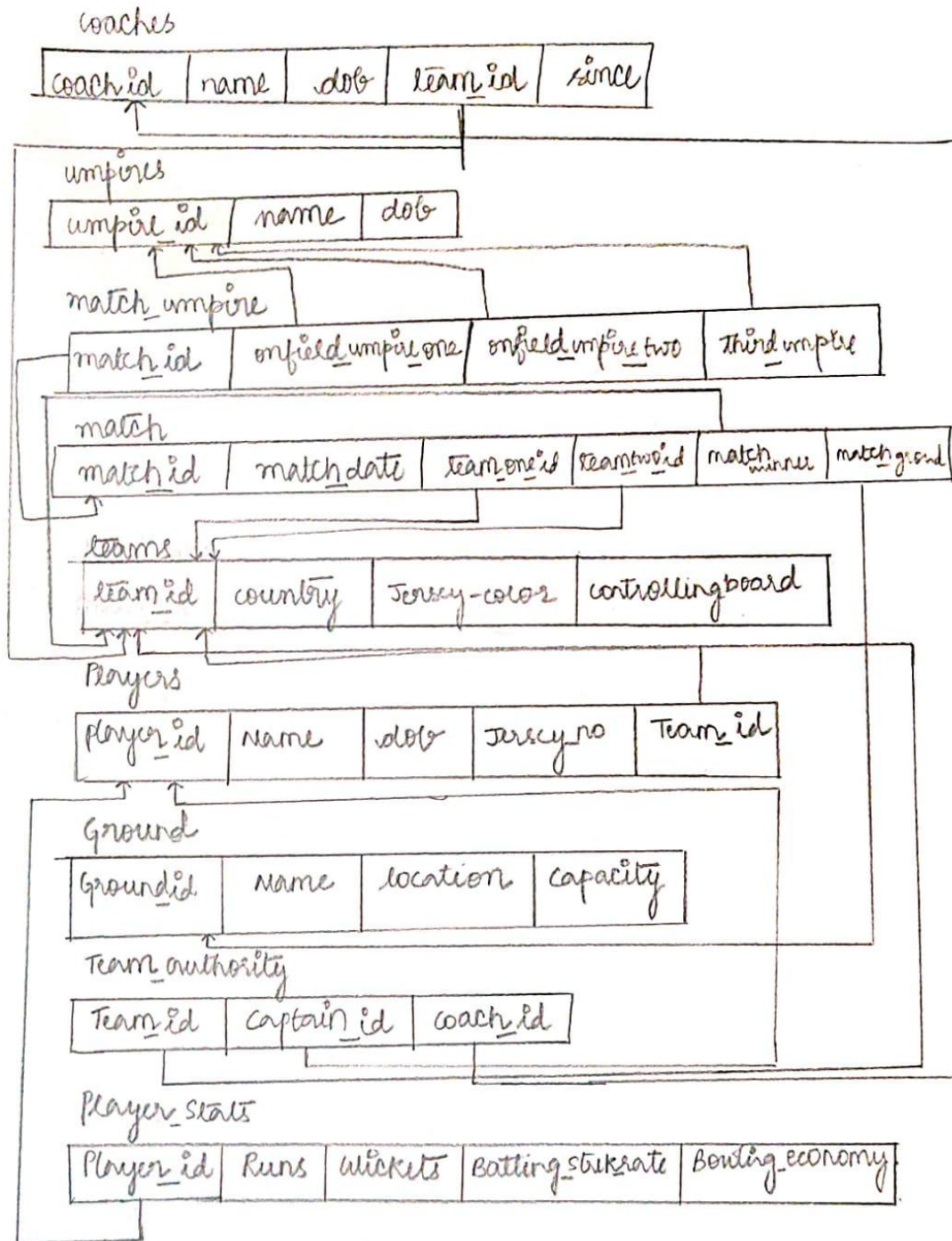


Relational Schema:

Mapping conceptual model to Relational/ No SQL data model.

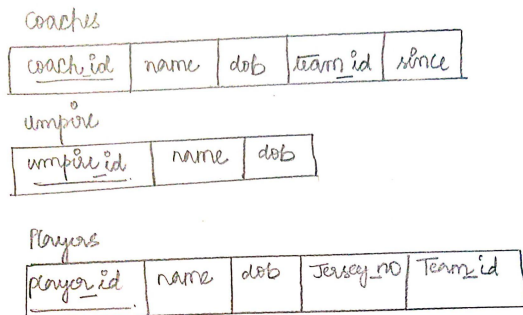


Step 1: Mapping of Regular Entity Types.

