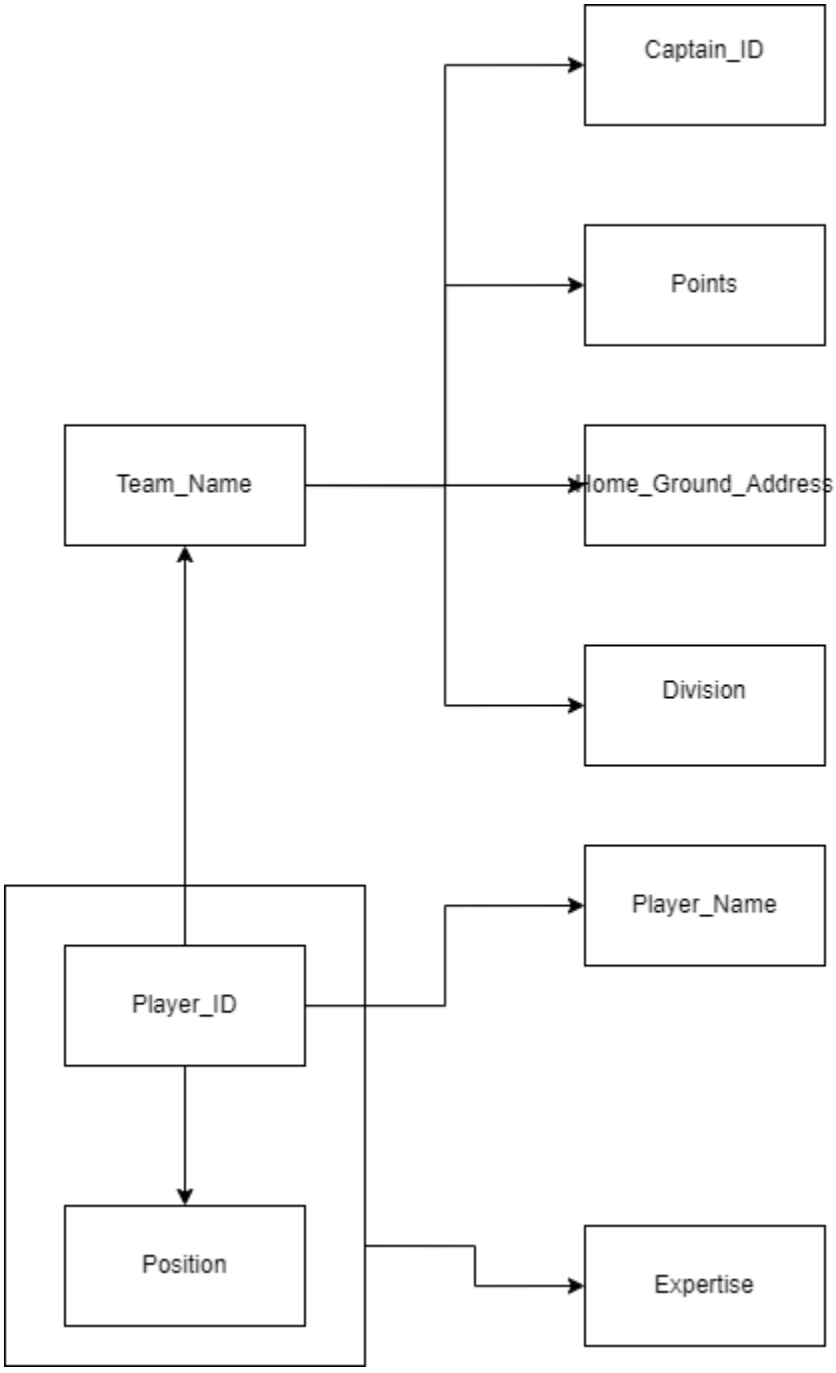
Football League Database

(A) Functional Dependency Diagram



Assumptions Made

- **Unique Team Names:** Each team has a unique name, which is why Team_Name stands alone without a functional dependency.
- **Captains as Players:** Captain_ID is a foreign key, meaning that it references Player_ID, signifying that each team's captain is also a listed player.
- **Non-unique Player Names:** Since player names are not unique, Player_ID is used to uniquely identify players.
- **Multiple Positions Per Player:** A player can play in multiple positions, and their ability in these positions is captured by the Expertise attribute. It is assumed that Expertise depends on both Player_ID and Position.
- **Independence of Points and Address:** Points and Home_Ground_Address are without dependencies, because they are directly associated with the Team entity and do not depend on other attributes for their value.
- **Division as a Separate Entity:** Division is as an independent box, as not functionally dependent on any other attribute in the diagram.

(B) Normalised Relations

Relations for Determining Attributes

Relation 1: Player
Primary Key: Player_ID
Attributes: Player_Name, Position, Team_Name
Assumption: Player_ID is unique for each player.

Relation 2: Player_Position
Composite Primary Key: Player_ID, Position
Attributes: Expertise
Assumption: Expertise depends on both the Player_ID and Position.

Attributes Determined by Primary Key

Relation 3: Player
Player_ID (Primary Key)
Player_Name

Relation 4: Player_Position
Player_ID (Composite Primary Key, Foreign Key referencing Player)
Position (Composite Primary Key)
Expertise

Other Relations

Relation 5: Team
Primary Key: Team_Name
Foreign Key: Captain_ID

Attributes: Points, Home_Ground_Address, Division, Captain_ID
Assumption: Team_Name is unique for each team. Each team has one captain.

(C) Constraints

Team Constraints

Team_Name: Must be unique.
Points: Must be a non-negative integer since you cannot have negative points in a league.
Home_Ground_Address: Should be a valid address format.
Division: Must be one of the four divisions (1, 2, 3, 4).

Player Constraints

Player_ID: Must be unique
Player_Name: No specific constraint other than it being a non-empty string.
Position: Must be one of the predefined positions (goalkeeper, defender, midfielder, striker).

Player_Position Constraints

Player_ID and Position together form a composite primary key.
Expertise: Must be an integer greater than 0.

Captain Constraints

Captain_ID: Must reference a valid Player_ID.
Each Team_Name can have only one Captain_ID.

General Constraints

All ID fields should be auto-incremented if they are integers or generated in a way that ensures uniqueness.
All names should be strings and possibly have a character limit based on the database design.
All references to other tables must be valid foreign keys.