RAILWAY RESERVATION SYSTEM

A Software Engineering Project Report

Submitted for the partial fulfilment for the Bachelor Degree in Technology (B.Tech) to the department of Xavier School of Computer Science & Engineering, XIM University Bhubaneswar.

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CERTIFICATE

Certified that the Software Engineering Project Report entitled “Railway Reservation System” submitted by Mr. Aditya Kumar, Mr. Siddharth Das & Mr. Surmeet Mohanty towards the partial fulfilment for the bachelor’s degree in technology in Computer Science & Engineering is based on the investigation carried out under our guidance. The Project Report therefore has not been submitted for the academic award of any other University or Institution.

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ABSTRACT

The Railway Reservation System facilitates the passengers to enquire about the trains available based on source and destination. Booking and Cancellation of tickets, enquire about the status of the booked ticket etc. The aim of the study is to design and develop a database maintaining the records of different trains, train status and passengers.

This project contains Introduction to the Railway reservation System. It is the computerized system of reserving the train seats in advance. It is mainly used for long routes. Online reservation has made the process for the reservation of seats very much easier than ever before.

In India, there are a number of counters for the reservation of the seats and one can easily make reservations and get tickets. Example of some SQL queries to retrieve data from Rail Management Database.

1. INTRODUCTION

The main purpose of maintaining the database for the Railway Reservation System is to reduce the manual errors involved in the booking and cancellation of tickets and make it convenient for the customers and providers to maintain the data about their customers and also about the seats available at time. Due to automation many loopholes that exist in the manuals maintenance of the records can be removed. The speed of obtaining and processing the data will be fast. For figure expansion the proposed system can be web enabled so that the clients can make various enquiries about trains between stations. Due to this, sometimes a lot of problems occur, and they are facing many disputes with customers. To solve the above problems, we design a database which includes customer details, availability of seats in the train, Number of trains and their details.

2. PROJECT DESCRIPTION

The Railway Reservation System facilitates the passengers to enquire about the trains available based on source and destination, booking and cancellations of tickets, enquire about the status of the booked tickets etc. The aim of the study is to design and develop a database maintaining the records of different trains, Train status and passengers. The record of a train includes its number, name, source, destination, and days on which it is available, whereas record of train status includes dates for which tickets can be booked, total number of seats available and number of seats already booked.

Passengers can book their tickets for the train in which seats are available. For this, passengers must provide the desired train number and the date for which tickets are to be booked. Before booking a ticket for passengers, the validity of train number and booking dates are validated, it is checked whether seats are available. If yes, the ticket is booked with confirmed status and corresponding ticket ID generated which is stored along with other details of the passenger. The ticket once booked can be cancelled at any time. For this, the passenger must provide the ticket ID. The ticket ID is searched, and the corresponding record is deleted. Hence, the first ticket with waiting status also gets confirmed.

2.1. SCOPES AND OBJECTIVE

I. All the manual work should be converted into computerized so that the load of employees should decrease.
II. The database should be stored in a computer rather than in a register.
III. Easy to store information and fast accessing information
IV. Centralized management reporting & decision support.
V. Accurate and timely control program
VI. To make it easy for fast processing and modification
VII. List of accounts of all customers is available
VIII. Easy retrieval of accounts
IX. To make the Railway System Interactive
X. Quick feedback

2.2. FEATURES

I. Searching of data is easy

II. Passengers don’t have to wait for a long time
III. Information is accurate
IV. It is a fast process
V. Data Efficiency is more

2.3. SOFTWARE REQUIREMENTS

Any window-based operating system with DOS support are primary requirements for the software development. Windows XP, Frontpage and dumps are required. The systems must be connected via LAN and connection to the internet is mandatory.

2.4. HARDWARE REQUIREMENTS

Minimum Hardware Requirements: Processor Pentium III, Hard disk drive 40GB, RAM 128MB, Cache 512 kb.

