# SIX WEEKS SUMMER TRAINING REPORT

On

# Airline management System

# (Database systems concepts and designs)

Submitted by

**Name-Navin Chandra**

**Registration No. 12001138**

**Program Name:B-tech CSE lateral entry**

Under the Guidance of

**Georgia Tech (Udacity)**

School of Computer Science & Engineering

Lovely Professional University, Phagwara

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# DECLARATION

I hereby declare that I have completed my six weeks summer training at UDACITY from 26 Jul 2021 to 14 Aug 2021 under the guidance of Georgia tech. I have declare that I have worked with full dedication during these six weeks of training and my learning outcomes fulfill the requirements of training for the award of degree of B.tech CSE , Lovely Professional University, Phagwara.

Name of student: Navin Chandra

Registration No: 12001138

Date:30 sept 2021

# ACKNOWLEDGEMENT

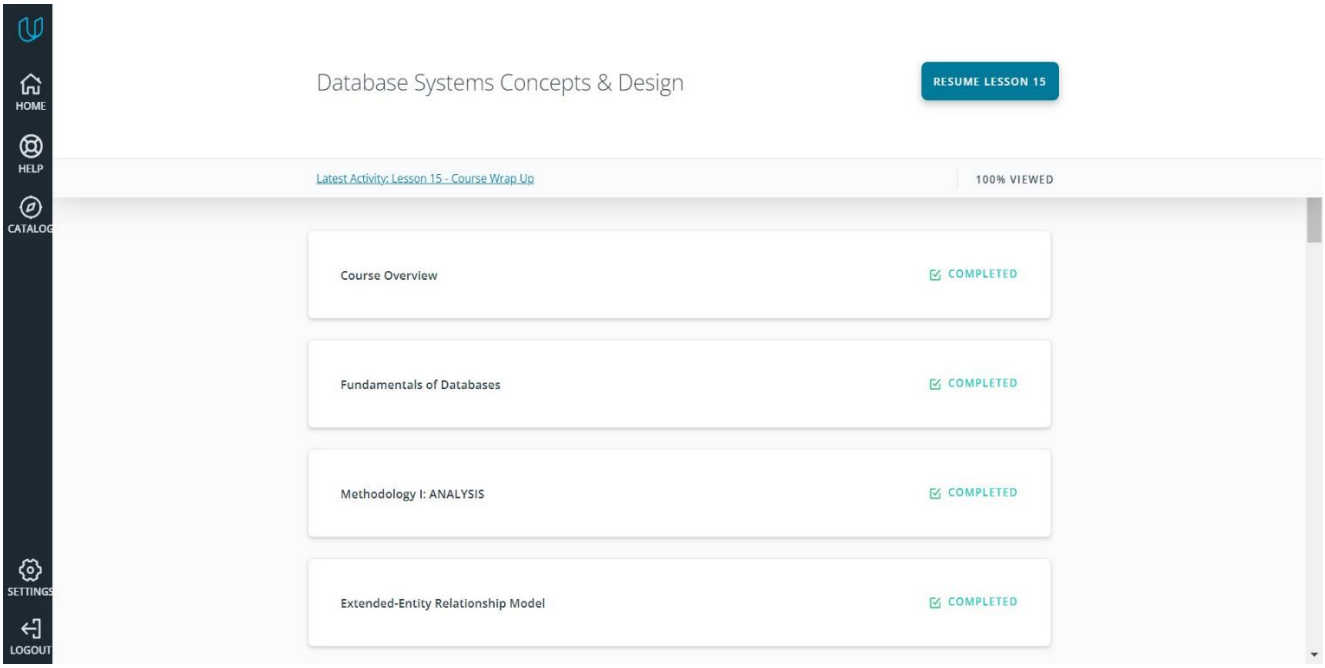
I would like to express my gratitude towards my University as well as Udacity for providing me the golden opportunity to do this wonderful summer training regarding Database systems concepts and designs , which also helped me in doing a lot of homework and learning. As a result, I came to know about so many new things. So, I am really thank full to them.

Moreover I would like to thank my Instructor who explained in such a way that, whenever I got stuck in some problem related to my course. I am really thankfull to have such a good Course.

Also,I would like to mention the support and consideration of my parents who have always been there in my life to make me choose right thing and oppose the wrong. Without them I could never had learned and became a person who I am now.

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them.

# Summer Training Certificate



## Contents


| SL NO. | TABLE OF CONTENT | PAGE NO. |
|---|---|---|
| 1 | Intoduction | 6 |
| 2 | Technology Learnt | 8 |
| 3 | Reason for choosing this technology | 9 |
| 4 | Profile of the Problem | 10 |
| 5 | Existing System | 11 |
| 6 | Problem Analysis<br>• Product definition<br>• Feasibility Analysis | 12 |
| 7 | Software Requirement Analysis | 13 |
| 8 | Design<br>• Tables and their relationships<br>• Flowcharts/Pseudo code | 15 |
| 9 | Implementation | 33 |
| 1O | Learning Outcome from training/technology learnt | 40 |

# 1. Introduction

Database system is a tool that simplifies the above tasks of managing the data and extracting useful information in a timely fashion. It analyses and guides the activities or business purposes of an organisation. It is the central repository of the data in the organisation's information system and is essential for supporting the organisation's functions, maintaining the data for these functions and helping users interpret the data in decision-making. Managers are seeking to use knowledge derived from databases for competitive advantages, for example, to determine customer buying pattern, tracking sales, support customer relationship management (CRM), on-line shopping, employee relationship management, implement decision support system (DSS). managing inventories and so on. To meet the changing organisational needs, database structures must be flexible to accept new data and accommodate new relationships to support the new decisions

With the rapid growth in computing technology and its application in all spheres of modern society. databases have become an integral component of our everyday life. We encounter several activities in our day-to-day life that involve interaction with a database, for example, bank database to withdraw and deposit money, air or railway reservation databases for booking of tickets, library database for searching of a particular book, supermarket goods databases to keep the inventory, to check for sufficient credit balance while purchasing goods using credit cards and so on.

In fact, databases and database management systems (DBMS) have become essential for managing our business, governments, banks, universities and every other kind of human endeavour. Thus, they are a critical element of today's software industry to support these requirements and a daunting task to solve the problems of managing huge amounts of data that are increasingly being stored

# Project Name and Description

## The Airline management

The Airline management System was one of the earliest changes to improve efficiency. ARS eventually evolved into the Computer Reservations System (CRS). A Computer Reservation System is used for the reservations of a particular airline and interfaces with a Global Distribution System (GDS) which supports travel agencies and other distribution channels in making reservations for most major airlines in a single system.

