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DEVELOP THE WEB APPLICATION FOR PUSHING THE NOTIFICATION TO INTIMATE THE CURRENT TRAIN TICKET BOOKING

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Abstract - Passengers can quickly check the status of booked tickets, book and cancel tickets, and check the availability of trains depending on origin and destination using the railway reservation system. The case study's objective is to plan and create a database. Maintain track of the various trains, their state, and their passengers. An introduction to a rail reservation system is part of this project. There is a computerized system for pre-reserving train seats and sending notifications of canceled tickets to those who did not make a reservation. The procedure of making a seat reservation is now more convenient than before. Four hours before departure from the station, activate ticket reservations for current ticket bookings in an existing train reservation system. Passengers are unable to see available seats as a result. So, we had the idea to create a ticket purchasing app that would allow registered passengers' email addresses to receive push notifications. Those who are waiting for recent reservations will benefit from this. This project also involves designing the relational database for the railway reservation system. Below are a few examples of SQL queries that retrieve information from the train management database

***Key Words*:** Train booking, Available seats, Push notifications, SQL database, Current Booking.

1.INTRODUCTION

The process of reserving a seat or berth on a train for a particular day and time is known as railroad ticket booking. A ticket used to need to be physically purchased at a train station by the traveler. But now that there are online ticketing systems, purchasing train tickets is easier and more effective. A computerized system known as a railway reservation system is used by railroads to organize and retain passenger reservations. This system is used to manage train schedules, track train movements, and book tickets. Customers can reserve train tickets through the railway reservation system in advance, skipping the line at the station. Tickets can be purchased by customers either in person, over the phone, or online. To store and manage passenger and train data, including train schedules, seat availability, and passenger information, the system makes use of a database. The reservation system for trains is a complicated system that must be integrated with a number of other systems, such as inventory control, fare calculation, and train scheduling. The system is also in charge of handling ticket cancellations, refunds, and reschedules. This system enables current ticket booking notification. As a whole, the railway reservation system is essential to the proper management of passenger reservations and train operations throughout the whole railway network. Our project's primary goal is to make it easier for users to stay informed about their current ticket orders by sending notifications to their registered phone number or email address. Maintaining a database for a train reservation system's major purpose is to reduce manual errors that can happen when buying and canceling tickets and to make it simpler for consumers and service providers to keep track of information about their clients and the seats that are accessible to them. Automation can fill many of the gaps left by manual record upkeep. Data will be gathered and processed promptly. In the future, the suggested approach might be web-enabled to allow customers to look up different trains between stops. As a result, they occasionally encounter various problems and customer disputes.

In order to address this issue, we created a database that lists client information, train seat availability, the number of trains, and other pertinent information. Also, four hours before departure from the station, activate train reservations for current ticket bookings. As a result, passengers cannot receive notification when their current booking opens. As a result, we created a system for making reservations for trains that allows users to enable notifications and push notifications to registered passengers' email addresses or phone numbers. Those who are awaiting for recent reservations will benefit from this.

2. LITERATURE STUDY

Literature studies emphasize the importance of developing efficient, user-friendly, and intelligent web applications for railway reservation systems. The use of technologies such as the machine learning, MVC framework, big data analytics, and cloud-based platforms can significantly enhance the performance and scalability of the system. Addressing issues such as security, user experience, and real-time updates is crucial in ensuring the smooth functioning of the web application.

Singh and Gupta (2020) conducted a literature review on the development of web applications for railway reservation systems using cloud-based technologies[1]. The study highlighted the benefits of using cloud-based platforms such as

scalability, cost-effectiveness, and flexibility in developing web applications

Jain and Jindal (2020) conducted a study on developing a web application for railway reservation systems using machine learning algorithms[2]. The study focused on developing an intelligent system that could predict the availability of seats and provide personalized recommendations to users.

Patel et al. (2020) conducted a study on developing a web-based reservation system for Indian Railways using cloud-based technologies[3]. The study focused on developing a system that could handle peak loads and provide seamless service to users.

