Cricket Players & Teams Database Management System

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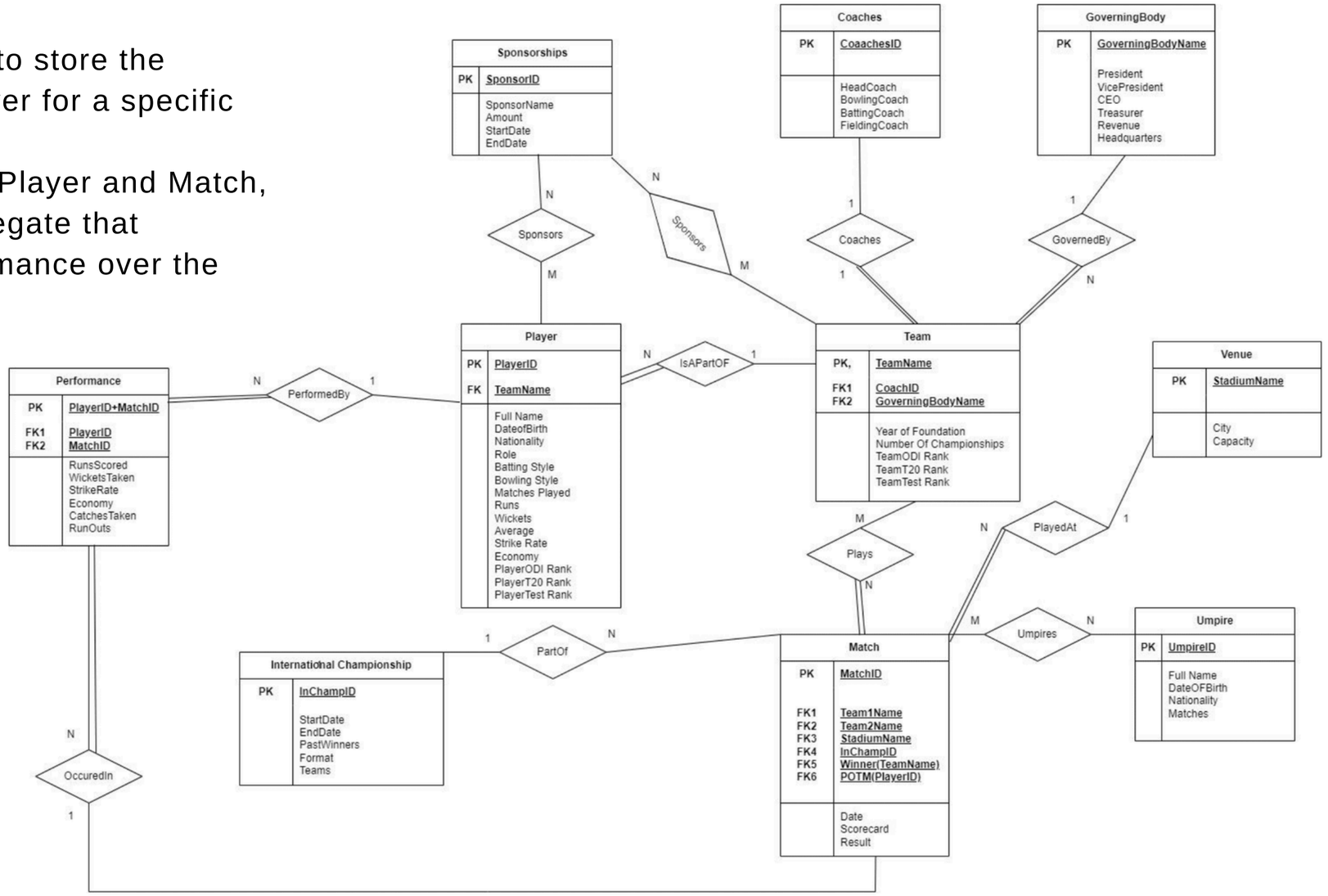
Functional Requirements

1. Find the player with most runs in each team.
2. Find the players with more career Wickets and Runs than their team's average performance metrics.
3. Find the matches where the total runs are greater than the average total runs in all matches.
4. List the players who have won more than 1 "Player of the Match" awards and have an average of at least 1 wickets per match.
5. Find teams that have participated in every international championship.
6. Find the player with the most wickets in each team.
7. Find the player with the most wickets in a given series or tournament and their team information.
8. Find the coaches of the teams in the Top 3 for T20 Rankings.
9. Find umpires who have officiated in matches where a specific team (e.g., 'India', ‘Australia’) played.
10. List teams and players who share the same sponsor, showing the sponsor’s name and sponsorship amount.
11. Find teams that have an average number of matches won per year (since foundation) greater than 0. (Since we have inserted less number of rows in Match Table, we have to keep matches won per year > 0, but with enough number of rows, it could be kept a desired value).
12. List teams with an average player strike rate greater than 80, along with their average strike rate and number of players.
13. Find coaches of the teams that have played in all international championships.
14. Find umpires who have officiated in matches where a specific team (e.g., 'India', ‘Australia’) played.
15. Find players who have taken more than 2 wickets and have an average economy rate below 6.0 runs per over in the matches they played.
16. Find players who have played more matches than the average number of matches played by all players.
17. Find umpires who have officiated more matches than the average number of matches officiated by all umpires.
18. Find the names and the number of matches of the stadiums that have hosted more number of matches than the average matches played at each stadium.
19. Find the number of distinct venues where players have played.
20. Find teams with total sponsorship amount greater than the average sponsorship amount.

