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CSE-A

Case Study
Online Railway Reservation System

Aim:

This case study aims to understand how the Online Railway Reservation System simplifies the process of booking train tickets, making it easier and more convenient for passengers. Additionally, we will examine the security measures it employs to safeguard the passenger's data and transactions.

Description:

The objective of this project is to establish a database for the management of railways. The railway booking system allows passengers to inquire about train availability according to their departure and arrival points, make reservations and cancellations, check the status of their tickets and perform relevant tasks.

Passengers have the option to book their train tickets if seats are available. To do this, they must provide the desired train number and the date they want to book the ticket. Before confirming a passenger's ticket, we check the validity of the train number and booking date. Once these details are verified, we check for seats on the train. If there are, we book the ticket with status and generate a ticket ID, which is stored along with other passenger details. Passengers also have the flexibility to cancel their booked tickets at any time by providing their ticket ID. When a cancellation occurs, that particular ticket gets deleted from our records. Also, any waiting list tickets get upgraded to confirmed status.

Tables required with description:-

- User Table;
    - This table is used for managing user accounts within the system, including passengers, and other stakeholders.
    - It stores information such as usernames, passwords, name, email, phone numbers and user roles.

Column Name	Data type	Description
user_ID	INT	Primary key.
username	VARCHAR	User's chosen username for login.
password	VARCHAR	Encrypted password for login.
first_name	VARCHAR	First name of the user.
last_name	VARCHAR	Last name of the user.
email	VARCHAR	Email address of user.
phone_num	VARCHAR	The contact number of users.
role	VARCHAR	Role or permission level of user.

- Passenger Table:
    - This table stores passenger information, including name, contact details, and a unique passenger ID.

Column Name	Data type	Description
passenger_ID	INT	Primary key.
first_name	VARCHAR	First name of the passenger.
last_name	VARCHAR	Last name of the passenger.
phone	VARCHAR	Contact number of passengers.
gender	VARCHAR	Gender of the passenger.

- Train Table:
    - This table stores details about different trains, such as train name, number, source, destination, and schedule.

Column Name	Data type	Description
train_num	INT	Primary key.
train_name	VARCHAR	Name of the train.
source_station	VARCHAR	Starting station of the train.
destination_station	VARCHAR	Final destination station of the train.
departure_time	TIME	Time of departure for the train.
arrival_time	TIME	Time of arrival at the destination station.
seats_available	INT	No.of available seats on the train.

- Station Table:
    - This table stores information about different trains such as train number, arrival time of the train, and halting time of the train.

Column Name	Data type	Description
station_ID	INT	Primary key.
station_name	VARCHAR	Name of the station.
arrival_time	TIME	Arrival time of the train at this station.
halt_time	TIME	Duration of the train's halt at this station.
train_num	INT	Foreign key, train number that serves this station.

