

Database Design for AirIndia

❖ Main concept and definition

- Nowadays online flight booking is so common. We have lots of functionality and option like read reviews, compare price of flight, see the services and using online payment we can easily book a flight ticket.
- But in the market, there are many company which provide such services and functionality so every company need to be updated.
- Here, provide that all the functionality Company like AirIndia needs to big amount of data and data management system.

❖ Needs of Database

- To store the sales data like (reservation data, fare collection data)
- To store the flight & route data
- To store the ticket collection data
- To store the customer & employee data

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❖ Entity List

1. Flight
2. Airport
3. Aircraft
4. Seat
5. Route
6. Runway
7. Flight_schedule
8. Air_fare
9. Passenger
10. Passenger_preference
11. Security_qestion
12. Contact_details
13. Address
14. Branches
15. Payment_details
16. Employee
17. Booking_transaction
18. Cancel_policy_charges
19. Ticket

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❖ Data Dictionary

➤ Flight

Field	DataType	Description	Constraint
FlightID	INT	Store flight id	Primary key
Filght_takeoff_point	VARCHAR(100)	Store source point	Not Null
Flight_destination	VARCHAR(100)	Store destination point	Not Null
Flight_datetime	DATETIME	Store Date & time	Not Null
Take_off_time	DATETIME	Store Takeoff Time	Not Null
Landing_time	DATETIME	Store landing time	Not Null

➤ Airport

Field	DataType	Description	Constraint
AirportID	INT	Store airport id	Primary key
AirportName	VARCHAR(100)	Store airport name	Not Null
Country	VARCHAR(80)	Store country name	Not Null
State	VARCHAR(80)	Store state of airport	Not Null
City	VARCHAR(80)	Store city of airport	Not Null

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➤ Aircraft

Field	DataType	Description	Constraint
AircraftID	INT	Store Aircraft ID	Primary key
Aircraft_type	VARCHAR(100)	Store Aircraft type	Not Null
Aircraft_number	VARCHAR(100)	Store Aircraft Number	Not Null
SeatID	INT	Store foreign key from seat table	Foreign Key

➤ Seat

Field	DataType	Description	Constraint
seatID	INT	Store flight id	Primary key
SeatNumber	VARCHAR(100)	Store source point	Not Null

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➤ Route

Field	DataType	Description	Constraint
RouteID	INT	Store Route ID	Primary key
AircraftID	INT	Store foreign key from Aircraft table	Foreign Key
RouteCode	VARCHAR(50)	Store Route code	Not Null
Source_point	VARCHAR(100)	Store source point	Not Null
Destination_point	VARCHAR(100)	Store destination point	Not Null

➤ Runway

Field	DataType	Description	Constraint
RunwayID	INT	Store runway id	Primary key
RunwayName	VARCHAR(80)	Store runway name	Not Null
Runway_control_office	VARCHAR(150)	Store Runway control office name	Not Null

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➤ Flight_schedule (Junction table)

Field	DataType	Description	Constraint
Flight_schedulID	INT	Store Flight_schedule ID	Primary key
FlightID	INT	Store foreign key from Flight table	Foreign Key
AircraftID	INT	Store foreign key from Aircraft table	Foreign Key
RunwayID	INT	Store foreign key from Runway table	Foreign Key
RouteID	INT	Store foreign key from Route table	Foreign Key
AirportID	INT	Store foreign key from Airport table	Foreign Key

➤ Air_fare

Field	DataType	Description	Constraint
AirFareID	INT	Store runway id	Primary key
RouteID	INT	Store foreign key from route table	Foreign Key
fare_amount	Money	Store amount	Not Null

