

Department of Computer Science

CMPS 244 – Database Systems

**FOOTBALL MATCHES**

**MANAGEMENT**

**DATABASE**

Team: AL

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# **Phase 1: Database Idea**

# **Introduction and Motivation**

# Football is one of the most popular sports in the world. It is a sport we love and enjoy playing and watching. Thus, we wanted to create a database system that stores relevant information about football that can be used by football fans and enthusiasts, as well as football organizations. This relevant information includes data about the teams, players, managers, trophies, leagues,…

# B) **Sample Queries:**

# 1) List all players in a team.

# 2) List all teams in a league.

# 3) List the teams with more than 5 trophies.

# 4)List the matches that were watched by more than 50 thousand fans live.

# 5) List the matches that were covered by more than 3 channels.

# 6) List the stadiums that hold more than 30 thousand fans.

# 7) List the stadiums located in a certain country or city.

**Phase 2: (E)ER Model**

**A diagram of a football game

Description automatically generated**

**Phase 3: Relational Design and SQL Data Modeler**

1. **Logical Model:**

A diagram of a computer

Description automatically generated

1. **Relational Model:**

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Description automatically generated with medium confidence

**Phase 4: MySQL and Web Interface**

1. **MySQL:**
2. Data Definition:

CREATE SCHEMA FOOTBALL;

USE FOOTBALL;

CREATE TABLE PERSON (

P\_ID VARCHAR(100),

Fname VARCHAR(100) NOT NULL,

Minit CHAR(1),

Lname VARCHAR(100) NOT NULL,

DATE\_OF\_BIRTH DATE,

GENDER CHAR(1),

ROLE VARCHAR(10),

CONSTRAINT PERSON\_PK PRIMARY KEY (P\_ID));

CREATE TABLE TEAM (

TEAM\_NAME VARCHAR(100),

Found\_date DATE,

type VARCHAR(20),

OWNER\_ID VARCHAR(100),

MGR\_ID VARCHAR(100),

CONSTRAINT TEAM\_PK PRIMARY KEY (TEAM\_NAME),

CONSTRAINT TEAM\_OWNER\_ID\_FK FOREIGN KEY(OWNER\_ID) REFERENCES PERSON(P\_ID) ON DELETE SET NULL ON UPDATE CASCADE,

CONSTRAINT TEAM\_MGR\_ID\_FK FOREIGN KEY(MGR\_ID) REFERENCES PERSON(P\_ID) ON DELETE SET NULL ON UPDATE CASCADE);

CREATE TABLE STADIUM (

STD\_NAME VARCHAR(100),

VALUE FLOAT,

LOCATION VARCHAR(100),

CAPACITY INT,

PRIMARY KEY(STD\_NAME));

CREATE TABLE TROPHY (

T\_NAME VARCHAR(100),

VALUE FLOAT,

WIN\_TEAM VARCHAR(100),

WIN\_PLAYER\_ID VARCHAR(100),

WIN\_DATE DATE,

CONSTRAINT T\_PK PRIMARY KEY(T\_NAME),

CONSTRAINT T\_WIN\_TEAM\_FK FOREIGN KEY (WIN\_TEAM) REFERENCES TEAM(TEAM\_NAME) ON DELETE SET NULL ON UPDATE CASCADE,

CONSTRAINT T\_WIN\_PLAYER\_ID\_FK FOREIGN KEY (WIN\_PLAYER\_ID) REFERENCES PERSON(P\_ID) ON DELETE SET NULL ON UPDATE CASCADE);

CREATE TABLE CHANNEL (

CH\_NAME VARCHAR(100),

WEBSITE VARCHAR(100),

TYPE VARCHAR(100),

CONSTRAINT CH\_PK PRIMARY KEY (CH\_NAME));

CREATE TABLE CHANNEL\_SAT (

CH\_NAME VARCHAR(100),

SATELLITE VARCHAR(100),

CONSTRAINT CH\_SAT\_PK PRIMARY KEY (CH\_NAME, SATELLITE),

CONSTRAINT CH\_SAT\_FK FOREIGN KEY (CH\_NAME) REFERENCES CHANNEL(CH\_NAME) ON DELETE CASCADE ON UPDATE CASCADE);