Li et al. (2019) conducted a study on developing a web-based intelligent system for railway reservation using big data analytics[4]. The study focused on developing a system that could predict user preferences and provide personalized recommendations for booking tickets.

Javangula and Raju (2019) conducted a literature review on developing web applications for railway reservation systems[5]. The study explored the various technologies and tools used in developing web applications and highlighted the importance of user-centered design to enhance user experience.

Kumar and Tiwari (2019) conducted a literature review on the challenges and solutions in developing web applications for railway reservation systems[6]. The study highlighted the importance of addressing issues such as security, scalability, and performance in the development process.

Sharma and Rathi (2018) conducted a literature review on the design and development of web applications for railway reservation systems[7]. The study highlighted the importance of addressing issues such as user experience, security, and scalability in the development process.

Khan and Mehta (2018) conducted a study on developing a web application for railway reservation systems using ASP.NET technology[8]. The study focused on developing a system that could handle online bookings, cancellations, and modifications efficiently.

Reddy and Seshagiri Rao (2018) conducted a study on developing a web-based reservation system for Indian Railways[9]. The study focused on developing an efficient and user-friendly system that could handle large volumes of data and provide real-time updates to users..

Bhatia and Wadhwa (2017) conducted a study on the design and development of a web-based railway reservation system using the MVC framework[10]. The study focused on developing an efficient system that could handle large volumes of data and provide real-time updates to users.

3. PROBLEM STATEMENT

In an existing train reservation system activate ticket reservations for current ticket booking four hours before departure from the station. Therefore, passengers cannot see available seats. So, we came up with the idea to develop a ticket booking application that can enable the registered passengers email id to push notifications. This will help passengers who are waiting for current bookings.

4. PROPOSED WORK

Four hours before departure from the station, activate ticket reservations for current ticket bookings in an existing train reservation system. Passengers are unable to see available seats as a result. So, we had the idea to create a ticket purchasing app that would allow registered passengers' email addresses to receive push notifications. Those who are waiting for recent reservations will benefit from this. This project also involves designing the relational database for the railway reservation system. Below are a few examples of SQL queries that retrieve information from the train management database

A. User Requirements

- *User-Friendly Interface:* The system should have an intuitive, user-friendly interface that is straightforward to use.
- *Booking and Cancellation:* It should be simple for passengers to book and cancel tickets. Real-time information on seat availability and fare costs should be provided by the system. Several payment methods, such as credit/debit cards, net banking, and digital wallets, should be available on the system.
- *Seat Selection:* Upon purchasing a ticket, customers should have the option to choose their seats. Passengers should be able to choose their favorite seats from an available map of seats provided by the system.
- *Refunds:* In the event that a ticket is canceled or a train is delayed, the system should offer a simple refund procedure.
- *Availability*: The system should be accessible at all times, without server or downtime interruptions.
- *Accessibility:* Users who are blind or hard of hearing should be able to utilize the system without difficulty.
- *Mobile-Friendly:* The system must have a responsive design that can adjust to various screen sizes and be user-friendly on mobile devices.
- *Security:* The system must be secure, with the necessary safeguards in place to protect users' financial and personal data.
- *Support:* The system should offer users email and phone support in the event of any problems or questions.
- The Railway Reservation System can be created to fulfill the demands of many users and offer a seamless experience for booking and managing train tickets by taking these user requirements into account.

B. System Design

The following elements ought to be part of the railway reservation system's system design:

- *Front-end Interface:* The system's user-facing front-end interface enables users to make reservations, examine train schedules, and manage their bookings.

The user interface needs to be responsive, usable on a variety of devices, and welcoming.

