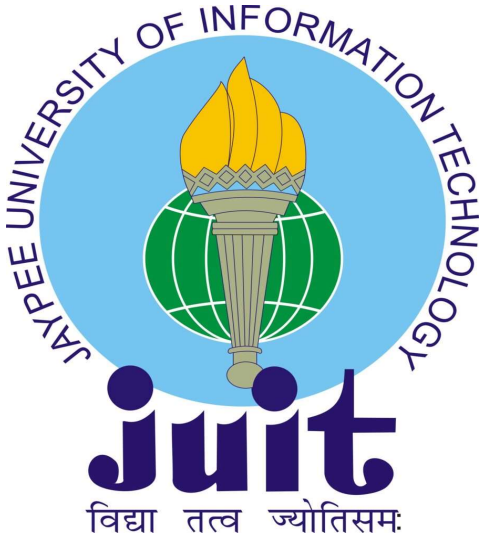

PROJECT REPORT

Database Management Systems Lab (18B17CI373)

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Introduction

This project is being made to simulate the databases needed to be used for an Airline Ticket Reservation System.

The list of entities to be used in this project are:

- AirCrafts
- Route
- AirFare
- Flight Schedule
- Discounts
- Charges
- Countries
- State
- Contact Details
- Passengers
- Branches
- Employee
- Transactions

The following criteria were met:

- The database was made to use the maximum variation of datatypes we could use.
- The database is free from anomalies and satisfies normal forms.
- The Entity-Relationship diagram for the database is attached within this report.

Entities used in this database

01. AirCrafts

Field	Data Types	Description	Constraints
AcID	INT	Field will store unique row number.	Primary Key.
AcNumber	Varchar(32)	Aircraft number that identifies the plane.	NOT NULL
Capacity	INT	No. of seats available.	NOT NULL
MfdBy	Varchar(128)	Manufacturing company.	NOT NULL
MfdOn	DATETIME	Manufactured date of aircraft.	NOT NULL

02. Route

Field	Data Types	Description	Constraints
RtID	INT	Stores unique row id.	Primary Key
Airport	Varchar(32)	From where the flight will take off.	NOT NULL
Destination	Varchar(32)	Flight Destinations.	NOT NULL
RouteCode	Varchar(16)	A unique Route code generated using source & destination of flight.	NOT NULL UNIQUE

03. AirFare

Field	Data Types	Description	Constraints
AfID	INT	Stores unique row id.	Primary Key
Route	INT	Route id from Route table.	Foreign Key
Fare	Currency	Stores service charge amount.	NOT NULL
FSC	Currency	Stores fuel surcharge amount.	NOT NULL

04. Flight_Schedule

Field	Data Types	Description	Constraints
FlID	INT	Unique number to identify the flight.	Primary Key
FlightDate	DATETIME	Date of flight.	NOT NULL
Departure	DATETIME	Stores the departure time of flight.	
Arrival	DATETIME	Stores the arrival time of flight on destination.	
AirCraft	INT	Aircraft number that will fly, a number from Aircraft table.	Foreign Key
NetFare	INT	To determine total fare of flight, an ID from Air_Fare table.	Foreign Key

05. Discounts

Field	Data Types	Description	Constraints
DiID	INT	Unique row id.	Primary Key
Title	Varchar(32)	Label to know discount.	NOT NULL
Amount	INT	Discount amount in %	NOT NULL
Description	Varchar(255)	Discount remarks & details.	

06. Charges

Field	Data Types	Description	Constraints
ChID	INT	Unique row id.	Primary Key
Title	Varchar(32)	Label for charge.	NOT NULL
Amount	INT	Amount of charge in %.	NOT NULL
Description	Varchar(255)	Describe cause of charge.	

07. Countries

Field	Data Types	Description	Constraints
CtID	INT	Unique row id.	Primary Key
CountryName	Varchar(32)	Room to store country name	NOT NULL

08. State

Field	Data Types	Description	Constraints
StID	INT	Unique row id.	Primary Key.
StateName	Varchar(32)	State name will take place here.	
Country	INT	PK from Country table.	Foreign Key.

