Dhirubhai Ambani Institute of Information and Communication Technology

IT214 – Database Management System

Database for keeping records of Indian Premier League
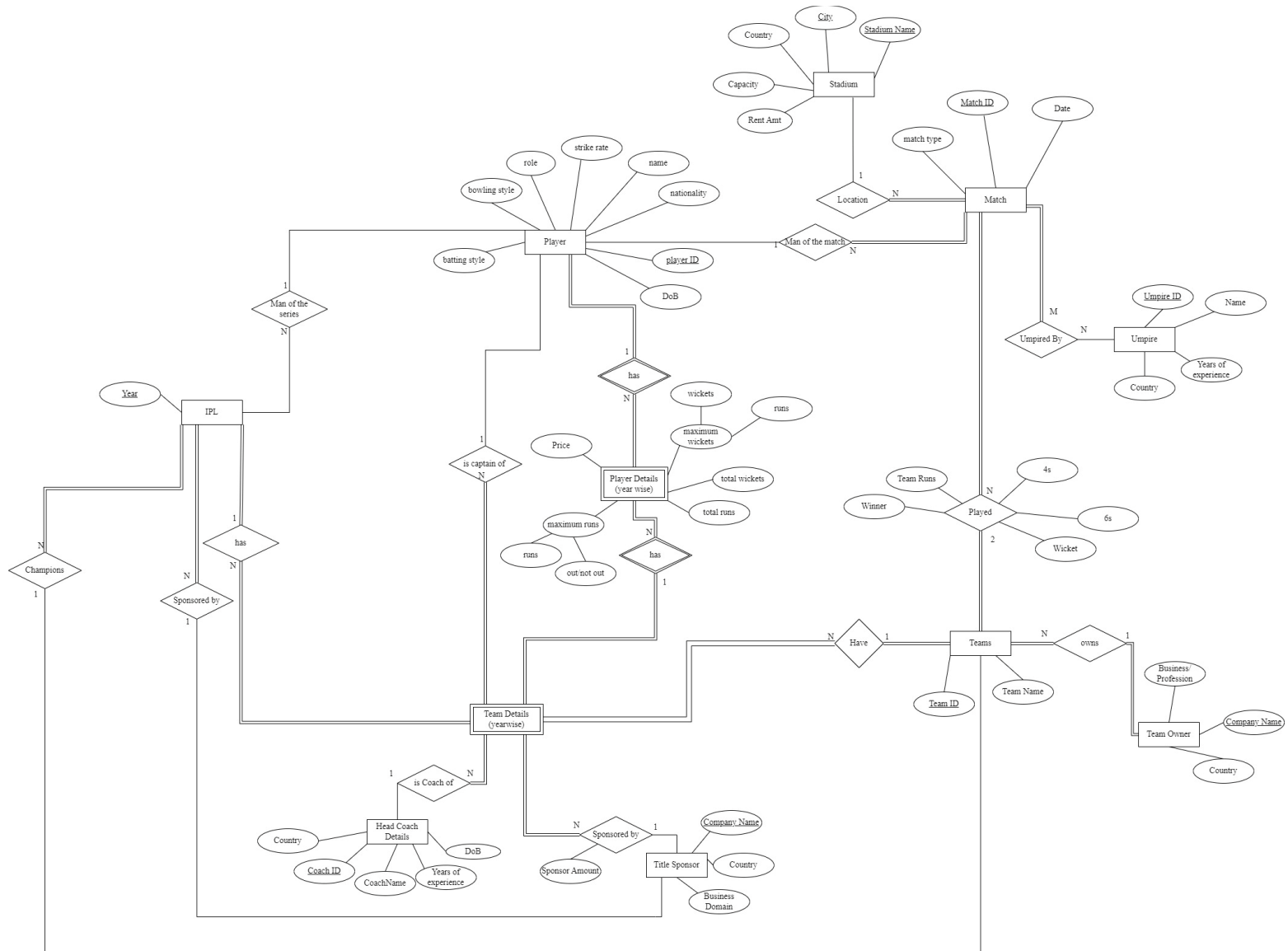
G5_14