Airline management System contain airline schedules, fare tariffs, passenger reservations and ticket records. An airline's direct distribution works within their own reservation system, as well as pushing out information to the GDS. A second type of direct distribution channel are consumers who use the internet or mobile applications to make their own reservations.

# 2. Technology Learnt

It had 15 units which was further divided into topics so during my whole 6 week course I learned the following :

## Fundamental of Database:

In this chapter I learnt

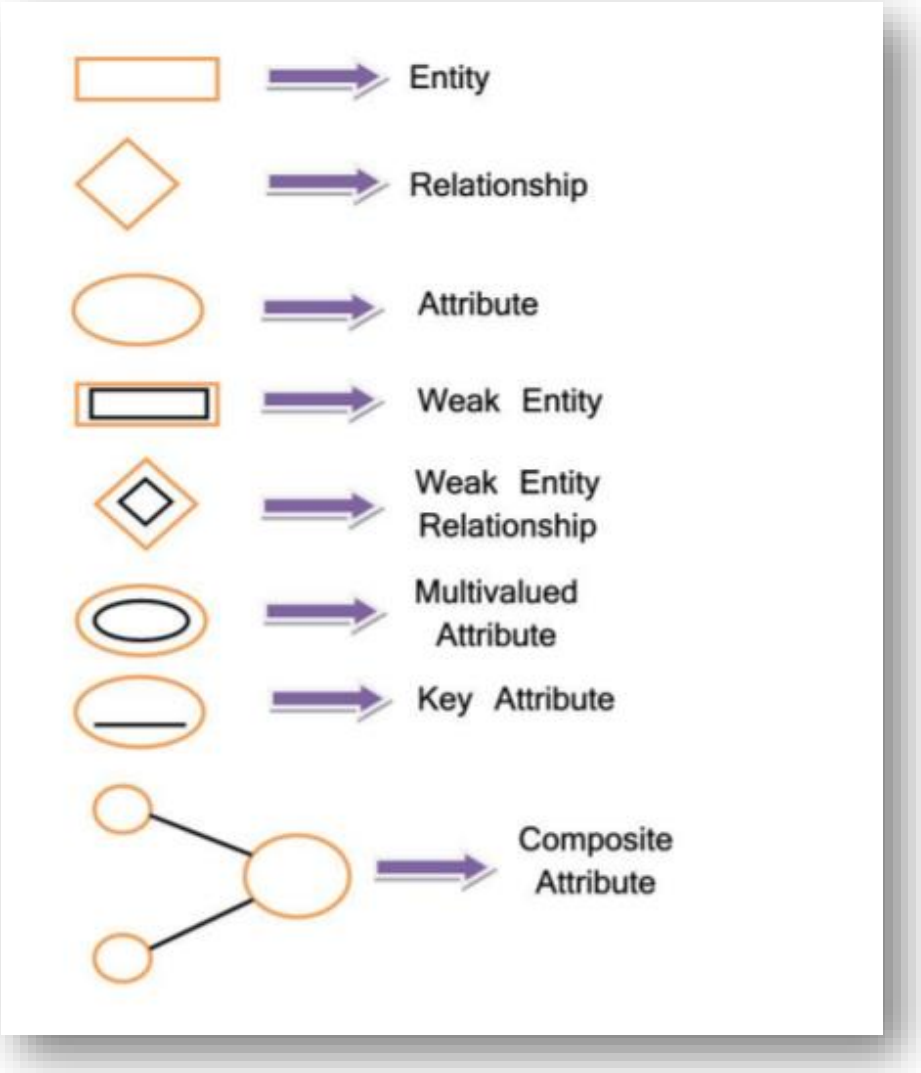
- The introduction of database,
- use of database,
- Data Modeling ,
- Process Modeling ,
- Data Models-Architecture ,
- Relational Model ,
- Introduction to Keys and Identifiers ,
- Introduction to Integrity and Consistency,
- ANSI-SPARC
- Intro to Conceptual Schema, Ecternal Schema, Internal Schema
- Physical, logical Data Independence
- Metadata.

# Entity Relationship Diagram

**Draw the ER diagram here. An example is shown:**

ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic concepts: entities, attributes and relationships.

ER Diagrams contain different symbols, here's how they are represented.



# Normalization

## First Normal Form (1NF) :

For a table to be in the First Normal Form, it should follow the following 4 rules:

1. It should only have single(atomic) valued attributes/columns.

2. Values stored in a column should be of the same domain

3. All the columns in a table should have unique names.

4. And the order in which data is stored, does not matter.

## Second Normal Form (2NF) :

For a table to be in the Second Normal Form,

1. It should be in the First Normal form.

2. And, it should not have Partial Dependency.

## Third Normal Form (3NF) :

A table is said to be in the Third Normal Form when,

1. It is in the Second Normal form.

2. And, it doesn't have Transitive Dependency

## Boyce and Codd Normal Form (BCNF) :

Boyce and Codd Normal Form is a higher version of the Third Normal form. This form deals with certain type of anomaly that is not handled by 3NF. A 3NF table which does not have multiple overlapping candidate keys is said to be in BCNF. For a table to be in BCNF, following conditions must be satisfied:

R must be in 3rd Normal Form

and, for each functional dependency ( $X \rightarrow Y$ ), X should be a super Key.

# 3. Reason of choosing this technology

I choosed this technology because Database is concept which is everywhere in every websites and every companies also use this technology

And, In order to ensure data accuracy, you must design a database that only store relevant and valuable information. A well-designed database is essential to guarantee information consistency, eliminate redundant data, efficiently execute queries, and improve the database's performance.

- Database management system helps making data more efficient and effective. This system stores, organises and manages a large amount of information within a single software application.
- Our Project on airline database system holds flight details, flight schedule, passenger details, ticket records, etc.
- We have used SQL as an language for applying queries. (Queries for insertion, deletion, updating, etc.)
- Benefits –
    - ✓ Control redundancy in data storage and in development of effort.
    - ✓ It Provides a structured approach to managing risks.
    - ✓ It Reduces risk by streamlining continuous improvement to operations.
    - ✓ Improve maintenance through data independence also backup and recovery services.

# 4. Profile of the Problem

The web based “Airline management System” project is an attempt to stimulate the basic concepts of airline reservation system. The system enables the customer to do the things such as search for airline flights for two travel cities on a specified date, choose a flight based on the details, reservation of flight and cancellation of reservation.

