CSC675 Spring 2022

Airlines Online Book DataBase Management System

By: Yuhua Wu 918665701

Milestone#: Milestone 2
Date: 04/19/2022

History Table

Milestone	Date
M1V1	03/14/2022
M2V1	04/19/2022

Table of Contents

Project Description	3
Use Case	4
Entities List	6
Database Requirements	7
Main Entities, Attributes and Keys	10
ERD	12
Testing Table	13
Database Model/EER	15
Update and Delete	16
Forward Engineering	17

Project Description

Airline will contain domestic travel options It boasts the largest number of aircraft, all of which are outfitted with cutting-edge technology to ensure quality and safety while flying. has a number of branches in several nations. Its motivated personnel are eager to demonstrate the high-quality service that its clients frequently suggest. The airline is well-known for its inexpensive fares on both inbound and outbound domestic flights.Airline is committed to providing excellent customer service and offers a variety of discounts for children and persons with disabilities. The airline has received several national and international honors for its flight safety and dependability records. Because of its strong reliability, safety records, and high consumer confidence, the airline is seeing an increase in transactions, making day-to-day operations difficult to handle. Implementing an Airlines Reservation System, a computerized system that will help manage all information related to flights, passengers, their contact details, reservations, transactions, schedule publishing, air fare payments, and so on, is highly recommended to ensure more flexible service for customers.

Use Cases

With the assistance of many travel companies, the airline provides on-the-spot airline reservation and flight booking services. It not only causes clients trouble, but it also boosts the real rate that they must pay. Employee somehow fails to please clients in distant places when they have to travel for reservation as well as when they need to travel for cancellation or flight day extension, despite having branches in numerous cities targeting a wide variety of customers. The following are the main operations of an airline's day-to-day operations:

1. Sale Transactions : All sales transactions involving airline tickets, including advance reservations, reservation cancellations, and so on, are connected to flight ticket sales.
    a. Reservation
        i. Customers can book flights in advance with the airline. All clients are welcome to book flights for future trips. Reservations must be made before 11 a.m. on the day of the flight. Pre-booking ensures future sales Forecast.

    b. Cancellation
        i. There are no hard and fast restrictions as long as the corporation does not lose anything. Customers have the option to cancel their flights at any time. Seats that have been canceled are immediately available for resale. If a cancellation request is received within six hours of the flight, the company refuses to cancel a sold ticket.
2. Flight Scheduling
    a. Daily flight scheduling, new flight arrangements based on sales potential, and flight departure delay choices are all part of the company's daily flight scheduling operations, among other things.
3. Ticketing

a. On-the-spot ticket sales, online reservation sales, urgent sales, and ticketing are all handled by the company's several branches, which are staffed by authorized agents from various travel agencies.

Business Rules: Airline Customer and Employee Rule Use Case

Rules of business With clear business principles, providing high-quality services to clients is impossible. From its own employees to third-party sales representatives and potential consumers, the airline follows a set of business principles.

1. Customer
    a. They accept passengers from various flight schedules who are available at various times throughout the day, based on their comfort, willingness, and flexibility, as well as flight availability.
    b. All customers must provide accurate contact information. To travel, all clients must book a flight. There will be no sales at the entrance.
    c. Customers cannot purchase tickets at airports; instead, they must go to an online shop or a sales counter to purchase a ticket or make a reservation for a future flight.
    d. To confirm a reservation, full payment is required. Yes, there may be many discounts schemes which can be claimed by clients & is supplied upon correct alignment with discount specifications. Customers must be fined if they cancel their orders.
2. Employees
    a. All personnel must adhere to the business dress code and display an ID card that is plainly visible to visitors.
    b. During duty hours, employees are required to be present in their seats.
    c. All staff are assigned to clients on a first-come, first-served basis. Yes, there is a provision for exceptional treatment in cases of emergency or national security.
    d. Employees are first and foremost accountable for helping consumers, then for their own work.

Entities List:

1. **Charges :** A service provided or commodities given, demand (an amount) as a price from someone.

2. **Countries :** A sovereign nation occupying a specific region with its own government.

3. **State :** A country or region that is seen as a unified political community with a single administration.

4. **Contact_Details :** An employee or passenger information needed to contact someone, such as a phone number or an address.

5. **Passengers :** A passenger who is not the driver, pilot, or crew on a public or private transport.