Khushi Shah – 202101430 - +917383469283
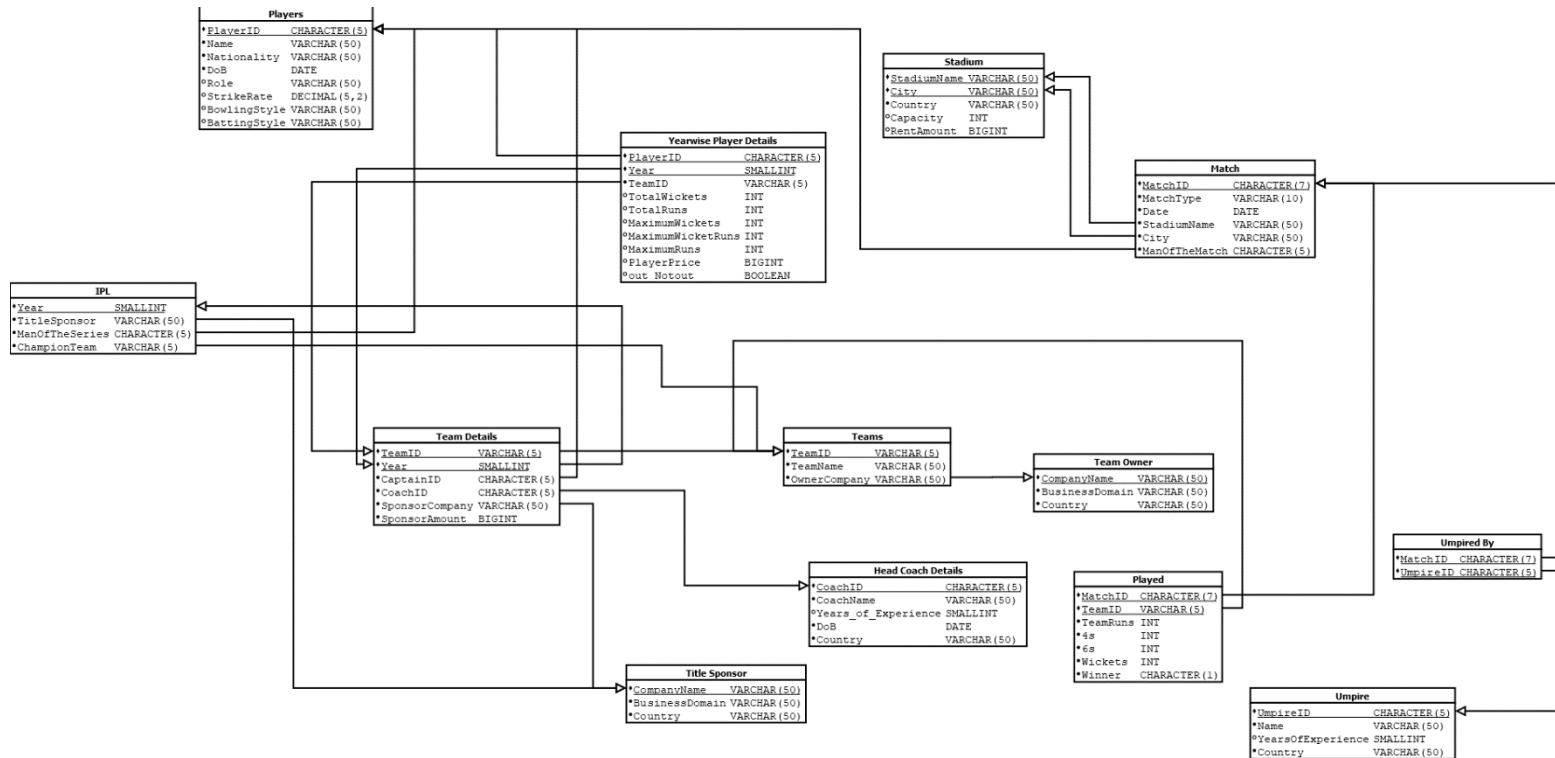
Vansh Joshi – 202101445

Sakshi Patadiya – 202101469

Ishita Rathod – 202101516

(1)   ER Diagram

Stadium
- Country
- City
- Stadium Name
- Capacity
- Rent Amt

Match
- Match ID
- Date
- match type

Location (1 — N)

Player
- role
- strike rate
- name
- bowling style
- nationality
- batting style
- player ID
- DoB

Man of the match (1 — N)

Umpired By (M — N)

Umpire
- Umpire ID
- Name
- Years of experience
- Country

Man of the series (1 — N)

has (1 — N)

Player Details (year wise)
- Price
- wickets
- maximum wickets
- runs
- total wickets
- total runs

maximum runs
- runs
- out/not out

has (N — 1)

Played
- Team Runs
- Winner
- 4s
- 6s
- Wicket

IPL
- Year

has (1 — N)

Sponsored by (N — 1)

is captain of (1 — N)

Champions (N — 1)

Have (N — 1)

Teams
- Team ID
- Team Name

owns (N — 1)

Team Owner
- Business/Profession
- Company Name
- Country

Team Details (yearwise)

is Coach of (1 — N)