The system allows the airline passenger to search for flights that are available between the two travel cities, namely the “Departure city” and “Arrival city” for a particular departure and arrival dates. The system displays all the flight’s details such as flight no, name, price and duration of journey etc. After search the system display list of available flights and allows customer to choose a particular flight. Then the system checks for the availability of seats on the flight. If the seats are available then the system allows the passenger to book a seat. Otherwise it asks the user to choose another flight

To book a flight the system asks the customer to enter his details such as name, address, city, state, credit card number and contact number. Then it checks the validity of card and book the flight and update the airline database and user database.

# 5. Existing System

In the existing system all the data are stored manually to an excel sheet and filed accordingly in a filing cabinet.

### Disadvantages in existing system:

- Time consuming
- Possibly of loosing data
- Lack of security
- Difficulties in maintaining records
- Human error will be frequent
- searching the records manually leads time consuming

### HARDWARE: PROCESSOR :

- PENTUIUM IV 2.6 GHz
- RAM : 512MB DD RAM
- MONITOR : 15” COLOR
- HARD DISK :250 GB
- CDDRIVE : LG52X
- KEYBOARD : STANDARD 102 KEYS
- MOUSE :OPTICAL MOUSE

### SOFTWARE:

- FORNT END :JAVA,HTML,SERVLETS
- BACKEND : ORACLE 10i
- OPERATING SYSTEM : WINDOWS XP

# 6. Problem Analysis

- **Product definition**

1. **Airplane_type :** This defines the physical type of the plane. It dictates the capacity of first, executive, business and economy seats that a flight can have.
2. **Route :** A route is simply a tuple of airports: (StartAirport,EndAirport), and every route has a unique route id. A flight runs over a route only
3. **Flight :** A flight is identified by its flightid. A flight denotes an unique "plane", i.e. one which is scheduled to run at a certain time, from one place to another. A flight runs over a set of routes.
4. **AirFare :** Air fare is Price of ticket which is decided by the airline company and the government
5. **Passengers :** Passengers are the people who book the flight and travel
6. **Employees :** An Employees is a person who can book tickets for others, and can find retrieve the complete list of passengers boarding a flight. An official works at an airport.
7. **Transactions :** Transactions are the process of booking the ticket made by Passengers in which all their details are present , Each transaction is unique.
8. **Countries :** Countries are basically the Country in which flight are going and from flight are going
9. **Airport :** An airport consists of a name, the city it is in, and its airport id.

- **Feasibility Analysis**

**FlightRouteScheme:** This is a ternary relation that says that a flight runs over a route using a particular scheme. The scheme can be null, but not the flight id and route id. The attributes in this include:

1. Fare for the flight between the two stops given by the route specified.
2. Any scheme valid on this flight, for this route
3. Number of booked seats on this flight, route. d. A flag value indicating whether this is an elementary or complex route for this flight.

# 7. Software Requirement Analysis

## Introduction :

Requirements analysis is critical to the success of a development project. Requirements must be documented, actionable, measurable, testable, related to identified business needs or opportunities, and defined to a level of detail sufficient for system design. Requirements can be architectural, structural, behavioral, functional, and non-functional.

**Specific Requirements**

- **Software**
  - Windows 10
  - M.S Word
  - SQL Live

- **Hardware**
  - Lenovo Ideapad 320
  - Intel i3 $7^{th}$ generation
  - Recommended: 2.2 GHz or higher CPU, 1024 MB or more RAM, 1280×1024 display, 7200 RPM or higher hard disk

**APPLICABILITY**

This project solve the problem of the traditional reservation system.

With certain changes it can be applicable on any online reservation field.

One of the most benefits in today's life is that reservation can be made from any place of the world.

The user need not to be present the physically to draw a reservation slip. It will automatically do by the system

## ADVANTAGES

1. It easy to learn and adjust to the system

2. this system does not require the staff to be highly educated

3. the requirements to tackle this job may be limited to

4. Willing to work long hours

5. data is not easily lost

6. it easy to manage the system due to the high number of staff working

# 8. Design

## ○ Tables and their relationships

Here we represent the database management system for an Airline. The entities and their respective attributes required are as follows:

1. Airplane_type
    - A_ID ( Number )
    - Capacity ( Number )
    - A_weight ( Number )
    - Company ( Varchar )
2. Route
    - Route_ID ( Number )
    - Destination ( Varchar )
    - Take_Off_point ( Varchar )
    - R_type
3. Flight
    - Flight_ID ( Number )
    - Departure
    - Arrival
    - Flight_date ( Date )
4. AirFare
    - Fare_ID ( Number )
    - Charge_Amount ( Number )
    - Description ( Varchar )
5. Passengers
    - Ps_ID ( Number )
    - Name ( Varchar )
    - Address ( Varchar )
    - Age ( Number )
    - Sex ( Varchar )
    - Contacts ( Number )

6. Employees
    - Emp_ID ( Number )
    - Name ( Varchar )
    - Address ( Varchar )
    - Age ( Varchar )
    - Email_ID ( Varchar )
    - Contacts ( Number )

7. Transactions
    - TS_ID ( Number )
    - Booking_Date ( Date )
    - Departure_Date ( Date )
    - Type ( Varchar )
    - Emp_ID* ( Number )
    - Ps_ID* ( Number )
    - Flight_ID* ( Number )
    - Charge_Amount* ( Number )
8. Countries
    - Country_code ( Number )
    - Country_Name ( Varchar )

9. Airport
    - Air_Code ( Number )
    - Air_Name ( Varchar )
    - City ( Varchar )
    - State ( Varchar )

## Relationships and Cardinality

- Relationship is nothing but an association among two or more entities. Entities take part in relationships. We can often identify relationships with verbs or verb phrases.
- Cardinality defines the numerical attributes of the relationship between two entities or entity sets. These are most useful in describing binary relation sets.

Different types of cardinal relationships are:

- One-to-One Relationships ( 1 : 1 )

One entity from entity set X can be associated with at most one entity of entity set Y and vice versa.

- One-to-Many Relationships ( 1 : M )

One entity from entity set X can be associated with multiple entities of entity set Y, but an entity from entity set Y can be associated with at least one entity.

- Many to One Relationships ( M : 1 )

More than one entity from entity set X can be associated with at most one entity of entity set Y. However, an entity from entity set Y may or may not be associated with more than one entity from entity set X.

