SAVONIA

PROJECT REPORT – BACHELOR'S DEGREE PROGRAMME

TECHNOLOGY, COMMUNICATION AND TRANSPORT

FOOTBALL LEAGUE DATABASE

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Abstract

The Bangladesh Football League Database Project attempts to automate and simplify a football league's record-keeping.

Through the painstaking creation of five separate tables (Teams, Players, Matches, Goals, and Results), we establish a productive approach for handling important information. SQL commands are used in the project's operation to construct tables, views, and triggers. Interestingly, the Goal Insertion Trigger dynamically modifies pertinent data, but the Match Completion Trigger automatically updates match statuses. The database structure is represented graphically in the ER diagram.

All things considered, this project broadens our knowledge of SQL, database design, and sports data management while providing insightful information that is not just relevant to football.

Keywords
Database, SQL, Mysql

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PICTURE LIST

1 INTRODUCTION

1.1 Project Overview

The Bangladesh Football League database project was created with a view of effectively managing and automating a football league's record-keeping. Teams, Players, Matches, Goals, and Results are the five separate tables that include the data for the four teams. Every table has several columns designed to meet particular data needs. Goals and results are automatically updated in the database according to the status of the match, which can be "Scheduled," "In Progress," or "Finished." When a match is finished, the Results table is updated with the new scores and goals. The shift from "In Progress" to "Finished" denotes the start of a match. Triggers that are dependent on changes in the match status make this automation easier.

This project gives a excellent idea to design a database for the teams. This knowledge and idea could be use in different purpose in future.

1.2 Project Insights

This project is a great example of database design for the sports industry. The adaptability and scalability of the design is demonstrated by the insights and approaches used here, which may be modified for a variety of new uses.

2 DESIGN DECISIONS

The five different tables have been created using the SQL command (CREATE TABLE Teams (column..);). I have created all the tables first according to the given instructions. The command I used was a normal basic command to create the table structure. When I created all the tables, views, triggers, and the whole database, I imagined that I was working for a company, and I had to do my best to complete the project. There are several ways to create the table structure; I particularly used this one because it is easy to use and clear to understand. Furthermore, I could create the table and insert the data into the table at the same time. Figure 1 refers to the ER diagram of my database.

