#### SAVEETHA SCHOOL OF ENGINEERING

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**CHENNAI-602105**

**ONLINE TRAIN RESERVATION SYSTEM: A WEB-BASED SOLUTION FOR SEAMLESS TRAIN BOOKING**

#### A CAPSTONE PROJECT REPORT

*Submitted in the partial fulfillment for the completion of the course*

**CSA4317-INTERNET PROGRAMMING WITH MOBILE APP INTEGRATION**

**COMPUTER SCIENCE AND ENGINEERING**

**Submitted by**

**SK. SHADIK (192210594)**

**M.MAHENDRA REDDY (192210555)**

#### Under the Supervision of

**Ms. L. REETHA**

**NOV 2024**

## DECLARATION

We Shadik.SK, Mahendra Reddy. M are students of the Computer Science and Engineering,

Saveetha Institute of Medical and Technical Sciences, Saveetha School of Engineering, Chennai, hereby declare that the work presented in this Capstone Project Work entitled Online Train Reservation System is the outcome of our own Bonafide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics.

SHAIK.SHADIK(192210594)

M. MAHENDRA (192210555)

Date:

Place:

## CERTIFICATE

This is to certify that the project entitled **“**online train reservation system**”** submitted by

SK. Shadik, M. Mahendra has been carried out under my supervision. The project has been submitted as per the requirements in the current semester of B.E. Computer Science and Engineering.

Supervisor

Ms. L. Reetha

# Table of Contents

|  |  |  |
| --- | --- | --- |
| **S.NO** | **TOPICS** | **PAGE NO.** |
| 1 | **Abstract** | **1-2** |
| 2 | **Introduction** | **3-4** |
| 3 | **Project Description** | **4-5** |
| 4 | **Problem Description** | **5-6** |
| 5 | **Tool Description** | **7-8** |
| 6 | **Operations** | **9-10** |
| 7 | **Module Description** | **10-13** |
| 8 | **Implementation** | **13-17** |
| 9 | **Result** | **17-18** |
| 10 | **Conclusion & References** | **19-23** |

**Aim**

**Online Train Reservation System** is to provide a simple, secure platform for passengers to book and manage train tickets online. It enhances convenience for users while helping railway operators manage schedules and seats efficiently.

**Abstract Top of Form**

The **Online Train Reservation System** is a web-based platform designed to simplify and automate the process of train ticket booking, management, and cancellation. The system allows users to easily search for available trains, select seats, make secure payments, and receive instant booking confirmations. It includes features such as real-time seat availability, user profile management, and ticket management. Administrators can manage train schedules, bookings, and fare structures through an intuitive admin panel.

Built with a responsive frontend (HTML, CSS, JavaScript) and a secure backend (Python/Django, Node.js, or PHP), the system ensures a smooth user experience across devices. A relational database (MySQL or PostgreSQL) is used for storing user and booking data, while payment integrations (Stripe, PayPal) ensure safe financial transactions. Security measures such as SSL encryption and role-based access control safeguard user information. Additionally, email and SMS notifications provide real-time updates on bookings.

**Keywords**

Web-based System, Train Ticket Booking, Seat Selection, Real-time Availability, Payment Gateway Integration, User Management, Booking Confirmation, Email and SMS Notifications, E-ticketing, Payment Security.

## INTRODUCTION

Internet programming involves developing software applications that work across the internet. It combines the skills of traditional programming with the unique requirements of networked environments, allowing for the creation of interactive, distributed, and scalable web applications.

The **Online Train Reservation System** is a digital platform designed to streamline the process of booking and managing train tickets. It replaces traditional, often time-consuming methods with an efficient, web-based solution that allows passengers to search for trains, view seat availability, select seats, and complete bookings online. This system provides users with real-time updates on schedules and seat options, making the booking process easier and more accessible.

In addition to improving passenger convenience, the system offers railway operators tools to efficiently manage train schedules, fares, and passenger data. This digital approach not only enhances user experience but also reduces the manual workload for railway staff, ensuring a more organized and efficient train reservation system overall.

