Database Management Systems Project Report
Railway Management System
Group 23

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Introduction

We are modeling the Railway Management system as a part of this project. This consists of the various basic functionalities that should supported by the interface. This is done through the use of various pages which are explained in detail in the Pages Section.

Tools and Platform

We have used the LAMP stack to develop this booking system. We have used MySql to store the database. We have written the frontend of the booking system in php and we have used Php to run all the queries required for booking and cancellation by connecting it and MySql. We have used apache2 to display it on the web browser.

Strategies

1. Booking

In the railway system for a train going from station A to station B, we have taken the train path as a sequence of stations at which the train stops to take in passengers. We have assumed that

a person can book a train at any of these stations in its path. So for that we have allotted tickets to each station. So if a person has to go from station A to B he has to buy a ticket for each station from station A to the last station before station B in the train's path. We have assumed that a ticket for a particular train and station is for the path from the station to the next station in the train path.

If someone wants to book a ticket for some path A to B, there needs to be at least one ticket available in all the stations which lie on the path from A to B,if that is not the case then the person would be added to the waiting list.

We have taken the price of a ticket as proportional to the distance the ticket is valid for, and the constant depends on the coach which the person books. So a ticket in 2AC coach is costlier than the 3AC coach for the same distance.

2. Cancellation

To model cancellation we have created an overall waiting list for a train departing on a particular date. The waiting list number depends upon the time at which you booked the ticket for the train. Upon someone cancelling his/her ticket we increase the seats on all the stations which lie on the path. After that we traverse the overall waiting list one by one and check if someone can book a ticket now,if he/she can book the ticket and again start traversing the list. We keep on doing this until we have traversed the complete overall waiting list for that train.

3. Locking

Now, we know that booking and cancellation are a distributed phenomenon and multiple people can perform booking and cancellation at the same time. So, to ensure correctness we have used locking to ensure that the data in the booking tables remains correct.

We have assumed that a person can book only a single ticket at the same time. Each ticket is associated with a unique PNR number and a person can cancel his/her ticket using that PNR number.

Pages

Our booking system consists of the following pages :

1. **Login Page** : This page asks for username and password for the user to login in to a particular account.

2. **Registration Page** : This page is used for registering a new user and consists of username and password text boxes for the user to enter the corresponding credentials.

3. **Home Page** : This page consists of 3 buttons for the user to proceed to the Train display page, Booking page, and the General Query page.

4. **Trains display Page** : This page gives the option of selecting the source and destination, boarding date and coach type. On submitting the query, this page directs to a new page which shows all the available trains and the number of seats available for that particular coach type. Each row in the result of the above query has an option for booking that particular seat, clicking on which directs to the Booking Page.

5. **Booking Page** : This page asks for the personal information required for booking, namely the person's name, age, date of birth, gender, and insurance. There is button for book ticket, clicking on which generates a unused PNR number. The details for the booking transaction are explained in the Strategies Section.

6. **PNR status and cancellation Page** : This page has two options, one for showing the booking status for a given PNR and another is to cancel the ticket for a PNR number. Showing a PNR status consists of single query to the Bookings Table and retrieving the status. If the status is 'waiting' then another query in made to the Overall_waiting table to retrieve the waiting list number. The details for cancellation are explained in the Strategies Section.

7. **General Query Page** : This page consists of a single text input box, to which a MySQL query is fed. On submitting the response, this page redirects to another page which shows the result of that query in tabular form.

Tables

Login_attempts
This table is used to store past login attempts made by users. It contains fields user_id and time.

Members
This table contains General Informations about users like their user_id, name, email.

Stations
Stores the information about Stations. It contains fields : station_no, station_name, city, station_master and platforms where station_no is the primary key.

Coach_Detatils
Stores general information about various types of coaches like Nature_of_coach, Layout_no, whether it is AC or not and Total seats in coach for every coach Type.

Train_Info
For every train_no we maintain train_name, Source_station_no, Destination_station_no, Distance, Track type and days it runs on, in the table Train_Info.

Train_Schedule
For every Train_no, we store the no of coaches and ticket prices for each type of coach in Table Train_Schedule.

Railway_Path
Each entry in Railway_Path corresponds to the train_no, station_no, station from which it reaches this station, distance between current station and previous station, sequence number, Arrival time for the train station pair, Departure time for the train station pair and day offset.

All_Possible_Paths
It is used to maintain all possible source and destination stations.

Ticket_Availability
For each train_no, date of run, coach type and station no, we maintain tickets available for the train from this station to next station.

Booking
This table is used to maintain all the bookings that have been made. It has fields PNR_No of the booking, Username, Name, Age, Date of birth and Gender of the person who booked the ticket, whether insurance is made or not, Train no, Coach type, Source station and destination station, Boarding date and booking status of the booking.

Overall_waiting
This table models the waiting lists and which stores waiting no, coach type, train no and date corresponding to the pnr_no which currently has booking status as waiting.

Employee
This table has basic information like Employee_id, name, designation, age and gender of all the employees.

Station employee
This table maintains a relationship between employee and station and is used to store the station where each employee works.

TT
This table models the daily schedule of ticket collector, indexed by station no., date and train no. and valued by its source and destination station.

Layout Details
This table keeps information about which seat is lower berth, middle, upper and so on, with respect to each different layout of trains.

Chart

This table keeps seat allocations of each PNR.