Avan Airways
Database Design Document (DDD)

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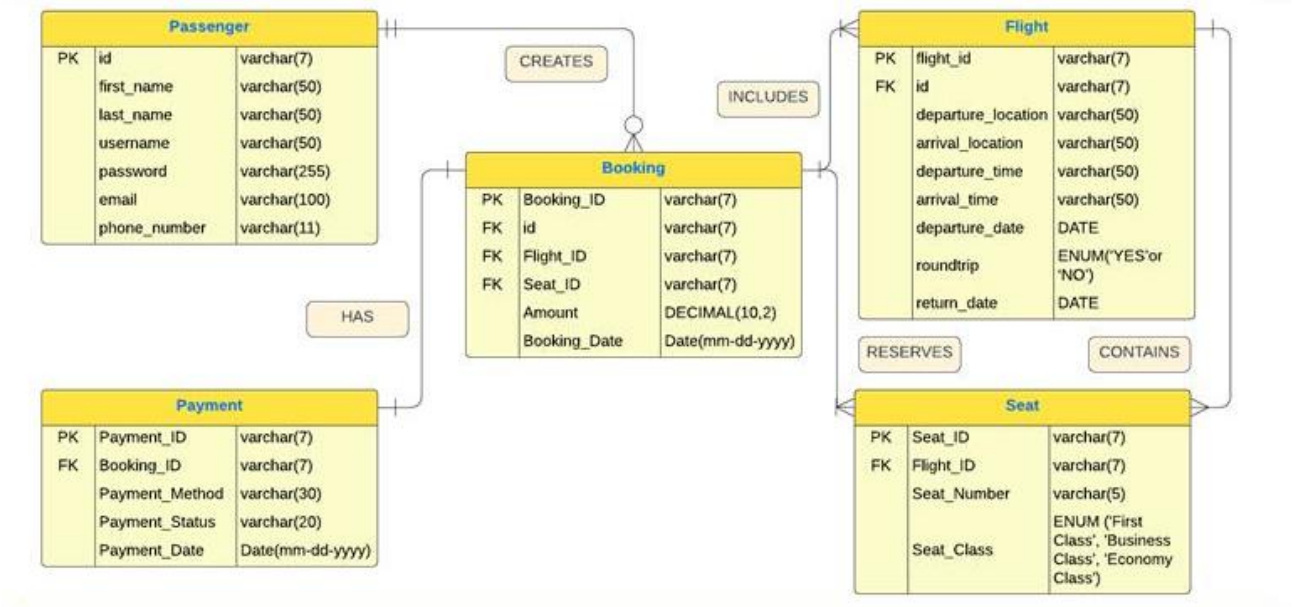
Table of Content

1.0 Introduction

The structure and design of a database system specifically made for handling user reservations, flights, seats, payments, and associated data are described in this document. The database is made to fulfill a flight booking system's operational requirements while guaranteeing effective data management and data integrity. This paper acts as a thorough manual for developers, database administrators, and other stakeholders engaged in the system's implementation and upkeep by outlining the tables, their functions, and the connections between them.

2.0 Entity Relationship Diagram



3.0 Detailed Database Design

The database's organized design, which guarantees effective data storage and well specified relationships between entities, is covered in this section. User interactions, flight information, booking administration, seat assignments, and payment processing are all handled by the database's several tables. To ensure data consistency and integrity, each table has particular properties with limitations.

Each table's properties, data types, restrictions, and descriptions are summarized in the data dictionary. To create links between tables and guarantee smooth transactions, primary and foreign keys are used. To safeguard user data, the design also includes security features like role-based access and encrypted passwords.

3.1 Data Dictionary

3.1.1 Data dictionary for Element: Passenger

Name	***Data Type***	***Constrain***	***Description***
id	VARCHAR(7)	PRIMARY KEY	Unique identifier for users (format: AAP-XXX)
first_name	VARCHAR(50)	NOT NULL	First name of the user
last_name	VARCHAR(50)	NOT NULL	Last name of the user
username	VARCHAR(50)	UNIQUE, NOT NULL	Unique username for the user
password	VARCHAR(255)	NOT NULL	User's password (hashed for security)
email	VARCHAR(100)	UNIQUE, NOT NULL, CHECK (email LIKE '@gmail.com’)	User's email address (must be a Gmail account)
phone_number	VARCHAR(11)	UNIQUE, NOT NULL, CHECK (phone_number REGEXP ‘09[0-9]{9}$’)	User's phone number (must start with '09') and consist of 11 digits