CREATE TABLE SPONSOR (

SP\_NAME VARCHAR(100),

TYPE VARCHAR(100),

CONSTRAINT SP\_PK PRIMARY KEY (SP\_NAME));

CREATE TABLE SPONSORSHIP (

SP\_NAME VARCHAR(100),

TEAM\_NAME VARCHAR(100),

CONTRACT\_DATE DATE,

DURATION\_YRS INT,

AMOUNT FLOAT,

CONSTRAINT SPONSORSHIP\_PK PRIMARY KEY (SP\_NAME,TEAM\_NAME) );

CREATE TABLE LEAGUE (

LEAGUE\_NAME VARCHAR(100),

NB\_OF\_TEAMS INT,

REGION VARCHAR(100),

CONSTRAINT LEAGUE\_PK PRIMARY KEY (LEAGUE\_NAME));

CREATE TABLE PART\_IN\_LEAGUE (

LEAGUE\_NAME VARCHAR(100),

TEAM\_NAME VARCHAR(100),

SEASON DATE,

CONSTRAINT PART\_IN\_LEAGUE\_PK PRIMARY KEY (LEAGUE\_NAME, TEAM\_NAME) );

CREATE TABLE FIXTURE (

TEAM\_1 VARCHAR(100),

TEAM\_2 VARCHAR(100),

STADIUM VARCHAR(100) NOT NULL,

CHANNEL VARCHAR(100),

FIXT\_DATE DATE,

RESULT VARCHAR(50),

CONSTRAINT FIXT\_PK PRIMARY KEY (TEAM\_1,TEAM\_2,FIXT\_DATE),

CONSTRAINT FIXT\_TEAM\_1\_FK FOREIGN KEY (TEAM\_1) REFERENCES TEAM(TEAM\_NAME) ON DELETE CASCADE ON UPDATE CASCADE,

CONSTRAINT FIXT\_TEAM\_2\_FK FOREIGN KEY (TEAM\_2) REFERENCES TEAM(TEAM\_NAME) ON DELETE CASCADE ON UPDATE CASCADE );

CREATE TABLE PLAYS (

P\_ID VARCHAR(100),

TEAM\_NAME VARCHAR(100),

START\_DATE DATE,

DURATION\_YRS INT,

CONSTRAINT PLAYS\_PK PRIMARY KEY (P\_ID,TEAM\_NAME),

CONSTRAINT PLAYS\_P\_ID\_FK FOREIGN KEY (P\_ID) REFERENCES PERSON(P\_ID) ON DELETE CASCADE ON UPDATE CASCADE,

CONSTRAINT PLAYS\_TEAM\_NAME FOREIGN KEY (TEAM\_NAME) REFERENCES TEAM(TEAM\_NAME) ON DELETE CASCADE ON UPDATE CASCADE);

1. Data Manipulation:
2. Inserting:

INSERT INTO PERSON (P\_ID, Fname, Minit, Lname, DATE\_OF\_BIRTH, GENDER, ROLE) VALUES

('P001', 'John', 'A', 'Smith', '1985-06-15', 'M', 'Player'),

('P002', 'Alice', 'B', 'Johnson', '1990-04-22', 'F', 'Owner'),

('P003', 'Bob', 'C', 'Lee', '1982-12-03', 'M', 'Manager'),

('P004', 'Clara', 'D', 'Evans', '1995-07-30', 'F', 'Player'),

('P005', 'David', 'E', 'Miller', '1988-01-09', 'M', 'Coach'),

('P006', 'Ella', 'F', 'Brown', '1983-03-25', 'F', 'Player');

INSERT INTO TEAM (TEAM\_NAME, Found\_date, type, OWNER\_ID, MGR\_ID) VALUES

('Team A', '1999-03-01', 'Professional', 'P002', 'P003'),

('Team B', '2001-08-15', 'Semi-Professional', 'P005', 'P004'),

('Team C', '2005-11-23', 'Amateur', 'P006', 'P003');