6. **Branches :** A subdivide into one or more halves.

7. **Employee :** A person employed for wages or salary, especially at nonexecutive level.

8. **Transactions :** A transaction in which something is bought or sold; a commercial transaction.

9. **AirCrafts :** An aircraft, a helicopter, or another flying machine.

10. **Route :** A route or path traveled to go from a starting point to a destination.

11. **AirFare :** The cost of a passenger ticket on a plane.

12. **Flight_Schedule :** A flight that is regularly planned and promoted, although it does not refer to every everyday operation of airplanes on that trip.

13. Discounts : A passenger will use many to many coupons or discounts.

Database Requirements

1. Passenger
    a. A passenger shall have one or many transactions.
    b. A passenger shall have a flight schedule.
    c. A passenger shall receive assistance from one employee during the transaction.
    d. A passenger shall have charges from transactions.
    e. A passenger shall have discounts from transactions.
    f. A passenger shall have contact Contact_Details.
2. Employees
    a. An employee shall have access to transactions .
    b. An employee shall have access to Flight_Schedule.
    c. An employee shall have access to Discounts.
    d. An employee shall have access to Charges.
    e. An employee shall have access to airline Branches.
    f. An employee shall have access to States and Countries within the Branches.
    g. An employee shall have access to Passenger's Contract_Details.
    h. An employee shall have access to Passenger's Flight_Schedule.
    i. An employee shall have access to Passenger's Flight_Schedule of AirCrafts.
    j. An employee shall have access to Passenger's Flight_Schedule of AirFare.
    k. An employee shall have access to Passenger's Flight_Schedule of AirFare Routes.
3. Flight_Schedule
    a. A Flight Schedule shall be accessed by transactions by the employee .
    b. A Flight Schedule shall be accessed by transactions by the passengers.
    c. A Flight Schedule shall be accessed by transactions by the flight.

   d. A Flight Schedule shall be accessed by transactions by the charges.
   e. A Flight Schedule shall be accessed by transactions that can have discounts.
   f. A Flight Schedule shall be accessed by transactions that have Charges.
   g. A Flight Schedule shall be accessed by transactions that can be made by passengers.
   h. A Flight Schedule shall be accessed by aircraft to get the time and route.
   i. A Flight Schedule shall be accessed by airfare for employee and passenger to check tickets.
   j. A Flight Schedule shall be accessed by airfare with route details in it.
4. AirFare
   a. An AirFare shall Route information
   b. An AirFare shall AirCraft details
   c. An AirFare shall be for route details
   d. A Flight Schedule shall be accessed by Employee
   e. A Flight Schedule shall be accessed by Passenger
5. AirCraft
   a. An AirCraft shall have AirCraft ID
   b. An AirCraft shall be for Flight Schedule
   c. An AirCraft shall be for Passenger to ride
   d. An AirCraft shall be for Employee to ride
6. Transaction
   a. A transactions shall have transaction ID (tsID)
   b. A transactions shall be accessed by Employee
   c. A transactions shall be accessed by Passengers
   d. A transactions shall have Chargers
   e. A transactions shall have Discount(s) or not
   f. A transactions shall Flight details
   g. A transactions shall can be made passenger
   h. A transactions shall can be made employee
7. Discount
   a. A discount can be applied by an employee.
   b. A discount can be applied by passengers.
   c. A discount can be applied by transaction’s automatic system payment.
8. Charges
   a. A charge can be applied by an employee.
   b. A charge can be applied by passengers.
   c. A charge can be applied by transaction’s automatic system payment.
9. Routes
   a. An route shall be for Flight Schedule.

   b. An route shall be for Passenger to access.
   c. An route shall be for the Employee to access.

10. Countries
    a. A country shall have Country ID (CtID).
    b. A country shall have a Country Name.
    c. A country shall have a state.
11. State
    a. A state shall have State ID (StID).
    b. A state shall have a Country Name.
    c. A state shall be accessed by Contact Details on the Passenger.
12. Contact_Details
    a. A contact Detail shall have contact detail ID (cdID).
    b. A state shall have a State Name.
    c. A passenger's contact shall be accessed by the Passenger.
    d. A passenger's contact shall be accessed by the Employee.
13. Branch
    a. A branch shall have branch ID (BrID).
    b. A branch shall have a State.
    c. A branch shall have the employees within.