3.1.2 Data dictionary for Element: Flight

Name	***Data Type***	***Constraint***	***Description***
flight_id	VARCHAR(7)	PRIMARY KEY	Unique identifier for flights (AAF-XXX)
id	VARCHAR(7)	FOREIGN KEY (users.id)	Reference to the user who booked the flight
departure_location	VARCHAR(50)	NOT NULL	Flight's departure location
arrival_location	VARCHAR(50)	NOT NULL	Flight's arrival destination
departure_time	VARCHAR(50)	NOT NULL	Departure time of the flight
arrival_time	VARCHAR(50)	NOT NULL	Arrival time of the flight
departure_date	DATE	NOT NULL	Date of departure
roundtrip	ENUM('Yes', 'No')	DEFAULT 'No'	Indicates if the flight is roundtrip
return_date	DATE	NULL	Date of return (if roundtrip)

3.1.3 Data dictionary for Element: Payment

Name	***Data Type***	***Constraint***	***Description***
Payment_ID	VARCHAR(7)	PRIMARY KEY	Unique identifier for payments (AAM-XXX)
Booking_ID	VARCHAR(7)	FOREIGN KEY (Booking.Booking_ID	Reference to the associated booking
Payment_Method	VARCHAR(30)	NOT NULL, CHECK (predefined values)	Payment method used (GCash, Visa, PayPal, etc.)
Payment_Status	VARCHAR(20)	NOT NULL, DEFAULT 'Accomplished'	Status of the payment
Payment_Date	DATE	NOT NULL, DEFAULT CURRENT_DATE	Date when the payment was made

3.1.4 Data dictionary for Element: Seat

Name	***Data Type***	***Constraint***	***Description***
Seat_ID	VARCHAR(7)	PRIMARY KEY	Unique identifier for seats (AAS-XXX)
Flight_ID	VARCHAR(7)	FOREIGN KEY (Flight.flight_id)	Reference to the associated flight
Seat_Number	VARCHAR(5)	UNIQUE, NOT NULL	Unique seat number in the flight
Seat_Class	ENUM('First Class', 'Business Class', 'Economy Class')	NOT NULL	Classification of the seat

3.1.5 Data dictionary for Element: Booking

Name	***Data Type***	***Constraint***	***Description***
Booking_ID	VARCHAR(7)	PRIMARY KEY	Unique identifier for bookings (AAB-XXX)
Id	VARCHAR(7)	FOREIGN KEY (users.id)	Reference to the user who booked
Flight_ID	VARCHAR(7)	FOREIGN KEY (Flight.flight_id)	Reference to the flight being booked
Seat_ID	VARCHAR(7)	FOREIGN KEY (Seat.Seat_ID)	Reference to the assigned seat

Amount	DECIMAL(10,2)	NULL	Cost of the booking
Booking_Date	DATE	NOT NULL, DEFAULT CURRENT_DATE	Date when the booking was made

3.2 Purpose of Tables

3.2.1 Purpose of Passenger Table

The details of the system's registered users are included in this table. It contains the user's first and last name, username, email address, and phone number, among other personal information. The id column is auto-generated and has the format of AAP-XXX. It also checks for unique constraints on the username, email, and phone number. Also, the email must be from a Gmail account, and the phone number must be in a certain format.

3.2.2 Purpose of Flight Table

Information regarding user-booked flights is kept in this table. It contains information like the flight's departure and arrival locations, times, and whether it's a round-trip ticket. The primary key is the flight_id column, which is automatically created and has the format AAF-XXX. The table also references the users table through the id column, establishing a relationship between users and their booked flights.

3.2.3 Purpose of Payment Table

This table stores payment details for bookings made by users. It includes the payment method, payment status, and payment date. The Payment_ID column is the primary key and is auto-generated in the format AAM-XXX. The table references the Booking table through the Booking_ID column, ensuring that each payment is linked to a specific booking.

3.2.4 Purpose of Seat Table

Information regarding available seats on flights is kept in this table. It contains the flight to which the seat belongs, the seat number, and the seat class (First Class, Business Class, Economy Class, etc.). The primary key, the Seat_ID column, is automatically produced in the AAS-XXX format. The table references the Flight table through the Flight_ID column, linking seats to specific flights.

3.2.5 Purpose of Booking Table

This table stores booking details for users. It includes the user ID, flight ID, seat ID, booking amount, and booking date. The Booking_ID column is the primary key and is auto-generated in the format AAB-XXX. The table establishes relationships with the users, Flight, and Seat tables, linking bookings to users, flights, and seats.

3.3 Relations

From Table	*To Table*	*Relation*
Passenger	Flight	A passenger can book one or more flights.
Flight	Seat	A flight can have multiple seats.
Seat	Booking	A seat is assigned to a booking.
Passenger	Booking	A passenger can make one or more bookings.
Booking	Payment	A booking is associated with a payment.
Flight	Booking	A flight can have multiple bookings.
Passenger	Payment	A passenger indirectly makes a payment through their booking.