INSERT INTO STADIUM (STD\_NAME, VALUE, LOCATION, CAPACITY) VALUES

('Stadium A', 150000.50, 'City Z', 50000),

('Stadium B', 50000.00, 'City Y', 30000),

('Stadium C', 75000.75, 'City X', 45000);

INSERT INTO TROPHY (T\_NAME, VALUE, WIN\_TEAM, WIN\_PLAYER\_ID, WIN\_DATE) VALUES

('Champions Trophy', 100000.00, 'Team A', 'P001', '2023-11-05'),

('League Cup', 50000.00, 'Team B', 'P004', '2023-11-12'),

('Intercontinental Cup', 75000.00, 'Team C', 'P006', '2023-11-20');

INSERT INTO CHANNEL (CH\_NAME, WEBSITE, TYPE) VALUES

('Channel Sports', 'www.channelsports.com', 'Sports'),

('Channel News', 'www.channelnews.com', 'News'),

('Channel Fun', 'www.channelfun.com', 'Entertainment');

INSERT INTO CHANNEL\_SAT (CH\_NAME, SATELLITE) VALUES

('Channel Sports', 'GeoStationary1'),

('Channel News', 'GeoStationary2'),

('Channel Fun', 'GeoStationary3');

INSERT INTO SPONSOR (SP\_NAME, TYPE) VALUES

('SportyGood', 'Apparel'),

('QuickEnergy', 'Beverage'),

('HealthPlus', 'Health');

INSERT INTO SPONSORSHIP (SP\_NAME, TEAM\_NAME, CONTRACT\_DATE, DURATION\_YRS, AMOUNT) VALUES

('SportyGood', 'Team A', '2023-01-01', 3, 200000),

('QuickEnergy', 'Team B', '2023-02-01', 2, 150000),

('HealthPlus', 'Team C', '2023-03-01', 1, 120000);

INSERT INTO LEAGUE (LEAGUE\_NAME, NB\_OF\_TEAMS, REGION) VALUES

('Premier League', 20, 'National'),

('Champions League', 32, 'International'),

('Europa League', 48, 'International');

INSERT INTO PART\_IN\_LEAGUE (LEAGUE\_NAME, TEAM\_NAME, SEASON) VALUES

('Premier League', 'Team A', '2023-08-01'),

('Champions League', 'Team B', '2023-08-01'),

('Europa League', 'Team C', '2023-08-01');

INSERT INTO FIXTURE (TEAM\_1, TEAM\_2, STADIUM, CHANNEL, FIXT\_DATE, RESULT) VALUES

('Team A', 'Team B', 'Stadium A', 'Channel Sports', '2023-09-15', '2-1'),

('Team B', 'Team C', 'Stadium B', 'Channel News', '2023-10-01', '1-1'),

('Team C', 'Team A', 'Stadium C', 'Channel Fun', '2023-10-18', '0-2');

INSERT INTO PLAYS (P\_ID, TEAM\_NAME, START\_DATE, DURATION\_YRS) VALUES

('P001', 'Team A', '2023-01-01', 4),

('P004', 'Team B', '2023-01-15', 3),

('P006', 'Team C', '2023-02-01', 5);

1. Updating:

UPDATE PERSON

SET Fname = 'Alice', Lname = 'Johnson', ROLE = 'Coach'

WHERE P\_ID = 'P002';

UPDATE TEAM

SET MGR\_ID = 'P005', type = 'Professional'

WHERE TEAM\_NAME = 'Team C';

UPDATE STADIUM

SET CAPACITY = 55000, LOCATION = 'City Y New Area'

WHERE STD\_NAME = 'Stadium B';

UPDATE TROPHY

SET WIN\_PLAYER\_ID = 'P003', WIN\_DATE = '2024-01-01'

WHERE T\_NAME = 'Champions Trophy';

UPDATE SPONSORSHIP

SET DURATION\_YRS = 5, AMOUNT = 250000

WHERE SP\_NAME = 'SportyGood' AND TEAM\_NAME = 'Team A';

UPDATE FIXTURE

SET RESULT = '3-2'