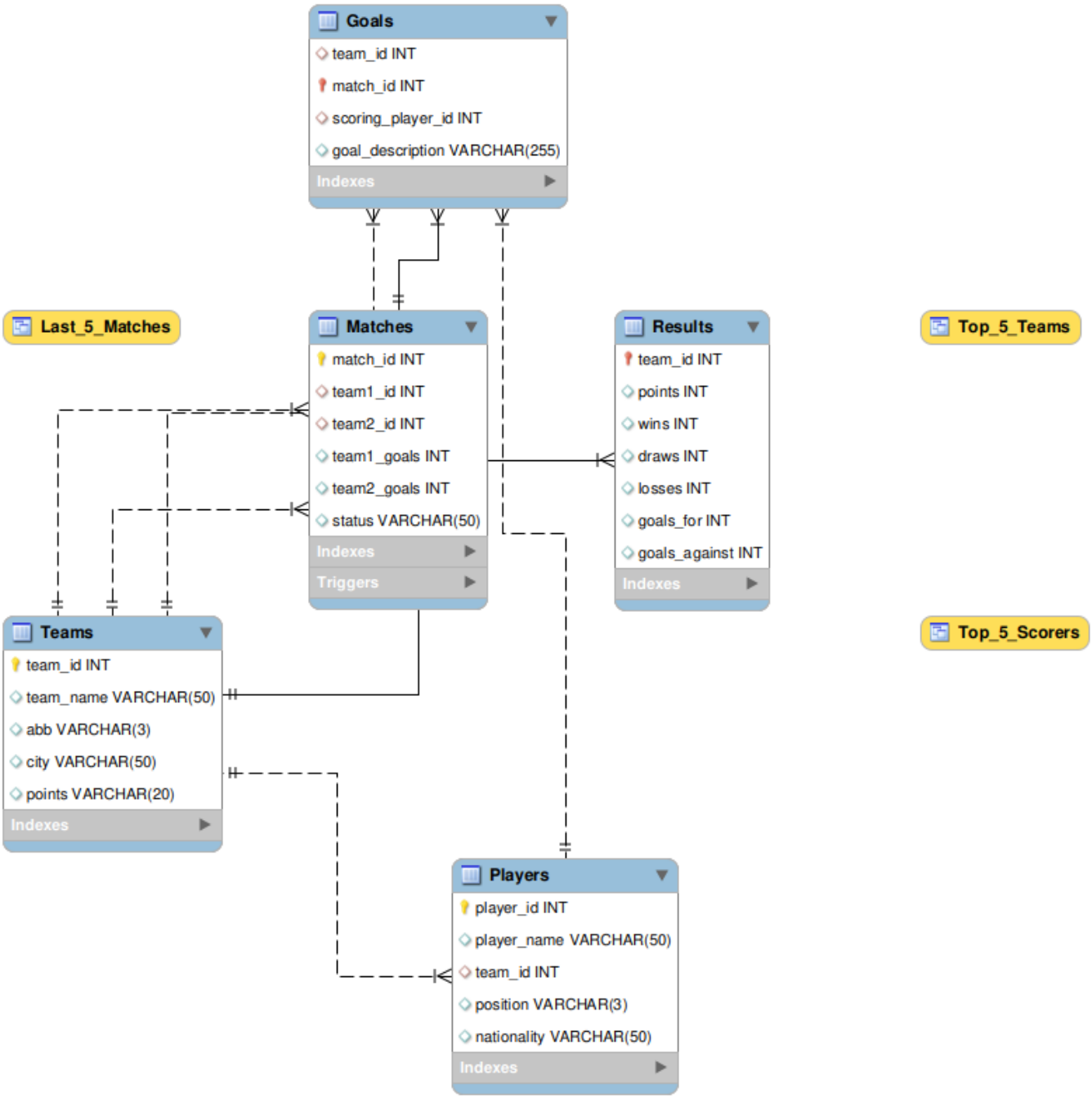

FIGURE 1. ER Diagram of the database (Md. Sajib Pramanic 2024)

3 TRIGGERS EXPLAINATION

3.1 Match Completion Trigger

The Match Completion trigger contained three distinct elements. Event, action, and contribution.

Event: This trigger responds to a change in match status, specifically when a match concludes and transitions to the 'Finished' state.

Action: When a match status is updated to 'Finished', the trigger automatically updates the Matches table to reflect this change.

Contribution: By maintaining accurate match statuses, this trigger ensures that we can track completed matches efficiently. It also facilitates reporting and analysis by providing a reliable source of match data.

The figure 2 lay-out shows the whole ideas of the code.

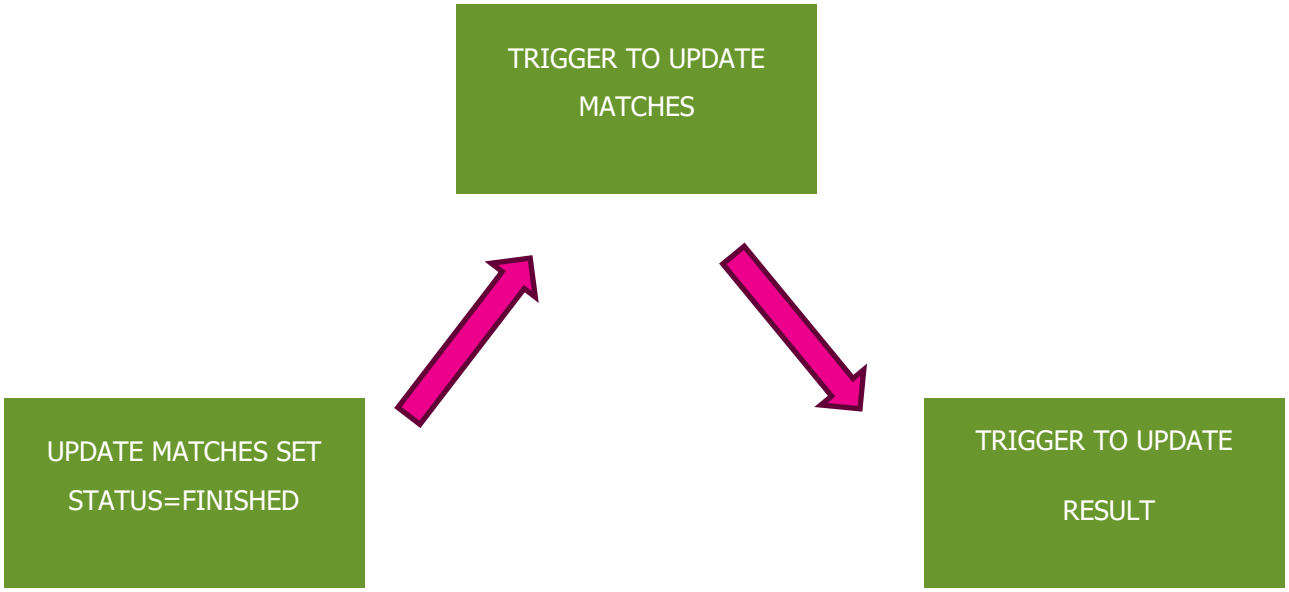

FIGURE 2. Trigger idea (Md. Sajib Pramanic 2024)

3.2 Goal Insertion Trigger

The Goals insertion Trigger contained three distinct elements. Event, action, and contribution.

