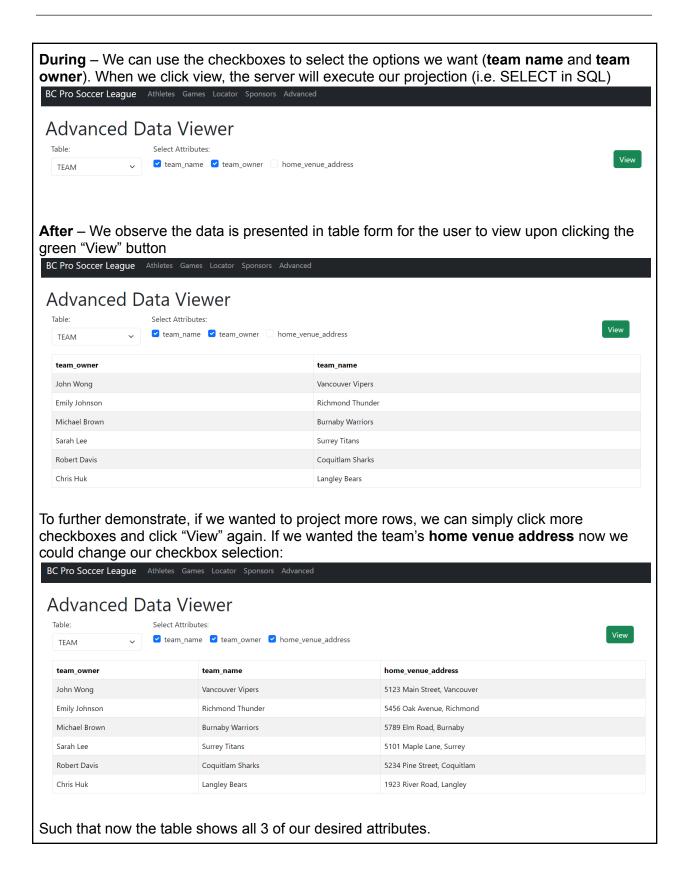
Projection - dbQueries.js, lines 222 - 229; 240 - 242; 253

Demonstrated in the advanced data viewer, allowing users to select which attributes they wish to see. For this example let us say we want to know the **team owner** for each **Team**, and we do not care about the **home venue address**.

Before – navigate to the Advanced Data Viewer in the top menu. There will initially be no tables selected and no data shown.



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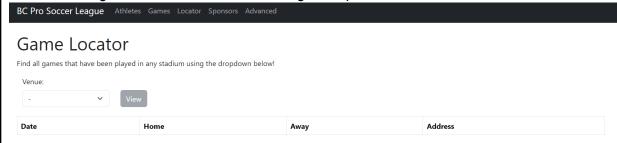


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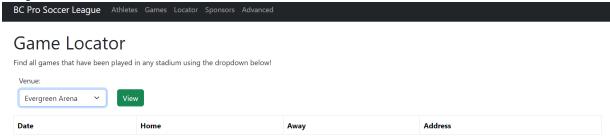
JOIN - dbQueries.js, lines 583 - 584; 595 - 598

Joined the **Game**, **LocatedIn**, and **Venue** tables to allow a user to learn more about games played at a venue of their choosing. For this example say we want to learn all games (and some extra information) played at **Evergreen Arena**.

Before – Navigate to the Game Locator along the top bar. It will be blank to start:

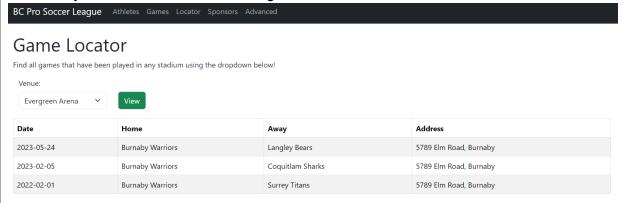


During – We can specify which arena we want (here we select "Evergreen Arena") and click the green "View" button:



The guery will join the Venue, LocatedIn, and Game tables to obtain our resulting table.

After – The table detailing all games is shown below. We can also observe the date, home team, away team, and address of these games.



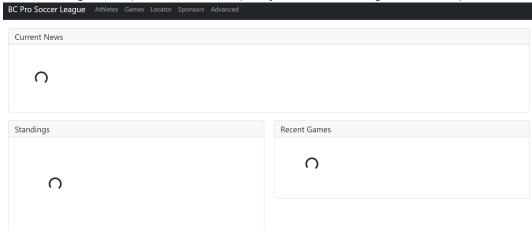
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Aggregation + GROUP BY – dbQueries.js, lines 262 - 381

Used in the standings table on the homepage, which is determined by games played, wins, draws & losses for each team

Before – This query is present on the homepage, so the tables are retrieved on page load. There is thus no significant action for the before stage.

During – The tables and queries are fetched on page load or refresh, Typically this step does not take long, but if (for some reason) they take a little longer to load, spinners are present.



After – The standings tables are shown as below. Generating these tables involves multiple chaining Aggregation + GROUP BY statements, so please view the code for further implementation details.