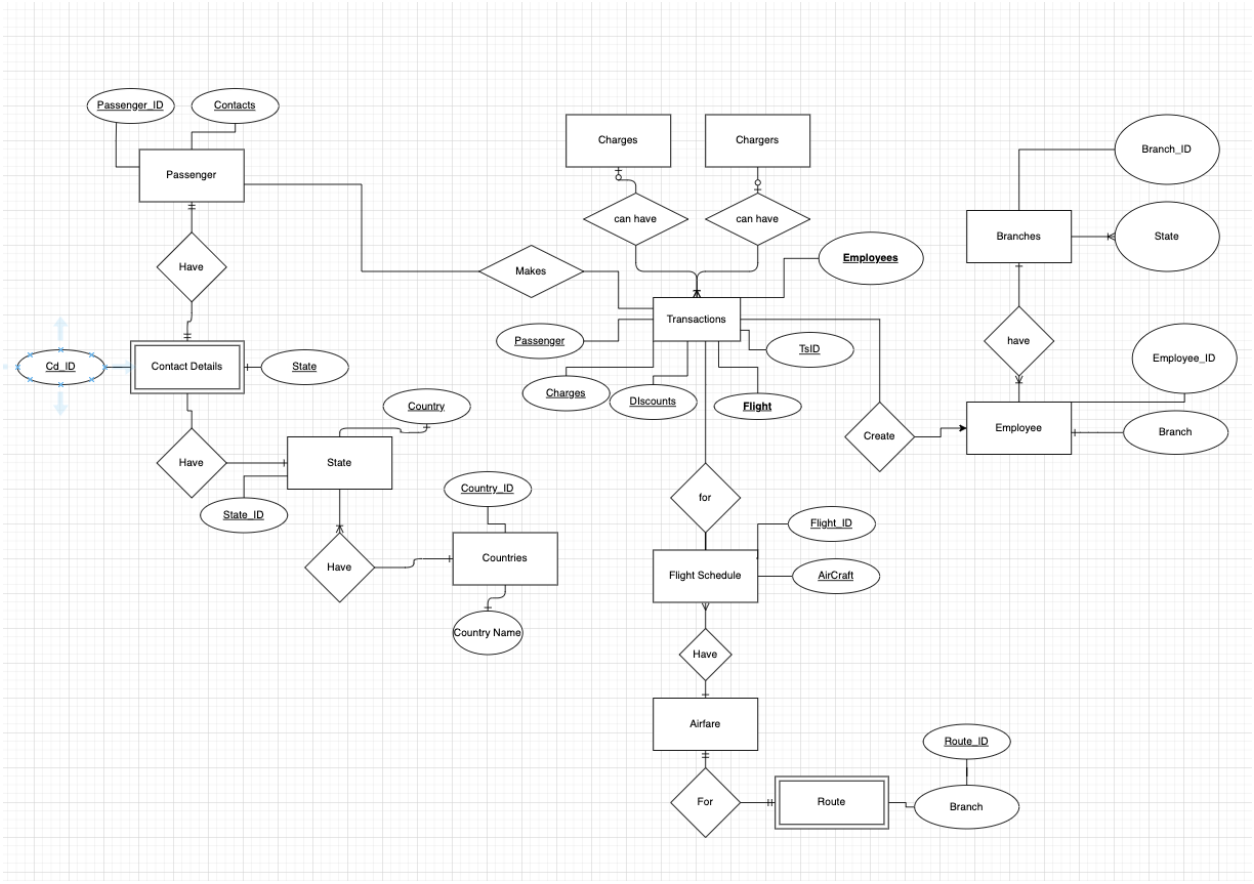
Main Entities, Attributes and Keys

- Transactions (strong)
    - TSID : key, numeric
    - BookingDate : simple, numeric
    - DepartureDate : simple, numeric
    - Passenger : composite, alphanumeric
    - Flight : composite, alphanumeric
    - Type : composite, alphanumeric
    - Employee : composite, alphanumeric
    - Charges : simple, numeric
    - Discount: simple, numeric
- Employee (strong)
    - EmpID : key, numeric
    - Name : simple, alphanumeric
    - Address : simple, alphanumeric
    - Branch : simple, alphanumeric
    - Designation : simple, alphanumeric
    - Email : simple, alphanumeric
    - Telephone: simple, numeric
- Charges (weak)
    - ChID: key, numeric
    - Title: simple, alphanumeric
    - Amount : simple, numeric
    - Descript: simple, alphanumeric
- Discounts (weak)
    - ChID: key, numeric
    - Title : simple, alphanumeric
    - Amount : simple, numeric
    - Description: simple, alphanumeric