- *Database:* The database is the central location where all information about the Railway Reservation System is kept, including details on passengers, train timetables, available seats, and past reservations. The database needs to be safe, scalable, and able to manage a lot of data.
- *Booking Engine:* The system's central element, the booking engine manages all aspects of booking, including seat selection, fare calculation, and payment processing. The booking engine should be built to process a large number of queries and offer up-to-the-second data on seat availability and ticket costs.
- *Payment Gateway:* The system in charge of processing passenger payments is known as the payment gateway. Credit/debit cards, net banking, and digital wallets should all be integrated with the payment gateway, which should also be trustworthy and secure.
- *Admin panel:* The back-end element of the system, the admin panel, enables administrators to control the system, including adding new trains, changing schedules, and managing reservations. Only authorized users should be able to access the admin panel, which should be safe.
- *Integration with Other Systems:* It is recommended that the Railway Reservation System be integrated with other systems such as train tracking systems, passenger information systems, and payment gateways. Passengers should have a seamless and enjoyable experience as a result of the integration.
- *Security*: The system must be built with security in mind, with the necessary safeguards in place to protect users' money and personal data. These include countermeasures like access controls, firewalls, and encryption.

Ultimately, the Railway Reservation System's system architecture should be flexible, dependable, and secure, with a user-friendly interface that satisfies both administrators' and passengers' expectations.

A. Technologies Used

Depending on the particular needs of the system, many technologies may be employed in a railway reservation system. Nonetheless, a few typical technologies applied in creating such a system are as follows:

- *Relational databases:* The system's data can be stored and managed using relational databases like MySQL, PostgreSQL, and Oracle.
- *UML Diagram tool:* A visual workspace that combines diagramming, data visualization, and collaboration to speed learning and promote innovation is the UML Diagram tool from Lucidchart.
- *HTML:* HTML is a formatting language used to display content downloaded from the internet.
- *CSS:* CSS is used to format and style HTML documents.
- *Java:* Creating and running applications in Java.
- *Selenium:* Tool for automating web application testing.

By utilizing these technologies, the Railway Reservation System can be created to satisfy the system's unique requirements and offer a seamless and secure experience for users.

D. Black Box Testing

Black box testing, sometimes referred to as behavioral testing, is a type of software testing in which the tester is not aware of the internal structure, design, or implementation of the thing being tested. These tests may be functional or non-functional, however functional testing is more common.

The reason for the method's name is because the software program appears to the tester to be a black box, with no windows. The following categories are targeted by this strategy for error detection:

- Wrong or absent functionalities
- Interaction issues
- Mistakes in external database access or data structures.
- Mistakes in behavior or performance
- Errors in initialization and termination

E. White Box Testing

A software testing technique called white box testing, also referred to as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing, or Structural Testing, involves the tester being aware of the internal structure, design, and implementation of the object being tested. The tester selects inputs to test various code routes and decides on the necessary outputs. Knowledge of implementation and programming is crucial. White box testing examines a system's inner workings, going beyond the user interface.

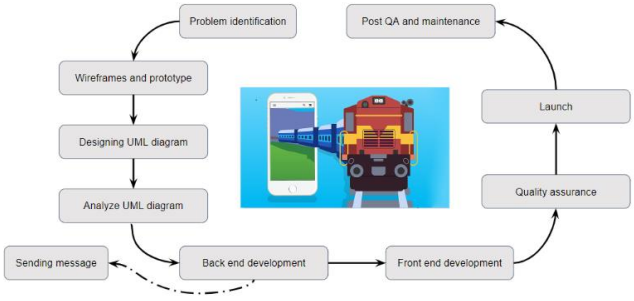

Figure 1 : Methodology

5. IMPLEMENTATION PROCEDURES OF APPLICATION

A. Designing UML diagrams

Unified Modeling Language, sometimes known as UML, is a common language for producing visual models of software systems. Software designers and developers can better

envision, comprehend, and explain the many components of a software system with the aid of UML diagrams.

There are various UML diagram kinds, each of which illustrates a different component of the system. Among the often employed UML diagrams are:

- Use Case Diagram

Use case diagram illustrates the system's functionality and the actors (users or other systems) that interact with it.