Preferred Hardware Requirements: Processor Pentium IV, Hard disk drive 80GB, RAM 256MB, Cache 512kb

2.5. PRODUCT PERSPECTIVE

The system has the following drawbacks:

- The existing system is highly manual involving a lot of paperwork and calculation and therefore may be erroneous. This has led to inconsistency and inaccuracy in the maintenance of data.
- The data, which is stored on the paper only, may be lost, stolen or destroyed due to natural calamity like fire and water.
- The system is sluggish and consumes a lot of time causing inconvenience to customers and the staff.
- Due to manual nature, it is difficult to update, delete, add, or view the data.

- Since the number of passengers have drastically increased therefore maintaining and retrieving detailed records of passengers is extremely difficult.
- A railway has many offices around the world, an absence of a link between these offices lead to lack of coordination and communication.

Hence the Railway Reservation System is proposed with the following:

- The computerization of the reservation system will reduce a lot of paperwork and hence the load on the airline administrative staff.
- The machine performs all calculations. Hence chances of error are nil.
- The passenger, reservation, cancellation list can easily be retrieved and any required addition, deletion or updating can be performed.
- The system provides for User-ID validation hence unauthorized access is prevented.

2.6. ASSUMPTIONS AND DEPENDENCIES

- The software needs a booking agent to have complete knowledge of the railway reservation system.
- Software is completely dependent on access to the internet.

3. REQUIREMENT SPECIFICATION

3.1. FUNCTIONAL REQUIREMENTS

1.Create Reservations: A passenger should be able to reserve seats in the train. A reservation form is filled by the passenger and given to the clerk, who then checks for the availability of seats for the specified date of journey. If seats are available then entries are made in the system regarding the train name, train number, date of journey, boarding station, destination, passenger name, gender, and total fare. Passengers are asked to pay the required fare and the tickets are printed. If the seats are not available, then the passenger is informed.

Input:

1) Date of journey

2) Personal details like address, name, etc. of passenger

3) No of tickets as desired by the passenger

Output:

If seats are available:

1) Total Fare

2) Tickets

If seats aren't available, then passenger is informed about the unavailability of tickets

Process:

The reservation form is filled by the passenger and given to the clerk, who then checks for availability of seats for specified date of journey

Validation:

All fields in reservation form are mandatory, phone no, address must be validated.

Security:

The clerk handling the reservation form will handle this requirement. Phone no will be validated through OTP.

2. Cancel Reservation: A passenger wishing to cancel a reservation is required to fill a form. The passenger then submits the form and the ticket to the clerk. The clerk then deletes the entries in the system and changes the reservation status of that train. The clerk crosses the ticket by hand to mark as cancelled. The seat of the person is then listed under reservation.

- **Input:** 1) Cancellation form containing personal details about passenger

  2) Ticket details

- **Output**: 1) Reservation status is changed, and ticket is marked as cancelled

  2) Ticket fare is returned to the customer

- **Process:** Passenger submits the cancellation form to the clerk who then deletes the entries in the system and changes the reservation status of the train.
- **Validation:** All fields in cancellation form are mandatory, phone no, address must be validated.
- **Security:** The clerk handling the cancellation form will handle this requirement. Phone no will be validated through OTP. The ticket to be cancelled will also be verified

3. Update Train Info: Only the administrator or manager enters any changes related to the train information like change in the train name, train number, train route etc. in the system.

- **Input:** Change in:

  Train name

  Train number

  Train route

- **Output:** The updated information is provided to the passengers
- **Process:** The admin or manager enters the required changes in the system

4. Generate Report: Provision for generation of different reports should be given in the system. The system should be able to generate reservation charts, monthly train reports etc.

- **Input:** Provisions for generation of different reports
- **Output:** 1) Reservation charts

2) Monthly train reports

- **Process:** After provision for generation of different reports is given in the system, reservation charts, monthly train reports etc. will be generated

5. View Train Schedule: Provision should be given to see information related to the train schedule for the entire train network. The user should be able to see the train name, train number, boarding and destination stations, duration of journey etc.

Input: Provision to see info related to train schedule for entire network

Output: 1) Train name

2) Train number

3) Boarding and destination stations

Duration of journey

Process: Provision should be given to see info related to train schedule and then the user should be able to see train name, train number etc.

6. Search: This allows the booking agent to search for the trains that are available between two cities, namely the "Departure City" and "Arrival City", as desired by the traveller.