- State (weak)
    - StID: key, numeric
    - State Name : simple, alphanumeric
    - Country : simple, alphanumeric
- Branches (weak)
    - BrID: key, numeric
    - Center : simple, alphanumeric
    - Address : simple, alphanumeric
    - State : simple, alphanumeric
- Countries (weak)
    - CtID: key, numeric
    - Country Name
- ContactDetails (weak)
    - CnID: key, numeric
    - Email : simple, alphanumeric
    - Cellphone: simple, numeric
    - Telephone: simple, numeric
    - Street : simple, alphanumeric
    - State : simple, alphanumeric
- Route (weak)
    - RTID: key, numeric
    - Airport : simple, alphanumeric
    - Destination : simple, alphanumeric
    - Route Code : simple, alphanumeric
- AirFare (strong)
    - AfID: key, numeric
    - Route : simple, alphanumeric
    - Fare : simple, alphanumeric
- Aircraft (weak)
    - AcID: key, numeric
    - Aircraft Number : simple, alphanumeric
    - Capacity : simple, alphanumeric
    - Manufactured By : simple, alphanumeric
    - Manufactured On : simple, alphanumeric
- Passengers (Strong)
    - PsID: key, numeric
    - Name: simple, alphanumeric
    - Address: simple, alphanumeric
    - Age: simple, alphanumeric
    - Nationality: simple, alphanumeric
    - Contacts: simple, alphanumeric
- FlightSchedule (strong)
    - FsID: key, numeric
    - Flight Date: simple, numeric

- Departure: simple, alphanumeric
- Arrival: simple, alphanumeric
- AirCraft: simple, alphanumeric
- NetFare: simple, numeric

Entity Relation Diagram



https://drive.google.com/file/d/1Dexl3FLcEoRSDO-G76pazGCryVhhmkLL/view?usp=sharing

