DATABASE SYSTEM

TERM PROJECT

CRICKET MATCH DATABASE

ABSTRACT

A database application to keep information about a cricket match. Information stored in such a way that the full score card can be produced.

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Assignment I

1. Problem Statement Definition:

To design a Web Database application (using PHP and MySQL) to store information about international T20 cricket matches (Men). The Database will store information about the cricket matches and the information can be used to produce a scorecard (for any match, given the match-id). The user can enter the match-id in the system and the system can generate the full scorecard for the match.

The full scorecard for a particular match will consist of the overall Match, batting and bowling statistics (Team-wise and Player-wise and Innings-wise) :

-For Batsman Statistics:

- Batsman Name
- Runs by each batsman
- The strike rate of each batsman
- Number of 4s and 6s
- Extras (No. of wides, no-balls)
- Number of balls faced
- Current status (batting/out)
- Overall Team Score (Total Runs/Wickets Fallen)

Oman Innings						90-7 (17.2)
Batsman		**R**	B	4s	6s	SR
Jatinder Singh	batting	**52**	42	4	1	123.81
Khawar Ali	c Scott McKechnie b Nasrulla Rana	**4**	10	0	0	40.00
Aqib Ilyas	run out (Nizakat Khan)	**4**	3	1	0	133.33
Zeeshan Maqsood (c)	run out (KD Shah)	**2**	5	0	0	40.00
Mohammad Nadeem	c Barkat b Aizaz Khan	**2**	5	0	0	40.00
Suraj Kumar (wk)	c Scott McKechnie b Ehsan Khan	**2**	5	0	0	40.00
Mehran Khan	lbw b Mohammad Ghazanfar	**1**	3	0	0	33.33
Aamir Kaleem	c Mohammad Ghazanfar b Nasrulla Rana	**17**	30	1	0	56.67
Naseem Khushi	batting	**0**	1	0	0	0.00
Extras		**6** (b 0, lb 3, w 3, nb 0, p 0)				
Total		**90** (7 wkts, 17.2 Ov)				

Fig 1.1: Batsman Statistics Layout

-For Bowler Statistics :

- Bowler Name
- Number of overs bowled
- Numbers of maiden overs delivered
- Number of wickets taken
- Number of Wide balls and No–balls delivered
- The economy of the Bowler

Bowler	O	M	R	W	NB	WD	ECO
Aizaz Khan (c)	3	0	12	**1**	0	0	4.00
Kyle Christie	2.2	0	15	**0**	0	1	6.43
Nasrulla Rana	2	0	11	**2**	0	1	5.50

Fig 1.2: Bowler Statistics Layout

-Overall Match Statistics :

- Match-id
- Date & Time of the Match
- Toss Info (who won and what they choose)
- Venue Info (Stadium Name and Location)
- Umpires
- The name of the Players for each Team(11 Players each)

Match Info	
Match	HK vs OMAN, Play off 4 - B4 v Loser of Play-off 2, ICC Mens T20 World Cup Qualifier 2019
Match Id	156
Toss	Oman won the toss and opt to bat
Time	03:30 PM GMT
Venue	Dubai International Cricket Stadium , Dubai
Umpires	Allahudien Paleker, Sam Nogajski
Date	Wednesday, October 30, 2019
Hong Kong Squad	
Playing XI	Nizakat Khan, Aizaz Khan (c), Kinchit Shah, Simandeep Singh, Waqas Barkat, Scott McKechnie (wk), Haroon Arshad, Nasrulla Rana, Kyle Christie, Ehsan Khan, Mohammad Ghazanfar
Oman Squad	
Playing XI	Khawar Ali, Jatinder Singh, Aqib Ilyas, Zeeshan Maqsood (c), Aamir Kaleem, Suraj Kumar (wk), Mohammad Nadeem, Mehran Khan, Naseem Khushi, Fayyaz Butt, Bilal Khan

Fig 1.3: Overall Match's Statistics Layout

Every statistic in the scorecard will be displayed for the current match only.

The Database will store information about each of the individual players of the Teams and their statistics (like debut-date, age, the total number of runs and wickets, the total number of matches played, etc). This will be useful in maintaining the profile of the Players.

The statistics of each player will be updated after each ball of every Match (i.e. the statistics of each player will remain updated).