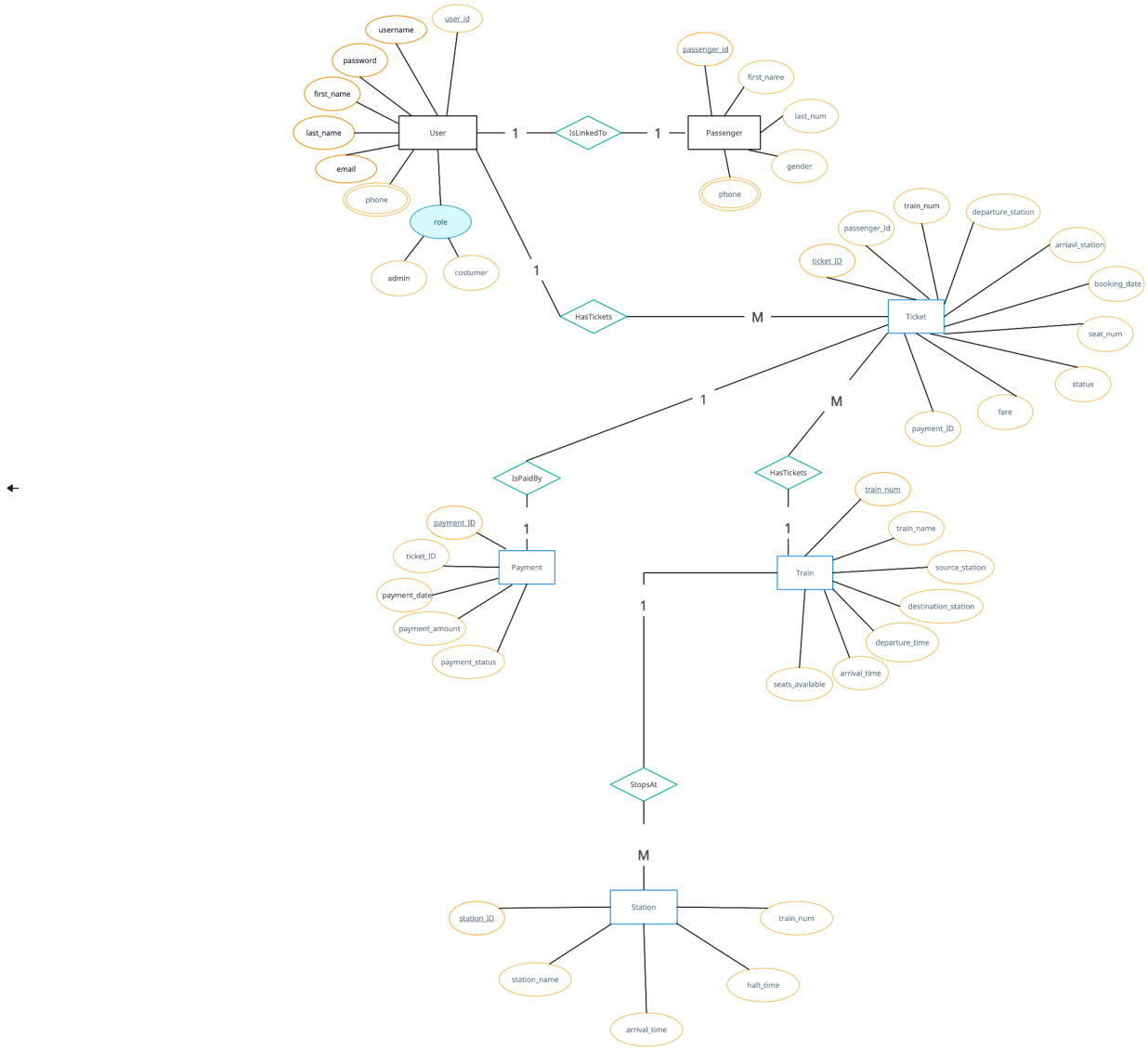
- Ticket Table:
    - This table shows information about train numbers, booked passengers, status, and no.of passengers.

Column Name	Data type	Description
ticket_ID	INT	Primary key.
passenger_ID	INT	Foreign key passengers associated with the ticket.
train_num	INT	Foreign key, train for which the ticket is booked.
departure_station	VARCHAR	Departure station for the journey.
arrival_station	VARCHAR	Arrival station for the journey.
booking_date	DATE	Date of ticket booking.
seat_num	VARCHAR	Seat number allocated for the ticket.
status	VARCHAR	Ticket status (eg., confirmed, waitlisted, cancelled).
fare	DECIMAL	Fare for the ticket.
payment_ID	INT	Foreign key, payment associated with the ticket.

- Payment Table:
    - This table stores details such as payment_ID, ticket_ID, payment date, payment status and amount.

Column Name	Data type	Description
payment_ID	INT	Primary key.
ticket_ID	INT	Foreign key, ticket associated with the payment.
payment_date	DATE	Date of payment.
payment_amount	DECIMAL←	Amount paid for the ticket.
payment_status	VARCHAR	Payment status (eg., paid, pending).

