CS354 Database

MidSem Assignment

ER Diagram of a database system for Indian Premier League (IPL)

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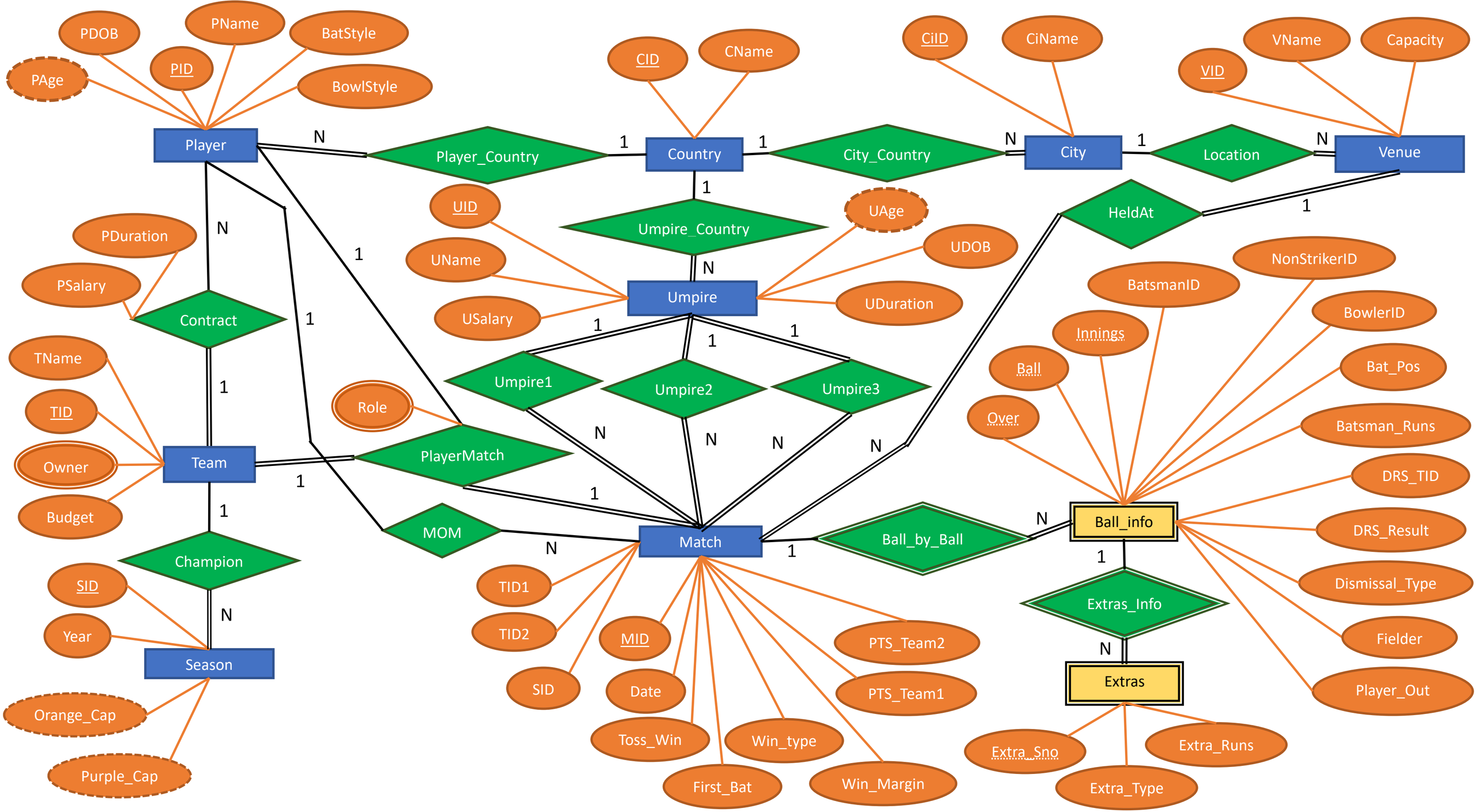

ER Diagram of a database system for IPL

Entity Sets:

Sno	Name	Attributes	Entity Set Type
1	Player	PID, PName, PDOB, PAge, BatStyle, BowlStyle	Strong
2	Team	TID, TName, Owner, Budget	Strong
3	Season	SID, Year, Orange_Cap, Purple_Cap	Strong
4	Venue	VID, VName, Capacity	Strong
5	Country	CID, CName	Strong
6	City	CiID, CiName	Strong
7	Umpire	UID, UName, UDOB, UAge, USalary, UDuration	Strong
8	Match	MID, TID1, TID2, SID, Date, Toss_Win, First_Bat, Win_type, Win_Margin, PTS_Team1, PTS_Team2	Strong
9	Ball_info	Over, Ball, Innings, BatsmanID, NonStrikerID, BowlerID, Bat_Pos, Batsman_Runs, DRS_TID, DRS_Result, Dismissal_Type, Fielder, Player_Out	**Weak**
10	Extras	Extra_Sno, Extra_Type, Extra_Runs	**Weak**

Player:

This entity set stores information about Players who have played and are currently playing in the IPL.