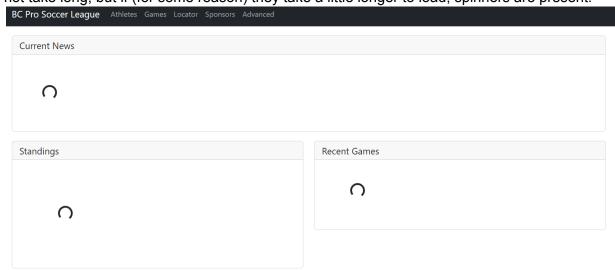
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Aggregation + HAVING - dbQueries.js, lines 501 - 505

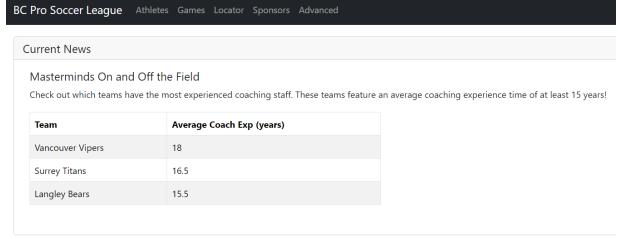
Demonstrated with the 'most experienced coaching staff' announcement on the homepage, where only teams featuring a high enough average year count were included

Before – This query is present on the homepage, so the tables are retrieved on page load. There is thus no significant action for the before stage.

During – The tables and queries are fetched on page load or refresh, Typically this step does not take long, but if (for some reason) they take a little longer to load, spinners are present.



After – The coaching tables will be loaded as below. We required included coaches to have an average coaching experience time of at least 15 years for this table:



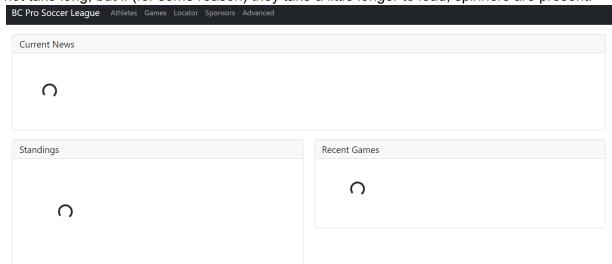
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Nested Aggregation + GROUP BY – dbQueries.js, lines 395 - 430

Used in the 'championship favourites' announcement on the home page, determined as the team with their average goals scored per game as the maximum over all the teams' average goals per game across the whole league

Before – This query is present on the homepage, so the tables are retrieved on page load. There is thus no significant action for the before stage.

During – The tables and queries are fetched on page load or refresh, Typically this step does not take long, but if (for some reason) they take a little longer to load, spinners are present.



After – the championship contender team should be loaded and highlighted in a green alert box. This metric is calculated over multiple SQL statements and is best described as the team with their average goals scored per game as the maximum over all the teams' average goals per game, thus requiring the nested aggregation + GROUP BY.

Current News Championship Favourites Here is the championship favourite for this season: Langley Bears: 3.6 average goals per game This team features an average goals scored per game as the maximum over all the teams' average goals per game across the whole league!	3C Pro Soccer League	Athletes Games Locator Sponsors Advanced
Here is the championship favourite for this season: Langley Bears: 3.6 average goals per game	Current News	

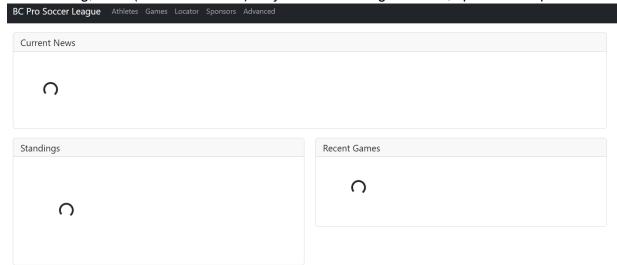
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DIVISION – dbQueries.js, lines 515 - 523

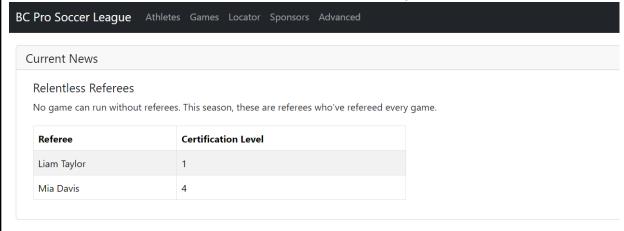
Shown in the 'Relentless Referees' shoutout on the homepage, which lists all referees who have officiated all games

Before – This query is present on the homepage, so the tables are retrieved on page load. There is thus no significant action for the before stage.

During – The tables and queries are fetched on page load or refresh, Typically this step does not take long, but if (for some reason) they take a little longer to load, spinners are present.



After – Once the data has been successfully fetched, it will appear as below. We can observe the name and certification level of each that has officiated all games.



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Code Locations For Additional (non-required) Queries:

Sanitization – dbQueries.js, lines 538 - 548; 563 - 573

Allows for a lookup of all emails and phone numbers to ensure no duplicate phone numbers are present

Displaying Basic Athlete Information – *dbQueries,js, lines* 56 - 58

Used in generating the table that appears on Athletes page

Get Awards For a Given Player – dbQueries.js, lines 208 - 210

Used for fetching awards for a given player