Head Coach Details
- Country
- Coach ID
- CoachName
- Years of experience
- DoB

Sponsored by (N — 1)
- Sponsor Amount

Title Sponsor
- Company Name
- Country
- Business Domain

(2)   Relational Schema

Players

*PlayerID	CHARACTER(5)
*Name	VARCHAR(50)
*Nationality	VARCHAR(50)
*DoB	DATE
°Role	VARCHAR(50)
°StrikeRate	DECIMAL(5,2)
°BowlingStyle	VARCHAR(50)
°BattingStyle	VARCHAR(50)

Stadium

*StadiumName	VARCHAR(50)
*City	VARCHAR(50)
*Country	VARCHAR(50)
°Capacity	INT
°RentAmount	BIGINT

Yearwise Player Details

*PlayerID	CHARACTER(5)
*Year	SMALLINT
*TeamID	VARCHAR(5)
°TotalWickets	INT
°TotalRuns	INT
°MaximumWickets	INT
°MaximumWicketRuns	INT
°MaximumRuns	INT
°PlayerPrice	BIGINT
°out Notout	BOOLEAN

Match

*MatchID	CHARACTER(7)
*MatchType	VARCHAR(10)
*Date	DATE
*StadiumName	VARCHAR(50)
*City	VARCHAR(50)
°ManOfTheMatch	CHARACTER(5)

IPL

*Year	SMALLINT
*TitleSponsor	VARCHAR(50)
*ManOfTheSeries	CHARACTER(5)
°ChampionTeam	VARCHAR(5)

Team Details

*TeamID	VARCHAR(5)
*Year	SMALLINT
*CaptainID	CHARACTER(5)
*CoachID	CHARACTER(5)
*SponsorCompany	VARCHAR(50)
*SponsorAmount	BIGINT

Teams

*TeamID	VARCHAR(5)
*TeamName	VARCHAR(50)
*OwnerCompany	VARCHAR(50)

Team Owner

*CompanyName	VARCHAR(50)
*BusinessDomain	VARCHAR(50)
*Country	VARCHAR(50)

Umpired By

*MatchID	CHARACTER(7)
*UmpireID	CHARACTER(5)

Head Coach Details

*CoachID	CHARACTER(5)
*CoachName	VARCHAR(50)
°Years_of_Experience	SMALLINT
*DoB	DATE
*Country	VARCHAR(50)

Played

*MatchID	CHARACTER(7)
*TeamID	VARCHAR(5)
*TeamRuns	INT
*4s	INT
*6s	INT
*Wickets	INT
*Winner	CHARACTER(1)

Title Sponsor

*CompanyName	VARCHAR(50)
*BusinessDomain	VARCHAR(50)
*Country	VARCHAR(50)

Umpire

*UmpireID	CHARACTER(5)
*Name	VARCHAR(50)
°YearsOfExperience	SMALLINT
*Country	VARCHAR(50)

3

(3)   Minimal FD Set

PlayerID → Name
PlayerID → Nationality
PlayerID → DoB
PlayerID → Role
PlayerID → StrikeRate
PlayerID → BowlingStyle
PlayerID → BattingStyle
Year → TitleSponsor
Year→ ManOfTheSeries
Year→ ChampionTeam
{StadiumName, City} → Country
{StadiumName, City}→ Capacity
{StadiumName, City}→ RentAmount
CoachID → CoachName
CoachID → YearsOfExperience
CoachID → DoB
CoachID → Country
UmpireID → Name
UmpireID → YearsOfExperience
UmpireID → Country
OwnerCompanyName → OwnerBusinessDomain
OwnerCompanyName → OwnerCompanyCountry
SponsorCompanyName → SponsorBusinessDomain
SponsorCompanyName → SponsorCompanyCountry
{PlayerID, Year} → TotalWickets
{PlayerID, Year} → TotalRuns
{PlayerID, Year} → MaximumWickets
{PlayerID, Year} → MaximumWicketRuns
{PlayerID, Year} → MaximumRuns
{PlayerID, Year} → Out-Notout
{PlayerID, Year} → PlayerPrice
{PlayerID, Year} → TeamID
{TeamID, Year} → CaptainID
{TeamID, Year} → CoachID
{TeamID, Year} → SponsorComapany

{TeamID, Year} → SponsorAmount
TeamID→ TeamName
TeamID → OwnerCompany
MatchID → MatchType
MatchID → Date
MatchID → StadiumName
MatchID → City
MatchID → ManOfTheMatch
{MatchID,TeamID} → TeamRuns
{MatchID,TeamID} → 4s
{MatchID,TeamID} → 6s
{MatchID,TeamID} → Wickets
{MatchID,TeamID} → Winner