This system offers an intuitive user interface that allows passengers to search for available trains based on multiple parameters such as departure and destination cities, date, and time. Users can view available trains, select preferred seats, and complete the booking with secure online payment options. With the integration of real-time data, the platform ensures accurate seat availability, preventing overbooking or double bookings. Additionally, passengers receive immediate booking confirmations, along with ticket details sent via email or SMS.

For railway operators, the **Online Train Reservation System** provides a powerful administrative dashboard to manage various aspects of train travel. Operators can update train schedules, modify seat availability, and adjust pricing structures in real-time. The system also offers comprehensive data analytics and reporting tools that help operators monitor booking trends, manage capacity, and optimize operations.

## PROJECT DESCRIPTION

The **Online Train Reservation System** builds upon existing research and advancements in the domains of digital ticketing, transportation management, and e-commerce. A literature survey on this topic explores studies, technologies, and methods used to enhance booking systems in the transportation industry, particularly in railways.

1. **Digital Ticketing Systems in Transportation**

* Researchers have extensively studied digital ticketing systems as an effective way to improve user convenience and operational efficiency. According to Kumar and Gupta (2019), implementing online booking systems in transportation minimizes wait times, reduces dependency on physical counters, and provides real-time seat availability.

**2. E-Commerce and Secure Payment Systems**

* Security is a key concern in e-commerce, especially in online reservation systems where transactions involve sensitive personal and financial data. Gide and Rao (2020) discuss the importance of secure payment gateways and encryption protocols like SSL in protecting user information. They also emphasize that user trust in digital platforms is critical for the success of online booking systems.

**3. User Experience (UX) in Reservation Systems**

* Research indicates that user experience (UX) design is crucial for the success of online reservation platforms. A study by Ahmad and Singh (2021) reveals that a simple, intuitive interface improves the usability of reservation systems, allowing users to book tickets quickly and without confusion.

**4. Real-time Data and Scalability**

* The need for real-time data processing in reservation systems is a critical area of research. According to studies by Bansal et al. (2018), real-time data on seat availability, schedule changes, and booking confirmations are essential for providing users with accurate information and preventing issues such as overbooking.

## PROBLEM DESCRIPTION

The traditional train reservation system, used in many regions before the adoption of digital solutions, typically involved booking tickets through physical counters at railway stations, over the phone, or through authorized travel agents. While these methods provided necessary services, they often came with significant limitations:

1. **Manual Process**
   * In existing non-digital systems, passengers usually needed to visit physical booking counters, which led to long wait times, especially during peak travel seasons. This process was time-consuming and relied heavily on manual data entry, increasing the risk of human error.
2. **Limited Accessibility**
   * Physical counters have fixed working hours, limiting passengers’ ability to book tickets outside these hours. This inconvenience especially affects those with busy schedules or those who live far from booking locations.
3. **High Operational Costs**
   * Manual ticketing systems require substantial resources, including staff, physical infrastructure, and paperwork. This results in high operational costs for the railway department, as it needs to maintain and manage these resources continuously.
4. **Lack of Real-Time Updates**
   * Existing systems lack real-time data synchronization, which means that seat availability, train schedules, and booking statuses are often outdated or inaccurate by the time passengers receive the information.
5. **Payment and Security Limitations**
   * In traditional systems, payment is usually made in cash or through limited digital means, which is inconvenient and often poses security risks, especially for passengers who prefer cashless transactions.
6. **Data Management and Reporting Limitations**
   * Traditional systems often lack the ability to generate insightful data reports on passenger booking trends, occupancy rates, and revenue. This limits the railway operators’ ability to analyses performance and make data-driven decisions.
7. **Limited Flexibility for Users**
   * Passengers have limited flexibility to modify or cancel bookings, as most changes require visiting the counter in person. This can be highly inconvenient, particularly for travelers who need to make quick adjustments to their plans.