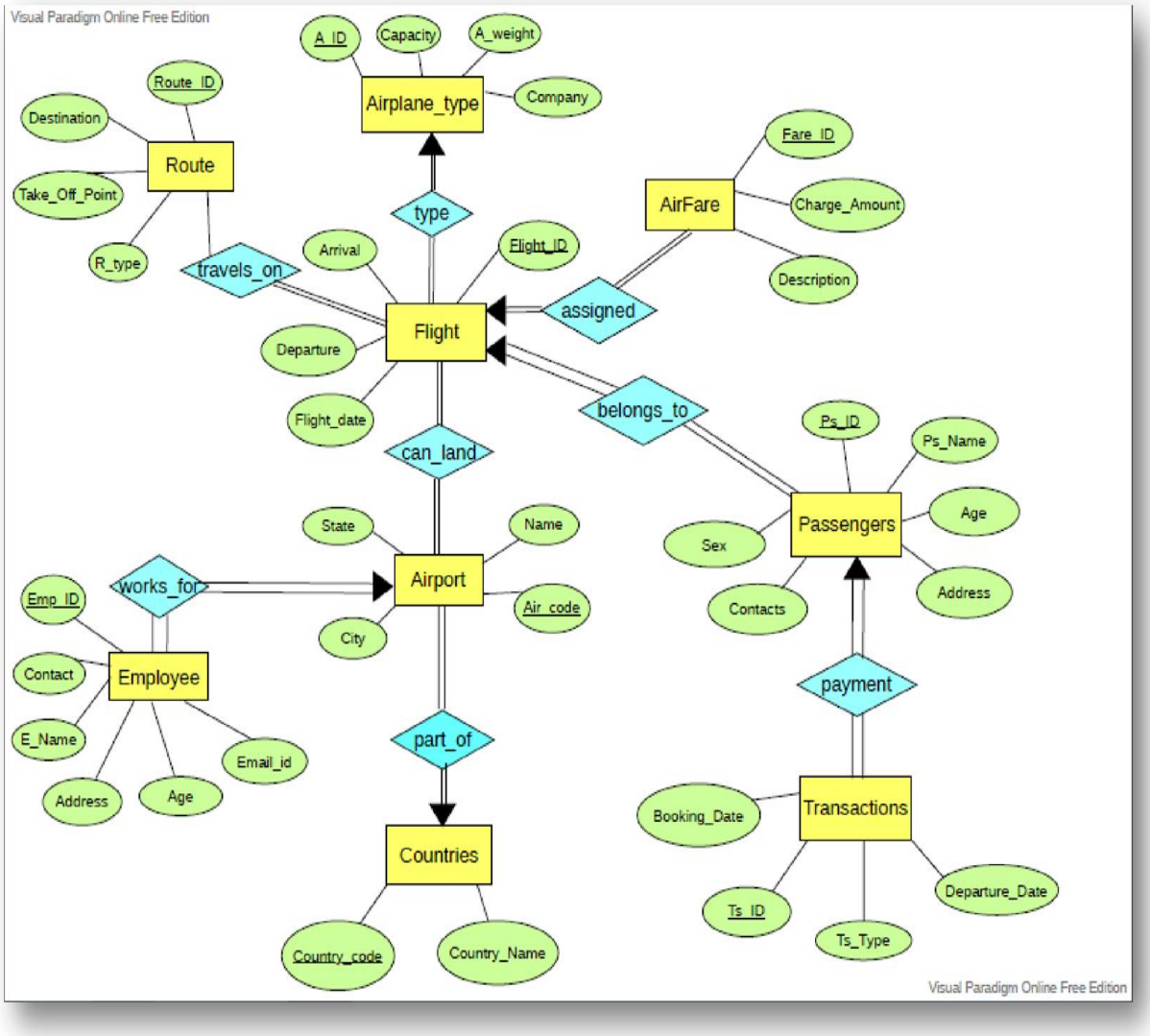
- Many-to-Many Relationships ( M : N )

One entity from X can be associated with more than one entity from Y and vice versa

1. The entities Airplane_type and Flight are connected by a relation called Type. It is a One To Many Relationship.
   And they Both Have Total Participation.
2. The entities Passengers and Transactions are connected by a relation called Payment. It is a One To Many Relationship.
   And they Both Have Total Participation.
3. The entities Flight and Airport are connected by a relation called Can land. It is a Many To Many Relationship.
   And they Both Have Total Participation.
4. The entities Flight and Route are connected by a relation called Travels on. It is a Many To Many Relationship.
   And here Flight has Total Participation and the Route has Partial Participation.
5. The entities Air-Fare and Flight are connected by a relation called Assigned. It is a Many To One Relationship.
   And they Both Have Total Participation.
6. The entities Airport and Countries are connected by a relation called Part of. It is a Many To One Relationship.
   And they Both Have Total Participation.
7. The entities Employee and Airport are connected by a relation called Works for. It is a Many To One Relationship.
   And they Both Have Total Participation.
8. The entities Passenger and Flight are connected by a relation called Belongs to. It is a Many To One Relationship.
   And they Both Have Total Participation

- **Flowcharts and Pseudo code**

## Entity Relationship Diagram



## ○ SQL Queries:( Pseudo code)

### 1. Airplane type

```
CREATE TABLE Airplane_type( A_ID INT,
 Capacity INT,  A_weight INT,
 Company VARCHAR(15),
 PRIMARY KEY(A_ID));
INSERT INTO Airplane_type VALUES (738,853,394,'Indigo');
INSERT INTO Airplane_type VALUES (777,800,380,'Vistara');
INSERT INTO Airplane_type VALUES (750,790,364,'AirIndia');
INSERT INTO Airplane_type VALUES (790,850,390,'SpiceJet');
INSERT INTO Airplane_type VALUES (745,770,405,'GoAir');
INSERT INTO Airplane_type VALUES (768,867,387,'AirAsia');
INSERT INTO Airplane_type VALUES (821,790,355,'TruJet');
INSERT INTO Airplane_type VALUES (785,835, 410,'Alliance Air');
SELECT * FROM Airplane_type;
```

| A_ID | CAPACITY | A_WEIGHT | COMPANY |
|---|---|---|---|
| 738 | 853 | 394 | Indigo |
| 777 | 800 | 380 | Vistara |
| 750 | 790 | 364 | AirIndia |
| 790 | 850 | 390 | SpiceJet |
| 745 | 770 | 405 | GoAir |
| 768 | 867 | 387 | AirAsia |
| 821 | 790 | 355 | TruJet |
| 785 | 835 | 410 | Alliance Air |