09. Contact_details

Field	Data Types	Description	Constraints
CnID	INT	Unique row id.	Primary Key.
Email	Varchar(16)	Passenger's contact email for transaction about flights.	NOT NULL
Cell	Varchar(16)	Passenger's contact cell no. for transaction about flights.	NOT NULL
Tel	Varchar(16)	Passenger's contact telephone no. for transaction about flights.	
Street	Varchar(16)	Street address of the passengers.	NOT NULL
State	INT	PK from State table.	Foreign Key.

10. Passengers

Field	Data Types	Description	Constraints
PsID	INT	Unique row id.	Primary Key.
Name	Varchar(32)	Passenger's name	NOT NULL
Address	Varchar(64)	Passenger's address	NOT NULL
Age	INT	Passenger's age	NOT NULL
Nationalities	Varchar(16)	Nationality of passenger.	NOT NULL
Contacts	INT	ContactID from Contact_Details table.	Foreign Key.

11. Branches

Field	Data Types	Description	Constraints
BrID	INT	Unique id for each branches.	Primary Key.
Center	Varchar(16)	Branch title	NOT NULL
Address	Varchar(32)	Address of branch	NOT NULL
State	INT	State ID from state table	Foreign Key.

12. Employees

Field	Data Types	Description	Constraints
EmpID	INT	Unique no. to identify employee, unique on entire system	Primary Key.
Name	Varchar(32)	Employee name	NOT NULL
Address	Varchar(32)	Employee address	NOT NULL
Branch	INT	Associated branch id from branch table	Foreign Key.
Designation	Varchar(32)	Working duty position.	NOT NULL
Email	Varchar(32)	Contact email of employee.	NOT NULL
Tel	Varchar(16)	Contact telephone number.	
Ext	INT	Ext number of employee cabinet, if applicable.	

13. Transactions

Field	Data Types	Description	Constraints
TsID	INT	Unique row id.	Primary Key.
BookingDate	Date/Time	Keeps the booking date.	NOT NULL
DepartureDate	Date/Time	Keeps the departure date.	NOT NULL
Passenger	INT	Transaction creator passengers row id to associate booking/cancellation, payments etc.	Foreign Key.
Flight	INT	Flight no, a PK of Flight_Schedule to determine flying details & costs.	Foreign Key.
Type	BIT	Reservation/Cancellation.	NOT NULL

Employee	INT	Reservation agent, a row id of employee who helps the passenger to make transaction.	Foreign Key.
Charges	INT	If transaction is cancellation, charges may apply as per business rules.	Foreign Key.
Discount	INT	Discount offers may apply based on scheme criteria.	Foreign Key.
Total	INT	Calculated value of actual payable cost by customer to make a transaction.	NOT NULL