WHERE TEAM\_1 = 'Team A' AND TEAM\_2 = 'Team B' AND FIXT\_DATE = '2023-09-15';

UPDATE LEAGUE

SET NB\_OF\_TEAMS = 24

WHERE LEAGUE\_NAME = 'Europa League';

1. Deletion

DELETE FROM PERSON

WHERE P\_ID = 'P006';

DELETE FROM TEAM

WHERE TEAM\_NAME = 'Team C';

DELETE FROM FIXTURE

WHERE TEAM\_1 = 'Team A' AND TEAM\_2 = 'Team B' AND FIXT\_DATE = '2023-09-15';

1. Sample Queries
2. List all teams and their type:

SELECT TEAM\_NAME, type FROM TEAM;

1. Find the total value of all trophies:

SELECT SUM(VALUE) AS Total\_Trophy\_Value FROM TROPHY;

1. Count the number of teams in each type category:

SELECT type, COUNT(\*) AS Number\_of\_Teams FROM TEAM GROUP BY type;

1. List players and the trophies they have won:

SELECT p.Fname, p.Lname, t.T\_NAME, t.WIN\_DATE

FROM PERSON p

JOIN TROPHY t ON p.P\_ID = t.WIN\_PLAYER\_ID;

1. Display teams with their stadiums and locations:

SELECT t.TEAM\_NAME, s.STD\_NAME, s.LOCATION

FROM TEAM t

JOIN STADIUM s ON t.TEAM\_NAME = s.STD\_NAME;

1. Average stadium capacity by location:

SELECT LOCATION, AVG(CAPACITY) AS Average\_Capacity

FROM STADIUM

GROUP BY LOCATION;

1. Indices:

1) Index on PERSON(Lname)

* Purpose: This index helps speed up searches, sorts, and join operations that involve the Lname (Last Name) column in the PERSON table.
* Use Case: Common in applications where users might look up players, managers, or other personnel by their last name. For example, if you often have queries that filter or sort by last name, this index will make those operations faster.

--Index for searching people by last name

CREATE INDEX idx\_lname ON PERSON(Lname);

2) Index on TEAM(type):

* Purpose: To enhance the performance of queries filtering by the type of team (e.g., Professional, Semi-Professional, Amateur).
* Use Case: Useful for analytics or filtering operations where you want to group or count teams based on their type. This is especially beneficial for reports or user interfaces that categorize teams by their professional status.

-- Index for searching by team type

CREATE INDEX idx\_team\_type ON TEAM(type);

3) Index on STADIUM(LOCATION):

* Purpose: To optimize searches and queries that involve the LOCATION column of the STADIUM table.
* Use Case: If you often need to retrieve all stadiums in a particular location or sort stadiums by location, this index helps speed up those queries.

-- Index for stadium location

CREATE INDEX idx\_stadium\_location ON STADIUM(LOCATION);

4) Index on TROPHY(WIN\_TEAM)

* Purpose: Facilitates quicker lookup, sort, and join operations on the WIN\_TEAM column in the TROPHY table.
* Use Case: Enhances performance when querying for trophies won by specific teams, which is a common requirement for generating historical performance data or statistics.

-- Index for trophy winner team

CREATE INDEX idx\_trophy\_win\_team ON TROPHY(WIN\_TEAM);

5) Index on SPONSOR(TYPE):

* Purpose: Improves query performance on the TYPE column in the SPONSOR table, which categorizes sponsors by their industry or type of business.
* Use Case: Useful for reporting and analysis purposes where sponsors need to be grouped or counted by type—such as summarizing the number of sponsors in each category (e.g., Apparel, Beverage, Health).

