UCS2404 - DATABASE MANAGEMENT SYSTEMS

ASSIGNMENT 1 – PROJECT

RAILWAY MANAGEMENT SYSTEM

TEAM MEMBERS:

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PROBLEM OBJECTIVE:

To design the database schema for an Online booking and service system.

1. The instructor introduces the general aspects of Online booking and service system with constraints involved. Further, the faculty provides pointers to several variants of this system mentioned above.

2. The Students are grouped in teams and each team is asked to formulate a variant of Online booking and service system and identify the constraints and scope of their problem.

3. This problem can be solved in two phases.

PHASE-1:

IDENTIFICATION OF CONSTRAINTS AND FUNCTIONAL DEPENDENCIES (FD) AMONG SET OF ATTRIBUTES

PHASE-2:

NORMALIZING THE RELATIONS INTO 3NF OR BCNF

*In this Documentation

The Specifications and Assumptions have been made for the Railway database system.

The needed Entities and Relationships has been identified.

The basic ER Diagram has been established.

This Railway Database Management System is a SQL plus database model enhanced with Java GUI application designed to automate the operations of managing a railway database system. It contains various aspects such as ticket booking, train scheduling, passenger information management, fare calculation and more. This system aims to provide an efficient and user-friendly platform for both railway administrators and passengers.

Key Components of the Railway Database Management System:

Ticket Booking: The system allows passengers to search for trains, check seat availability, and book tickets online. It provides a convenient way for passengers to select their preferred train, class, and seat.

Train Scheduling: The system manages the scheduling of trains, including their departure and arrival times, source and destination stations, and intermediate stops. It ensures proper coordination and optimization of train routes to minimize delays and maximize efficiency.

Passenger Information Management: The system maintains a database of passenger details, including their names, ages, genders, and contact information. It facilitates the management of passenger records, ticket cancellations, and modifications.

Fare Calculation: The system calculates the fare for different train routes based on class of travel. It ensures accurate fare calculation and provides transparent pricing information to passengers.

Train and Class Management: The system manages the information related to trains and their coaches. It keeps track of the train's capacity, coach types (e.g., sleeper, AC, general), and the number of available seats in each coach. This allows efficient allocation of seats during the booking process.

Automated Interface: The system includes a Java-based Graphical User Interface (GUI) that provides an easy-to-use platform for interacting with the database. The GUI presents a layout with organized menus, buttons, and forms, making it user-friendly for users.

ASSUMPTIONS MADE

Database System:

This developed system assumes the use of a relational database management system (RDBMS) to store and manage railway-related data.

It assumes that the database system provides data integrity, transaction management, and query processing capabilities.

The system assumes the availability of sufficient storage capacity to accommodate the expected amount of data.

Data Consistency and Concurrency:

This system assumes that the database maintains data consistency and integrity through the use of appropriate constraints and validation rules.

It assumes the implementation of concurrency control mechanisms to handle multiple users accessing and modifying data simultaneously.

Scalability and Performance:

The system assumes the need for scalability to accommodate a growing number of users, trains, and transactions over time.

It assumes the implementation of automated query processing to make the process easier.

Different Roles:

The system assumes the presence of different user roles, such as administrators, railway staff, and passengers.

The interface assumes the implementation of user authentication and access control mechanisms to ensure secure access to the system.

The system assumes that appropriate security measures are in place to protect user information and prevent unauthorized access.

ENTITIES WITH ATTRIBUTES

1. PASSSENGER
    - P_id
    - F_Name
    - L_Name
    - Gender
    - Phone
    - Age

2. TRAIN
    - Train_no
    - Name
    - Source
    - Dest
    - Seat_CC
    - Seat_SL
    - Seat_1A
    - Seat_2A
    - Seat_3A
    - Sunday
    - Monday
    - Tuesday
    - Wednesday
    - Thursday
    - Friday
    - Saturday

3. TICKET
    - T_no
    - Train_no
    - P_id
    - No_of_passengers
    - Date
    - Seat No
    - Class
    - Status
    - Price

4. AVAILABILITY
    - Train_no
    - Rem_CC
    - Rem_SL
    - Rem_1A
    - Rem_2A
    - Rem_3A

5. SCHEDULE
    - Train_no
    - Station_id
    - Station_Name
    - A_time
    - D_time

TABLE DEFINITIONS:

- The Trains table stores information about different trains, including their names, source station, destination station, departure time, and arrival time.
- The Stations table lists all the available stations.
- The Ticket Bookings table tracks the bookings made by users, including the associated user ID, train ID, booking date, seat number, and status of the booking.
- The Passengers table stores details of passengers associated with each booking, including their names, age, and gender.
- The Ticket Fare table stores the fare for different train routes between source and destination stations.
- The Schedule Table stores the details of arrival time, departure time and Station Id with its corresponding Train Number.
- The availability Table stores the details of remaining seats in each class for every available trains.

ENTITY-RELATIONSHIP DIAGRAM

Identified Relationships

1. Passenger – BOOKS – TICKET (1:N)
2. Ticket – FOR – Train (N:1)
3. Train – HAS – Availability (1:1)
4. Train – FOLLOW – Schedule (M:N)