Attributes are:

- PID – Primary Key attribute to identify each player uniquely
- PName – Name of the Player
- PDOB – Date of Birth of the Player
- PAge – Age of the player. This is a Derived Attribute
- BatStyle – Batting Style of the Player (Left-Hand/Right-Hand)
- BowlStyle – Bowling Style of the Player (Right-Hand/Left-Hand: Fast, Medium, Off-Spin, Leg-Spin etc)

Team:

This entity set stores information about teams that have been and currently are a part of the IPL.

Attributes are:

- TID – Primary Key attribute to identify each team uniquely. Basically, Short Form of the team name.
- TName – Name of the Team
- Owner – Owners of the Team. This is a Multivalued Attribute.
- Budget – Team Budget to buy players. Used to enforce the budget constraint placed by BCCI on spending of each team. NULL for a currently non-existent team.

Season:

Used to record the Year and other Statistics (listed below) of each season of the IPL.

Attributes are:

- SID – Primary Key attribute to identify each season of the IPL. Basically, it is season number.
- Year – Year of Conduct of the season
- Orange_Cap – Player ID who scored most runs in the season
- Purple_Cap – Player ID who took most wickets in a season

Venue:

Used to store the details of the stadiums in which IPL matches were held in the past or are currently being held.

Attributes are:

- VID – Primary key attribute to identify each stadium uniquely
- VName – Name of the Stadium
- Capacity – Capacity of the Stadium

Country:

Used to store details about various countries for easy access and minimization of errors in other parts of this database.

Attributes are:

- CID – Primary Key attribute to identify each country uniquely. Basically, short form of the country name
- CName – Name of the country

City:

Used to store details about cities that have conducted atleast one IPL match, for easy access and minimization of errors in other parts of this database.

Attributes are:

- CiID – Primary Key attribute to identify each city uniquely. Basically, short form of the city name
- CiName – Name of the city

Umpire:

Used to store details of the umpires who have umpired in the past and are umpiring currently.

Attributes are:

- UID – Primary key attribute to identify each umpire uniquely
- UName – Name of the umpire
- UDOB – Date of Birth of the umpire
- UAge – Age of the umpire. This is a Derived Attribute
- USalary – Salary of the umpire
- UDuration – Duration of the contract given to the umpire

Match:

Used to store details of all the matches that have happened in the history of IPL and are happening currently.

Attributes are:

- MID – Primary key to uniquely identify each match held in the IPL
- TID1 – ID of Team 1 contesting the match
- TID2 – ID of Team 2 contesting the match
- SID – ID of Season in which match happened/happening
- Date – Date of conduct of match
- Toss_Win – ID of the team that won the toss (NULL if no toss due to bad weather)
- First_Bat – ID of the team that did first batting (NULL for abandoned matches)

- Win_type – Decided by checking whether the first batting team won or the second (NULL for abandoned matches)
- Win_Margin – Margin for the win (runs if first batting team won, wickets if second batting team won, NULL if match abandoned)
- PTS_Team1 – Points awarded to Team 1
- PTS_Team2 – Points awarded to Team 2

Ball_info:

Used to store Ball by Ball details of a particular match. This is a **weak entity set.**

Justification:

- Existence of Ball_info records are dependent on the corresponding match. If the match is abandoned, there are no Ball_info records.

Attributes are:

- Over – Over number of the match in which the ball is bowled
- Ball – Serial number of the ball in that over
- Innings – Innings no. in which ball was bowled

} Discriminator Attributes

- BatsmanID – ID of batsman on strike
- NonStrikerID – ID of batsman off strike
- BowlerID – ID of bowler
- Bat_Pos – Position of the batsman in the batting line up
- Batsman_Runs – Runs scored by the batsman
- DRS_TID – ID of the team which reviewed umpire's decision (NULL if no review taken)
- DRS_Result – Result of umpire's review (Decision Stands/Overturned/Umpire's Call/NULL)
- Dismissal_Type – Type of dismissal (bowled/run-out/stumping/caught/NULL if not out)
- Fielder – ID of fielder involved in dismissal (NULL if no dismissal)
- Player_Out – ID of player who is out (NULL if not out)

Extras:

Used to store information about all extras bowled during a match. This is a **weak entity set.**

Justification:

- Runs scored in extras are considered to be a part of the runs scored in the corresponding ball. Therefore, they are dependent on a particular ball for existence.
- If extras are kept as a separate entity set, it would be difficult to calculate the total score of the team because two tables have to be accessed in the database.