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## 2. Route

```
CREATE TABLE Route( Route_ID INT, Take_Off_point VARCHAR(15),
 Destination VARCHAR(15)  R_type VARCHAR(15),
 PRIMARY KEY(Route_ID));
INSERT INTO Route VALUES(168806,'London','Delhi','Direct');
INSERT INTO Route VALUES(157306,'NewJersey','Mumbai','2Hr Break');
INSERT INTO Route VALUES(178916,'Washington','Jodhpur','3Hr Break');
INSERT INTO Route VALUES(324567,'Chennai','Denmark','Direct');
INSERT INTO Route VALUES(452368,'Chandigard','NewYork','3Hr Break');
INSERT INTO Route VALUES(894521,'Daman','Delhi','Direct');
INSERT INTO Route VALUES(578425,'Beijing','Punjab','Direct');
INSERT INTO Route VALUES(421523,'Hyderabad','Jammu & Kashmir','Direct')
SELECT * FROM Route;
```

| ROUTE_ID | TAKE_OFF_POINT | DESTINATION | R_TYPE |
|---|---|---|---|
| 168806 | London | Delhi | Direct |
| 157306 | NewJersey | Mumbai | 2Hr Break |
| 178916 | Washington | Jodhpur | 3Hr Break |
| 324567 | Chennai | Denmark | Direct |
| 452368 | Chandigard | NewYork | 3Hr Break |
| 894521 | Daman | Delhi | Direct |
| 578425 | Beijing | Punjab | Direct |
| 421523 | Hyderabad | Jammu & Kashmir | Direct |

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## 3. FLIGHT

CREATE TABLE Flight( Flight_ID VARCHAR(15),Departure VARCHAR(30), Arrival VARCHAR(30),A_ID INT,PRIMARY KEY(Flight_ID),FOREIGN KEY (A_ID) REFERENCES Airplane_type(A_ID));

INSERT INTO Flight VALUES('AI2014','2021-01-12 08:45am','2021-01-12 10:25pm',738);

INSERT INTO Flight VALUES('QR2305','2020-12-26 12:05pm','2020-12-27 12:25pm',777);

INSERT INTO Flight VALUES('EY1234','2021-02-10 05:00am','2021-02-10 10;30pm',750);

INSERT INTO Flight VALUES('LH9876','2021-02-25 10:15am','2021-02-25 11:00pm',790);

INSERT INTO Flight VALUES('BA1689','2021-03-02 2:15am','2021-03-02 10:00pm',745);

INSERT INTO Flight VALUES('AA4367','2021-03-25 12:05am','2021-03-25 02:15am',768);

INSERT INTO Flight VALUES('CT7812','2021-04-04 2:15pm','2021-04-04 8:00pm',821);

INSERT INTO Flight VALUES('PF4521','2020-12-25 5:00pm','2020-12-25 10:30pm',785);

SELECT * FROM Flight;

| FLIGHT_ID | DEPARTURE | ARRIVAL | A_ID |
|---|---|---|---|
| AI2014 | 2021-01-12 08:45am | 2021-01-12 10:25pm | 738 |
| QR2305 | 2020-12-26 12:05pm | 2020-12-27 12:25pm | 777 |
| EY1234 | 2021-02-10 05:00am | 2021-02-10 10;30pm | 750 |
| LH9876 | 2021-02-25 10:15am | 2021-02-25 11:00pm | 790 |
| BA1689 | 2021-03-02 2:15am | 2021-03-02 10:00pm | 745 |
| AA4367 | 2021-03-25 12:05am | 2021-03-25 02:15am | 768 |
| CT7812 | 2021-04-04 2:15pm | 2021-04-04 8:00pm | 821 |
| PF4521 | 2020-12-25 5:00pm | 2020-12-25 10:30pm | 785 |

Download CSV
8 rows selected.

## 4. AIRFARE

```
CREATE TABLE AirFare(  Fare_ID INT, Charge_Amount INT, Description VARCHAR(25), Flight_ID
VARCHAR(15), PRIMARY KEY(Fare_ID), FOREIGN KEY (Flight_ID) REFERENCES
Flight(Flight_ID));
INSERT INTO AirFare VALUES(1,27341,'Standard Single','AI2014');
INSERT INTO AirFare VALUES(4,34837,'Standard Return','QR2305');
INSERT INTO AirFare VALUES(2,42176,'Key Fare Single','EY1234');
INSERT INTO AirFare VALUES(3,27373,'Business Return','LH9876');
INSERT INTO AirFare VALUES(6,44592,'Advanced Purchase','BA1689');
INSERT INTO AirFare VALUES(5,8777,'Superpex Return','AA4367');
INSERT INTO AirFare VALUES(7,9578,'Standard Return','CT7812');
INSERT INTO AirFare VALUES(8,4459,'Superpex Return','PF4521');
SELECT * FROM AirFare;
```

| FARE_ID | CHARGE_AMOUNT | DESCRIPTION | FLIGHT_ID |
|---|---|---|---|
| 1 | 27341 | Standard Single | AI2014 |
| 4 | 34837 | Standard Return | QR2305 |
| 2 | 42176 | Key Fare Single | EY1234 |
| 3 | 27373 | Business Return | LH9876 |
| 6 | 44592 | Advanced Purchase | BA1689 |
| 5 | 8777 | Superpex Return | AA4367 |
| 7 | 9578 | Standard Return | CT7812 |
| 8 | 4459 | Superpex Return | PF4521 |

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## 5. Passengers

```
CREATE TABLE Passengers( Ps_ID INT, Ps_Name VARCHAR(20), Address VARCHAR(50), Age INT,
Sex VARCHAR(1), Contacts VARCHAR(10), Flight_ID VARCHAR(15), PRIMARY KEY(Ps_ID),
FOREIGN KEY (Flight_ID) REFERENCES Flight(Flight_ID));

INSERT INTO Passengers VALUES(1,'Steve
Smith','2230Northside,Apt11,London',30,'M','8080367290','AI2014');

INSERT INTO Passengers VALUES(2,'Ankita Ahir','3456
VikasApts,Apt102,NewJersey',26,'F','8080367280','QR2305');

INSERT INTO Passengers VALUES(4,'Akhilesh Joshi','345 Chatam
courts,Apt678,Chennai',29,'M','9080369290','EY1234');

INSERT INTO Passengers VALUES(3,'Khyati Mishra','7820 Mccallum
courts,Apt234,Washington',30,'F','8082267280','LH9876');

INSERT INTO Passengers VALUES(5,'Rom Solanki','1234 Baker
Apts,Apt208,Chandigard',60,'M','9004568903','EY1234');

INSERT INTO Passengers VALUES(6,'Lakshmi Sharma','1110 Fir hills,Apt
90,Daman',30,'F','7666190505','AA4367');

INSERT INTO Passengers VALUES(8,'Manan Lakhani','7720 Mccallum
Blvd,Apt77,Beijing',45,'M','8124579635','CT7812');
```