Event: Whenever a new goal is added to the Goals table (via an INSERT operation).

Action: The trigger dynamically updates relevant match and team statistics. For example:

It increments the goal count for the respective teams in the Matches table.

It adjusts the goal difference for each team in the Results table. The figure 3. shows the triggers.

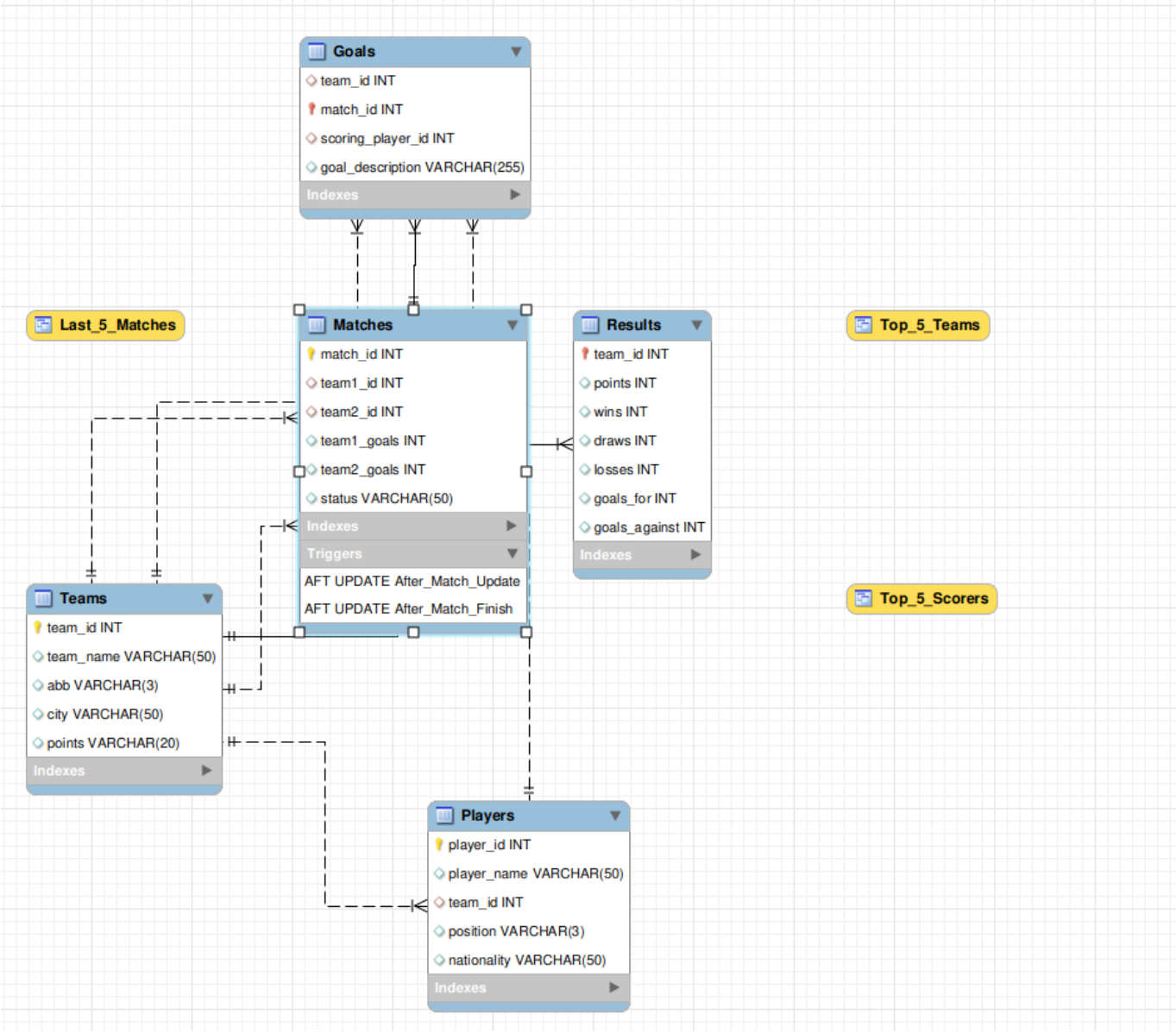

FIGURE 3. Trigger layout and relations showing on ER diagram (Md. Sajib Pramanic 2024)

Contribution: This trigger automates the process of maintaining goal-related data. Without manual intervention, it ensures that goals impact team standings accurately. Additionally, it enhances the real-time nature of our database, reflecting changes as they occur during matches.

4 PERSONAL CHALLENGES AND SOLUTIONS

During the project, I encountered some challenges, especially with Triggers. I was puzzled about how they function automatically and their practical application. My attempts to find clear answers online didn't quite match my database needs. Fortunately, my course lecturer patiently walked me through it, providing the clarity I needed (refers to figure 2). I'm thankful for their guidance and support throughout the learning process.