**TOOL DESCRIPTION**

The **Online Train Reservation System** is designed to overcome the limitations of traditional booking systems by providing a web-based platform for booking, managing, and cancelling train tickets. This digital solution automates various aspects of the ticketing process, making it more convenient, efficient, and secure for passengers and railway operators alike. Below are the key features and benefits of the proposed system:

1. **User-Friendly Online Booking Platform**
   * The proposed system allows passengers to search for trains, view real-time seat availability, select seats, and book tickets online. Users can access this platform 24/7 from any internet-enabled device, such as a computer, smartphone, or tablet.
2. **Real-Time Data and Seat Availability**
   * The system updates seat availability in real-time, ensuring users receive accurate information during booking. This eliminates double bookings and overbooking, which are common in traditional systems.
3. **Secure Online Payment Integration**
   * The system incorporates secure payment gateways (such as Stripe, PayPal, or Razor pay), allowing users to pay for their tickets online using various methods, including credit cards, debit cards, and online wallets.
4. **Automated Ticket Management and Confirmation**
   * Once a booking is completed, users receive instant booking confirmations along with ticket details via email or SMS. This reduces the need for physical tickets and minimizes paperwork.
   * Digital tickets are stored securely within user accounts, accessible anytime for quick reference or printing.
5. **Efficient Cancellations and Modifications**
   * The system provides users with the flexibility to cancel or modify their bookings directly through the platform. Any changes are updated immediately, and users are notified of refunds or additional charges, depending on the modification.
6. **Administrative Control for Railway Operators**
   * The proposed system includes an admin dashboard where railway operators can manage train schedules, seat allocation, fare adjustments, and other key operational aspects.
7. **Improved Data Management and Reporting**
   * The system stores all booking data securely in a cloud database, allowing railway operators to generate custom reports and analyse data trends. This data can be used to optimize train schedules, pricing, and resources based on passenger demand.
   * Real-time monitoring and data logging help track passenger flow, improve service, and enhance planning for maintenance and operational improvements.

## BLOCK DIAGRAM

## C:\Users\bunny\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\DCFB3D36.tmp

Fig 1: Flow Chart of Train Reservation System

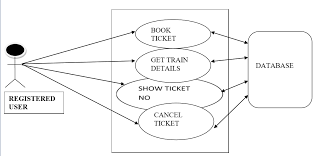


Fig 2: Block Diagram for Train Reservation System

### Module Description

* + The user interface is designed to be intuitive, making it easy for users to search, book, modify, and cancel reservations with minimal steps, even if they are not tech-savvy.
  + Real-time data is also used for updating train schedules and notifying passengers of any delays, cancellations, or changes to their travel plans, enhancing transparency and customer satisfaction.
  + SSL encryption and multi-factor authentication ensure secure transactions, reducing the risk of fraud and protecting sensitive user information.
  + This automated process saves users from having to visit physical counters and allows them to manage their bookings from anywhere.
  + Administrators can generate data-driven insights through reporting tools, helping them understand booking trends, peak travel periods, and revenue, enabling better decision-making.
  + The system stores all booking data securely in a cloud database, allowing railway operators to generate custom reports and analyse data trends. This data can be used to optimize train schedules, pricing, and resources based on passenger demand.
  + Real-time monitoring and data logging help track passenger flow, improve service, and enhance planning for maintenance and operational improvements.

## IMPLEMENTATION

The implementation of the **Online Train Reservation System** involves several stages, including system design, database setup, backend and frontend development, integration of payment gateways, and thorough testing. This phased approach ensures that all aspects of the system work cohesively to provide a seamless experience for users and administrators.