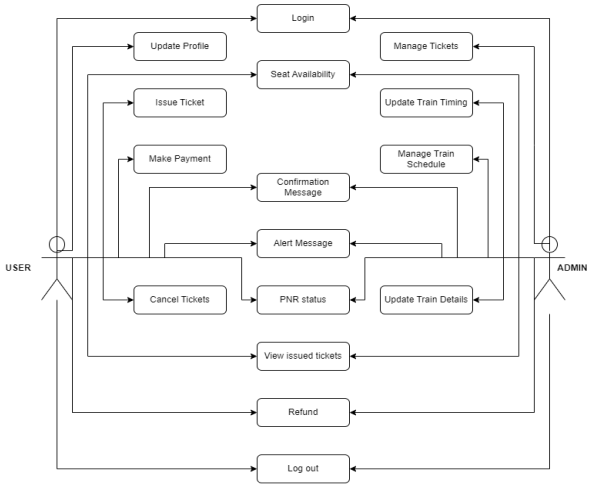

Figure-2 : Use case diagram

- Sequence Diagram

Sequence diagram shows the interactions between objects in a particular scenario.

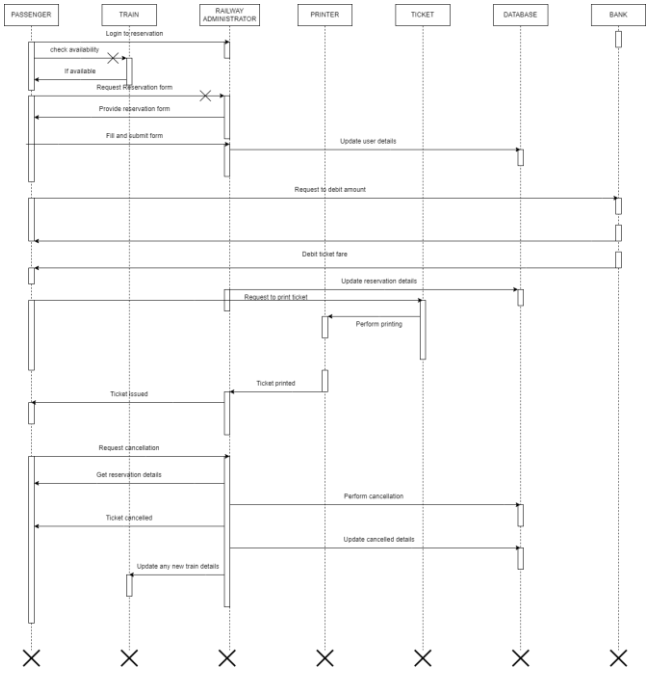

Figure-3: Sequence Diagram

- Data Flow Diagram

Data movement across a system or organization is graphically represented by a data flow diagram (DFD). It is used to simulate how a system's processes and data sources interact with users and other systems, among other external elements

- Class Diagram

Class diagram shows the classes and their relationships in the system.

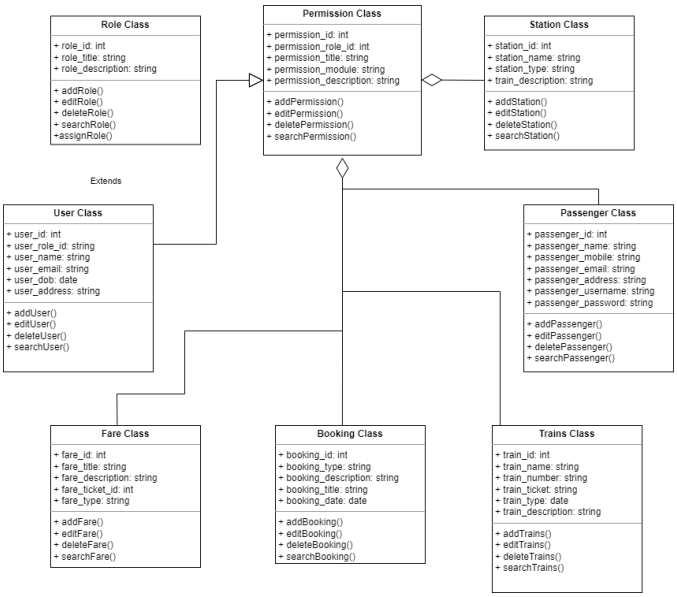

Figure-6: Class Diagram

UML diagrams can be used throughout the software development lifecycle, from the early stages of requirements gathering and analysis to the design and implementation phases. They are also useful for documentation and communication purposes, as they provide a common visual language for all stakeholders involved in the project.