- **Input:**1) Departure City

  2) Arrival City

  3) Date of Departure

  4) Time of Departure

  5)Number of Passengers

- **Output:** Trains available between the departure city and arrival city on the specified date and time.
- **Process:** This function allows the booking agent to search for the trains that are available between two cities, namely the "Departure City" and "Arrival City", as desired by the traveller
- **Validation:** The departure city, arrival city, date, and time of departure along with no of passengers and other essential details must be validated.

7) Selection: This allows a particular train to be selected from the displayed list.

- **Input:** 1) Train Number

2) Date, Time, and place of departure

3) Date, Time, and place of arrival

4) Train Duration

5)Fare per head

6)Number of stoppages

- **Output:** Train that matches the above criteria
- **Process:** This function allows a particular train to be selected from the input list.

8) Payment: It asks the agent to enter various payment details of the person making the reservation.

- **Input:** Payment details of person making reservation i.e.

1) Payment mode
2) User details (Name, Card number, CVV, UPI ID)

- **Output:** Payment receipt/slip
- **Process:** It asks the agent to enter various payment details of the person making the reservation and after necessary security steps payment receipt is generated
- **Validation:** Card number/ UPI ID of the user is validated.
- **Security:** QR code is generated for UPI users and OTP is generated for card users for secure payment.

3.1.1. PROJECT FUNCTION

Booking agents with varying levels of familiarity with computers will mostly use this system, with this in kind an important feature of this software is that it be relatively simple to use. The functions are as follows:

Search: This function allows the booking agent to search for the trains that are available between two cities, namely the “Departure City” and “Arrival City”, as desired by the traveller. The system initially prompts the agent for the departure and arrival city, the date of the departure, preferred time slot and the number of passengers. It then displays a list of trains available with different airlines between the designated cities on the specified time and date.

Selection: This function allows a particular train to be selected from the displayed list. All the details of the train are shown:

- Train Number
- Date, Time, and place of departure
- Date, Time, and place of arrival
- Train Duration
- Fare per head
- Number of stoppages

Review: If the seats are available then the software prompts for the booking of the train. The train information is shown. The total fare including taxes is shown and the train details are reviewed.

Traveller Information: It asks for the details of the passengers supposed to travel including name, address, contact number, email id and Aadhar Number.

Payment: It asks the agent to enter various payment details of the person making the reservation. For UPI users it provides a QR code to scan and pay the necessary amount, for cash users they simply must deposit the required amount and for Credit/Debit card holders they must swipe the card through a card swiping machine. While swiping the card the details are entered in the machine.

Cancellation: The system also allows the passenger to cancel an existing reservation, this function registers the information regarding a passenger who has requested a cancellation of his/her ticket. It includes entries pertaining to the Train No., Confirmation No., Name, Date of Journey, Fare deducted.

3.2.DESIGN CONSTRAINTS:

There are a few factors in the client's environment that may restrict the choices of a designer. Such factors include standards that must be followed, resource limits, operating environment, reliability and security requirements and policies that may have an impact on the design of the system. An SRS (System Requirement Analysis and Specification) should identify and specify all such constraints:

- **Standard Compliance:** This specifies the requirements for the standards the system must follow, the standards may include the report format and accounting properties.
- **Hardware Limitation:** The software may have to operate on some existing or predetermined hardware, thus imposing restrictions on the

design. Hardware limitations can include types of machines to be used, operating system available on the system, languages supported and limits on primary and secondary storage.

- **Reliability and Fault Tolerance:** Fault tolerance requirement can place a major constraint on how the system is to be designed. Fault tolerance requirements often make the system more complex and expensive. Requirements about system behaviour in the face of certain kinds of faults are specified. Recovery requirements are often an integral part here, detailing what the system should do. Some failure occurs to ensure certain properties. Reliability requirements are very important for critical applications.
- **Security:** Security requirements are particularly significant in defence systems and database systems. They place restrictions on the use of certain commands, control access to data, provide different kinds of access requirements for the management, require the use of passwords and cryptography techniques, and maintain a log of activities in the system.