E-R Diagram:-


user_id
username
password
first_name
last_name
email
phone
role
admin
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User
1
IsLinkedTo
1
Passenger
passenger_id
first_name
last_num
gender
phone
1
HasTickets
M
Ticket
train_num
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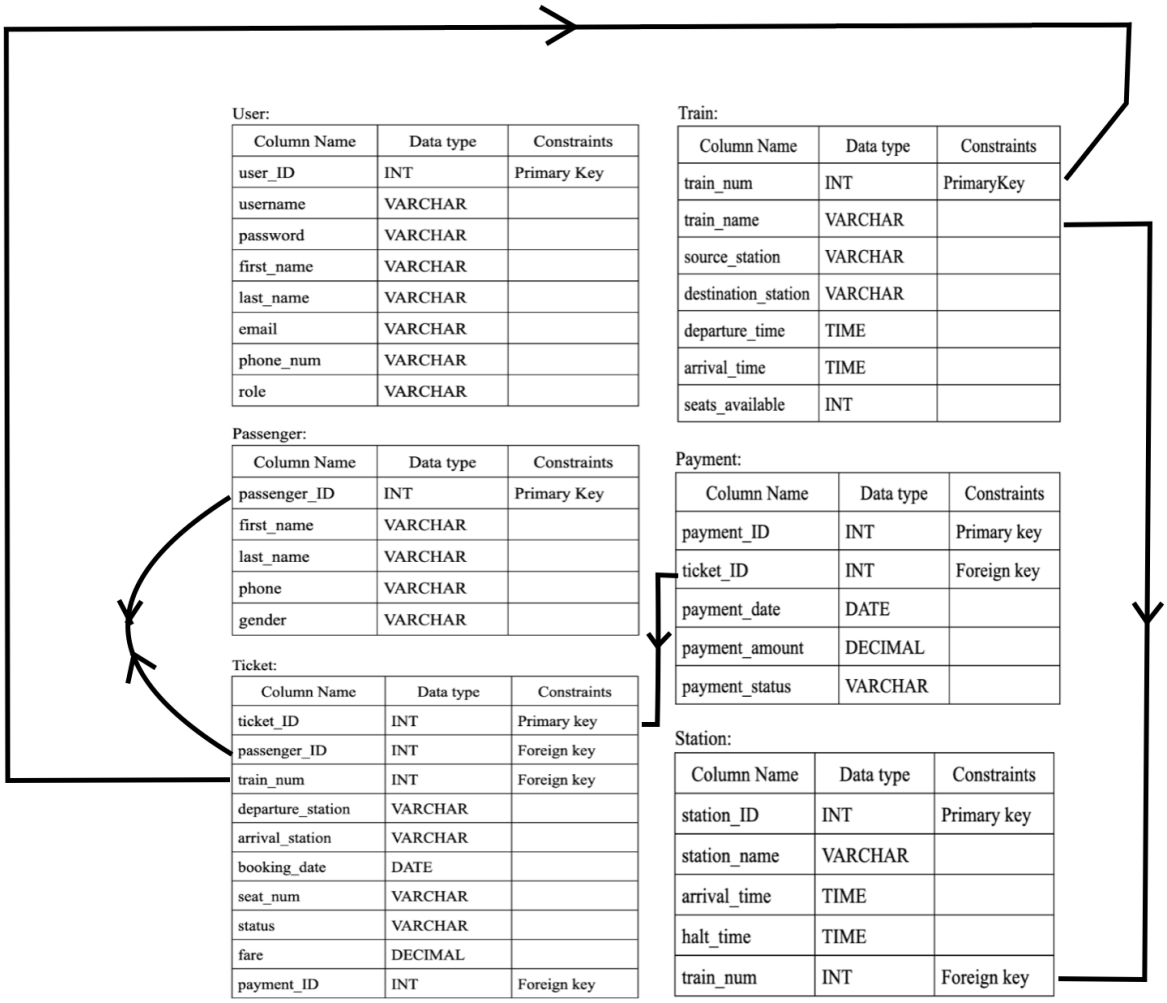
passenger_Id
arriavl_station
ticket_ID
booking_date
seat_num
status
fare
payment_ID
1
IsPaidBy
M
HasTickets
payment_ID
ticket_ID
payment_date
payment_amount
payment_status
Payment
1
Train
train_num
train_name
source_station
destination_station
departure_time
arrival_time
seats_available
1
StopsAt
M
Station
station_ID
station_name
arrival_time
halt_time
train_num

Relational schema:-



User:

Column Name	Data type	Constraints
user_ID	INT	Primary Key
username	VARCHAR	
password	VARCHAR	
first_name	VARCHAR	
last_name	VARCHAR	
email	VARCHAR	
phone_num	VARCHAR	
role	VARCHAR	

Train:

Column Name	Data type	Constraints
train_num	INT	PrimaryKey
train_name	VARCHAR	
source_station	VARCHAR	
destination_station	VARCHAR	
departure_time	TIME	
arrival_time	TIME	
seats_available	INT	

Passenger:

Column Name	Data type	Constraints
passenger_ID	INT	Primary Key
first_name	VARCHAR	
last_name	VARCHAR	
phone	VARCHAR	
gender	VARCHAR	

Payment:

Column Name	Data type	Constraints
payment_ID	INT	Primary key
ticket_ID	INT	Foreign key
payment_date	DATE	
payment_amount	DECIMAL	
payment_status	VARCHAR	

Ticket:

Column Name	Data type	Constraints
ticket_ID	INT	Primary key
passenger_ID	INT	Foreign key
train_num	INT	Foreign key
departure_station	VARCHAR	
arrival_station	VARCHAR	
booking_date	DATE	
seat_num	VARCHAR	
status	VARCHAR	
fare	DECIMAL	
payment_ID	INT	Foreign key

Station:

Column Name	Data type	Constraints
station_ID	INT	Primary key
station_name	VARCHAR	
arrival_time	TIME	
halt_time	TIME	
train_num	INT	Foreign key