5 TESTING AND RESULTS

Firstly I inserted sample data into all tables (e.g., teams, players, matches, goals). For instance, I added records for teams like Bashundhara Kings, Brothers Union, and other participating clubs. Verifying data consistency and cross-referencing foreign keys ensured accurate relationships.

Then I simulated match rounds by updating match statuses (e.g., from 'Scheduled' to 'Finished'). Observing how the database responded allowed us to validate the trigger functionality. For example, when a match concluded, the trigger updated the match status and relevant statistics.

After that, I inserted goals into the Goals table (e.g., "Goal scored by Bashundhara Kings"). The trigger automatically adjusted goal counts for teams in the Matches table. I verified that the goal difference in the Results table reflected the actual match outcomes.

For the view Test, I executed queries against the Last_5_Matches, Top_5_Teams and Top_5_Scorers views. These views provided real-time insights into recent matches and top-performing teams.Testing revealed that the views consistently updated based on underlying data changes.The figures 4,5,6 shows the testing of performance.

```sql
/*
16. SQL command to create a view for Last 5 Matches.
*/
-- My answer here below

CREATE VIEW Last_5_Matches AS
SELECT m.match_id, m.team1_id, m.team2_id, m.status,
       (SELECT COUNT(*) FROM Goals WHERE match_id = m.match_id AND team_id = m.team1_id) AS team1_goals,
       (SELECT COUNT(*) FROM Goals WHERE match_id = m.match_id AND team_id = m.team2_id) AS team2_goals
FROM Matches m
ORDER BY m.match_id DESC
LIMIT 5;


-- Check the VIEW
SELECT *
FROM Last_5_Matches;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

#	match_id	team1_id	team2_id	status	team1_goals	team2_goals
1	4	16049	16745	In Progress	0	0
2	3	16782	16653	In Progress	0	1
3	2	16653	16745	In Progress	1	0
4	1	16782	16049	In Progress	0	1

FIGURE 4. Last_5_Matches view (Md. Sajib Pramanic 2024)

```sql
/*
17. SQL command to create a view for Top 5 Teams.
*/
-- My answer here below

CREATE VIEW Top_5_Teams AS
SELECT team_id, points, wins, draws, losses, goals_for, goals_against, (goals_for - goals_against) AS goal_difference
FROM Results
ORDER BY points DESC, goal_difference DESC
LIMIT 5;

-- Check the VIEW
SELECT *
FROM Top_5_Teams;


/*
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

#	team_id	points	wins	draws	losses	goals_for	goals_against	goal_difference
1	16653	4	2	0	0	1	4	-3
2	16049	3	1	1	0	1	3	-2
3	16782	2	0	0	2	5	2	3
4	16745	0	0	1	1	2	0	2

FIGURE 5. Top_5_Teams view (Md. Sajib Pramanic 2024)

```sql
/*
18. SQL command to create a view for Top 5 Scorers View.
It will show Top 5 goal scorers player according to the given instruction in your question. (player who scored)
*/
-- My answer here below

CREATE VIEW Top_5_Scorers AS
SELECT p.player_id, p.player_name, t.team_name, COUNT(*) AS goals_scored
FROM Goals g
JOIN Players p ON g.scoring_player_id = p.player_id
JOIN Teams t ON g.team_id = t.team_id
GROUP BY p.player_id, p.player_name, t.team_name
ORDER BY goals_scored DESC
LIMIT 5;



-- Check the VIEW
SELECT *
FROM Top_5_Scorers;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

#	player_id	player_name	team_name	goals_scored
1	28	Topu Barman	Bashundhara Kings	1
2	43	Patrick Sylva	Brothers Union	1
3	46	Md Showkat Helal Mia	Brothers Union	1

FIGURE 6. Top_5_Scorers view (Md. Sajib Pramanic 2024)

6 CONCLUSION AND LEARNINGS

From the standpoint of database architecture and SQL, I can state that this project gave me practical experience creating a solid database structure. I gained knowledge on how to make tables, specify associations, and maximise triggers, views, and data storage.The ER diagram (Figure 1) helped me better grasp database modelling by providing a visual representation of the relationships between various elements. There was also a big learning curve when crafting SQL statements to generate tables, views, and triggers.

Real-time updates, precise statistics, and effective reporting are all part of the sports data management process.

In conclusion, this project helped me gain a deeper understanding of SQL, database design, and the complexities involved in managing sports data. It reaffirmed the importance of precision, automation, and careful schema design. I will apply these skills going forward and recognise the flexibility of well-organized databases in my projects.

REFERENCES

Kuosmanen, Keijo 2024. Figure 2. Trigger idea . Location: Kuopio, Savonia UAS.