Example:

We create the relations COACHES, UMPIRE, and PLAYERS in the relational schema corresponding to the regular entities in the ER diagram.

- COACH_ID, UMPIRE_ID, and PLAYER_ID are the primary keys for the relations COACHES, UMPIRE, and PLAYERS as shown.

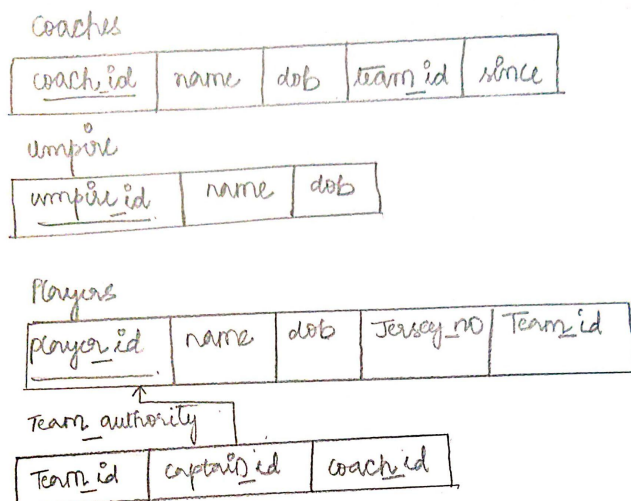


Step 2: Mapping of Weak Entity Types

Example:

We Create the relation TEAM_AUTHORITY in this step to correspond to the entity type TEAM AUTHORITY

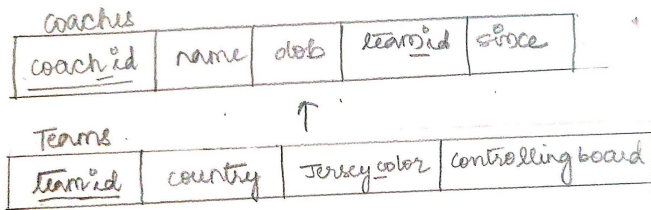
- Include the primary key PLAYER_ID of the PLAYERS relation as a foreign key attribute of TEAM_AUTHORITY



Step 3: Mapping of Binary 1:1 Relation Types

Example:

1:1 relation COACHES is mapped by choosing the participating entity type TEAMS because only one coach can train one particular team and relationship type is total.

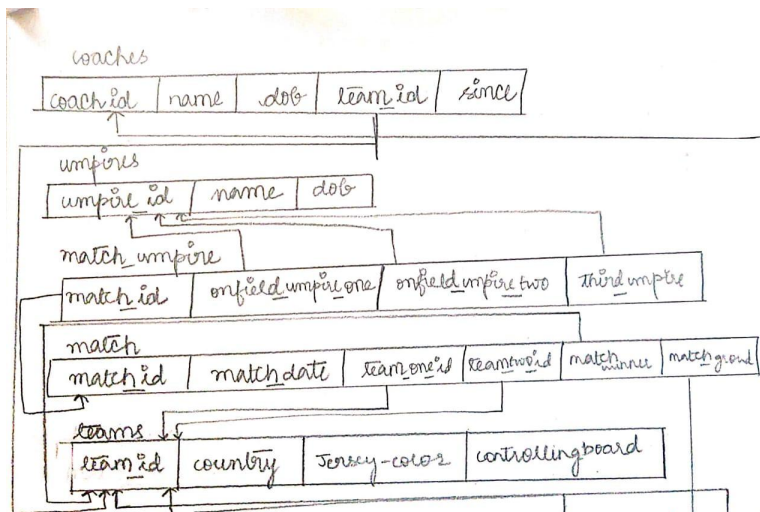


Step 4: Mapping of Binary 1:N Relationship Types.

Example:

1:N relationship types we have SCHEDULED_AT, CONSIST_OF

- For SCHEDULED_AT we include the primary key GROUND_ID of the GROUND relation as a foreign key in the MATCH relation and call it MATCH_GROUND.