INSERT INTO Passengers VALUES(7,'Ria Gupta','B402,Aditya Apt,Hyderabad',

34,'F','9819414036','EY1234');

SELECT * FROM Passengers;

| PS_ID | PS_NAME | ADDRESS | AGE | SEX | CONTACTS | FLIGHT_ID |
|---|---|---|---|---|---|---|
| 1 | Steve Smith | 2230 Northside,Apt 11,London | 30 | M | 8080367290 | AI2014 |
| 2 | Ankita Ahir | 3456 Vikas Apts,Apt 102,New Jersey | 26 | F | 8080367280 | QR2305 |
| 4 | Akhilesh Joshi | 345 Chatam courts,Apt 678, Chennai | 29 | M | 9080369290 | EY1234 |
| 3 | Khyati Mishra | 7820 Mccallum courts,Apt 2 34,Washington | 30 | F | 8082267280 | LH9876 |
| 5 | Rom Solanki | 1234 Baker Apts,Apt 208,Chandigard | 60 | M | 9004568903 | EY1234 |
| 6 | Lakshmi Sharma | 1110 Fir hills,Apt 90,Daman | 30 | F | 7666190505 | AA4367 |
| 8 | Manan Lakhani | 7720 Mccallum Blvd,Apt 77,Beijing | 45 | M | 8124579635 | CT7812 |
| 7 | Ria Gupta | B402,Aditya Apt,Hyderabad | 34 | F | 9819414036 | EY1234 |

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## 6. Countries

```
CREATE TABLE Countries( Country_code INT, Country_Name VARCHAR(20), PRIMARY
KEY(Country_code));

INSERT INTO Countries VALUES (+44,'England');

INSERT INTO Countries VALUES (+1,'USA');

INSERT INTO Countries VALUES (+91,'India');

INSERT INTO Countries VALUES (+45,'Kingdom of Denmark');

INSERT INTO Countries VALUES (+64,'New Zealand');

INSERT INTO Countries VALUES (+971,'UAE');

INSERT INTO Countries VALUES (+213,'Algeria');

INSERT INTO Countries VALUES (+55,'Brazil');

SELECT * FROM Countries;
```

| COUNTRY_CODE | COUNTRY_NAME |
|---|---|
| 44 | England |
| 1 | USA |
| 91 | India |
| 45 | Kingdom of Denmark |
| 64 | New Zealand |
| 971 | UAE |
| 213 | Algeria |
| 55 | Brazil |

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8 rows selected.

## 7. Airport

CREATE TABLE Airport( Air_code VARCHAR(10), Air_Name VARCHAR(52), City VARCHAR(20), State VARCHAR(20), Country_code INT, PRIMARY KEY(Air_code),FOREIGN KEY (Country_code) REFERENCES Countries(Country_code));

INSERT INTO Airport VALUES('DEL','Indira Gandhi International Airport','Delhi','UP',+91);

INSERT INTO Airport VALUES('BOM','Chhatrapati Shivaji Maharaj International Airport','Mumbai','Maharashtra',+91);

INSERT INTO Airport VALUES('LCY','London City Airport','Newham','London',+44);

INSERT INTO Airport VALUES('EWR','Newark Liberty International Airport','Newark','New Jersey',+1);

INSERT INTO Airport VALUES('JFK','John F.Kennnedy International Airport','New York City','New York',+1);

INSERT INTO Airport VALUES('CPH','Copenhagen Airport','Copenhagen','Denmark',+45);

INSERT INTO Airport VALUES('AIP','Adampur Airport','Jalandhar','Punjab',+91);

INSERT INTO Airport VALUES('IXJ','Satwari Airport','Jammu','Jammu & Kashmir',+91);

SELECT * FROM Airport;

| AIR_CODE | AIR_NAME | CITY | STATE | COUNTRY_CODE |
|---|---|---|---|---|
| DEL | Indira Gandhi International Airport | Delhi | UP | 91 |
| BOM | Chhatrapati Shivaji Maharaj International Airport | Mumbai | Maharashtra | 91 |
| LCY | London City Airport | Newham | London | 44 |
| EWR | Newark Liberty International Airport | New ark | New Jersey | 1 |
| JFK | John F.Kennnedy International Airport | New York City | New York | 1 |
| CPH | Copenhagen Airport | Copenhagen | Denmark | 45 |
| AIP | Adampur Airport | Jalandhar | Punjab | 91 |
| IXJ | Satwari Airport | Jammu | Jammu & Kashmir | 91 |

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8 rows selected.

## 8. Employees

```
CREATE TABLE Employees( Emp_ID INT, E_Name VARCHAR(20),
Address VARCHAR(50), Age INT, Email_ID VARCHAR(20),
Contact VARCHAR(20), Air_code VARCHAR(10),
 PRIMARY KEY(Emp_ID),
FOREIGN KEY (Air_code)
REFERENCES Airport(Air_code));

INSERT INTO Employees VALUES(1234,'Rekha Tiwary','202-Meeta Apt,Yogi
Nagar,Mumbai',30,'rekha1234@gmail.com','+918530324018','DEL');

INSERT INTO Employees VALUES(3246,'John Dsouza','302-Fountain Apt,ElizaBeth
Street,Newham',26,'john2346@gmail.com','+447911123456','BOM');

INSERT INTO Employees VALUES(9321,'Sanjay Rathod','62-Patwa Apt,Pradeep
Nagar,Delhi',36,'sanjay78@gmail.com','+917504681201','LCY');

INSERT INTO Employees VALUES(8512,'Hafsa Iqmar','1023-Prajwal
Apt,Newark',41,'hafsa964@gmail.com','6465554468','EWR');

INSERT INTO Employees VALUES(7512,'Akshay Sharma','Akshay Villa,Queens
Street,Copenhagen',20,'akshay27@gmail.com','+45886443210','JFK');
```

INSERT INTO Employees VALUES(5123,'Lara Jen','28-Mark road,Victoria street,New YorkCity',31,'jenlara4@gmail.com','+448000751234','CPH');

INSERT INTO Employees VALUES(2458,'Johny Paul','45-Balaji Apt,Ajit Nagar,Jalandar',32,'johnypaul8@gmail.com','+919785425154','AIP');

INSERT INTO Employees VALUES(4521,'Nidhi Maroliya','6-Matruchaya Apt,Park Road,Jammu',31,'nidhi785@gmail.com','+918211954901','IXJ');

