CCAS 4.3 – Software Engineering Milestone 2: Database Design and SQL Queries

Project: Travel Agency Management System

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1. Introduction

This document presents the database design for the Travel Agency Management System. It includes the Entity Relationship Diagram (ERD), the relational database schema with data types, and an explanation of how entities and relationships are mapped into tables.

This database design supports managing customers, trips, bookings, hotels, flights, and payments.

2. Entity Relationship Diagram (ERD)

The ERD represents the conceptual design of the Travel Agency Management System. It identifies the main entities, their attributes, and the relationships between them.
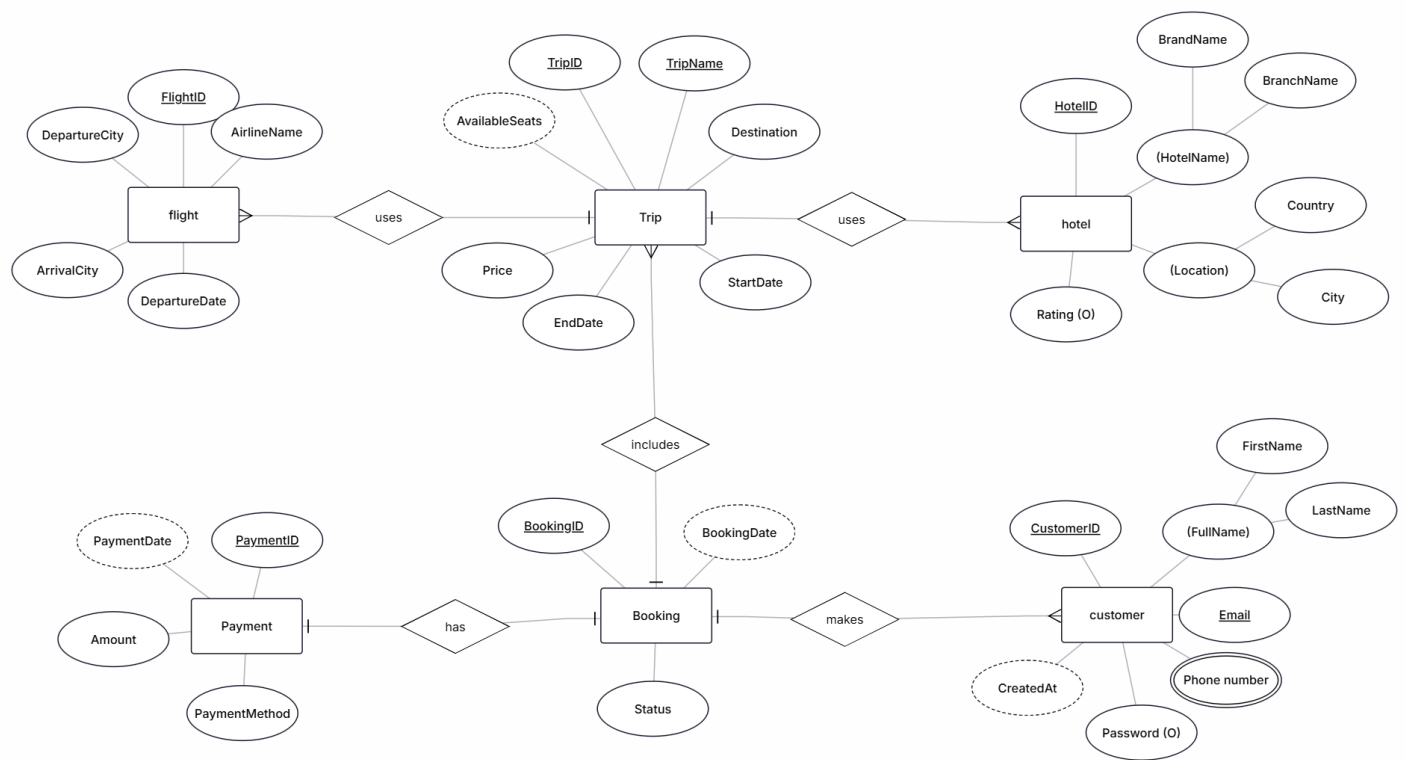
Main Entities:

- Customer

- Trip

- Hotel

- Flight

- Booking

- Payment

Relationships:

- A customer can make many bookings

- A trip can be booked many times

- Each booking has one payment

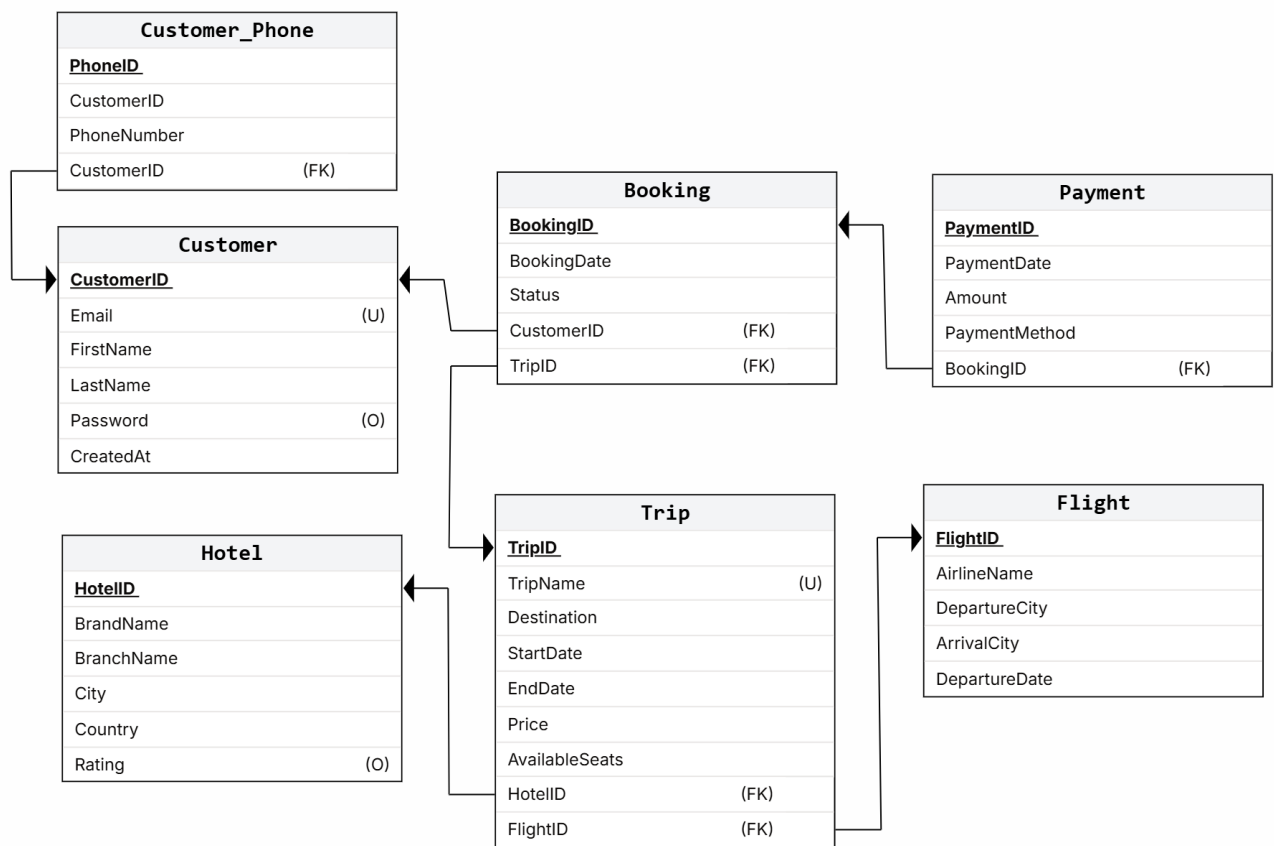- Each trip is linked to one hotel and one flight

(ERD diagram created using ERDPlus and attached below)

3. Relational Database Schema

The relational schema is generated from the ERD and represents the logical database design. Primary keys (PK) uniquely identify records, and foreign keys (FK) maintain relationships between tables.

(Relationship Schema created using ERDPlus and attached below)

Customer_Phone

PhoneID	
CustomerID	
PhoneNumber	
CustomerID	(FK)

Customer

CustomerID	
Email	(U)
FirstName	
LastName	
Password	(O)
CreatedAt	

Booking

BookingID	
BookingDate	
Status	
CustomerID	(FK)
TripID	(FK)

Payment

PaymentID	
PaymentDate	
Amount	
PaymentMethod	
BookingID	(FK)

Hotel

HotelID	
BrandName	
BranchName	
City	
Country	
Rating	(O)

Trip

TripID	
TripName	(U)
Destination	
StartDate	
EndDate	
Price	
AvailableSeats	
HotelID	(FK)
FlightID	(FK)

Flight

FlightID	
AirlineName	
DepartureCity	
ArrivalCity	
DepartureDate	

4.1 Insert Queries

QUR_001 – Insert a new customer:

INSERT INTO Customer (FullName, Email, Phone, Password, CreatedAt)

VALUES ('John Doe', 'john@email.com', '0123456789', 'hashed_password', CURRENT_DATE);

QUR_002 – Insert a new trip:

INSERT INTO Trip (TripName, Destination, StartDate, EndDate, Price, AvailableSeats)

VALUES ('Paris Tour', 'Paris', '2025-06-01', '2025-06-07', 1200, 20);

4.2 Update Queries

QUR_003 – Update available seats for a trip:

UPDATE Trip

SET AvailableSeats = AvailableSeats - 1

WHERE TripID = 1;

4.3 Delete Queries

QUR_004 – Delete a trip

DELETE FROM Trip

WHERE TripID = 3;

4.4 Select Queries (Complex Queries)

QUR_005 – View all bookings with customer and trip details:

SELECT c.FullName, t.TripName, b.BookingDate, b.Status

FROM Booking b

JOIN Customer c ON b.CustomerID = c.CustomerID

JOIN Trip t ON b.TripID = t.TripID;

QUR_006 – Calculate total revenue

SELECT SUM(Amount) AS TotalRevenue

FROM Payment;

5. Conclusion

This milestone defines the database structure and SQL queries for the Travel Agency Management System. The ERD and queries ensure that customer data, trips, bookings, and payments are stored and managed efficiently. This database design will support GUI development and system testing in the next milestones.