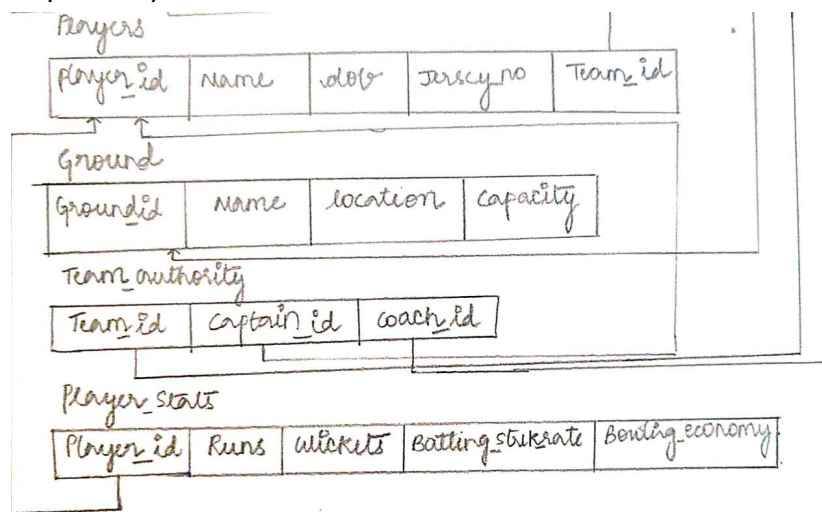


Step 5: Mapping of Binary M:N Relationship Types

Example:

The M:N relationship type IS_FROM from the ER diagram is mapped by creating a relation IS_FROM in the relational database schema.

- The primary keys of the MATCH_UMPIRE and UMPIRE relations are included as foreign keys in IS_FROM and renamed ONFEILD_UMPIRE_ONE, ONFEILD_UMPIRE_TWO and THIRD_UMPIRE respectively



Step 6: Mapping of Multivalued attributes
we do not have multi-valued attributes.

Step 7: Mapping of N-ary Relationship Types
We do not have n-ary attributes.

List of reasons/constraints to justify the choice of DBMS.

We chose PostgreSQL as our database because it is one of the most advanced open-source databases and is also available for almost every operating system.

Here are few advantages of the PostgreSQL database:

- Diverse Community
- PostgreSQL support ACID(Atomicity, Consistency, Isolation, Durability).
- SQL functions called 'Store Procedure' can be used for the server environments. Also, we support languages similar to PL/SQL in Oracle such as PL/pgSQL, PL/Python, PL/Perl, C/C++, and PL/R.
- Full-text search is available when searching for strings with the execution of vector operation and string search.
- PostgreSQL supports different kinds of techniques for geographic data storage such as PostGIS, Key-Value Store, and DBLink.

Installing PostgreSQL

Step 1: Go to <https://www.postgresql.org/download> and select Windows

Step 2: Choose “Interactive Installer by EnterpriseDB”

Step 3: You will be prompted to desired PostgreSQL version and operating system. Select the latest PostgreSQL version and OS as per your environment and click on the download button.

Step 4: Once you Download PostgreSQL, open the downloaded exe and Click next on the install welcome screen.

Database Implementation:

DDL Commands:

Create table teams(team_id int primary key, country varchar(20) NOT NULL, jersey_color varchar(20) UNIQUE , board varchar(15) UNIQUE NOT NULL);

Create table ground(ground_id int primary key, name varchar(30) NOT NULL, location varchar(20), incharge_name varchar(20) NOT NULL);

Create table players(player_id int primary key, player_name varchar(20) NOT NULL, dob date, jersey_no int, team_id int, Foreign Key (team_id) references teams(team_id));

Create table coach(coach_id int primary key, name varchar(20) NOT NULL, dob date, nationality varchar(20), team_id int NOT NULL, since date NOT NULL);

Create table umpire(ump_id int primary key, name varchar(20) NOT NULL, dob date, nationality varchar(20));

Create table match(match_id int primary key, match_date date UNIQUE, team_one_id int, team_two_id int, result varchar(20), ground_id int NOT NULL, Foreign Key (team_one_id) references teams(team_id), Foreign Key (team_two_id) references teams(team_id), Foreign Key (ground_id) references ground(ground_id));

Create table match_umpire(match_id int primary key, onfield_umpire_one int NOT NULL, onfield_umpire_two int, third_umpire int, Foreign Key (match_id) references match(match_id), Foreign key (onfield_umpire_one) references umpire(ump_id), Foreign key (onfield_umpire_two) references umpire(ump_id), Foreign key (third_umpire) references umpire(ump_id));

Create table team_authority(team_id int primary key, captain_id int UNIQUE, coach_id int UNIQUE, Foreign Key (team_id) references teams(team_id), Foreign Key (captain_id) references players(player_id), Foreign Key (coach_id) references coach(coach_id));

Create table player_stats(player_id int NOT NULL, runs int, wickets int , batting_strike_rate float, bowling_economy float, Primary key(player_id), Foreign key(player_id) references players(player_id));

```

C:\Program Files\PostgreSQL\13\bin>psql -U postgres -f E:\Geeth_DBMS_Project\cricketddl.sql
Password for user postgres:
DROP DATABASE
CREATE DATABASE
You are now connected to database "cricket" as user "postgres".
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE

```

```

cricket=# \d
               List of relations
Schema |      Name      | Type  | Owner
-----+-----+-----+-----
public | coach           | table | postgres
public | ground          | table | postgres
public | match           | table | postgres
public | match_umpire    | table | postgres
public | player_stats    | table | postgres
public | players         | table | postgres
public | team_authority  | table | postgres
public | teams           | table | postgres
public | umpire          | table | postgres
(9 rows)

```

Inserting Into Tables:

//Here are few insert commands that we used

Insert into coach values(1,'Phil Simmons','1963-04-18','West Indies',10,'2018-05-22');

Insert into coach values(2,'Justin Langer','1970-11-21','Australia',2,'2017-12-28');

Insert into teams values(1,'India','Orange Blue','BCCI');

Insert into teams values(2,'Australia','Yellow','CA');

Insert into umpire values(1,'Paul Wilson','1979-07-01','Australia');

Insert into umpire values(2,'Mike Burns','1981-11-27','England');

Insert into match values(1,'2019-05-30',3,7,3,10);

Insert into match values(2,'2019-05-31',5,9,9,1);

Insert into match_umpire values(1,14,2,10);

Insert into players values(5,'Faf Du Plessis','1984-07-13',18,7);

Insert into player_stats values(20,634,13,123.59,7.34);

Insert into team_authority values(1,4,5);

Screenshots of the final database

```
cricket=# select * from teams;
```

team_id	country	jersey_color	board
1	India	Orange Blue	BCCI
2	Australia	Yellow	CA
3	England	Royal Blue	ECB
4	New Zealand	Black	NZC
5	Pakistan	Dark Green	PCB
6	Sri Lanka	Yellow Blue	SLC
7	South Africa	Pink	CSA
8	Bangladesh	Red Green	BCB
9	West Indies	Brown	CWI
10	Afghanistan	Red Blue	ACB

(10 rows)

```
cricket=# select * from coach;
```

coach_id	name	dob	nationality	team_id	since
1	Phil Simmons	1963-04-18	West Indies	10	2018-05-22
2	Justin Langer	1970-11-21	Australia	2	2017-12-28
3	Steve Rhodes	1964-06-17	England	8	2018-10-03
4	Trever Bayliss	1962-12-21	Australia	3	2017-09-05
5	Ravi Shastri	1962-05-27	India	1	2018-10-25
6	Gary Stead	1972-01-09	New Zealand	4	2018-04-27
7	Micky Arthur	1968-05-17	South Africa	5	2017-12-18
8	Ottis Gibson	1969-03-16	West Indies	7	2018-01-26
9	Chandika	1968-09-13	Sri Lanka	6	2018-06-19
10	Floyd Reifer	1972-07-23	West Indies	9	2018-04-20

(10 rows)

```
cricket=# select * from ground;
```

ground_id	name	location	incharge_name
1	Edgbaston	Birmingham	25000
2	Bristol County Ground	Bristol	17500
3	Sophia Gardens	Cardiff	15643
4	Riverside Ground	Chester le Street	17000
5	Headingley	Leeds	18350
6	Lords	London	30000
7	The Oval	London	25500
8	Old Trafford	Manchester	26000
9	Trent Bridge	Nottingham	17500
10	Rose Bowl	Southampton	12500

(10 rows)


```
cricket=# select * from match;
```

match_id	match_date	team_one_id	team_two_id	result	ground_id
1	2019-05-30	3	7	3	10
2	2019-05-31	5	9	9	1
3	2019-06-01	4	6	4	2
4	2019-06-02	10	2	2	3
5	2019-06-03	5	3	5	7
6	2019-06-04	6	10	6	4
7	2019-06-05	1	7	1	3
8	2019-06-06	8	4	4	9
9	2019-06-07	5	6		6
10	2019-06-08	3	8	3	4
11	2019-06-09	1	2	1	5
12	2019-06-10	7	9		10
13	2019-06-11	2	5	2	8
14	2019-06-12	1	4		1
15	2019-06-13	9	3	3	5
16	2019-06-14	10	7	7	3
17	2019-06-15	1	5	1	2
18	2019-06-16	9	8	8	4
19	2019-06-17	7	4	7	3
20	2019-06-18	1	10	1	9

```
(20 rows)
```

```
cricket=# select * from match_umpire;
```

match_id	onfield_umpire_one	onfield_umpire_two	third_umpire
1	14	2	10
2	1	15	4
3	5	14	7
4	13	6	5
5	2	1	15
6	4	8	3
7	9	11	6
8	8	10	13
9	7	12	11
10	12	9	10
11	15	12	5
12	11	6	7
13	3	2	14
14	1	4	8
15	9	15	11
16	10	13	8
17	7	2	14
18	12	1	10
19	3	13	4
20	6	5	15