Source Code:

```
CREATE DATABASE Airlines;

USE Airlines;

CREATE TABLE AirCrafts(
     AcID INT PRIMARY KEY.
     AcNumber Varchar(32) NOT NULL,
     Capacity INT NOT NULL,
     MfdBy Varchar(128) NOT NULL,
     MfdOn Datetime NOT NULL
);

INSERT INTO AirCrafts
(AcID, AcNumber, Capacity, MfdBy, MfdOn)
VALUES
(1, "ATR 72-500:, 75, "Alenia Aeronotica", "23 April 1998");


CREATE TABLE Route(
RtID INT,
Airport Varchar(32) NOT NULL,
Destination Varchar(32) NOT NULL,
RouteCode Varchar(16) NOT NULL UNIQUE,
PRIMARY KEY (RtID)
);

INSERT INTO Route VALUES (1, "Kathmandu", "Pokhra", "KTM-
PKR");

CREATE TABLE AirFare(
AfID INT,
Route INT,
Fare Currency,
FSC Currency,
PRIMARY KEY (AfID),
CONSTRAINT fk_Route FOREIGN KEY (Route) REFERENCES
Route(RtID)
);

INSERT INTO AirFare VALUES (1, 1, 86, 12);

CREATE TABLE Flight_Schedule(
FIID INT,
FlightDate DATETIME,
Departure DATETIME,
Arrival DATETIME,
Aircraft INT,
```

```
NetFare INT,
PRIMARY KEY (FIID),
CONSTRAINT fk_AirCraft FOREIGN KEY (AirCraft) REFERENCES
AirCrafts(AcID),
CONSTRAINT fk_NetFare FOREIGN KEY (NetFare) REFERENCES
AirFare(AfID)
);

INSERT INTO Flight_Schedule VALUES
(1, 'January 23, 2012', '23:20', '1:20', 1, 1);

CREATE TABLE Discounts(
DiID INT PRIMARY KEY,
Title Varchar(32),
Amount INT,
Description Varchar (255)
);

INSERT INTO Discounts VALUES
(1,'Children', 10, 'Discount is provided to all children under
the age of 10.');

CREATE TABLE Charges(
ChID INT PRIMARY KEY,
Title Varchar(32),
Amount INT,
Description Varchar (255)
);

INSERT INTO Charges VALUES
(2,'Urgent Cancellation', 33.33, '33.3% will be charged for
cancellation for booking within 11 hrs from flight time');


CREATE TABLE Countries (
CtID INT PRIMARY KEY,
CountryName Varchar (32) NOT NULL
);

INSERT INTO Countries
VALUES
(1, 'INDIA');


CREATE TABLE State(
StID INT,
StateName Varchar (32),
Country INT,
PRIMARY KEY (StID),
```

```
CONSTRAINT fk_Country FOREIGN KEY (Country) REFERENCES
Countries(CtID)
);

INSERT INTO State
VALUES
(1, 'Himachal', 1);


CREATE TABLE Contact Details(
CnID INT PRIMARY KEY,
Email Varchar (16) NOT NULL,
Cell Varchar (16) NOT NULL,
Tel Varchar (16),
Street Varchar (64),
State Varchar(20) NOT NULL,
CONSTRAINT fk _State FOREIGN KEY (State) REFERENCES
State(StID)
);

INSERT INTO Contact Details
VALUES
(1,'211438@juitsolan.in', '7018003823', '12', 'Geeta', 1);

CREATE TABLE Passengers(
PsID INT PRIMARY KEY,
Name Varchar (32) NOT NULL,
Address Varchar (64) NOT NULL,
Age INT NOT NULL,
Nationality Varchar(16) NOT NULL,
Contacts INT NOT NULL,
CONSTRAINT fk_Contacts FOREIGN KEY (Contacts) REFERENCES
Contact Details(CnID)
);

INSERT INTO Passengers
VALUES
(1,'Akshit Sharma', 'H-10, Shastri Bhavan', 20, 'Indian', 1);

CREATE TABLE Branches(
BrID INT PRIMARY KEY,
Center Varchar(16) NOT NULL,
Address Varchar(32) NOT NULL,
State INT,
CONSTRAINT fk_StateOfEmployee FOREIGN KEY (State) REFERENCES
State(StID)
);

INSERT INTO Branches
```