B. Front end Development

Front-end development is the practice of creating the visual and interactive elements of a website or web application that users interact with directly. It involves designing and developing the user interface (UI), user experience (UX), and ensuring that the website or application is responsive, accessible, and works across different browsers and devices. Front-end developers use programming languages such as HTML, CSS and JavaScript to create the visual design and functionality of a website. An intuitive and user-friendly user interface should be used. The user should be able to rapidly discover the information they require, and it should be simple to navigate.The website or application must be responsively

designed to function on a variety of screens and devices. As a result, it must be responsive and adjust to the size of the screen being utilized.Users should be able to search for train tickets via the website or app based on their preferences, including the departure and arrival locations, dates, and times. Choosing a train and class, as well as reserving tickets online, should be possible for users on the website or mobile application.Press the Allow Enable button. Integration with a secure payment gateway is necessary for a website or application to support online payment processing. The website or application should provide a confirmation page and email the user their ticket once they have completed their booking.

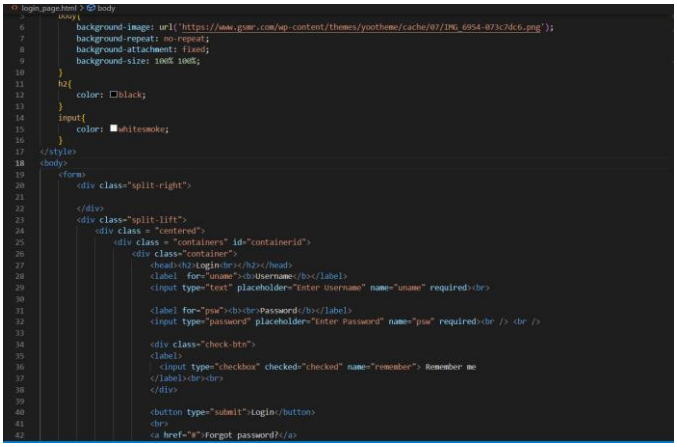

Figure-7 : HTML Code

C. *Back end Development*

The portion of web development that deals with the server-side of web applications is referred to as back-end development. It entails creating code that interacts with databases, interprets user inputs, and carries out the activities required to provide dynamic content for websites. Back-end development involves the business logic and functionality that makes web applications function, in contrast to front-end development, which focuses on the user interface and presentation of web pages. To create server-side applications, we used java, MySql and PHP.The back-end of an application for purchasing railway tickets must include a database. The database contains data on customers, available seats, and train schedules. It is in charge of maintaining and supplying data to the application.A payment gateway is a service that enables users to purchase railway tickets online. To guarantee secure and effective payment processing, the back-end of the application must integrate with the payment gateway.To ensure that only authorized users may access the application, user authentication and authorization must be included in the back-end of the application. Managing user sessions and confirming user credentials are included in this.

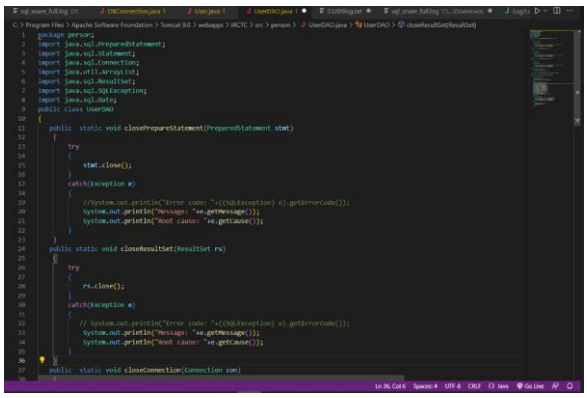

Figure-8: User Database Connection

6. RESULTS AND DISCUSSION

The online system for booking train tickets was successfully planned and created . It was thoroughly tested using a database that has data representative of what might be found in a real database. The technology was discovered to operate flawlessly in all circumstances.