A general overview of the game:

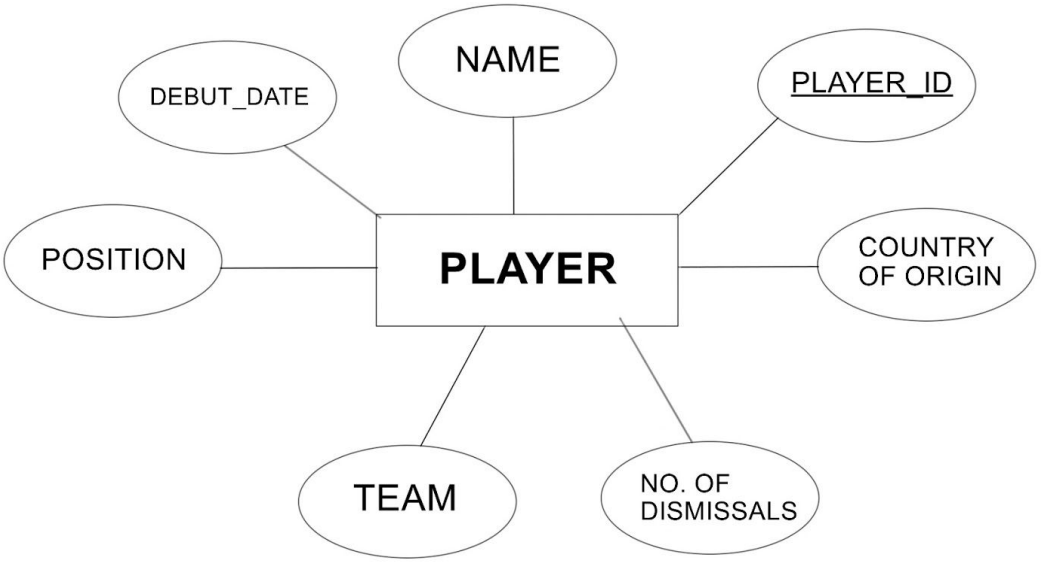
T20 International is a form of cricket, played between 2 of the international members of the ICC, in which each team faces 20 overs. The 2 teams are made up of 11 players each. The cricket match consists of 2 innings, in which one of the team bats while the other team fields and bowls for 20 overs. The aim of the batting team is to score runs while the aim of the fielding team is to bowl ten people out and close the batting teams' innings. After the first innings is over, the target runs are set and the bowling team (in the first innings) has to bat and reach the target. The match ends when either the 20 overs are over or the team reaches its target. In the end, the team with the highest number of runs is declared as the winner.

2. The ER Model:

Before moving into the ER model for the given problem statement, each entity is briefly defined below:

a.Entity Name: Player

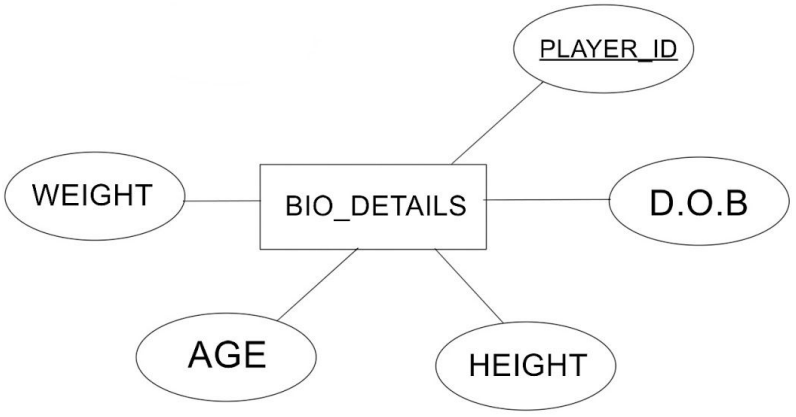
Attributes: Player_ID, Name, Position, Team, Country_of_Origin, Debut_Date, No of Dismissals



Every Player will have a Player_ID which will be unique. Each Player_ID will identify the Name, team, Country_of_origin of the Player and the position in which he plays.