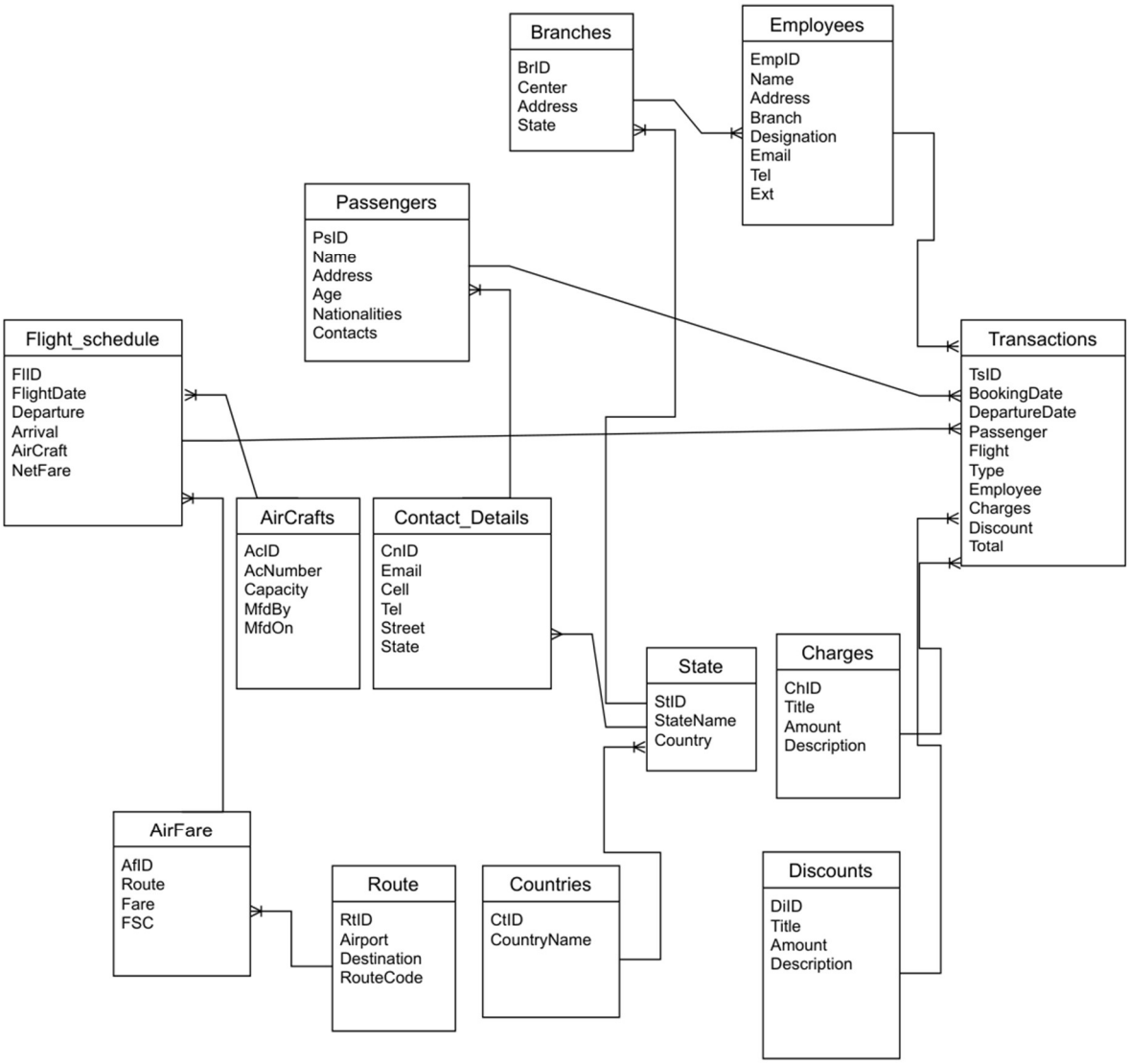
```
VALUES
(1, 'Himachal', 'Waknaghat, Himachal', 1);

CREATE TABLE Employee
EmpID INT PRIMARY KEY,
Name Varchar (32) NOT NULL,
Address Varchar (32) NOT NULL,
Branch INT NOT NULL,
Designation Varchar(32) NOT NULL,
Email Varchar (16) NOT NULL,
Tel Varchar (16) NOT NULL,
Ext INT,
CONSTRAINT fk_Branch FOREIGN KEY (Branch) REFERENCES
Branches(BrID)
);

INSERT INTO Employee
VALUES
(1, 'Niharika', 'H12 - Geeta Bhavan', 1, 'CEO',
'211438@juitsolan.in', '7018003823', 12);


CREATE TABLE Transactions(
TSID INT PRIMARY KEY,
BookingDate DATETIME,
Departure Date DATETIME,
Passenger INT,
Flight INT,
Type BIT,
Employee INT,
Charges INT,
Discount INT,
CONSTRAINT fk_Passenger FOREIGN KEY (Passenger) REFERENCES
Passengers (PsID),
CONSTRAINT fk_Flight FOREIGN KEY (Flight) REFERENCES Flight
Schedule(FIID),
CONSTRAINT fk_Employee FOREIGN KEY (Employee) REFERENCES
Employee(EmpID),
CONSTRAINT fk_Charges FOREIGN KEY (Charges) REFERENCES
Charges(ChID),
CONSTRAINT fk_Discount FOREIGN KEY (Discount) REFERENCES
Discounts(DiID)
);

INSERT INTO Transactions
VALUES
(1,'30 November 2022', '17 December 2022', 1, 1, 0, 1, NULL,
NULL);
```