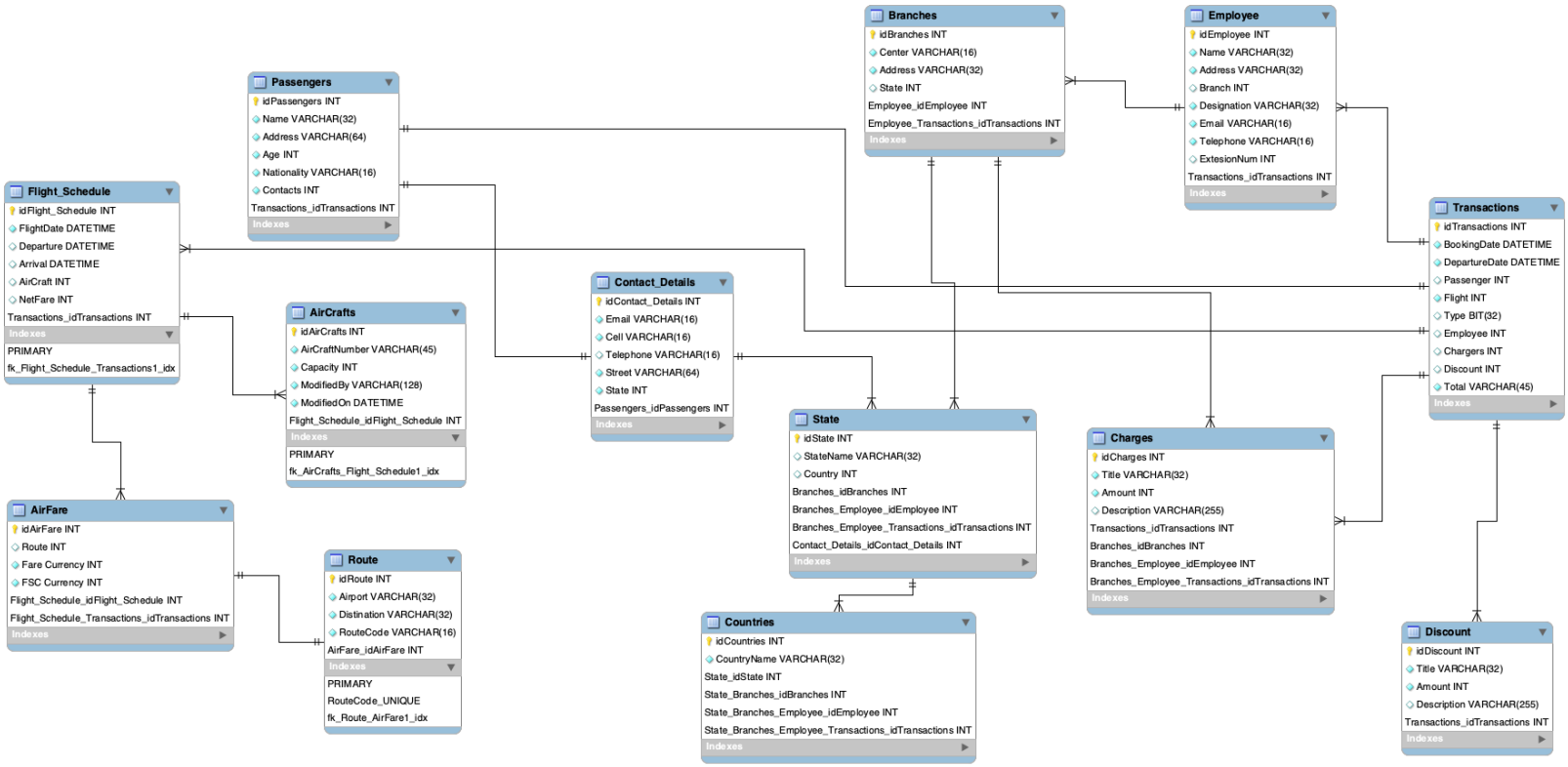
Testing Table

M = many, N = 0,1, 2….

Rule	Entity A	Relation	Entity B	Cardinality	Pass/Fail	Error Description
1	Aircraft	have	Flight Schedule	1 : M	Pass	None
2	Routes	have	AirFaire	1 : 1	Pass	None
3	AirFare	have	Flight Schedule	1 : M	fail	What happens if flight schedule change
4	Discounts	have	Transactions	N : 1	Pass	None
5	Charges	have	Transaction	1 :M	Pass	None
6	Countries	have	State	1 :M	Pass	None

7	State	have	Branches	1 : M	Pass	None
8	Contact Details	have	State	M : 1	Pass	None
9	Passengers	have	Contact Details	1-to-1	fail	Passengers can have multiple addresses , being current or two number
10	Passengers	have	Transactions	1-to-1	fail	Passenger may buy more more then one ticket probably
11	Branches	have	Employees	M : 1	Pass	None
12	Employees	have	Transactions	M-to-N	Pass	None
13	Transactions	have	Flight	M-to-N	Pass	None

Section VII: Database Model/EER



Delete and Update

Table	FK	ON DELETE	On Update	Comment
AirCrafts	Primary Key	Set Null	On Cascade	If a AirCrafts is deleted, then the contact details from that Route must be deleted as well
Route	Primary Key	Set Null	On Cascade	If a Route is deleted, then the contact details from that AirCrafts must be deleted as well
AirFare	Primary Key	Set Null	On Cascade	If a AirFare is deleted, then the contact details from that Charges and Discount must be deleted as well
Discount	Primary Key	Set Null	On Cascade	If a Discount is deleted, then set Null, no discounts
Charges	Primary Key	Set Null	On Cascade	If a Charges is deleted, then the AirFare from that user must be deleted as well
Passengers	User	On Cascade	On Cascade	If a passenger is deleted, then the contact details from that user must be deleted as well
Contact_Details	Details	Set Null	On Cascade	If Contact Details is deleted then the passengers must be deleted as well
State	Primary Key	Set Null	On Cascade	If a State is deleted, then the contact details from that user must updated
Country	Primary Key	Set Null	On Cascade	If a Country is deleted, then the contact details from that user must updated
Transaction	Primary Key	Set Null	On Cascade	If a Transaction is deleted, then theAirfare, charges from that user must be deleted as well
Employee	Primary Key	Set Null	On Cascade	If a Employee is deleted, then the contact details from that user must be deleted as well

Branch	Primary Key	Set Null	On Cascade	If a Branch is deleted, then all keys from that Branch must be deleted as well except for the Passenger and Contact Details.

Section VIII: Forward Engineering

Added into files