b.Entity Name: Bio_Details

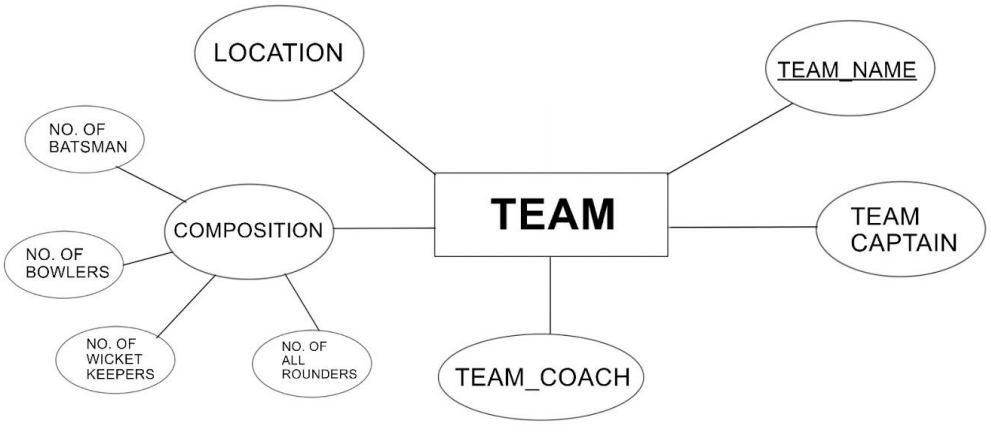
Attributes: Player_ID, D.O.B, Height, Age, Weight



This entity refers to the biological details of the Player, each tuple uniquely identified by the Player_ID attribute.

c.Entity Name: Team

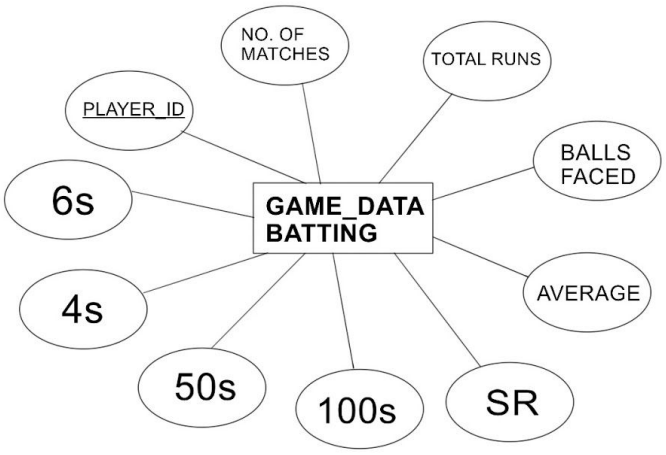
Attributes: Team_Name, Team_Captain, Team_Coach, Location, Composition (Number of Batsman, Number of Bowlers, Number of Wicket Keepers, Number of All Rounders)



This entity refers to different aspects of Cricket Teams. Each team consists of a Team_Name, a Captain, a Coach and the location specifying the region to which the team belongs to. Each of the tuples uniquely identified by the Team_Name.

d.Entity Name: Game_Data_Batting

Attributes: Player_ID, No. of Matches, Total Runs, Balls Faced, Average, SR(Strike Rate), 100s (centuries), 50s (half-centuries), 4s, 6s



This entity describes the batting data(history) for the Batsman, each uniquely identified by the Player_id. This entity is used for profiling of the player.

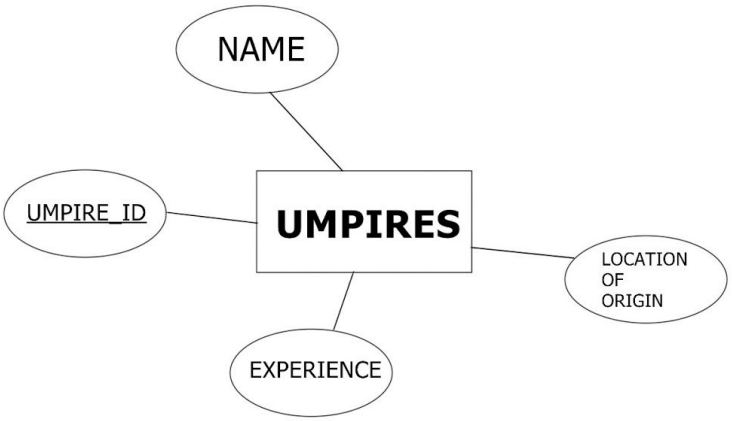
e.Entity Name: Game_Data_Bowling

Attributes: Player_ID, No. of Matches, Balls Bowled, Runs Conceded, Wickets, Economy, Average,(Bowling) Style

