**CST-217 Functional Requirements Document Template**

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  + Research resources for project
  + Responsible for overseeing the development and implementation of the project.
  + Responsible for finalizing the User Requirements section.

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# 1 INTRODUCTION

# The UEFA Prediction Database Project aims to predict which teams from Europe’s premier soccer leagues will qualify for the UEFA Champions League. This Functional Requirement Documentation (FRD) provides a comprehensive overview of the project, including its purpose, scope, background, references, assumptions, constraints, and methodology. The project will involve collecting and analyzing various data sets related to team history, team chemistry, match history, player statistics, and game statistics, with the English Premier League (EPL) serving as the model for the project.

## Purpose

# The purpose of this Functional Requirement Documentation (FRD) is to provide a comprehensive overview of a database project aimed at predicting the outcome of who is going to qualify for thedks Union of European Football Association (UEFA) from Europe’s premier soccer leagues. The project will involve collecting and analyzing various data sets related to team history, team chemistry, match history, player statistics, and game statistics.

## Scope

# This document presents a comprehensive plan for the UEFA Prediction Database Project, which seeks to determine the teams that will qualify for the prestigious UEFA Champions League. The project is set to encompass a vast scope, as it requires data aggregation from 55 countries that are under the umbrella of the Union of European Football Associations (UEFA). The focus of this endeavor will be placed solely on Europe's premier soccer leagues, and UEFA will play a pivotal role in helping to accurately predict the results. The English Premier League (EPL) has been selected as the model for this project due to its popularity, which is reflected in the abundance of data and statistics available. The EPL is considered a standard in the world of soccer, and its history, team dynamics, player statistics, and other relevant information will provide valuable insights for the project.

## Background

# UEFA is responsible for overseeing all of Europe's football national teams and clubs. The organization has 55 different countries as members. The aim of this project is to use data and statistical analysis to predict which teams from the major European soccer leagues will qualify for the UEFA Champions League. Since the Championship League is a tournament for the world’s best club teams, UEFA is under the documentation and rules.

## References

# References and controlling documents that may be used in this project include match history stats, player statistics, game history, team history, team chemistry, and other statistical analysis about soccer predictions.

# Assumptions

# This project operates under several key assumptions. One of the primary assumptions is the availability and use of specific technical tools for data storage and mining. In particular, the MySQL Workbench will be used as the platform for data storage. The Workbench is a comprehensive solution for database management and is known for its reliability and versatility. Additionally, the project will utilize Python for data mining purposes. Python is a very efficient programming language that is widely used in data science and a variety of fields. It offers a vast array of libraries and tools that make it a suitable choice for data mining tasks. These assumptions provide a solid foundation for the project, ensuring that the data storage and mining processes are efficient and accurate.

### Constraints

The delivery timeline for this project is a critical constraint, as the project must be completed by week 8. Technical requirements for this project include data mining, data validation, analysis, and visualization. Each of these tasks must be performed at a high level in order to achieve the overall goals of the project. To ensure that the project stays on track, the tasks will be divided among individual team members and managed effectively to meet the deadline. Additionally, the project must comply with legal requirements related to UEFA and the data collection and storage process must adhere to relevant technical standards. Strategic decisions and business rules for the database must also be taken into consideration to ensure the successful delivery of the project.

## Document Overview

## This document provides an overview of the database project aimed at predicting the outcome of who is going to qualify for the UEFA Champions League from Europe’s premier soccer leagues. The document includes the purpose, scope, background, references, assumptions, constraints, and methodology of the project, as well as appendices. The data will be collected by using data mining or data scraping. This project aims to have a real-world data value and generate basic data statistics.

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# 2 METHODOLOGY

The main methodology for the functional requirements was looking at the core types of data that a player, scouter, analyst, or fan would try to obtain. UEFA is a big organization, but we are generalizing it into a slimmed-down structure that still holds the data that the various users will need while eliminating anything extra. The main purpose of the database will be to find statistics on players and teams so having entities like employees and invoices are unnecessary. We will be using real data scraped from UEFA so we are structuring the database around data that is accessible to the public. Also, by comparing the historical data such as a match result to evaluate our analysis.