**1. System Design and Architecture**

* **Requirements Analysis**: Gather requirements from stakeholders (railway operators, users, administrators) to ensure the system meets their needs. Define the specific functionality for each feature, including user registration, train search, booking, seat selection, payment, and cancellation.
* **Architecture Design**: The system follows a three-tier architecture:
  + **Presentation Layer (Frontend)**: Handles user interactions and displays data to users.
  + **Application Layer (Backend)**: Processes user requests, manages business logic, and communicates with the database.
  + **Database Layer**: Stores all data, including user information, train schedules, bookings, and transaction details.
* **Technologies Used**:
  + **Frontend**: HTML, CSS, JavaScript with a framework like React.js or Vue.js for creating a responsive and interactive user interface.
  + **Backend**: Python with Django or Flask, Node.js, or PHP (LA ravel) to handle business logic, APIs, and server functions.
  + **Database**: MySQL or PostgreSQL for structured data storage. NoSQL databases (like MongoDB) can be used if additional flexibility is needed.
  + **Payment Gateway**: Integration of third-party payment systems like Stripe, PayPal, or Razor pay for secure online transactions.

1. **Database Setup**

* **Design Database Schema**: Design tables for users, trains, schedules, bookings, transactions, and seat availability. This schema includes relationships between these tables to maintain data consistency.
* **Data Storage**: The database stores crucial data, such as:
  + **User Data**: Personal details, contact information, and login credentials.
  + **Train Details**: Information about each train, including routes, schedules, and ticket prices.
  + **Booking and Transaction Data**: Stores booking records, transaction IDs, and payment status.
  + **Seat Availability**: Tracks seat availability in real-time to avoid double bookings.
* **Backup and Security**: Implement automated backup and encryption to protect sensitive information and ensure data recovery.

**3. Frontend Development**

* **User Interface Design**: Create a simple, intuitive interface for passengers to search trains, select seats, and book tickets. The interface includes forms for user registration, login, booking, payment, and profile management.
* **Responsive Design**: Ensure the platform works well on various devices (desktop, tablet, mobile) using responsive CSS frameworks like Bootstrap or Tailwind CSS.
* **Real-Time Updates**: Use JavaScript and frameworks like React or Vie for real-time booking updates, such as seat availability and booking status.

**4. Backend Development**

* **API Development**: Create RESTful APIs for handling data communication between the frontend and backend. APIs include endpoints for user authentication, train search, booking, cancellations, and payment processing.
* **Business Logic Implementation**: Implement the logic for managing bookings, calculating fares, handling refunds, and validating user input.
* **Real-Time Data Handling**: Implement server-side logic to handle seat availability and booking status updates in real-time.

**5. Payment Gateway Integration**

* Integrate a secure payment gateway (Stripe, PayPal, or Razor pay) to allow users to pay for tickets online. Ensure that transactions are encrypted and follow PCI DSS (Payment Card Industry Data Security Standard) guidelines.
* Implement a secure payment flow, where users are redirected to the payment page and, after payment confirmation, receive booking confirmation and an e-ticket.

**6. Admin Panel Development**

* **Admin Dashboard**: Develop a dashboard where administrators can manage train schedules, seat allocations, fares, and passenger bookings.

**7. Testing**

* **Unit Testing**: Test individual components and functions to ensure they work as expected.
* **Integration Testing**: Test interactions between different components (e.g., frontend and backend communication, database interactions).
* **System Testing**: Evaluate the complete system to ensure it meets all functional requirements and performs well under load.

**8. Deployment**

* **Server Setup**: Set up cloud hosting on AWS, Google Cloud, or Microsoft Azure for scalability and high availability.
* **Domain and SSL**: Register a domain name for the platform and secure it with SSL to encrypt data transfer and ensure user privacy.

**9. Maintenance and Updates**

* **Monitoring**: Implement monitoring tools (e.g., ELK Stack, Prometheus, Granma) to track system performance and identify issues.
* **Regular Backups**: Schedule automated backups to protect data.
* **System Updates**: Regularly update software, plugins, and security patches to keep the system secure and efficient.
* **User Feedback**: Gather user feedback to identify areas for improvement and add new features based on user needs.