This entity describes the bowling data(history) for the Bowlers, each uniquely identified by the Player_id. This entity is used for profiling of the player.

f.Entity Name: Umpires

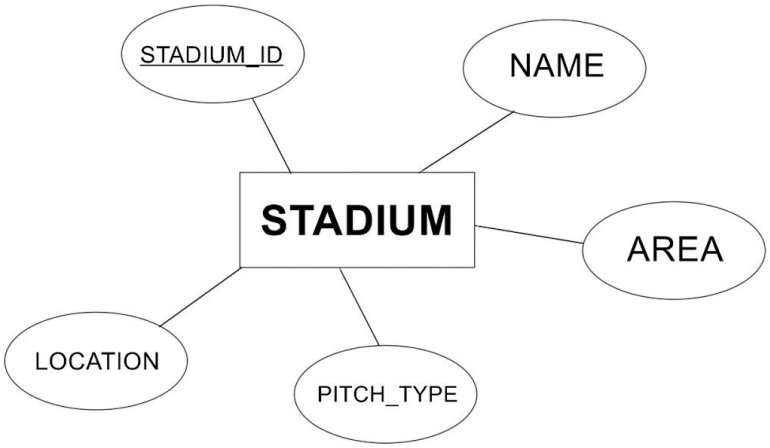
Attributes: Umpire_ID, Name, Location of Origin, Experience



This entity refers to the attributes of an Umpire.

g.Entity Name: Stadium

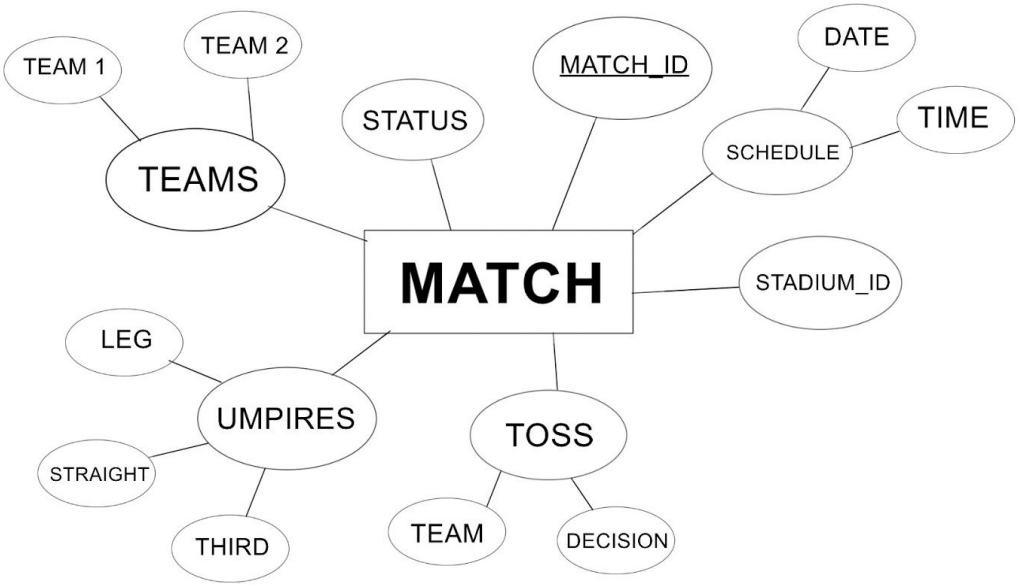
Attributes:Stadium_ID, Name, Area, Pitch_Type, Location



This entity refers to the attributes of a Stadium.