(20 rows)

```
cricket=# select * from players;
```

player_id	player_name	dob	jersey_no	team_id
1	Kane Williamson	1990-08-08	22	4
2	Eoin Morgan	1986-09-10	16	3
3	Quinton De Kock	1992-12-17	12	7
4	Virat Kohli	1988-11-05	18	1
5	Faf Du Plessis	1984-07-13	18	7
6	Liton Das	1994-10-13	16	8
7	Dimuth Karunaratne	1988-04-21	16	6
8	Gulbadin Naib	1991-03-16	14	10
9	Shai Hope	1993-11-10	4	9
10	Kusal Mendis	1995-02-02	2	6
11	Tim Southee	1988-12-11	38	4
12	Shakib Al Hasan	1987-03-24	75	8
13	Fakhar Zaman	1990-04-10	39	5
14	Chris Gayle	1979-09-21	8	9
15	Mashrafe Mortaza	1983-10-05	2	8
16	Ben Stokes	1991-06-04	55	3
17	Kusal Perera	1990-08-17	55	6
18	Jasprit Bumrah	1993-12-06	93	1
19	Steve Smith	1989-06-02	49	2
20	Sarfaraz Ahmed	1987-05-22	54	5
21	Jason Holder	1991-11-05	8	9
22	KL Rahul	1992-04-18	1	1
23	Jos Buttler	1990-09-08	63	3
24	Shoaib Malik	1982-02-01	18	5
25	Alex Carey	1991-08-27	4	2
26	Rashid Khan	1998-09-20	19	10
27	Mitchell Santner	1992-02-05	74	4
28	Dale Steyn	1983-06-27	8	7
29	Mitchell Starc	1990-01-30	56	2
30	Mujeeb Ur Rahman	2001-03-28	88	10

```
(30 rows)
```

```
cricket=# select * from player_stats;
```

```
player_id | runs | wickets | batting_strike_rate | bowling_economy
```

1	960		187.13	
2	721	10	140.55	8.64
3	900	12	175.44	7.53
4	954		185.96	
5	999	2	194.74	8.1
6	692	6	134.89	4.32
7	610	6	118.91	8.1
8	679	18	132.36	9.33
9	616	15	120.08	7.77
10	669	11	130.41	8.45
11	793	9	154.58	7.21
12	630	14	122.81	4.55
13		15		4.86
14	640	12	124.76	8.64
15	712	3	138.79	7.56
16	646	10	125.93	7.02
17	646	3	125.93	7.02
18	840	8	163.74	8.1
19	988	4	192.59	5.94
20	634	13	123.59	7.34
21	657	2	128.07	5.94
22	563	12	109.75	4.67
23	765	3	149.12	7.02
24	897		174.85	
25	789	7	153.8	5.94
26	767	11	149.51	8.23
27		10		6.12
28	543	19	105.85	8.64
29	464	17	90.45	4.86
30	678		132.16	

```
(30 rows)
```

```
cricket=# select * from team_authority;  
team_id | captain_id | coach_id
```

team_id	captain_id	coach_id
1	4	5
2	19	2
3	2	4
4	1	6
5	20	7
6	7	9
7	5	8
8	15	3
9	21	10
10	8	1

(10 rows)

```
cricket=# select * from umpire;
```

ump_id	name	dob	nationality
1	Paul Wilson	1979-07-01	Australia
2	Mike Burns	1981-11-27	England
3	Chris Brown	1982-06-09	New Zealand
4	Ravindra Wimalasiri	1983-12-14	Sri Lanka
5	Anil Chaudhary	1986-07-25	India
6	Shawn Craig	1989-03-05	Australia
7	Paul Reynolds	1978-04-11	Ireland
8	Shaun George	1979-07-06	South Africa
9	C.ŦáShamshuddin	1980-12-11	India
10	Izafullah Safi	1986-04-11	Afghanistan
11	Rashid Riaz Waqar	1979-10-09	Pakistan
12	Virender Sharma	1980-09-20	India
13	Nigel Duguid	1981-06-01	West Indies
14	Tanvir Ahmed	1983-06-02	Bangladesh
15	Alex Wharf	1985-07-19	England

(15 rows)