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➤ Passenger

Field	DataType	Description	Constraint
PassengerID	INT	Store passenger ID	Primary key
Title	VARCHAR(8)	Store title(Mr., Mrs.)	Not Null
Gender	VARCHAR(10)	Store gender	Not Null
First_name	VARCHAR(50)	Store firstname of passenger	Not Null
Last_naame	VARCHAR(50)	Store last name of passenger	Not Null
Name_ON_Card	VARCHAR(100)	Store name on card	Not Null
DOB	DATE	Store date	Not Null
Mother's_maiden_name	VARCHAR(80)	Store mother maiden name	Not Null
Nationality	VARCHAR(50)	Store nationality	Not Null
Country	VARCHAR(50)	Store country	Not Null
Passport_number	VARCHAR(50)	Store passport number	Not Null
passport_expiry_date	DATE	Store passport expiry date	Not Null

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Id_proof_photo	VARBINARY(MAX)	Store any id proof	Not Null
AddressID	INT	Store foreign key from address table	Foreign Key
ConatctID	INT	Store foreign key from contact table	Foreign Key
Password	VARCHAR(24)	Store password	Not Null
Update_permission	VARCHAR(100)	Store update permission	Not Null
Security_QuestionID	INT	Store foreign key from security Question	Foreign Key

➤ Security_Questions

Field	DataType	Description	Constraint
Security_QuestionID	INT	Store runway id	Primary key
Question_text	NVARCHAR(255)	Store Permission answer	Not Null
Answer	VARCHAR(80)	Store Question's answers	Not Null

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➤ Passenger_preference

Field	DataType	Description	Constraint
Passenger_preferenceID	INT	Store Passenger_preference	Primary key
PassengerID	INT	Store foreign key from Passenger table	Foreign key
Frequent_flyer_program	NVARCHAR(255)	Store foreign key from route table	Not Null
Frequent_flyer_Number	INT	Store Number	Not Null
Meal_selection	VARCHAR(100)	Store meal information	Null
Add_gst_info	VARCHAR(150)	Store gst information	Null
Special_assistance_request	VARCHAR(150)	Store Special assistant information	Null
Adults	INT	Store number of Adults ticket	Null
Childrens	INT	Store number of children ticket	Null
Infants	INT	Store number of Infant ticket	Null
Promotion_code	VARCHAR(20)	Store promotion code	Null

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➤ Contact_details

Field	DataType	Description	Constraint
ContactID	INT	Store contact id	Primary key
Phone_number	BIGINT	Store Phone Number	Null
Country_code	VARCHAR(8)	Store country code	Null
Mo_number	BIGINT	Store Mobile Number	Null
Primary_email	NVARCHAR(255)	Store Email	Not Null
Secondary_email	NVARCHAR(255)	Store second Email	Null

➤ Address

Field	DataType	Description	Constraint
AddressID	INT	Store address id	Primary key
Country	VARCHAR(80)	Store country name	Not Null
State	VARCHAR(80)	Store state name	Not Null
City	VARCHAR(80)	Store city	Not Null
Street	VARCHAR(150)	Store local address details	Not Null
Pincode	VARCHAR(20)	Store pincode of city	Not Null

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➤ Branches

Field	DataType	Description	Constraint
BranchID(PK)	INT	Store branch id	Primary key
BrancheName	VARCHAR(100)	Store Branch Name	Null
AddressID	INT	Store Foreign Key of Address Table code	Foreign Key

➤ Payment_details

Field	DataType	Description	Constraint
PaymentID	INT	Store Payment id	Primary key
PassengerID	INT	Store Foreign Key of Passenger table	Foreign Key
CardNumber	BIGINT	Store Card number	Not Null
Expiration_date	DATE	Store Expiration date	Not Null
CVV/CSV	INT	Store Cvv number	Not Null
Card_holder_name	VARCHAR(50)	Store card holder name	Not Null
AddressID	INT	Store foreign key of address table	Foreign Key

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Bank_name	VARCHAR(100)	Store bank name	Not Null
Virtual_payment_address	VARCHAR(80)	Store payment address	Not Null