(4)   Proof that relations are in BCNF

1. 'Players' relation :

- Attributes :
Players {PlayerID, Name, Nationality, DoB, Role, StrikeRate, BowlingStyle, BattingStyle}

- Functional dependencies :
    PlayerID → Name
    PlayerID → Nationality
    PlayerID → DoB
    PlayerID → Role
    PlayerID → StrikeRate
    PlayerID → BowlingStyle
    PlayerID → BattingStyle

Let X = PlayerID
X^+ = {PlayerID, Name, Nationality, DoB, Role, StrikeRate, BowlingStyle, BattingStyle}
Thus, **Primary key = PlayerID**

The left side of all the FDs in minimal set of FDs for the relation 'Players' is PlayerID, which is the primary key of this relation, so **"Players" is in BCNF.**

2. 'IPL' relation :

- Attributes :
IPL {Year, TitleSponsor, ManOfTheSeries, ChampionTeam}

- Functional dependencies :
    Year → TitleSponsor
    Year→ ManOfTheSeries
    Year→ ChampionTeam

Let X = Year

X^+ = {Year, TitleSponsor, ManOfTheSeries, ChampionTeam}
Thus, **Primary key = Year**

The left side of all the FDs in minimal set of FDs for the relation 'IPL' is Year, which is the primary key of this relation, so **"IPL" is in BCNF.**

3. **'Stadium' relation :**

   - Attributes :
     Stadium {StadiumName, City, Country, Capacity, RentAmount}

   - Functional dependencies :
     {StadiumName, City} $\rightarrow$ Country
     {StadiumName, City} $\rightarrow$ Capacity
     {StadiumName, City} $\rightarrow$ RentAmount

Let X = {StadiumName, City}
X^+ = {StadiumName, City, Country, Capacity, RentAmount }
Thus, **Primary key = {StadiumName, City}**

The left side of all the FDs in minimal set of FDs for the relation 'Stadium' is {StadiumName, City}, which is the primary key of this relation, so
"Stadium" is in BCNF.

4. **'HeadCoachDetails' relation :**

   - Attributes :
     HeadCoachDetails {CoachID, CoachName, YearsOfExperience, DoB, Country}

   - Functional dependencies :
     CoachID $\rightarrow$ CoachName
     CoachID $\rightarrow$ YearsOfExperience
     CoachID $\rightarrow$ DoB
     CoachID $\rightarrow$ Country

Let X = CoachID
X^+ = {CoachID, CoachName, YearsOfExperience, DoB, Country}
Thus, **Primary key = CoachID**

The left side of all the FDs in minimal set of FDs for the relation 'HeadCoachDetails' is CoachID, which is the primary key of this relation, so **"HeadCoachDetails" is in BCNF.**

5. **'Umpire' relation :**

   - Attributes :
     Umpire {UmpireID, Name, YearsOfExperience, Country}

   - Functional dependencies :
     UmpireID → Name
     UmpireID → YearsOfExperience
     UmpireID → Country

   Let X = UmpireID
   X^+ = {UmpireID, Name, YearsOfExperience, Country}
   Thus, **Primary key = UmpireID**

   The left side of all the FDs in minimal set of FDs for the relation 'Umpire' is UmpireID, which is the primary key of this relation, so **"Umpire" is in BCNF.**

6. **'UmpiredBy' relation :**

   - Attributes :
     UmpiredBy {MatchID, UmpireID}

   Here Primary key = {MatchID, UmpireID}
   According to theorem, all attribute primary key relation is always in BCNF.
   Hence **"UmpiredBy" is in BCNF.**

7. 'TeamOwner' relation :

- Attributes :
  TeamOwner {CompanyName, BusinessDomain, Country}

- Functional dependencies :
  CompanyName → BusinessDomain
  CompanyName → Country

Let X = CompanyName
X^+ = {CompanyName, BusinessDomain, Country}
Thus, **Primary key = CompanyName**

The left side of all the FDs in minimal set of FDs for the relation 'TeamOwner' is CompanyName, which is the primary key of this relation, so **"TeamOwner" is in BCNF.**

8. 'TitleSponsor' relation :

- Attributes :
  TitleSponsor {CompanyName, BusinessDomain, Country}

- Functional dependencies :
  CompanyName → BusinessDomain
  CompanyName → Country

Let X = CompanyName
X^+ = {CompanyName, BusinessDomain, Country}
Thus, **Primary key = CompanyName**