3.3.NON-FUNCTIONAL REQUIREMENTS

Security: The system uses SSL (Secured Socket Layer) in all the transactions that include any confidential customer information. The system must automatically log out all customers after a period of inactivity. The system should not leave any cookies on the customers computer containing the password. The system backend servers shall only be accessible to the authenticated management.

Reliability: The reliability of the overall project depends on the reliability of the separate components. The main pillar of reliability of the system is the backup of the database which is continuously maintained and updated to reflect the most recent changes. Also, the system will be functioning inside a container. Thus, the overall stability of the system depends on the stability of the container and its underlying operating system.

Availability: The system should be available at all times i.e. the user or the booking agent can access it using a web browser, only restricted by the downtime of the server on which the system runs. In case of a hardware failure or database corruption, a replacement page will be shown, and backups of the database should be retrieved from the server and saved by the organizer. Then service will be restarted which means 24X7 availability.

Maintainability: Commercial database is used for maintaining the database and the application server takes care of the site. In case of a failure, a re-initialization of the project will be done. Also, the software design is being done with modularity in mind so that maintainability can be done efficiently.

Supportability: The code and supporting modules of the system will be well documented and easy to understand.

4. LIST OF ENTITIES AND ATTRIBUTES

ENTITIES	**ATTRIBUTES**
PASSENGER	I. Passenger_Id II. Name III. Gender IV. Age V. PNR_No VI. Seat_No VII. Booked_by VIII. Reservation_Status IX. Address X. Pincode
TRAIN	I. Train_No II. Train_Name III. Train_Id IV. Source V. Destination VI. Arrival_time VII. Departure_time VIII. Availability_of_seats IX. Seat_id X. Class i. 1st Class ii. 2nd Class iii. Sleeper Class iv. General Class

STATION	I. Name II. Station_no III. Arrival_time IV. Hault
EMPLOYEES	I. Employee_Name II. Employee_Id III. Gender IV. Phone_no V. Date_joined VI. Salary VII. Designation VIII. Duty_shift
FORM	I. Form_name II. Form_Id
TIME	I. Reference_No II. Departure_Time III. Arrival_Time
FARE	I. Train_Id II. Source III. Destination IV. Class V. Fare VI. Receipt_number
CLASS	I. Date II. No_of_Seats III. Class_Id

4.1. KEYWORD

i. PNR Status – Passenger Name Record Status

ii. EC – Air-Conditioned Executive Class
iii. 1AC – Air- Conditioned First Class
iv. 2AC – Air-Conditioned Two-Tier Class
v. 3AC – Air -Conditioned Three-Tier Class
vi. FC – First Class
vii. CC – AC Chair Class
viii. SL – Sleeper Class
ix. 2S – Second Class
x. UGC2S – Unreserved/General Class

5. LOGICAL DESIGN

5.1. EMPLOYEE

In this part we are covering how employees are working in the reservation section of the railway. Following things involved in their details:

I. Name
II. ID
III. Address
IV. Gender
V. Phone Number
VI. Date Joined
VII. Salary
VIII. Designation
IX. Duty Shift

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Name	Char (10)			Not Null
ID	Number	Pk		Primary Key
Address	Varchar (30)			Not Null
Gender	Char (10)			‘f’, ‘m’, ’F’, ’M’, ’Male’, ‘Female’
Phone_No	Number			Not Null
Date_Joined	Date (10)			Not Null
Salary	Number			Not Null
Designation	Char (10)			Not Null
Duty_Shift	Time (10)			Not Null

5.2. PASSENGER

In this part we are covering all the details related to the user required for reservation. Following things are involved against their details:

I. Passenger name
II. Passenger ID
III. Address
IV. Age
V. Gender
VI. Phone Number

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Passenger_id	Number (10)	Pk		Primary Key
Name	Char (10)			Not Null
Ticket_No	Number (50)		Ticket (Ticket_id)	Foreign Key
Gender	Text (8)			Not Null
Phone_No	Number (10)			Not Null
Employee_id	Number (10)		Employee (Employee_id)	Foreign Key
Form_id	Number (10)		Form (Form_id)	Foreign Key

5.3. TICKET

This is the part where we are covering the ticket details. It includes many attributes like ticket ID, class, fare, source station, destination station etc. Ticket can be booked online as well as onsite. Details includes are:

I. PNR Number
II. Ticket Number
III. Source & Destination
IV. Class (Seat Type)
V. Fare
VI. Train_Id
VII. Seat_Id

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Ticket_Id	Number (10)	Pk		Primary Key
PNR_No	Number			Not Null
Source	Text			Not Null
Destination	Text			Not Null
Class	Varchar (10)		Class (Class_Id)	Foreign Key
Fare	Number (10)			Not Null
Train_id	Number (8)		Train (Train_id)	Not Null
Seat_id	Number (10)			Not Null

5.4. STATION

In this part we are covering the details of the station such as Station Name, Number of trains passing or going from that station or coming to the station. Number of platforms, Number of lines. Further details include are:

I. Station Name
II. Number Of Lines
III. Station ID
IV. Number of Platforms

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTARINTS
Station_name	Text (10)			Not Null
No_of_lines	Number (10)			Not Null
Station_id	Number (10)	Pk		Primary Key
No_of_Platform	Number (10)			Not Null

5.5. TRAIN

In this part we are covering all the details related to the trains. We are covering Train No., Train Name, Number of Passengers travelling through train, classes is train, Route through which the train is going. Primary details are:

I. Train Name
II. Train Number

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Station_Id	Number (10)		Station (Station_Id)	Foreign Key
Train_Name	Text (10)			Not Null
Train_Id	Number (10)	Pk		Primary Key
Ticket_Number	Number (10)		Ticket (Ticket_Number)	Foreign Key

5.6. FORM

Forms are the most important part of the reservation. Form is the source to know the details of the customers. The Primary details are:

I. Form Name
II. Form ID

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Form_Name	Text (10)			Not Null

Form_Id	Number (10)	Pk		Primary Key
User_Id	Number (10)		User (User_Id)	Foreign Key

5.7.CLASS

In this we will be discussing different kinds of classes. They are:

I. 1st Class
II. 2nd Class
III. Sleeper Class
IV. General Class

There are a total 9 different types of seats that are available on trains. They are EC – Air-Conditioned Executive Class, 1AC – Air- Conditioned First Class, 2AC – Air-Conditioned Two-Tier Class, 3AC – Air -Conditioned Three-Tier Class, FC – First Class, CC – AC Chair Class, SL – Sleeper Class, 2S – Second Class, UGC2S – Unreserved/General Class.

The price depends upon the class the customer selects. General Class is the cheapest.

ATTRIBUTE	**DATA TYPE**	**PRIMARY KEY**	**FOREIGN KEY**	**CONSTRAINTS**
Date	Number (10)			Not Null
Train_Id	Text		Train (Train_id)	Foreign Key
No_of_seats	Text			Not Null
Class_id	Number (10)	Pk		Primary Key

5.8. FARE

Fare is the charges spent by the customer. Fare is decided according to the train selected by the customer.

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Train_Id	Number (10)			Not Null
Source	Text (10)			Not Null
Destination	Text (10)			Not Null
Class	Text (10)			Not Null
Fare	Text (10)			Not Null
Ticket_Number	Number (8)		Ticket (Ticket_Number)	Foreign Key
Receipt_Number	Number (10)	Pk		Primary Key

5.9. TIME

In this part all the details related to time are covered. Each train has a different time. It can be in the morning, evening, or night. This includes:

I. Departure Time
II. Arrival Time
III. Train Id

ATTRIBUTE	DATA TYPE	PRIMARY KEY	FOREIGN KEY	CONSTRAINTS
Reference_Number	Number (10)	Pk		Primary Key
Departure_time	Date/time (8)			Not Null
Arrival_time	Date/time (8)			Not Null
Train_Id	Number (10)		Train (Train_Id)	Foreign Key
Station_Id	Number (10)		Station (Station_Id)	Foreign Key

CONCLUSION

In the Railway Reservation System project, we have stored all information about the Trains scheduled and the passenger booking tickets and even status of trains, seats etc. This database is a helpful application which facilitates passengers to book the train tickets and check the details of trains and their status. We had considered the most important requirement only, many more features and details to be added to our project to obtain even more user-friendly applications for the employees as well as the passengers.