➤ Booking_transaction

Field	DataType	Description	Constraint
Booking_transactionID	INT	Store Transaction id	Primary key
Booking_datetime	DATETIME	Store Booking Date And Time	Not Null
PassengerID	INT	Store foreign key of Passenger table	Foreign Key
SeatID	INT	Store foreign key of Passenger table	Foreign Key
FlightID	INT	Store foreign key of Flight table	Foreign Key
RouteID	INT	Store foreign key of Route table	Foreign Key
Booking_type	VARCHAR(80)	Store the type of booking	Not Null
Ticket_charges	MONEY	Store ticket charge of company	Not Null
Special_serveice_fare	MONEY	Store the request of special service	Not Null
AirfareID	INT	Store foreign key of Airfair table	Foreign Key

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Total_Amount	MONEY	Store Amount of tickets	Not Null
Discount	MONEY	Store Discount Amount of tickets	Not Null

➤ Employee

Field	DataType	Description	Constraint
EmployeeId	INT	Store Employee id	Primary key
Employee_type	VARCHAR(80)	Store Employee type	Not Null
Designation	VARCHAR(80)	Store Designation of employee	Not Null
Firstname	VARCHAR(80)	Store Firstname of employee	Not Null
LastName	VARCHAR(80)	Store Lastname of employee	Not Null
ConatctID	INT	Store Foreign Key of contact table	Foreign Key
AddressID	INT	Store Foreign Key of address table	Foreign Key
BranchID	INT	Store Foreign Key of branch table	Foreign Key

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➤ Cancel_policy_charges

Field	DataType	Description	Constraint
Cancel_PolicyID	INT	Store policy id	Primary key
Cancelation_reasion	VARCHAR(150)	Store Cancelation reasion	Not null
Cancelation_period	DATETIME	Store Time period	Not Null
Returnable_amount	INT	Store the returnable mount in %	Not Null

➤ Ticket

Field	DataType	Description	Constraint
TicketID	INT	Store ticket id	Primary key
TicketNumber	VARCHAR(100)	Store Ticket Number	Not Null
PassengerID	INT	Store Foreign Key from passenger table	Foreign Key, not null
Booking_transactionID	INT	Store Foreign key From booking_transaction	Foreign key, Not null
Cancel_policyID	INT	Store Foreign key From Cance_policy_charges	Foreign key , Not null

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❖ Primary Key & Foreign Key

<u>Sr No.</u>	<u>Table</u>	<u>Primary Key</u>	<u>Foreign Key column</u>	<u>Foreign Key Reference</u>
1	Flight	FlightID	-	-
2	Airport	AirportID	-	-
3	Aircraft	AircraftID	SeatID	Seat.SeatID
4	Seat	SeatID	-	-
5	Route	RouteID	AircraftID	Aircraft.AircraftID
6	Runway	RunwayID	-	-
7	Flight_schedul	Flight_schedu IID	FlightID AircraftID RunwayID RouteID AirportID	Flight. FlightID Aircraft.AircraftID Runway. RunwayID Route. RouteID Airport. AirportID
8	Air_fare	AirFareID	RouteID	Route. RouteID
9	Passenger	PassengerID	AddressID ContactID Security_Quest ionsID	Address. AddressID Contact. ContactID Security_Questions. Security_QuestionsID
10	Passenger_pref erence	Passenger_pr eferenceID	PassengerID AddressID	Passenger. PassengerID Address. AddressID
11				
11	Contact_details	ContactID	-	-
12	Address	AddressID	-	-
13	Branches	BranchID	AddressID	Address. AddressID

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14	Paymnt_details	PaymentID	PassengerID	Passenger. PassengerID
15	Booking_transa ction	Booking_tran sactionID	PassengerID SeatID FlightID AirfairID	Passenger. PassengerID Seat. SeatID Flight. FlightID Airfairl. AirfairID
16	Employee	EmployeeID	AddressID ContactID BranchID	Address. AddressID Contact. ContactID Branches.BranchID
17	Security_Questi ons	Security_Que stionsID	-	-
18	Cancel_policy_c harges	Cancel_policy ID	-	-
19	Ticket	TicketID	PassengerID Booking_transa ctionID Cancel_policyl D	Passenger. PassengerID Booking_transaction. Booking_transactionID Cancel_policy_charges .Cancel_policyID

