Team: 17

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CD431: Database ER Design

This is the Entity-Relationship (ER) database design document for a flight reservation system.

1. Initial ER Design

The database includes the following entities which will each be organized into corresponding tables:

- Customer: Stores standard customer information.
- Flight: Stores flight details.
- FlightCompany: Stores flight company information.
- FlightConnection: Stores flight connection information.
- Seat: Stores seat information for each flight.
- Reservation: Stores reservation details.
- Payment: Stores payment details.
- BankAccount: Stores customer bank information.

2. Intermediate ER Design

This is the intermediate design including attributes and types.

- Customers
  - CustomerID (PK) - INT
  - FirstName - VARCHAR
  - LastName - VARCHAR
  - Email - VARCHAR
  - PhoneNumber - VARCHAR
  - Address - TEXT

- Flights
  - FlightID (PK) - INT
  - FlightNumber - VARCHAR
  - DepartureTime - DATETIME
  - ArrivalTime - DATETIME
  - Origin - VARCHAR
  - Destination - VARCHAR
  - FlightCompanyID (FK) – INT
  - TotalSeats - INT: The total number of seats available on the flight.
  - IsFullyBooked - BOOLEAN: Indicates whether the flight is fully booked.

- FlightCompanies
    - FlightCompanyID (PK) - INT
    - CompanyName - VARCHAR
    - CompanyAddress - TEXT
    - ContactNumber - VARCHAR

- FlightConnections
    - ConnectionID (PK) - INT
    - FlightID (FK) - INT
    - ConnectingFlightID (FK) - INT
    - ConnectionTime - TIME

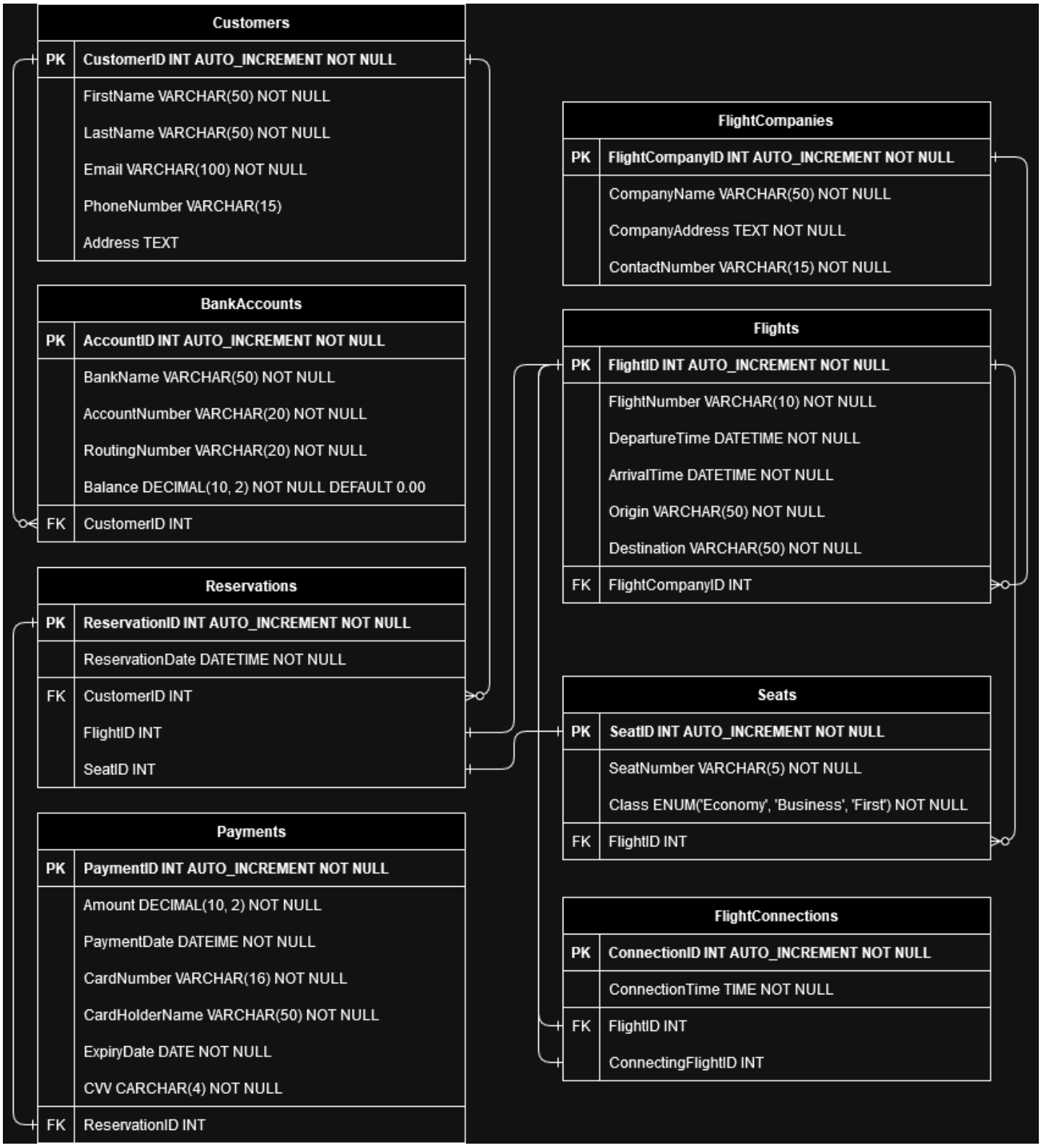
- Seats
    - SeatID (PK) - INT
    - SeatNumber - VARCHAR
    - Class – ENUM
    - FlightID (FK) – INT
    - IsBooked - BOOLEAN: Indicates whether the seat is booked.

- Reservations
    - ReservationID (PK) - INT
    - ReservationDate - DATETIME
    - CustomerID (FK) - INT
    - FlightID (FK) - INT
    - SeatID (FK) – INT
    - Amount – DECIMAL
    - PaymentDate - DATETIME
    - CardNumber - VARCHAR
    - CardHolderName - VARCHAR
    - ExpiryDate - DATE
    - CVV - VARCHAR

- BankAccounts
    - AccountID (PK) - INT
    - CustomerID (FK) - INT
    - BankName - VARCHAR
    - AccountNumber - VARCHAR
    - RoutingNumber - VARCHAR

3. Final ER Design

3.1. UML Diagram (created using draw.io)



As shown in the diagram, the entity relations are as follows:

- Customer (1) ---- (0..*) Reservation: One-to-Many
- Flight (1) ---- (0..*) Seat: One-to-Many
- FlightCompany (1) ---- (0..*) Flight: One-to-Many
- Reservation (1) ---- (1) Payment: One-to-One
- Reservation (1) ---- (1) Flight: One-to-Onex
- Reservation (1) ---- (1) Seat: One-to-One
- Flight (1) ---- (0..*) FlightConnection: One-to-Many
- FlightConnection (0..*) ---- (1) Flight (ConnectingFlightID): Many-to-One

3.2. Requirements

Customer Management:

- Add, update, and delete customer records.
- Store and manage customer contact information.

Flight and Seat Management:

- Add, update, and delete flight details.
- Manage seat assignments for each flight.

Reservation Management:

- Create, update, and cancel reservations.
- Assign seats to reservations and manage reservation dates.

Payment Processing:

- Record payment details for each reservation.
- Ensure payments are processed through card only.
- Subtract payment amounts from the associated bank account balance.

Bank Account Management:

- Add and update bank account information for customers
- Update account balances

Flight Company and Connection Management:

- Add, update, and delete flight company records.
- Manage flight connections and connection times.