Entity-Relationship Model

ERD

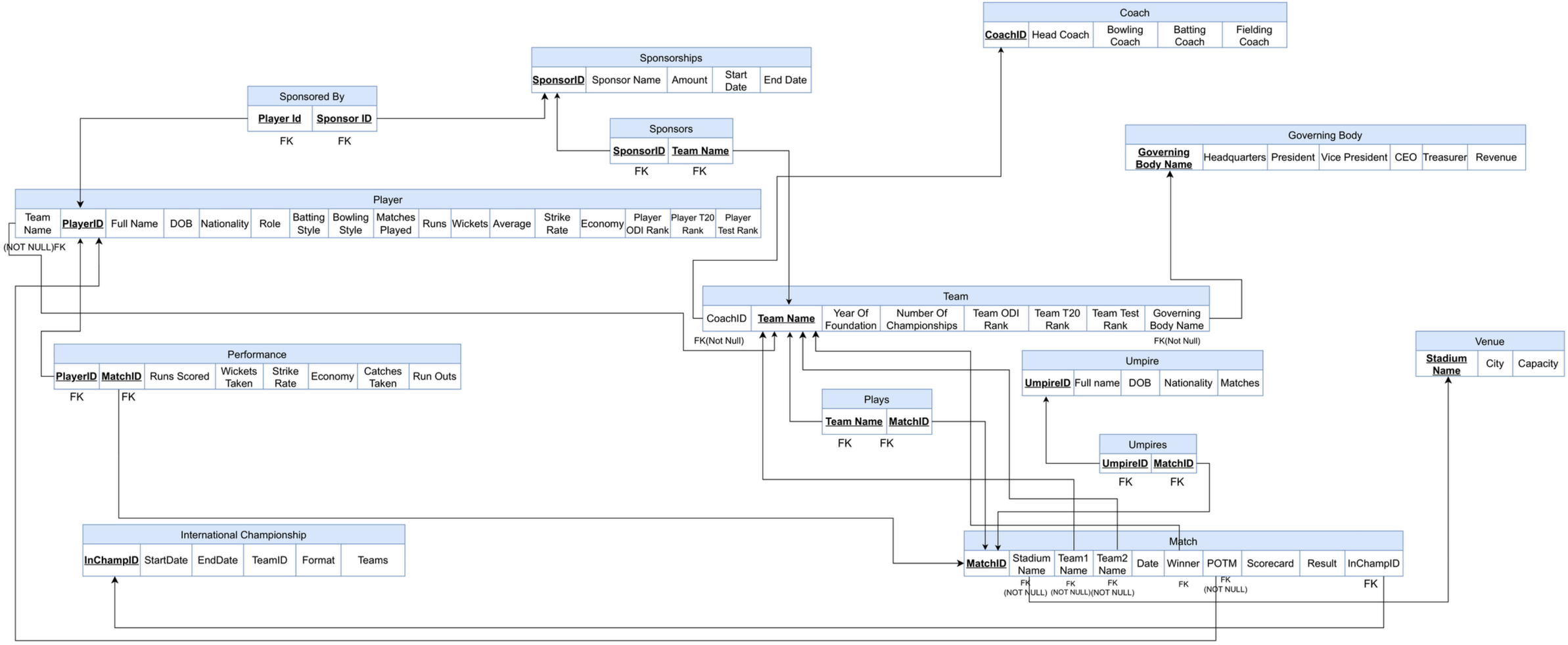
- Performance Entity is used to store the information of a specific player for a specific match.
- Because of its relation with Player and Match, it becomes easy to run aggregate that summarize a player's performance over the matches.



Relational Model

RD

- The Match entity stands out as a central hub that contains multiple foreign keys, which represents its key role in the databse to keep track of the scores and player performances.



SQL DDL Scripts

 SQL DDL Statements

- Most of the domain constraints are trivial (e. g. runs >= 0).
- One notable point is that in the InternationalChampionhip table, the constraint EndDate > StartDate ensures that the duration of the championship is valid.
- We have used CASCADE option upon delete or update.