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❖ Relationship

<u>SN</u>	<u>Entities</u>	<u>Cardinality</u>
1	Aircraft & Seat	1: M
2	Route & Aircraft	1:M
3	Flight_schedul & Flight	1:M
4	Flight_schedul & Aircraft	1:M
5	Flight_schedul & Runway	1:N
6	Flight_schedul & Route	1:M
7	Flight_schedul & Airport	M:1
8	Airfare & route	1:1
9	Passenger & Address	1:1
10	Passenger & Contact	1:1
11	Passenger_preference & Passange	N:1
12	Branches & Employee	1:M
13	Paymnt_details & Passanger	1:1
14	Booking_transaction & Passenger	1:1
15	Booking_transaction & Seat	1:M
16	Booking_transaction & Flight	M:1
17	Booking_transaction & Airfair	1:M
18	Employee & Address	1:1
19	Employee & Contact	1:1
20	Security_Questions & Passenger	M:1

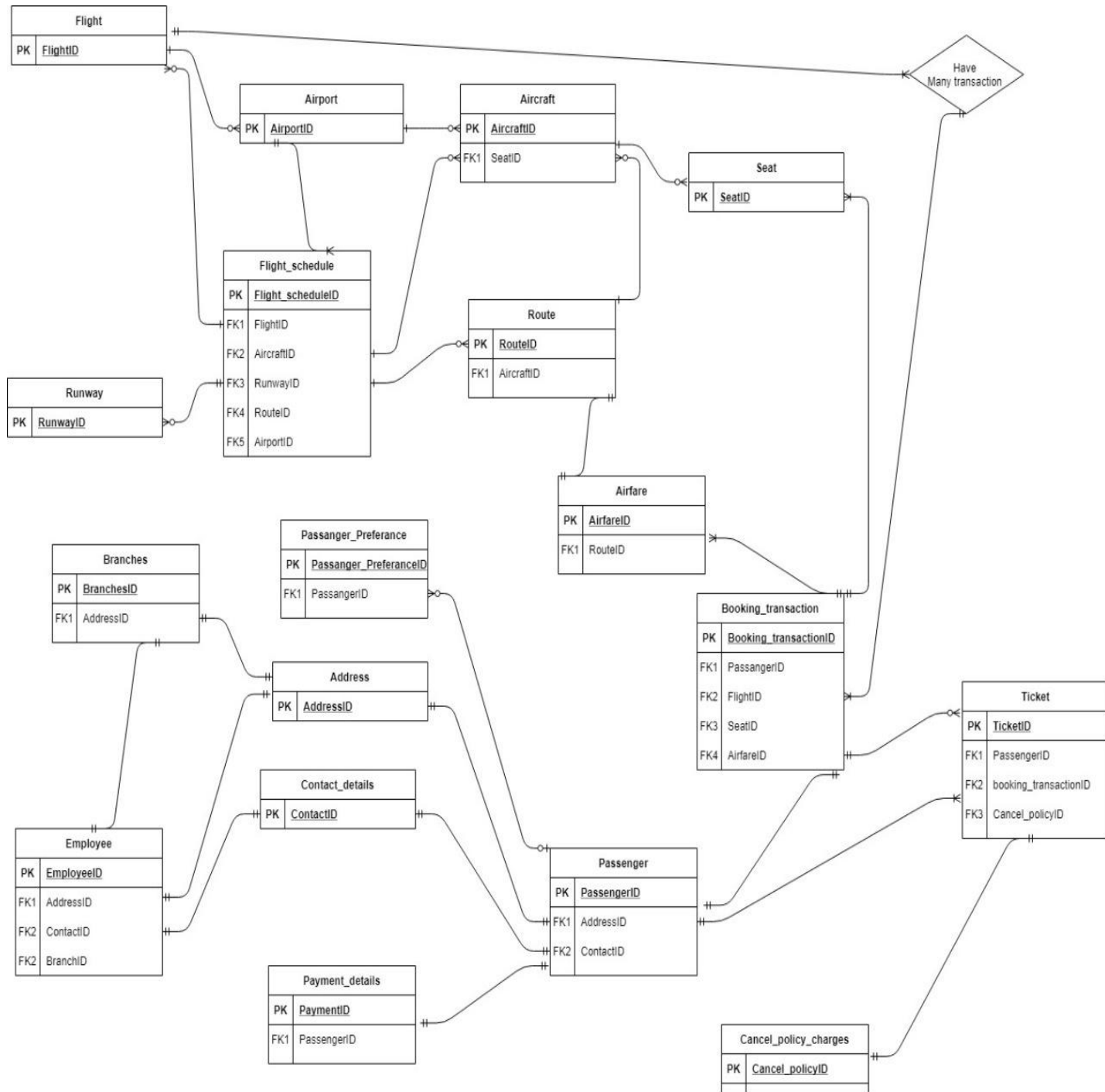
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❖ Table Normalization