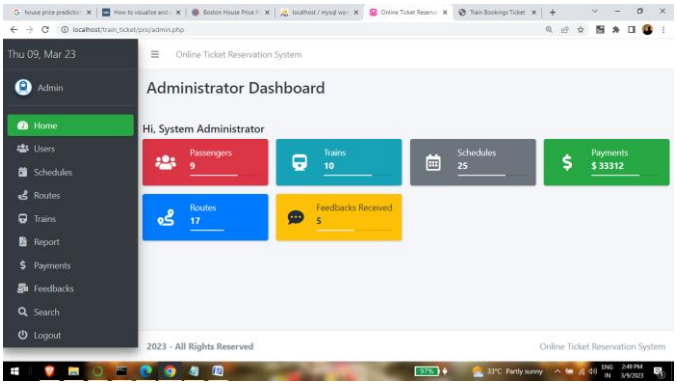

Figure-9: Admin Dashboard

Unit Testing

Unit testing is often done as part of a combined code and unit test phase of the software lifecycle, while it is not uncommon for the two stages to be carried out separately.

Test your approach and plan.

Comprehensive functional tests will be prepared, and manual field testing will be conducted.

Test Objectives:

- Each field entry must be functional.
- Pages can only be accessed by clicking the appropriate link.
- The entry screen, messages, and responses shouldn't be delayed in any way.

Testable features:

- Make sure the entries are in the right format.
- It should be forbidden to enter more than once.
- The user should be directed to the correct page by each link

Integration Testing

An integration test's objective is to validate the seamless interoperability of software programmes or components, such as those found in software systems or, at a higher level, programmes used by a whole company.

Results of the tests: The aforementioned test scenarios all resulted in positive results. There were no issues discovered.

Functional Test

Functional tests Give regular substantiation that the functionalities under test are available and meet all specialized and business conditions as well as those specified in the system attestation and stoner attendants.

Valid Input: Valid Input honored valid input classes must be accepted.

Inferior Input: Inferior Input honored orders of inferior input must be discarded.

Functions: Functions Use of the designated tasks is required.

Output: Affair Certain classes of operation labors need to be tested.

Systems/ Procedures: It's necessary to call interacting systems or processes.

With a focus on conditions, pivotal functions, or special test cases, functional tests are planned and produced. Also, methodical data field content, established practices, following processes, and business process flows must all be considered during testing. Before functional testing is complete, further tests are discovered, and the value of the bones that formerly live is estimated.

Acceptance Testing

Acceptance by users The testing phase of any project is vital and demands active participation from the end user. Additionally, it ensures that the system complies with the functional requirements.

Results of the tests: The tests for the aforementioned cases were all successful. There were no issues discovered.

User feedback

Gathering user feedback can reveal information about the user experience and point out areas that need to be improved. User opinions can be obtained by conducting surveys, user testing, or reviewing products. The website or application can be altered in response to user feedback to better suit their needs and preferences.

7. CONCLUSIONS

Through this application, to overcome this current train booking acknowledgment issue by pushing or sending a notification. It is useful for the passengers who are waiting for their current booking. Users may need to constantly check the ticket application to see if a seat is available in the absence of alert alerts, which can be tedious and time-consuming. Users run the risk of passing on seats that open up when they aren't regularly checking the application. By scheduling in advance, passengers can avoid the inconvenience of last-minute bookings and secure their seats or berths. Through the use of online booking tools and smartphone apps, purchasing train tickets has become easier and more accessible thanks to technological advancements. To prevent any inconvenience or extra costs, it is essential to remember the booking guidelines, cancellation policies, and other requirements. The system is dependable since it enables customers to reserve tickets ahead of time, allowing them to choose their chosen departure date, time, and seat. Also, it lessens the possibility of fraud and illegitimate bookings. The railway reservation system helps to conserve the environment by reducing the use of paper tickets.

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