# FUNCTIONAL REQUIREMENTS

## User Requirements

1. Players - Individual players are looking for a team that suits them.
   1. A professional England player is moving to Italy, but he is willing to join a team that has a high defensive strategy. He is searching for a team with a defense rating over 85 in the Italian League.
   2. A player on Manchester United wants to know when and where the next game will be played.
   3. Messi is curious about how many fans will attend his retirement match, which will be held in the PSG home stadium. He will check the number of tickets sold for the match.
2. Scouters - Scouters look for the specific position for the players to build strong team chemistry.
   1. A scout saw a young player, he remembers his last name ends with ‘Hunt’ when he was touring a European Country. The scouter wants to know what team he plays right now.
   2. A Manchester United team is under a budget, but they need 2 offensive players to cover the season. The team needs two Mid Fielder position players for the club team. The individual player should be under one million dollars and within a same league.
   3. A scouter watched a Tottenham Hotspur versus Arsenal and found fantastic defensive player from Tottenham Hotspur for his team couple months ago, but he doesn’t remember what match it was. He wants to find a player who played outstanding (overall rating greater than 95) on the match depends on the statistic and the match game.
   4. A scouter wants to contact with the team the Manchester United and Tottenham Hotspur. A scouter wants the coach’s number and how many players are on the team.
3. Analyst - Analysts
   1. A marketing analyst wants to know why some matches has great viewership. The analyst will compare the two match’s marketing budgets, viewership, and tickets sold.
   2. A strategic analyst is wanting to know how good the opposing team is. He is going to look at the specific team’s rating and match record so that they know what footage to look for.
   3. A club analyst wants to win against the next match’s opponent. He is going to look into previous matches and find the weakest/strongest performing players to focus on when watching film.
   4. A club analyst wants to know about the information about the coaches in individual teams.
4. FANS - Fans search for a player stat, club stat, match history, and other information for their knowledge boundaries.
   1. A fan of Manchester United wants to know when and where the Manchester United team will play. Fan wants to find out the match date and match opponent.
   2. A fan wants to know all the dates of Manchester City home games so he can see the ticket price, description, and available seats.
   3. A fan wants to know about a player’s statistics on arsenal that is over a defensive rating of 80.
   4. A brand-new fan Manchester United fan needs to buy a ticket for a game that is over $75. A fan wants to know the date for the game, price, and match number.

## Functional Requirements

1. Identifying all entities
   1. LEAGUES
      1. League\_name (Varchar(45) NOT NULL)
      2. League\_country (Varchar(45) NOT NULL)
      3. Leguae\_foundation Date (Date)
   2. TEAM
      1. Name (Varchar(45) NOT NULL)
      2. Stadium (Varchar(100) NOT NULL)
      3. Location (Varchar(100)
      4. Foundation (Date)
   3. PLAYERS
      1. Player\_fname (Varchar(45) NOT NULL)
      2. Player\_lname (Varchar(45) NOT NULL)
      3. Position (Varchar(20) NOT NULL)
      4. Salary (INT)
      5. Player\_email (Varchar(60))
      6. Player\_phone (Varchar(45))
      7. Player\_country (Varchar(45))
   4. MATCH
      1. Home\_score (INT NOT NULL)
      2. Away\_score (INT NOT NULL)
      3. Match\_date (Date)
      4. Marketing Budget (INT)
      5. Viewership (INT)
   5. Statistics
      1. Player\_stat (INT NOT NULL)
      2. Offensive\_stat (INT)
      3. Deffensive\_stat (INT)
   6. Tickets
      1. Ticket\_price (INT)
      2. Ticket\_seat\_no (INT NOT NULL)
      3. Ticket\_description (VARCHAR(100) NOT NULL)
   7. COACH
      1. Coach\_fname (Varchar(45) NOT NULL)
      2. Coach\_lname (Varchar(45) NOT NULL)
      3. Coach\_phone (Varchar(45))
      4. Coach\_email (Varchar(45))
   8. FANS
      1. Fan\_fname (Varchar(45) NOT NULL)
      2. Fan\_lname (Varchar(45) NOT NULL)
      3. Fan\_phone (Varchar(45))
      4. Fan\_email (Varchar(45))
      5. Fan\_address (Varchar(45))

**Relationships**

|  |  |
| --- | --- |
| A league is composed of many club teams | A club team must be involved in only one league |
| A club team has many players | A player can have only one team |
| A club team is scheduled to play many matches | A match must be done with two teams |
| A club team can have one coach | A coach can coach only one team |
| A club team can have many fans | A fan can have one favorite team |
| A ticket has only one fan (buyer) | A fan can have only one ticket |
| A match has many statistics | A statistic is recorded individual match |
| A player has many statistics | A statistic belongs to individual player |
| A ticket is belonged to one game | Game sells many tickets |

## Hardware/Software Requirements

The software platforms necessary to support the UEFA prediction database project include a MySQL server, MySQL workbench, Python, and Excel. These tools will enable efficient storage and processing of data collected for the project, as well as enable data mining, validation, analysis, and visualization. Using a database management system in the form of a MySQL server and workbench will ensure the integration and manipulation of data. At the same time, Python will provide the necessary tools for data mining and analysis. Excel, on the other hand, will provide a convenient platform for data visualization and reporting.

# Appendices

1. [UEFA](https://www.uefa.com/uefachampionsleague/statistics/clubs/)
2. [Team Lake - Organization Profile](https://docs.google.com/document/d/1bSw4APs8mVuNzInpNVWKb2DtiflrXetx/edit)
3. [Python Documentation](https://docs.python.org/3/)
4. [MySQL Documentation](https://dev.mysql.com/doc/)
5. [ESPN Database](https://www.espn.com/soccer/stats/_/league/eng.2)