SN.	Main Table	Normalized table
1	Passenger	Passenger + Passanger_preference + Address + Contact_details
2	Employee	Employee + Branches + Address + Contact_details
3	Booking_transaction	Booking_transaction + Flight + Seat + Airfare
4	Airport	Aitport + Runeway + Aircraft + Seat + Route

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❖ ER Diagram



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❖ DDL Documentation

```
CREATE DATABASE AirIndia
```

```
USE AirIndia
```

```
--===== Flight table =====
```

```
CREATE TABLE Flight
(
    FlightID INT NOT NULL PRIMARY KEY,
    Flight_takeoff_point VARCHAR(100) NOT NULL ,
    Flight_destination VARCHAR(100) NOT NULL ,
    Flight_datetime DATETIME NOT NULL ,
    Take_off_Time DATETIME NOT NULL ,
    Landing_Time DATETIME NOT NULL
)
```

```
-- ===== Airport =====
```

```
CREATE TABLE Airport
(
    AirportID INT NOT NULL PRIMARY KEY ,
    AirportName VARCHAR(100) NOT NULL,
    Country VARCHAR(80) NOT NULL ,
    State VARCHAR(80) NOT NULL,
    City VARCHAR(80) NOT NULL
)
```

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-- ===== Seat =====

CREATE TABLE Seat

```
(
    SeatID INT NOT NULL PRIMARY KEY ,
    Seatnumber VARCHAR(100) NOT NULL
)
```

-- ===== Aircraft =====

CREATE TABLE Aircraft

```
(
    AircraftID INT NOT NULL PRIMARY KEY ,
    Aircraft_type VARCHAR(100) NOT NULL ,
    Aircraft_number VARCHAR(100) NOT NULL ,
    SeatID INT NOT NULL FOREIGN KEY (SeatID) REFERENCES Seat(SeatID)
)
```

-- ===== Route =====

CREATE TABLE Route

```
(
    RouteID INT NOT NULL PRIMARY KEY ,
    AircraftID INT NOT NULL FOREIGN KEY (AircraftID) REFERENCES Aircraft(AircraftID) ,
    RouteCode VARCHAR(50) NOT NULL ,
    Source_point varchar(100) NOT NULL ,
    Destination_pointer VARCHAR(100) NOT NULL
)
```

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-- ===== Runway =====

CREATE TABLE Runway

```
(  
    RunwayID INT NOT NULL PRIMARY KEY ,  
    RunwayName VARCHAR(80) NOT NULL ,  
    Runway_control_office VARCHAR(150) NOT NULL  
)
```