SELECT * FROM Employees;

| EMP_ID | E_NAME | ADDRESS | AGE | EMAIL_ID | CONTACT | AIR_CODE |
|---|---|---|---|---|---|---|
| 1234 | Rekha Tiwary | 202-Meeta Apt,Yogi Nagar,Mumbai | 30 | rekha1234@gmail.com | +918530324018 | DEL |
| 3246 | John Dsouza | 302-Fountain Apt,ElizaBeth Street,Newham | 26 | john2346@gmail.com | +447911123456 | BOM |
| 9321 | Sanjay Rathod | 62-Patwa Apt,Pradeep Nagar,Delhi | 36 | sanjay78@gmail.com | +917504681201 | LCY |
| 8512 | Hafsa Iqmar | 1023-Prajwal Apt,Newark | 41 | hafsa964@gmail.com | 6465554468 | EWR |
| 7512 | Akshay Sharma | Akshay Villa,Queens Street,Copenhagen | 20 | akshay27@gmail.com | +45886443210 | JFK |
| 5123 | Lara Jen | 28-Mark road,Victoria street,New YorkCity | 31 | jenlara4@gmail.com | +448000751234 | CPH |
| 2458 | Johny Paul | 45-Balaji Apt,Ajit Nagar,Jalandar | 32 | johnypaul8@gmail.com | +919785425154 | AIP |
| 4521 | Nidhi Maroliya | 6-Matruchaya Apt,Park Road,Jammu | 31 | nidhi785@gmail.com | +918211954901 | IXJ |

Download CSV

8 rows selected.

## 9. Can_Land

```
CREATE TABLE Can_Land( Air_code VARCHAR(10), Flight_ID VARCHAR(15),
 PRIMARY KEY(Air_code,Flight_ID), FOREIGN KEY(Air_code) REFERENCES Airport(Air_code),
FOREIGN KEY(Flight_ID) REFERENCES Flight(Flight_ID));
INSERT INTO Can_Land VALUES('DEL','AI2014');
INSERT INTO Can_Land VALUES('BOM','QR2305');
INSERT INTO Can_Land VALUES('LCY','EY1234');
INSERT INTO Can_Land VALUES('EWR','LH9876');
INSERT INTO Can_Land VALUES('JFK','BA1689');
INSERT INTO Can_Land VALUES('CPH','AA4367');
INSERT INTO Can_Land VALUES('AIP','CT7812');
INSERT INTO Can_Land VALUES('IXJ','PF4521');
SELECT * FROM Can_Land;
```

| AIR_CODE | FLIGHT_ID |
|---|---|
| AIP | CT7812 |
| BOM | QR2305 |
| CPH | AA4367 |
| DEL | AI2014 |
| EWR | LH9876 |
| IXJ | PF4521 |
| JFK | BA1689 |
| LCY | EY1234 |

Download CSV
8 rows selected.

## 10.Transactions

CREATE TABLE Transactions( TS_ID INT, Booking_Date DATE NOT NULL, Departure_Date DATE NOT NULL, TS_Type VARCHAR(20), Emp_ID INT, Ps_ID INT, Flight_ID VARCHAR(15), Charge_Amount INT, PRIMARY KEY(TS_ID), FOREIGN KEY (Emp_ID) REFERENCES Employees(Emp_ID) , FOREIGN KEY (Ps_ID) REFERENCES Passengers(Ps_ID), FOREIGN KEY (Flight_ID) REFERENCES Flight(Flight_ID),FOREIGN KEY (Charge_Amount) REFERENCES AirFare(Fare_ID));

INSERT INTO Transactions VALUES(12345678,DATE '2021-02-21',DATE '2021-02-22','Google Pay',1234,1,'AI2014',27341);

INSERT INTO Transactions VALUES(45612789,DATE '2021-01-12',DATE '2021-01-14','Credit Card',3246,2,'QR2305',34837);

INSERT INTO Transactions VALUES(56987123,DATE '2020-12-05',DATE '2020-12-02','Paytm',9321,4,'EY1234',42176);

INSERT INTO Transactions VALUES(45321879,DATE '2021-03-15',DATE '2021-03-16','PhonePe',8512,3,'LH9876',27373);

INSERT INTO Transactions VALUES(75145863,DATE '2021-04-22',DATE '2021-04-25','Paytm',7512,5,'EY1234',44592);

INSERT INTO Transactions VALUES(17892455,DATE '2021-02-05',DATE '2021-02-08','Paytm',5123,6,'AA4367',8777);

INSERT INTO Transactions VALUES(24517852,DATE '2021-03-06',DATE '2021-03-08','PhonePe',2458,8,'CT7812',9578);

INSERT INTO Transactions VALUES(32548525,DATE '2021-01-20',DATE '2021-01-25','Credit Card',4521,7,'EY1234',4459);

SELECT * FROM Transactions;

## 11.Travels_on

```
CREATE TABLE Travels_on( Route_ID INT, Flight_ID VARCHAR(15),
 PRIMARY KEY(Route_ID,Flight_ID), FOREIGN KEY(Route_ID) REFERENCES Route(Route_ID),
FOREIGN KEY(Flight_ID) REFERENCES Flight(Flight_ID));
INSERT INTO Travels_on VALUES(168806,'AI2014');
INSERT INTO Travels_on VALUES(157306,'QR2305');
INSERT INTO Travels_on VALUES(178916,'EY1234');
INSERT INTO Travels_on VALUES(324567,'LH9876');
INSERT INTO Travels_on VALUES(452368,'BA1689');
INSERT INTO Travels_on VALUES(894521,'AA4367');
INSERT INTO Travels_on VALUES(578425,'CT7812');
INSERT INTO Travels_on VALUES(421523,'PF4521');
SELECT * FROM Travels_on;
```

| ROUTE_ID | FLIGHT_ID |
|---|---|
| 157306 | QR2305 |
| 168806 | AI2014 |
| 178916 | EY1234 |
| 324567 | LH9876 |
| 421523 | PF4521 |
| 452368 | BA1689 |
| 578425 | CT7812 |
| 894521 | AA4367 |

Download CSV
8 rows selected.

# 9. Implementation

1. **Find the Employee-id of all employees whose name includes the substring John.**

```
SELECT Emp_ID, E_Name
 FROM Employees
 WHERE E_Name LIKE '%John%';
```

| EMP_ID | E_NAME |
|---|---|
| 3246 | John Dsouza |
| 2458 | Johny Paul |

Download CSV
2 rows selected.