**Coding:**

<?php

// homepage.php

include('config.php');

session\_start();

if (!isset($\_SESSION['user\_id'])) {

header("Location: login.php");

exit();

}

?>

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<title>Homepage - Train Reservation System</title>

<style>

/\* General styling \*/

body {

font-family: Arial, sans-serif;

background-image:

url('https://cdn.pixabay.com/photo/2022/10/09/07/25/railway-7508384\_640.jpg');

background-size: cover;

background-position: center;

background-attachment: fixed;

margin: 0;

padding: 0;

display: flex;

flex-direction: column;

align-items: center;

min-height: 100vh;

color: #333;

}

header {

width: 100%;

background-color: rgba(76, 175, 80, 0.9);

color: white;

padding: 15px;

text-align: center;

position: relative;

}

header h1 {

margin: 0;

}

.logout {

position: absolute;

top: 15px;

right: 20px;

color: white;

text-decoration: none;

font-weight: bold;

}

.logout:hover {

text-decoration: underline;

}

/\* Navigation bar styling \*/

nav {

width: 100%;

background-color: rgba(0, 0, 0, 0.7);

overflow: hidden;

text-align: center;

}

nav a {

display: inline-block;

padding: 14px 20px;

color: white;

text-decoration: none;

font-weight: bold;

}

nav a:hover {

background-color: #4CAF50;

color: white;

}

main {

width: 100%;

max-width: 800px;

padding: 20px;

background-color: rgba(255, 255, 255, 0.9);

box-shadow: 0 4px 8px rgba(0, 0, 0, 0.2);

border-radius: 8px;

margin-top: 20px;

text-align: center;

}

h2 {

color: #4CAF50;

}

table {

width: 100%;

border-collapse: collapse;

margin-top: 20px;

box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);

}

table, th, td {

border: 1px solid #ddd;

}

th, td {

padding: 12px;

text-align: left;

}

th {

background-color: #4CAF50;

color: white;

}

tr:nth-child(even) {

background-color: #f2f2f2;

}

tr:hover {

background-color: #eaf6e3;

}

.book-btn {

color: #4CAF50;

text-decoration: none;

font-weight: bold;

}

.book-btn:hover {

text-decoration: underline;

}

.no-trains {

padding: 20px;

font-size: 18px;

color: #777;

}

</style>

</head>

<body>

<header>

<h1>Welcome to the Train Reservation System</h1>

<a href="logout.php" class="logout">Logout</a>

</header>

<nav>

<a href="search\_trains.php">Search Trains</a>

<a href="view\_trains.php">View Trains</a>

<a href="book\_trains.php">Book Trains</a>

<a href=" payment\_gateway.php"> payment gateway</a>

<a href="booking\_history.php">Booking History</a>

<a href="passenger\_details.php">Passenger Details</a>

</nav>

<main>

<h2>Available Trains</h2>

<table>

<tr>

<th>Train Name</th>

<th>Departure</th>

<th>Arrival</th>

<th>Price</th>

<th>Action</th>

</tr>

<?php

$sql = "SELECT \* FROM trains";

$result = $conn->query($sql);

if ($result->num\_rows > 0) {

while($row = $result->fetch\_assoc()) {

echo "<tr>

<td>{$row['train\_name']}</td>

<td>{$row['departure\_location']}</td>

<td>{$row['arrival\_location']}</td>

<td>\${$row['price']}</td>

<td><a class='book-btn' href='passenger\_details.php?train\_id={$row['train\_id']}'>Book</a></td>

</tr>";

}

} else {

echo "<tr><td colspan='5' class='no-trains'>No trains available</td></tr>";