-- ===== Flight_schedule (junction point) =====

CREATE TABLE Flight_schedule

```
(  
    Flight_scheduleID INT NOT NULL PRIMARY KEY ,  
    FlightID INT NOT NULL FOREIGN KEY (FlightID) REFERENCES Flight(FlightID),  
    AircraftID INT NOT NULL FOREIGN KEY (AircraftID) REFERENCES Aircraft(AircraftID),  
    RunwayID INT NOT NULL FOREIGN KEY (RunwayID) REFERENCES Runway(RunwayID) ,  
    RouteID INT NOT NULL FOREIGN KEY (RouteID) REFERENCES Route(RouteID),  
    AirportID INT NOT NULL FOREIGN KEY (AirportID) REFERENCES Airport(AirportID)  
)
```

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--===== Air_fare =====

```
CREATE TABLE Air_fare
(
    AirfareID INT NOT NULL PRIMARY KEY ,
    RouteID INT NOT NULL FOREIGN KEY (RouteID) REFERENCES Route(RouteID) ,
    fare_amount Money NOT NULL
)
```

-- ===== Address =====

```
CREATE TABLE Address
(
    AddressID INT NOT NULL PRIMARY KEY ,
    Country VARCHAR(80) NOT NULL ,
    State VARCHAR(80) NOT NULL ,
    City VARCHAR(80) NOT NULL ,
    Street VARCHAR(150) NOT NULL ,
    Pincode VARCHAR(20) NOT NULL ,
)
```

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-- ===== Contact =====

CREATE TABLE Contact_details

```
(
    ContactID INT NOT NULL PRIMARY KEY ,
    Phone_number BIGINT NULL ,
    Country_code VARCHAR(8) NULL ,
    Mo_number BIGINT NULL ,
    Primary_email NVARCHAR(255) NOT NULL ,
    Secondary_email NVARCHAR(255) NULL
)
```

-- ===== Security_questions =====

CREATE TABLE Security_questions

```
(
    Security_questionID INT NOT NULL PRIMARY KEY ,
    Question_text NVARCHAR(255) NOT NULL ,
    Answer VARCHAR(80) NOT NULL
)
```


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===== Passenger =====

CREATE TABLE Passenger

```
(
    PassengerID INT NOT NULL PRIMARY KEY ,
    Title VARCHAR(8) NOT NULL ,
    Gender VARCHAR(10) NOT NULL ,
    First_name VARCHAR(50) NOT NULL ,
    Last_name VARCHAR(50) NOT NULL ,
    Name_on_card VARCHAR(100) NOT NULL ,
    DOB DATE NOT NULL ,
    Mothers_maiden_name VARCHAR(80) NOT NULL ,
    Nationality VARCHAR(50) NOT NULL ,
    Country VARCHAR(50) NOT NULL ,
    Passport_number VARCHAR(50) NOT NULL ,
    Passport_expiry_date DATE NOT NULL ,
    Id_proof_photo VARCHAR(MAX) NOT NULL ,
    AddressID INT NOT NULL FOREIGN KEY (AddressID) REFERENCES Address(AddressID) ,
    ContactID INT NOT NULL FOREIGN KEY (ContactID) REFERENCES
Contact_details(ContactID) ,
    Password VARCHAR(50) NOT NULL ,
    Update_permission VARCHAR(100) NOT NULL ,
    Security_questionsID INT NOT NULL FOREIGN KEY(Security_questionsID) REFERENCES
Security_questions(Security_questionID)
)
```

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-- ===== Passenger_paference =====

CREATE TABLE Passenger_paference

```
(
    Passenger_preferenceID INT NOT NULL PRIMARY KEY ,
    PassengerID INT NOT NULL FOREIGN KEY (PassengerID) REFERENCES
Passenger(passengerID) ,
    Frequent_flayer_program NVARCHAR(255) NOT NULL ,
    Frequent_flayer_number INT NOT NULL ,
    Meal_selection VARCHAR(100) NULL ,
    Add_gst_info VARCHAR(150) NULL ,
    Special_assistance_request VARCHAR(150) NULL ,
    Adults INT NULL ,
    Childerns INT NULL ,
    Infants INT NULL ,
    Promotion_code INT NULL
)
```