Primary And Foreign Keys

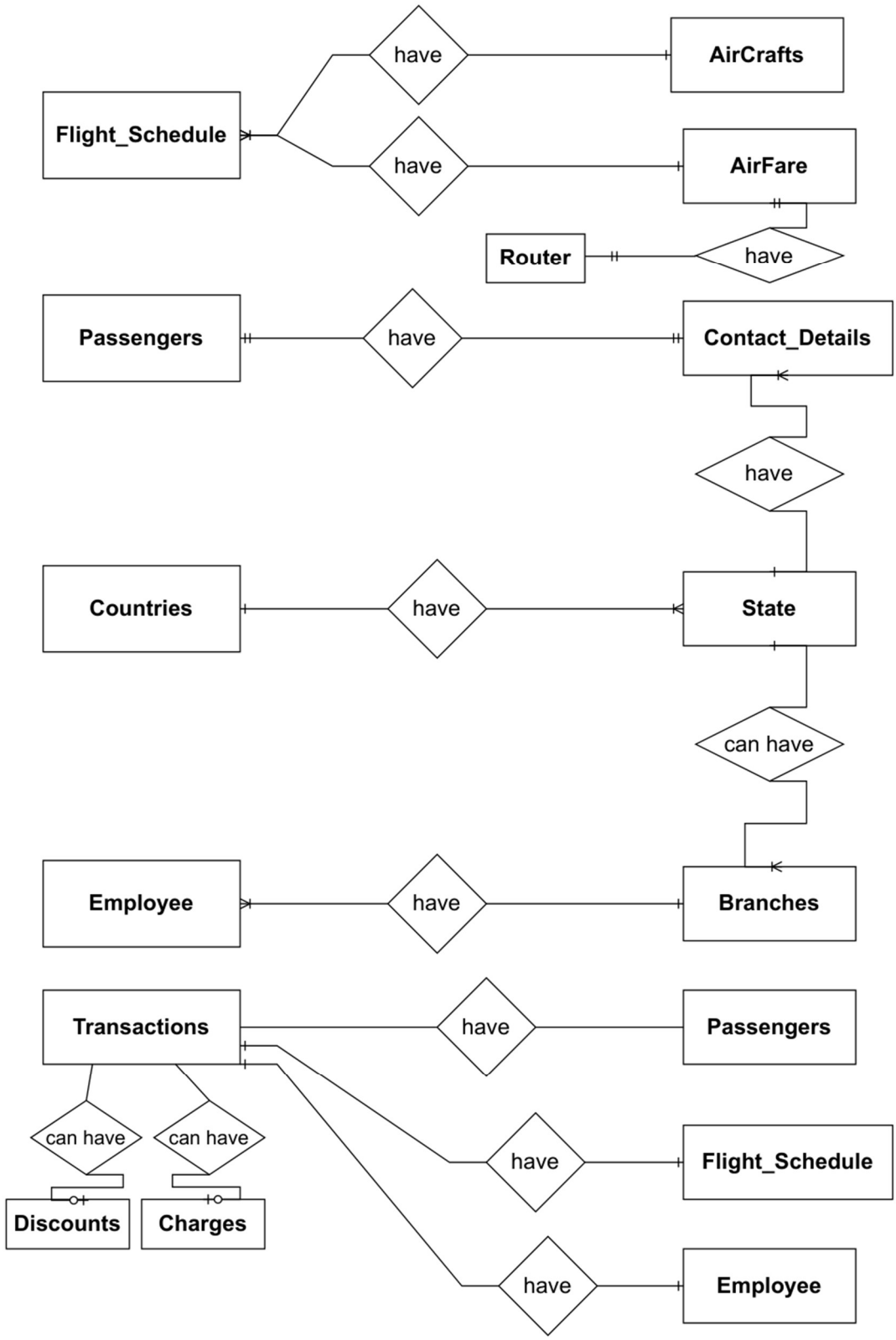
SN	Table	Primary key	Foreign key	
			Column	References
1	AirCraft	AcID	-	-
2	Flight_Schedule	FlID	AirCraft	AirCraft.AcID
			Route	Route.RtID
			AirFare	AirFare.AfID
3	Route	RtID	-	-
4	AirFare	AfID	Route	Route.RtID
5	Discounts	DiID	-	-
6	Charges	ChID	-	-
7	Passengers	PsID	Contacts	Contact_Details.CnID
8	Contact_Details	CnID	State	State.StID
9	State	StID	Country	Country.CtID
10	Country	CtID	-	-
11	Transaction	TsID	Passenger	Passengers.PsID
			Flight	Flight_Schedule.FlID
			Employee	Employee.EmpID
			Charge	Charges.ChID
			Discount	Discounts.DiID
12	Employee	EmpID	Branch	Branch.BrID
13	Branch	BrID		