-- Index for sponsor type

CREATE INDEX idx\_sponsor\_type ON SPONSOR(TYPE);

1. Views:

-- View for team details including manager and owner

CREATE VIEW View\_TeamDetails AS

SELECT t.TEAM\_NAME, t.Found\_date, t.type, p1.Fname AS Owner\_FirstName, p1.Lname AS Owner\_LastName, p2.Fname AS Manager\_FirstName, p2.Lname AS Manager\_LastName

FROM TEAM t

JOIN PERSON p1 ON t.OWNER\_ID = p1.P\_ID

JOIN PERSON p2 ON t.MGR\_ID = p2.P\_ID;

-- View for trophies with player and team details

CREATE VIEW View\_TrophyDetails AS

SELECT tr.T\_NAME, tr.VALUE, tr.WIN\_DATE, p.Fname AS Player\_FirstName, p.Lname AS Player\_LastName,tm.TEAM\_NAME

FROM TROPHY tr

JOIN PERSON p ON tr.WIN\_PLAYER\_ID = p.P\_ID

JOIN TEAM tm ON tr.WIN\_TEAM = tm.TEAM\_NAME;

-- View for upcoming fixtures with full details

CREATE VIEW View\_UpcomingFixtures AS

SELECT f.FIXT\_DATE, t1.TEAM\_NAME AS Team1, t2.TEAM\_NAME AS Team2, s.STD\_NAME, s.LOCATION, ch.CH\_NAME, ch.WEBSITE

FROM FIXTURE f

JOIN TEAM t1 ON f.TEAM\_1 = t1.TEAM\_NAME

JOIN TEAM t2 ON f.TEAM\_2 = t2.TEAM\_NAME

JOIN STADIUM s ON f.STADIUM = s.STD\_NAME

JOIN CHANNEL ch ON f.CHANNEL = ch.CH\_NAME

WHERE f.FIXT\_DATE >= CURDATE();

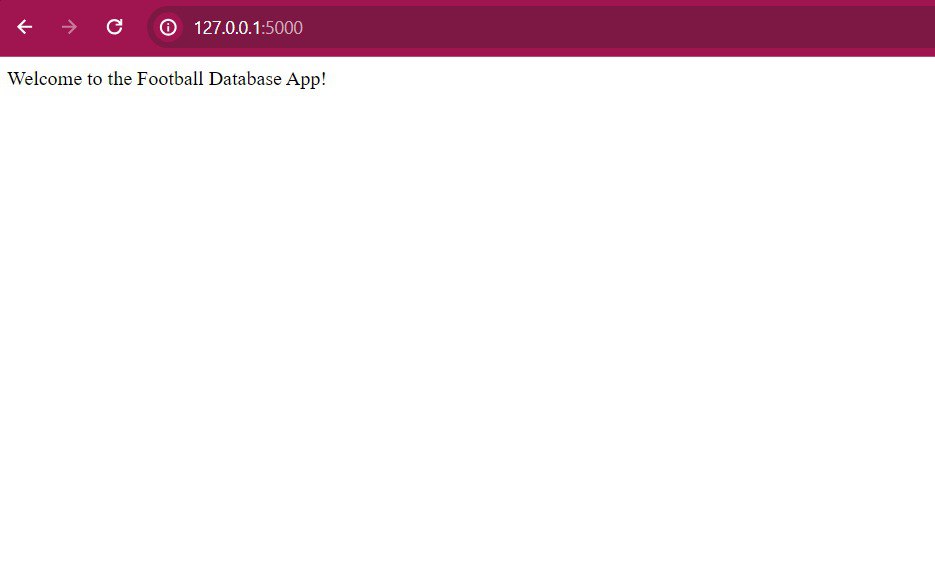
1. **Webapp:**

We designed a simple webapp, linked it to the database, tried some functions in a user friendly manner, and they all worked well.

Functions tried included inserting new records, updating records, or deleting records.

The more sophisticated and better designed webapp will be ready for the demo occuring after 14 days.

Homepage



Team table

A screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generated

Adding a team

A screenshot of a computer

Description automatically generated

Result of adding a team 'Real Madrid'

A screenshot of a computer

Description automatically generated

Searching by type 'Professional'

A screenshot of a computer

Description automatically generated

Editing a team

A screenshot of a computer

Description automatically generated

Result of editing

A screenshot of a computer

Description automatically generated

Deleting a team called 'Real Madrid'

A screenshot of a computer

Description automatically generated

The result of deleting the team 'Real Madrid'

A screenshot of a computer

Description automatically generated