h.Entity Name: Match

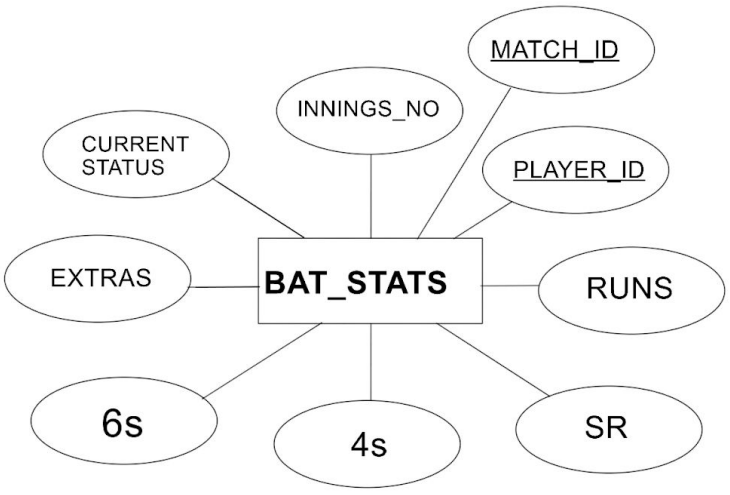
Attributes: Match_ID, Teams (Team1, Team2), Status, Schedule (Date, Time), Stadium_ID, Toss (Team, Decision), Umpires(Leg, Straight, Third)



This entity refers to the different attributes of a cricket match.

i.Entity Name: Bats_Stats

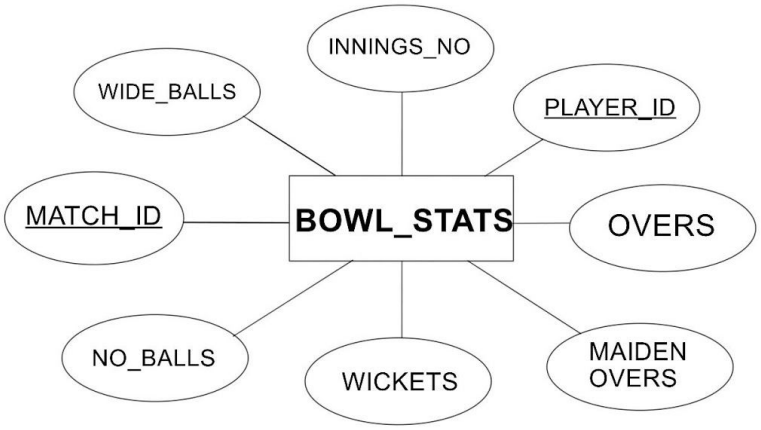
Attributes: Player_ID, Match_ID, Innings_No, Runs, SR,4s, 6s, Extras, Current status



This entity refers to the batting statistics of the cricket matches.