Attributes are:

- Extra_Sno – Discriminator attribute for distinguishing various extras bowled in a particular ball in a match
- Extra_Type – Type of the extra bowled (Wide/No-ball/Bye/Leg-bye)
- Extra_Runs – Runs scored in the extra

Relationships:

Sno	Name	Entity Sets Involved	Cardinality Ratio	Participation Constraint	Attributes	Description
1	Player_Country	Player, Country	Many to One	Total Partial		Depicts the nationality of a player
2	City_Country	City, Country	Many to One	Total Partial		Informs the country in which a city is present
3	Location	Venue, City	Many to One	Total Total		Informs the city in which a Venue is present
4	HeldAt	Match, Venue	Many to One	Total Total		Informs the stadium in which a match was held
5	Umpire_Country	Umpire, Country	Many to One	Total Partial		Depicts the nationality of an Umpire
6	Contract	Player, Team	Many to One	Partial Total	PDuration, PSalary	Mentions the contract details (Duration,Salary) between a player and a franchise in current season
7	Champion	Season, Team	Many to One	Total Partial		Mentions the winning team of the season
8	PlayerMatch	Match, Team, Player	Unique Combination of Match, Team, Player (Multiway Relationship)	Total Total Partial	Role	Mentions the role of a player (like Captain, Keeper, Bowler, Batsman, Allrounder) in a team during a match
9	MOM	Match, Player	Many to One	Partial Partial		Mentions the Player who got Man of the Match award in a particular match
10	Umpire1	Match, Umpire	Many to One	Total Total		Mentions On-field umpire 1 during a particular match
11	Umpire2	Match, Umpire	Many to One	Total Total		Mentions On-field umpire 2 during a particular match
12	Umpire3	Match, Umpire	Many to One	Total Total		Mentions TV umpire during a particular match
13	Ball_by_Ball	Match, Ball_info	One to Many	Partial Total		Identifying Relationship for **Ball_info** Entity Set
14	Extras_Info	Ball_by_Ball, Extras	One to Many	Partial Total		Identifying Relationship for **Extras** Entity Set

Justifications for Cardinality Constraint and Participation Constraint for each relationship:

Player_Country:

One player belongs to one country. One country can have many players. Therefore, Cardinality is Many to One.

Every country need not have a player. So, participation of country entity set is partial and player entity set is total.

City_Country:

One city belongs to only one country. One country has many cities. Cardinality is Many to One.

Every country need not have a city that conducted an IPL match. Therefore, participation of City is total and Country is partial.

Location:

One venue belongs to one city. One city can have many venues. Cardinality is Many to One.

Since, there are only cities which have conducted atleast one IPL match, participation of both entities is total.

HeldAt:

One match can be held at only one Venue. One Venue can hold many matches. Cardinality is Many to One.

The database has only those venues which have held matches. Therefore, participation is total for both entity sets.

Umpire_Country:

One umpire belongs to one country. One country can have many umpires. Therefore, Cardinality is Many to One.

Every country need not have an umpire. So, participation of country entity set is partial and umpire entity set is total.

Contract:

One player is contracted to one team. One team can have many players. Therefore, Cardinality is Many to One.

Players who are not currently playing don't have a team but every team buys players. So, participation of player entity set is partial and team entity set is total.

Champion:

A team can win in many seasons. A season has only one winner. Cardinality is Many to One.

Every Season has a Winning Team but every team need not be a winner. So, participation of Season Entity Set is Total and Team Entity Set is Partial.

PlayerMatch:

A player plays a match for a particular team only. Since each match is unique, the triplet of match, team, player must be unique. This is a Multiway Relationship.

Every team plays at least one match during IPL history but every player might not get the chance to play at most one match. Therefore, the participation of Match, Team entity sets is Total whereas that of Player is Partial.

MOM:

A player can get more than one Man of the Match awards in IPL. In a match, there is only one player who gets Man of the Match award. Cardinality Ratio is Many to One.

Every match need not have a Man of the Match because some are abandoned. Every player is not Man of the Match. Therefore, participation of Match and Player entity sets is Partial.

Umpire1, Umpire2, Umpire3:

Consider Umpire1 relationship. An umpire can do umpiring in many matches. But a match can have only one umpire to perform relevant duties of Umpire1. Therefore, Cardinality Ratio is Many to One.

Since database contains only those umpires who have done umpiring in IPL, the participation of Match and Umpire entity sets is Total in all 3 relationships.

Ball_by_Ball:

For a match only one set of records of ball by ball information is present. Many balls are bowled in a match. Therefore, Cardinality is One to Many.

The participation of Match entity set is Partial because some of the matches are abandoned. The participation of Ball_info Entity Set is Total as it is a weak entity set.

Extras_Info:

A ball can consist of many extras. An extra belongs to only one ball. Hence, cardinality is Many to One.

Every ball bowled need not have an extra. Every extra is part of some ball (reason for it being a weak entity set). Therefore, participation of Ball_by_Ball entity set is Partial and Extras entity set is Total.