ER Diagrams:

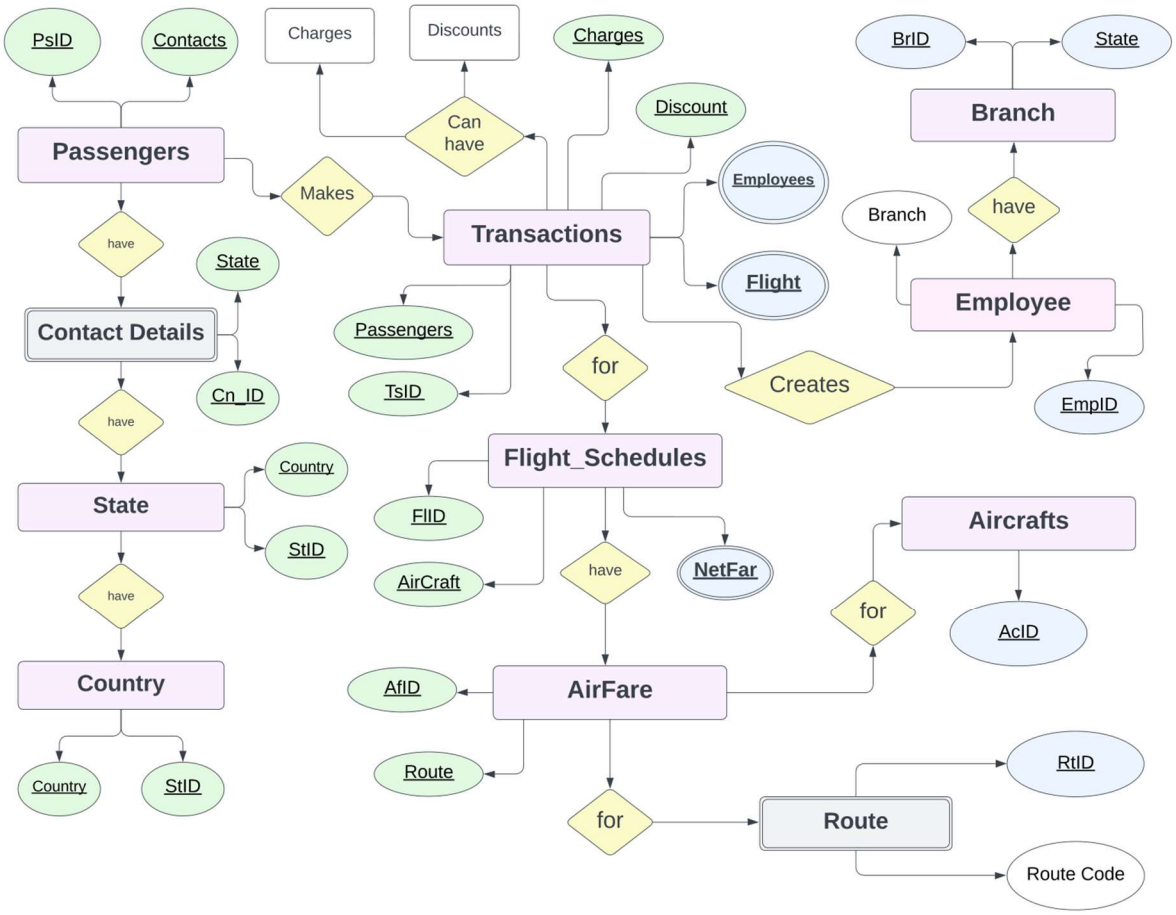
Relationship between all entities:



Cardinality Diagram:



Final ER Diagram:



Project Outputs:

Querries:

a) Selecting all the contact details to get people from a particular state:

```
+------+------------------+------------+------+---------+----------+
| CnID | Email            | Cell       | Tel  | Street  | State    |
+------+------------------+------------+------+---------+----------+
|    1 | 438@juitsolan.in | 7018003823 | 12   | Geeta   | Himachal |
|    2 | 435@juitsolan.in | 8988036095 | 14   | Shastri | Himachal |
|    3 | 444@juitsolan.in | 8091751405 | 16   | Shastri | Himachal |
+------+------------------+------------+------+---------+----------+
3 rows in set (0.00 sec)

mysql>
```

b) Selecting all the contact details of people who leave via a certain airline:

```
+------+------------------+------------+------+---------+---------------+
| CnID | Email            | Cell       | Tel  | Street  | State         |
+------+------------------+------------+------+---------+---------------+
|    2 | 435@juitsolan.in | 8988036095 | 14   | Shastri | Himachal      |
|    3 | 444@juitsolan.in | 8091751405 | 16   | Shastri | Himachal      |
|    8 | 447@juitsolan.in | 2214536985 | 25   | Parmar  | Haryana       |
|   32 | 421@juitsolan.in | 5869692344 | 82   | Vasant  | Uttar Pradesh |
+------+------------------+------------+------+---------+---------------+
4 rows in set (0.00 sec)

mysql>
```

c) Selecting all contact details whose airfare is more than 10,000 rupees:

```
+------+------------------+------------+------+--------+---------------+
| CnID | Email            | Cell       | Tel  | Street | State         |
+------+------------------+------------+------+--------+---------------+
|   32 | 421@juitsolan.in | 5869692344 | 82   | Vasant | Uttar Pradesh |
|   34 | 252@juitsolan.in | 5423698285 | 74   | Parmar | Haryana       |
|   39 | 200@juitsolan.in | 5444783624 | 39   | Vasant | Maharashtra   |
+------+------------------+------------+------+--------+---------------+
3 rows in set (0.00 sec)

mysql>
```

References:

1. Fundamentals of Database Systems – A book by Shamkant B. Navathe
2. https://dl.acm.org/doi/abs/10.1145/3226595.3226638
3. https://www.javatpoint.com/dbms-tutorial