Top 5 Functional Requirements

1. Find the player with most runs in each team.

DML Query :

```
SELECT p.playerid, p.fullname,
p.teamname, p.runs
FROM player AS p
JOIN (
    SELECT teamname, MAX(runs) AS
max_runs
    FROM player
    GROUP BY teamname
) AS max_runs_per_team
ON p.teamname =
max_runs_per_team.teamname
AND p.runs = max_runs_per_team.max_runs;
```

	playerid [PK] integer	fullname character varying (100)	teamname character varying (100)	runs integer
1	4	Steve Smith	Australia	8000
2	11	Mohammad Nabi	Afghanistan	2000
3	12	David Warner	Australia	8000
4	17	Chris Gayle	West Indies	11000
5	20	Jacques Kallis	South Africa	13000
6	1	Virat Kohli	India	12000
7	5	Kane Williamson	New Zealand	6000
8	18	Kumar Sangakkara	Sri Lanka	14000
9	22	James Smith	England	4100
10	25	Shoaib Malik	Pakistan	5200

Top 5 Functional Requirements

2. Find the players with more career Wickets and Runs than their team's average performance metrics.

DML Query :

```
SELECT PLAYERID, FULLNAME, RUNS, WICKETS
FROM PLAYER P1
WHERE RUNS > (
    SELECT AVG(RUNS)
    FROM PLAYER P2
    WHERE P2.TEAMNAME = P1.TEAMNAME
)
AND WICKETS > (
    SELECT AVG(WICKETS)
    FROM PLAYER P3
    WHERE P3.TEAMNAME = P1.TEAMNAME
);
```

	playerid [PK] integer	fullname character varying (100)	runs integer	wickets integer
1	20	Jacques Kallis	13000	300
2	22	James Smith	4100	120
3	25	Shoaib Malik	5200	105

Top 5 Functional Requirements

3. Find the matches where the total runs are greater than the average total runs in all matches.

DML Query :

```
SELECT MATCHID, TOTAL_MATCH_RUNS
FROM (
    SELECT MATCHID, SUM(RUNSSCORED) AS
TOTAL_MATCH_RUNS
    FROM PERFORMANCE
    GROUP BY MATCHID
) AS MATCH_RUNS
WHERE TOTAL_MATCH_RUNS > (
    SELECT AVG(TOTAL_MATCH_RUNS)
    FROM (
        SELECT SUM(RUNSSCORED) AS TOTAL_MATCH_RUNS
        FROM PERFORMANCE
        GROUP BY MATCHID
    ) AS AVG_MATCH_RUNS
);
```

	matchid integer	total_match_runs bigint
1	3	140
2	5	140
3	4	150
4	10	90
5	6	105
6	2	160
7	16	110
8	1	150

Top 5 Functional Requirements

4. List the players who have won more than 1 "Player of the Match" awards and have an average of at least 1 wickets per match.

DML Query :

```
SELECT P.FULLNAME,
       COUNT(M.POTMPlayerID) AS
PlayerOfTheMatchAwards,
       AVG(Perf.WicketsTaken) AS
AvgWicketsPerMatch
FROM Player P
JOIN Match M ON P.PlayerID = M.POTMPlayerID
JOIN Performance Perf ON P.PlayerID =
Perf.PlayerID
GROUP BY P.FULLNAME
HAVING COUNT(M.POTMPlayerID) > 1
   AND AVG(Perf.WicketsTaken) >= 1;
```

	fullname character varying (100)	playerofthematchawards bigint	avgwicketspermatch numeric
1	Ben Stokes	2	1.5000000000000000
2	Jasprit Bumrah	2	1.5000000000000000
3	Shikhar Dhawan	2	1.0000000000000000000
4	David Warner	2	2.0000000000000000
5	Trent Boult	2	2.0000000000000000
6	Babar Azam	2	1.0000000000000000000

Top 5 Functional Requirements

5. Find teams that have participated in every international championship.

DML Query :

```
SELECT T.TeamName
FROM Team T
WHERE NOT EXISTS (
    SELECT IC.InChampID
    FROM Match IC
    WHERE NOT EXISTS (
        SELECT 1
        FROM Plays P
        JOIN Match M ON P.MatchID = M.MatchID
        WHERE T.TeamName = P.TeamName
        AND M.InChampID = IC.InChampID
    )
);
```

	teamname [PK] character varying (100)
1	India
2	Australia
3	Pakistan
4	New Zealand
5	South Africa
6	England
7	West Indies
8	Sri Lanka
9	Bangladesh
10	Afghanistan
11	Ireland
12	Zimbabwe
13	Scotland
14	UAE
15	Nepal

Remarks

- In conclusion, this project has successfully demonstrated how a robust database management system can efficiently organize and retrieve key data about cricket players and teams, enabling analysis and performance tracking, or providing joy to the fans after seeing the stats of their favourite players/teams.

- Throughout this project, we have gained valuable knowledge into the design and implementation of relational databases, particularly in managing complex data relationships, implementing queries, and ensuring data integrity, all of which are essential skills in real-world database management systems.

Thank You!