-- ===== Branches =====

CREATE TABLE Brances

```
(
    BranchID INT NOT NULL PRIMARY KEY ,
    BranchName VARCHAR(100) NULL ,
    AddressID INT NOT NULL FOREIGN KEY (AddressID) REFERENCES Address(AddressID) ,
)
```

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--===== Payment_details =====

CREATE TABLE Payment_details

```
(
    PaymentID INT NOT NULL PRIMARY KEY ,
    PassengerID INT NOT NULL FOREIGN KEY (PassengerID) REFERENCES
Passenger(PassengerID) ,
    CardNumber BIGINT NOT NULL ,
    Expiration_date DATE NOT NULL ,
    CVV_CSV INT NOT NULL ,
    Card_holder_name VARCHAR(100) NOT NULL ,
    AddressID INT FOREIGN KEY (AddressID) REFERENCES Address(AddressID) ,
    Bank_name VARCHAR(100) NOT NULL ,
    Virtual_payment_address VARCHAR(80) NOT NULL
)
```

--===== Booking_transaction =====

CREATE TABLE Booking_transaction

```
(
    Booking_transactionID INT PRIMARY KEY ,
    Booking_datetime DATETIME NOT NULL ,
    PassengerID INT NOT NULL FOREIGN KEY (PassengerID) REFERENCES
Passenger(PassengerID) ,
```

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```
SeatID INT NOT NULL FOREIGN KEY (SeatID) REFERENCES Seat(SeatID) ,
FlightID INT NOT NULL FOREIGN KEY (FlightID) REFERENCES Flight(FlightID),
    RouteID INT NOT NULL FOREIGN KEY (RouteID) REFERENCES Route(RouteID) ,
Booking_type VARCHAR(80) NOT NULL ,
Ticket_fare MONEY NOT NULL ,
Special_req_fare MONEY NOT NULL ,
AirfareID INT NOT NULL FOREIGN KEY (AirfareID) REFERENCES Air_fare(AirfareID) ,
Total_amount MONEY NOT NULL ,
Discount MONEY NOT NULL
```

```
)
```

```
-- ===== Employee =====
```

```
CREATE TABLE Employee
```

```
(
```

```
    EmployeeID INT NOT NULL PRIMARY KEY ,
    Employee_type VARCHAR(80) NOT NULL ,
    Designation VARCHAR(80) NOT NULL ,
    Firstname VARCHAR(80) NOT NULL ,
    Lastname VARCHAR(80) NOT NULL ,
    AddressID INT NOT NULL FOREIGN KEY (AddressID) REFERENCES Address(AddressID) ,
    ContactID INT NOT NULL FOREIGN KEY (ContactID) REFERENCES
Contact_details(ContactID) ,
    BranchID INT NOT NULL FOREIGN KEY (BranchID) REFERENCES Brances(BranchID)
```

```
)
```

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--===== Cancel_policy_charges =====

CREATE TABLE Cancel_policy_charges

```
(
    Cancel_policyID INT NOT NULL PRIMARY KEY ,
    Cancellation_resion VARCHAR(150) NOT NULL ,
    Cancellation_period DATETIME NOT NULL ,
    Returnable_amount INT NOT NULL
)
```

--===== Ticket =====

CREATE TABLE Ticket

```
(
    TicketID INT NOT NULL PRIMARY KEY ,
    TicketNumber VARCHAR(100) NOT NULL ,
    PassengerID INT NOT NULL FOREIGN KEY (PassengerID) REFERENCES
Passenger(passengerID) ,
    Booking_transactionID INT NOT NULL FOREIGN KEY (Booking_transactionID)
REFERENCES Booking_transaction(Booking_transactionID) ,
    Cancel_policyID INT NOT NULL FOREIGN KEY (Cancel_policyID) REFERENCES
Cancel_policy_charges(Cancel_policyID)
)
```