

TASK 1: Conceptual Design through FTR

Aim:

CO1, K3

To design a **Conceptual Entity Relationship (ER) Model** using fundamental database design methodology by identifying entities, attributes, relationships, cardinalities, keys, and constraints, and to represent them using an ER diagram tool. (drawio, lucidchart)

Algorithm:

Algorithm:

- **Start**
- **Understand the Requirements:**
 - Read and analyze the problem domain (in this case, a cricket management system).
- **Identify Entities:**
 - List the main objects (entities) relevant to the system.
 - Example: CricketBoard, Team, Player, Match, Ground, Umpire.
- **Identify Attributes for Each Entity:**
 - Determine characteristics of each entity.
 - Example: Player has attributes like PlayerID, FName, LName, etc.
- **Determine Relationships:**
 - Identify how entities are related.
 - Example: A Team *plays* a Match, a Match *occurs at* a Ground.
- **Identify Cardinalities and Relationship Types:**
 - For each relationship, define how many instances of an entity relate to another.
 - Example: One CricketBoard *organizes* many Matches → 1:M.
- **Define Keys and Constraints:**
 - Assign **Primary Keys (PK)** for unique identification.
 - Assign **Foreign Keys (FK)** to enforce referential integrity.
- **Normalize and Reframe Relations:**
 - Convert the design into a relational schema.
- **Design ER Diagram using Creately:**
 - Go to <https://creately.com/diagram>.

- Use ER template, add entities, attributes, keys, and relationships with proper cardinality.
- **Save and Export Diagram** as needed.
- **End**

Question:

Using basic database design methodology and ER modeler, design Entity Relationship Diagram by satisfying the following sub tasks:

1. **a** Identifying the entities.
1. **b** Identifying the attributes.

Sample Output:

CricketBoard(BoardID, Name, Address, Contact_No)

Team(TeamID, Name, Coach, Captain)

Player(PlayerID, FName, LName, Age, DateofBirth, PlayingRole)

Match(MatchID, Date, Time, Result)

Ground(GroundID, Name, Location, Capacity)

Umpire(UmpireID, FName, LName, Age, DateofBirth, Country)

1. **c** Identification of relationships, cardinality, type of relationship.
1. **d** Reframing the relations with keys and constraint.
1. **e** Using creatively, develop ER/EER diagram

1.a Identifying the Entities

The major **entities** are:

1. **CricketBoard**
2. **Team**
3. **Player**
4. **Match**
5. **Ground**
6. **Umpire**

1.b Identifying the Attributes

Sample Output (EntityName(Attribute1, Attribute2,...)):

1. **CricketBoard**(*BoardID*, Name, Address, Contact_No)
2. **Team**(*TeamID*, Name, Coach, Captain)
3. **Player**(*PlayerID*, FName, LName, Age, DateofBirth, PlayingRole)
4. **Match**(*MatchID*, Date, Time, Result)
5. **Ground**(*GroundID*, Name, Location, Capacity)
6. **Umpire**(*UmpireID*, FName, LName, Age, DateofBirth, Country)

1.c Identification of Relationships, Cardinality, Type of Relationship

Relationship Entities Involved	Cardinality	Type
Organizes	CricketBoard – Match	1:M
Plays	Team – Match	M:N
Belongs To	Player – Team	M:1
Occurs At	Match – Ground	M:1
Officiates	Umpire – Match	M:N

1.d Reframing the Relations with Keys and Constraints

Below are the **relations with Primary Keys (PK) and Foreign Keys (FK)** defined:

1. **CricketBoard** (*BoardID*, Name, Address, Contact_No)
2. **Team**(*TeamID*, Name, Coach, Captain)
3. **Player**(*PlayerID*, FName, LName, Age, DateofBirth, PlayingRole, **TeamID**)
 - o FK: TeamID → Team.TeamID
4. **Match**(*MatchID*, Date, Time, Result, **GroundID**, **BoardID**)
 - o FK: GroundID → Ground.GroundID
 - o FK: BoardID → CricketBoard.BoardID
5. **Ground**(*GroundID*, Name, Location, Capacity)
6. **Umpire**(*UmpireID*, FName, LName, Age, DateofBirth, Country)
7. **MatchTeam**(*MatchID*, *TeamID*)
 - o Composite PK: MatchID + TeamID

- FK: MatchID → Match.MatchID
- FK: TeamID → Team.TeamID

8. MatchUmpire (*MatchID, UmpireID*)

- Composite PK: MatchID + UmpireID
- FK: MatchID → Match.MatchID
- FK: UmpireID → Umpire.UmpireID

1.e Using Creately – Develop ER/EER Diagram

You can now create the ER diagram on <https://creately.com> using the above information.

► Steps to create ER Diagram on Creately:

1. Go to [https://creately.com/diagram \(Lucidchart\)](https://creately.com/diagram)
2. Select **ER Diagram Template**
3. Add entities (CricketBoard, Team, Player, Match, Ground, Umpire)
4. Add attributes under each entity (underline primary keys)
5. Draw relationships and indicate cardinality (1:1, 1:N, M:N)
6. Use connectors and label relationships (e.g., "Organizes", "Plays", "Belongs To")
7. Save or export as PDF/Image

Summary Table of All Entities

Entity	Primary Key	Foreign Key(s)
CricketBoard	BoardID	—
Team	TeamID	—
Player	PlayerID	TeamID → Team.TeamID
Match	MatchID	GroundID, BoardID
Ground	GroundID	—
Umpire	UmpireID	—
MatchTeam	MatchID + TeamID	MatchID, TeamID
MatchUmpire	MatchID + UmpireID	MatchID, UmpireID

Result:

Thus, ER diagram was draw successfully using Lucid chart.