The left side of all the FDs in minimal set of FDs for the relation 'TitleSponsor' is CompanyName, which is the primary key of this relation, so **"TitleSponsor" is in BCNF.**

9. **'YearWisePlayerDetails' relation :**

- Attributes :
  YearWisePlayerDetails {TeamID, PlayerID, Year, TotalWickets, TotalRuns, MaximumWickets, MaximumWicketRuns, MaximumRuns, PlayerPrice Out-Notout}

- Functional dependencies :
  {PlayerID, Year} $\rightarrow$ TotalWickets
  {PlayerID, Year} $\rightarrow$ TotalRuns
  {PlayerID, Year} $\rightarrow$ MaximumWickets
  {PlayerID, Year} $\rightarrow$ MaximumWicketRuns
  {PlayerID, Year} $\rightarrow$ MaximumRuns
  {PlayerID, Year} $\rightarrow$ Out-Notout
  {PlayerID, Year} $\rightarrow$ PlayerPrice
  {PlayerID, Year} $\rightarrow$ TeamID

Let X = {PlayerID, Year}
X^+ = {TeamID, PlayerID, Year, TotalWickets, TotalRuns, MaximumWickets, MaximumWicketRuns, MaximumRuns, Out-Notout, PlayerPrice}
Thus, **Primary key = {PlayerID, Year}**

The left side of all the FDs in minimal set of FDs for the relation 'YearWisePlayerDetails' is {PlayerID, Year}, which is the primary key of this relation, so **"YearWisePlayerDetails" is in BCNF.**

10. **'TeamDetails' relation :**

- Attributes :
  Teams {Year, TeamID, CaptainID, CoachID, SponsorCompany, SponsorAmount}

- Functional dependencies :
  {TeamID, Year} $\rightarrow$ CaptainID
  {TeamID, Year} $\rightarrow$ CoachID
  {TeamID, Year} $\rightarrow$ SponsorComapany

$$\{TeamID, Year\} \rightarrow SponsorAmount$$

Let X = {TeamID, Year}
X^+ = {Year, TeamID, CaptainID, CoachID, SponsorCompany, SponsorAmount}

Thus, **Primary key = {TeamID, Year}**

The left side of all the FDs in minimal set of FDs for the relation 'Teams' is {TeamID, Year}, which is the primary key of this relation, so **"Teams" is in BCNF.**

Earlier, this table also had attributes, TeamName and OwnerCompany, but as the relation was not in BCNF, we have decomposed the table into two tables, 'Teams' and 'TeamDetails' both of which are in BCNF.

11. 'Teams' relation :

- Attributes :
TeamDetails {TeamID, TeamName, OwnerCompany}

- Functional dependencies :
    TeamID$\rightarrow$ TeamName
    TeamID $\rightarrow$ OwnerCompany

Let X = TeamID
X^+ = {TeamID, TeamName, OwnerCompany}

Thus, **Primary key = TeamID**

The left side of all the FDs in minimal set of FDs for the relation 'TeamDetails' is TeamID, which is the primary key of this relation, so **"TeamDetails" is in BCNF.**

12. 'Match' relation :

- Attributes :

Match {MatchID, MatchType, Date, StadiumName, City, ManOfTheMatch}

- Functional dependencies :

MatchID $\rightarrow$ MatchType
MatchID $\rightarrow$ Date
MatchID $\rightarrow$ StadiumName
MatchID $\rightarrow$ City
MatchID $\rightarrow$ ManOfTheMatch

Let X = MatchID
X^+ = {MatchID, MatchType, Date, StadiumName, City, ManOfTheMatch}
Thus, **Primary key = MatchID**
The left side of all the FDs in minimal set of FDs for the relation 'Match' is
MatchID which is the primary key of this relation, so **"Match" is in BCNF.**

13. 'Played' relation :

- Attributes :

Played {MatchID, TeamID, TeamRuns, 4s, 6s, Wickets, Winner}

- Functional dependencies :

{MatchID,TeamID} $\rightarrow$ TeamRuns
{MatchID,TeamID} $\rightarrow$ 4s
{MatchID,TeamID} $\rightarrow$ 6s
{MatchID,TeamID} $\rightarrow$ Wickets
{MatchID,TeamID} $\rightarrow$ Winner

Let X = {MatchID,TeamID}
X^+ = {MatchID, TeamID, TeamRuns, 4s, 6s, Wickets, Winner}
Thus, **Primary key = {MatchID, TeamID}**

The left side of all the FDs in minimal set of FDs for the relation 'Played' is {MatchID,TeamID} which is the primary key of this relation, so **"Played" is in BCNF.**