}

?>

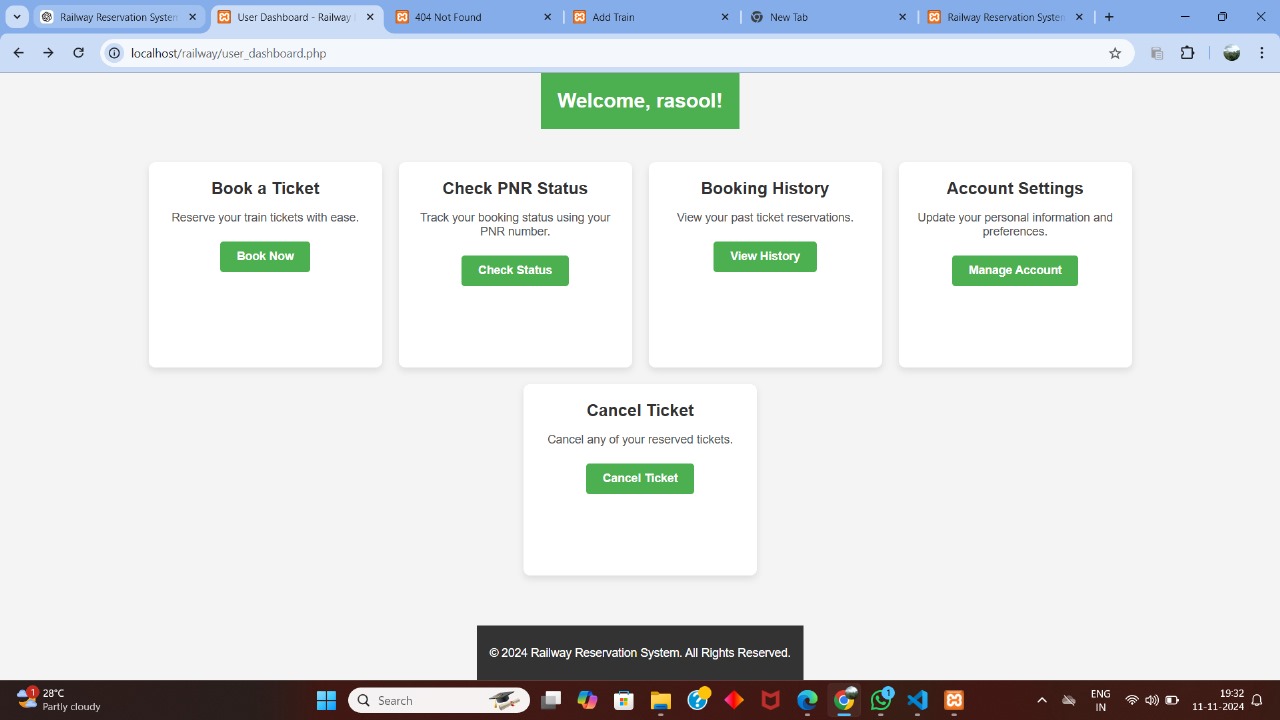
</table>

</main>

</body>

</html>

**Output:**



## RESULT

## 

## Fig 1: Home page

## C:\Users\bunny\AppData\Local\Packages\5319275A.WhatsAppDesktop_cv1g1gvanyjgm\TempState\AC796A52DB3F16BBDB6557D3D89D1C5A\WhatsApp Image 2024-11-11 at 19.32.48_fb057d69.jpg

## Fig 2: User Page

## CONCLUSION

The "Online Train Reservation System" represents a significant advancement in the way user’s book train tickets, offering a seamless and efficient web-based platform for managing train reservations. By centralizing train schedules, seat availability, booking options, and payment processing, this system enhances the overall user experience, enabling quick, reliable, and convenient access to essential train services. Through secure login, real-time data, and a user-friendly interface, it addresses the limitations of traditional booking methods, significantly reducing the time and effort required for travelers. This solution not only modernizes the booking process but also brings accessibility to a wider audience, fostering greater ease in planning and managing travel itineraries

References

1. [**https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA**](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA)
2. [**https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA**](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA)
3. [**https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA**](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA)
4. [**https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA**](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA)
5. [**https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA**](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.indianrail.gov.in%2F&psig=AOvVaw2mxzbmxpATQxQ09Lct6mQt&ust=1731421558306000&source=images&cd=vfe&opi=89978449&ved=0CAYQrpoMahcKEwjwqvSGvtSJAxUAAAAAHQAAAAAQBA)