

AIRLINE RESERVATION SYSTEM

**A PROJECT REPORT
for
Mini Project-I (K24MCA18P)
Session (2024-25)**

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Requirements for the Degree of**

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**Under the Supervision of
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Submitted to

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CERTIFICATE

Certified that **Gulshan Kumari 202410116100078, Mukul Dhiman 202410116100126, Himanshi Sharma 202410116100091** has/ have carried out the project work having “**Airline Reservation System**” (**Mini Project-I, K24MCA18P**) for **Master of Computer Application** from Dr. A.P.J. Abdul Kalam Technical University (AKTU) (formerly UPTU), Lucknow under my supervision. The project report embodies original work, and studies are carried out by the student himself/herself and the contents of the project report do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

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DECLARATION

We hereby declare that the work presented in this report entitled “ **AIRLINE RESERVATION SYSTEM**”, was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. We have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. We have used quotation marks to identify verbatim sentences and given credit to the original authors/sources. We affirm that no portion of my work is plagiarized, and the experiments and results reported in the report are not manipulated. In the event of a complaint of plagiarism and the manipulation of the experiments and results, We shall be fully responsible and answerable.

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AIRLINE RESERVATION SYSTEM

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ABSTRACT

An Airline Reservation System is a comprehensive software platform designed to automate and streamline the process of flight booking, ticketing, and passenger management for both airline staff and customers. The system provides an integrated environment where users can search for flights, make reservations, select seats, process payments, and receive confirmation in real time. The system offers a user-friendly interface that allows customers to search for flights based on various parameters, such as destination, travel dates, and class of service. Once a flight is selected, passengers can view seat availability, choose seats, and complete the booking by making secure online payments through integrated payment gateways.

For airline staff, the system provides powerful administrative tools to manage flight schedules, allocate seats, update flight statuses, and handle customer queries. Real-time seat inventory management ensures that seat availability is always up-to-date, and the system minimizes overbooking by tracking reservations dynamically. Additionally, the ARS integrates with external systems, such as global distribution systems (GDS), payment processors, and customer relationship management (CRM) tools, to offer a seamless and efficient workflow.

In conclusion, the Airline Reservation System serves as a vital tool for airlines to manage their flight operations while offering an enhanced, user-friendly booking experience for customers. It enables airlines to operate more efficiently, boost customer satisfaction, and generate higher revenue through improved resource management and seamless integration with other systems.

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Gulshan Kumari

Mukul Dhiman

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INTRODUCTION

An **Airline Reservation System (ARS)** is a software platform that helps airlines and customers manage flight bookings. It is an essential tool for automating the process of booking tickets, managing flight schedules, processing payments, and keeping track of passenger information. ARS simplifies tasks for both airline staff and passengers, making air travel more efficient and convenient.

1.1. Overview of Airline Reservation System:

Air travel is a vital part of modern transportation, connecting people and businesses across the globe. Managing the complex processes of flight booking, ticketing, and passenger management requires a robust and efficient system. The Airline Reservation System (ARS) is a comprehensive software platform that simplifies these operations by automating and streamlining key tasks.

1.2. Purpose of the System:

The ARS is designed to cater to both customers and airline staff. For customers, it provides a user-friendly interface to search for flights, check seat availability, and book tickets securely. For airline staff, it offers administrative tools to manage flight schedules, allocate seats, and handle customer queries, ensuring smooth operations and enhanced service delivery.

1.3. Key Features and Functionalities

The ARS includes essential features like:

- **Flight Search and Booking:** Customers can search for flights by destination, travel dates, and class of service.
- **Real-Time Inventory Management:** Ensures up-to-date seat availability to prevent overbooking.
- **Automated Ticket Generation:** Simplifies ticketing for both customers and staff.

- **Online Check-In:** Provides passengers with the convenience of checking in online.
- **Real-Time Notifications:** Updates passengers about flight status changes, cancellations, or delays.

1.4. Integration with External Systems:

To ensure seamless workflows, the ARS integrates with external systems like global distribution systems (GDS), payment processors, and customer relationship management (CRM) tools. This integration allows data to flow smoothly across various departments and systems, enhancing efficiency and accuracy.

1.5. Benefits of the Airline Reservation System

- **For Airlines:**
 - Reduces manual workload by automating repetitive tasks.
 - Minimizes human errors and enhances operational efficiency.
 - Provides insights into revenue, performance, and resource utilization through analytics.
- **For Customers:**
 - Offers a convenient, fast, and secure booking experience.
 - Ensures access to real-time flight information and personalized services.

LITERATURE REVIEW

An **Airline Reservation System (ARS)** is a software application used by airlines to manage bookings, reservations, seat allocations, payments, and customer information. This system is critical to the efficient operation of airlines and enhances the passenger experience by providing a seamless process for flight booking. This literature review presents key insights from previous studies and sources related to the development, technologies, and challenges of creating an ARS, particularly for a mini project or simplified version of the system.

2.1. Basics of Airline Reservation Systems

An **Airline Reservation System** allows customers to search for flights, make bookings, select seats, and receive e-tickets. Airlines use the system to manage flight schedules, seat availability, booking histories, and payment transactions.

2.2. Technologies Used in ARS

Modern **Airline Reservation Systems** are powered by various technologies, including web development frameworks, databases, and cloud services. For a mini project, it's important to consider which technologies are best suited to implement a basic version of ARS:

- **Frontend Technologies:** To create a user interface where customers can search flights and make bookings, front-end technologies like **HTML**, **CSS**, and **JavaScript** are commonly used.
- **Backend Technologies:** Java is used for the server-side or backend development of the Airline Reservation System. It processes client requests, handles business logic, communicates with the database, and returns the results to the front-end. Java's platform independence, scalability, and security features make it ideal for backend systems.