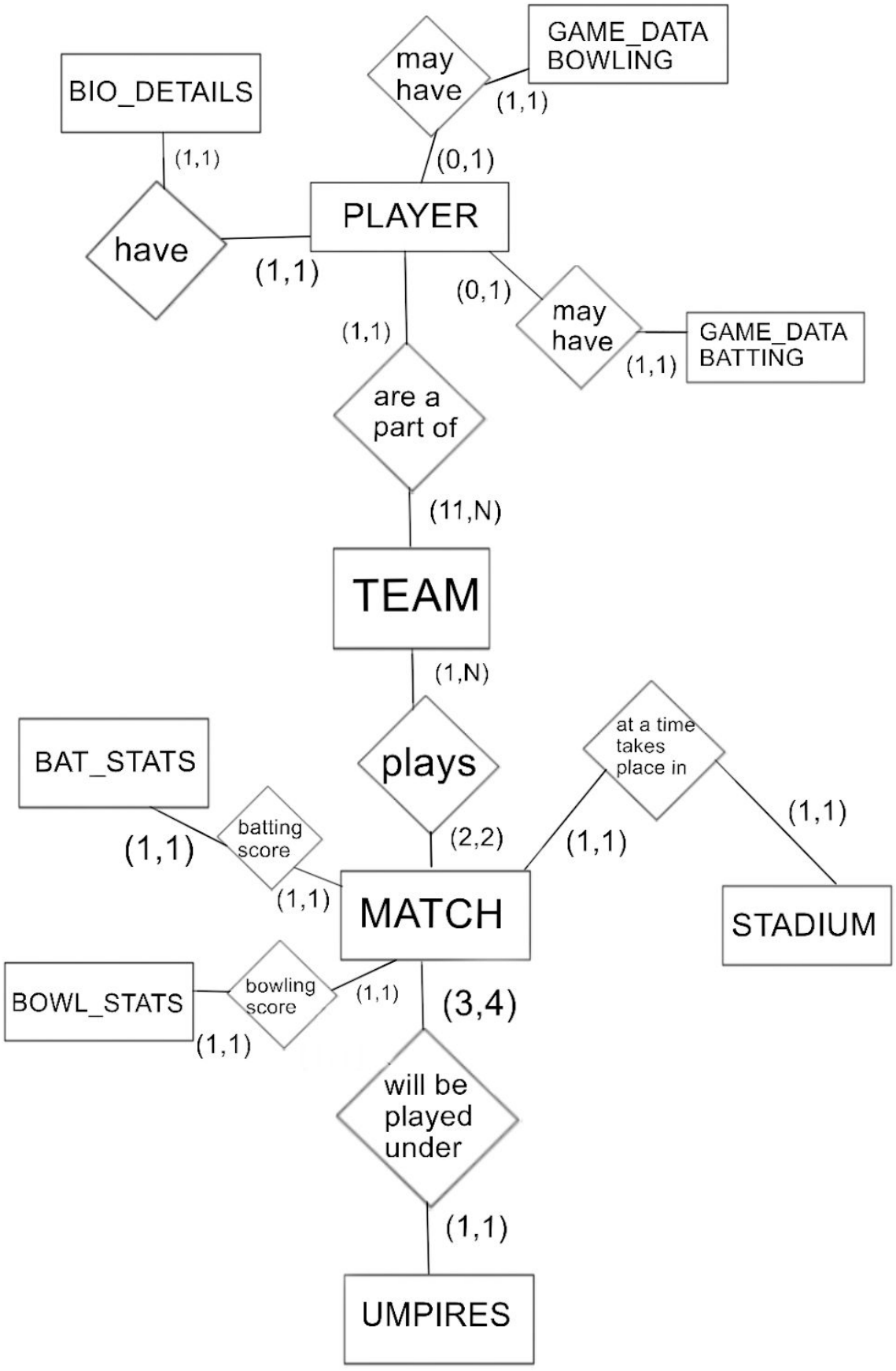
j.Entity Name: Bowl_Stats

Attributes: Player_ID, Match_ID, Innings_No, Overs, Maiden Overs, Wickets, No-Balls, Wide-Balls



This entity refers to the bowling statistics of the cricket matches.

The Entity-Relationship Model for the following problem statement :



NOTE:

The ER Model above has been made as concise as possible (due to limitation of space and for the maintenance of clarity). Kindly refer to the above entity definitions for their attributes.