2. **Display the companyname whose flight will be landed in mumbai Airport.**

```
SELECT Company, A_ID
 FROM Airplane_type
 WHERE A_ID in (SELECT A_ID
 FROM Flight
 WHERE Flight_ID in (SELECT Flight_ID
 FROM Can_Land
 WHERE Air_code in (SELECT Air_code
 FROM Airport
 WHERE City = 'Mumbai')))
```

| COMPANY | A_ID |
|---|---|
| Vistara | 777 |

3. **Find the Fare-id of those with Chargeamount between 20000 and 35000.**

```
SELECT Fare_ID, Charge_Amount
 FROM AirFare
 WHERE Charge_Amount BETWEEN 20000 AND 35000
```

| FARE_ID | CHARGE_AMOUNT |
|---|---|
| 1 | 27341 |
| 4 | 34837 |
| 3 | 27373 |

3 rows selected.

## 4. Increase the charge-amount by 5% whose class is Superex Return.

```
UPDATE AirFare
 SET Charge_Amount = Charge_Amount * 1.05
 WHERE Description = 'Superpex Return'
```

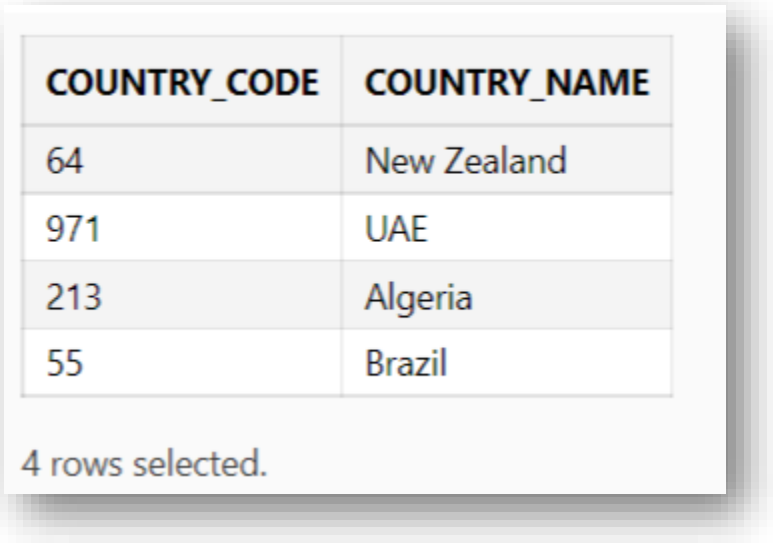
```
SELECT * FROM AirFare
```

| FARE_ID | CHARGE_AMOUNT | DESCRIPTION | FLIGHT_ID |
|---|---|---|---|
| 1 | 27341 | Standard Single | AI2014 |
| 4 | 34837 | Standard Return | QR2305 |
| 2 | 42176 | Key Fare Single | EY1234 |
| 3 | 27373 | Business Return | LH9876 |
| 6 | 44592 | Advanced Purchase | BA1689 |
| 5 | 9216 | Superpex Return | AA4367 |
| 7 | 9578 | Standard Return | CT7812 |
| 8 | 4682 | Superpex Return | PF4521 |

8 rows selected.

## 5. Display the country-name that does not have an airport

```
SELECT Country_code, Country_Name
 FROM Countries
 WHERE Country_code NOT IN (SELECT Country_code
 FROM Airport)
```



| COUNTRY_CODE | COUNTRY_NAME |
|---|---|
| 64 | New Zealand |
| 971 | UAE |
| 213 | Algeria |
| 55 | Brazil |

4 rows selected.

## 6. Display All the counties that may have or may not have the Airport.

```
SELECT *
 FROM Countries NATURAL LEFT OUTER JOIN Airport
```

| COUNTRY_CODE | COUNTRY_NAME | AIR_CODE | AIR_NAME | CITY | STATE |
|---|---|---|---|---|---|
| 91 | India | DEL | Indira Gandhi International Airport | Delhi | UP |
| 91 | India | BOM | Chhatrapati Shivaji Maharaj International Airport | Mumbai | Maharashtra |
| 44 | England | LCY | London City Airport | Newham | London |
| 1 | USA | EWR | Newark Liberty International Airport | Newark | New Jersey |
| 1 | USA | JFK | John F.Kennnedy International Airport | New York City | New York |
| 45 | Kingdom of Denmark | CPH | Copenhagen Airport | Copenhagen | Denmark |
| 91 | India | AIP | Adampur Airport | Jalandhar | Punjab |
| 91 | India | IXJ | Satwari Airport | Jammu | Jammu & Kashmir |
| 64 | New Zealand | - | - | - | - |
| 971 | UAE | - | - | - | - |
| 213 | Algeria | - | - | - | - |
| 55 | Brazil | - | - | - | - |

12 rows selected.

# 10. Learning Outcome from training/technology learnt

Airline Management System is a large scale project which includes database of more than a single Airport. This airline management system contains the details about: Airplane_Type, Route, Flight, Airfare, Passengers, Employees, Transactions, Countries and Airport.

1. The Airline database Management System keeps a record of its passengers:
   - Every passenger has a unique ID, name, address, age, sex and contacts.
   - The database keeps track of transactions made by the passengers.
   - It keeps track of the booking date, and charge amount of bookings.
   - The transaction details are also noted with transaction id and payment details.
   - Each passenger can make the payment with many transactions.
2. The Airline database Management System keeps a track of the employees and stores their information in the database.
   - The name, employee id, address, age, email id and contact are stored in the database.
   - Each employee has a unique id.
   - Since this is a rapidly growing establishment, the airline database continually keeps employing more employees to keep up with the workload.
   - An airport can employ various employees.
3. It also stores the information of airfare with unique fare if to book a ticket, modify or cancel a reservation also the details of the charge amount.
   - Depending on the travel time each airline assigns different airfare

4. Each country has an airport with a unique air code and a name.
    - This database systems contains details about all the passenger travelling and it also contains details of all employees associated to respective airports.
    - Each country may have more than one airport.
5. Each airport has various airplanes belonging to various airlines.
    - Each airport has a unique airplane id.
    - It also shows the passenger capacity and airplane weight.
6. The route of the each airplane has been provided by each airlines:
    - Each flight has a unique route ID and a distinct path to follow.
    - It also shows the information of take off and destination point of respective flights.
    - More than one flight can travel on the same path simultaneously.
7. 7. Many flight can land on a particular airport and more than one passenger belongs to particular flight.

- This system provides options for viewing different flights available with different timings for a particular date and also shows information of arrival and departure schedule of flights.
    - The project has been planned to be having the view of distributed architecture, with centralized storage of the database.
    - The entire project has been developed keeping in view of the distributed client server computing technology, in mind. The specification has been normalized up to 2NF to eliminate all the anomalies that may arise due to the database transaction that are executed by the general users and the organizational administration. The user interfaces are browser specific to give distributed accessibility for the overall system.

# THANK YOU