3. Conversion of the ER Model to a Relational Model:

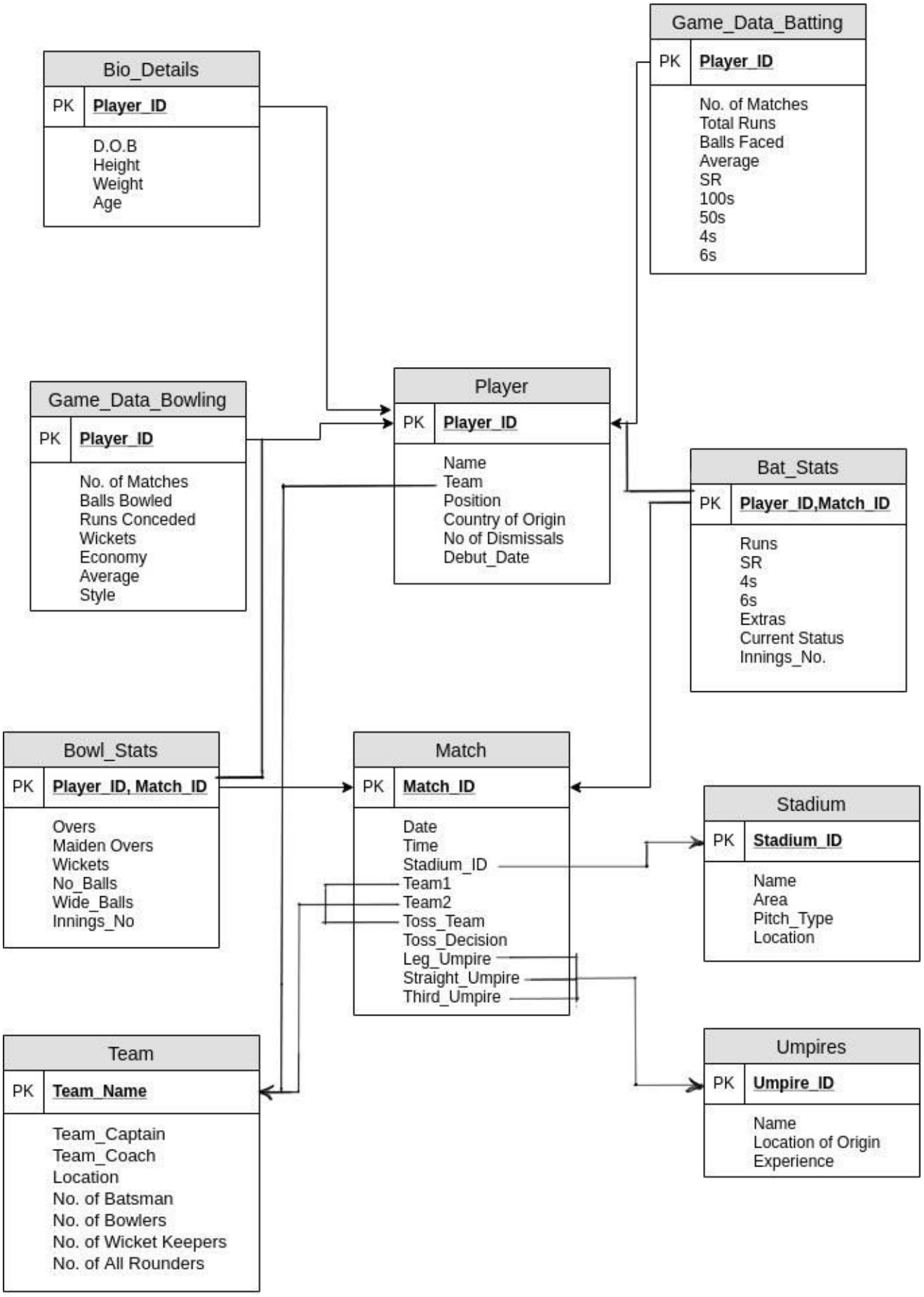


Fig 3: The Relational Model

3.1 Functional Dependencies and Highest Normal Form:

Relational Schema: Stadium
Functional Dependencies:
{Stadium_id} → { Stadium_Name, Location, Area, Pitch_Type }
Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Umpires
Functional Dependencies:
{Umpire_id} → {Umpire_Name, Location_of_origin, Experience}
Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Player
Functional Dependencies:
{Player_id} → {Name ,Position, Team_Name,Country_of_Origin, Debut_Date,
No_of_Dismissals}
Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Bio_Details
Functional Dependencies:
{Player_id} → {D.O.B, Age, Height, Weight}
Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Team
Functional Dependencies:
{Team_Name} → {Team_Location, Team_Coach, Team_Captain, No_of_batsman, No_of_bowlers , No_of_wicketkeepers , No_of_allrounders }

Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Match
Functional Dependencies:
{Match_id} → {Team1, Team2, Date, Time , Stadium_id, Toss_Team, Toss_Decision,
Leg_Umpire, Straight_Umpire, Third_Umpire,Status}

{Stadium_id,Date,Time} → {Match_id}
(Here the combination of Stadium_id ,Date And Time is a Super-Key.)

Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Bowl_Stats
Functional Dependencies:
{Player_id,Match_id} → {Innings_No, Overs, Maiden_Overs, Wickets, NO_Balls, Wide_Balls}
Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Bat_Stats

Functional Dependencies:

{Player_id,Match_ID} → {Innings_No, Runs, SR,4s,6s,Extras,Current_Status}

Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Game_Data_Bowling

Functional Dependencies:

{Player_id} → {No_of_Matches, Avg, Balls_bowled, runs_conceded, wickets, economy, style}

Highest Normal Form: **Boyce Codd Normal Form**

Relational Schema: Game_Data_Batting

Functional Dependencies:

{Player_id} → { No_of_Matches, Avg, total_runs, balls_faced, SR, 100s, 50s , 4s, 6s}

Highest Normal Form: **Boyce Codd Normal Form**