2.3. Key Functionalities in ARS Project

An **Airline Reservation System** would typically include the following key features:

1. **Flight Search:** Users should be able to search for flights based on parameters such as origin, destination, travel dates, and class. A basic algorithm can be implemented to match available flights from a database based on these criteria.
2. **Booking and Seat Selection:** After selecting a flight, the system should allow users to choose available seats from a seating chart.
3. **Booking Confirmation:** Once a user books a flight, an **e-ticket** can be generated and sent to the user. This feature could be as simple as generating a booking reference number and confirmation email.
4. **Admin Interface:** The admin panel should allow the airline staff to view and manage flight schedules, check the current reservations, and possibly modify seat availability or pricing. This functionality can be implemented through a basic login and dashboard interface.

2.4. Challenges in Developing ARS

Developing an **Airline Reservation System (ARS)** involves several challenges, particularly due to its complex functionalities and the need for real-time operations. Below are the key challenges faced during development:

Database Management:

- Managing large datasets like flight schedules, bookings, and customer information.
- Ensuring data consistency and handling concurrency when multiple users book flights simultaneously.

Real-Time Seat Availability:

- Updating seat availability in real-time to avoid overbooking.
- Handling concurrency when multiple users try to book the same seat.

User Authentication and Authorization:

- Secure login and access management for customers and admins.
- Implementing role-based access to ensure appropriate permissions.

Scalability and Performance:

- Handling high traffic, especially during peak booking periods.
- Optimizing the system for fast response times and smooth performance.

User Interface & Experience (UI/UX):

- Designing a simple, intuitive, and responsive interface for a seamless user experience.
- Ensuring compatibility across different devices and browsers.

External System Integration:

- Integrating with third-party APIs like Global Distribution Systems (GDS) for real-time flight data.
- Managing consistent and up-to-date information from external sources.

Regulatory Compliance:

- Ensuring the system complies with data privacy laws (e.g., GDPR) and financial regulations.
- Handling refunds, cancellations, and other legal requirements.

2.5. Future Directions and Enhancements

In future developments of an ARS, several advanced features could be integrated:

- **Machine Learning for Dynamic Pricing:** ML algorithms can adjust prices based on demand, availability, and time to departure.
- **Real-time Seat Management:** Advanced ARS platforms allow for real-time seat updates, which could be incorporated into more sophisticated systems using cloud databases and real-time data synchronization .
- **Mobile Integration:** Future projects could integrate ARS with mobile platforms, allowing passengers to check flight statuses, make bookings, or select seats directly from smartphones.

PROJECT OBJECTIVE

The primary objective of this project is to develop an efficient and user-friendly Airline Reservation System (ARS) that automates critical airline operations while enhancing the overall passenger experience. The system will streamline key processes such as flight booking, ticketing, and passenger management, offering advanced features to improve operational efficiency and user satisfaction. Specific goals include:

3.1. Implementing Secure Login/Signup

The system will provide a secure and seamless login/signup process using robust authentication mechanisms. Passengers can create personalized accounts, log in securely, and reset passwords when needed. Security features such as encryption, password hashing, and session management will ensure the protection of user data.

3.2. Real-Time Flight Search and Seat Selection

Passengers will be able to search for flights based on criteria such as destination, travel dates, and class of service. Real-time seat inventory will allow users to view and select available seats, ensuring a transparent and efficient booking process.

3.3. Providing Flight Schedules and Airline Information

The system will include detailed flight schedules and airline information, allowing passengers to make informed decisions. Flight details, including timings, layovers, and services offered, will be accessible to enhance user convenience.

3.4. Enhancing Passenger Engagement with Travel Blogs and Tips

To improve user engagement, the system will feature a section for travel blogs and tips. Passengers can access information on destinations, travel tips, and airline services, enriching their travel experience.

HARDWARE AND SOFTWARE REQUIREMENT

The **hardware** and **software** requirements for an Airline Reservation System (ARS) depend on factors like the system's scale, number of users, and the technologies used. Below are the general requirements:

4.1. Hardware Requirements

1. Server (For Backend & Database):

- **Processor:** Multi-core processor (Intel Xeon or AMD equivalent) to handle multiple requests and transactions simultaneously.
- **RAM:** Minimum 8GB RAM (for basic systems); 16GB or more for large-scale systems to handle high traffic and concurrency.
- **Storage:** SSD storage for fast read/write operations. Minimum 500GB storage, depending on the number of records and user data.

2. Client Machines:

- **Desktops/Laptops/Workstations:** To access the ARS for admin tasks like flight management, user management, and reporting.
- **Mobile Devices (Optional):** For customer access to the system via mobile apps.

3. Backup Servers:

- **Backup System:** Separate servers for data backup to prevent data loss in case of system failure. Regular backups are essential for security and recovery.

4. Firewall and Security Hardware:

- **Firewall/Proxy:** To protect the system from unauthorized access and cyber threats.
- **Load Balancers:** For distributing the incoming traffic efficiently across multiple servers to maintain system performance during peak loads.

4.2. Software Requirements

1. Operating System:

- **Windows live Server** for the backend server to run web applications and databases.

2. Database Management System (DBMS):

- **MySQL or Oracle Database** for relational database management to store flight, customer, and booking data.

3. **Backend Technologies:**

- **Java** (for server-side development) .

4. **Frontend Technologies:**

- **HTML5, CSS3, JavaScript** for designing the website interface.

5. **Security and Authentication Software:**

- **Firewall** software for data protection.

6. **Version Control System:**

- **Git** with platforms like **GitHub** for source code management and collaboration.

DATA FLOW DIAGRAM

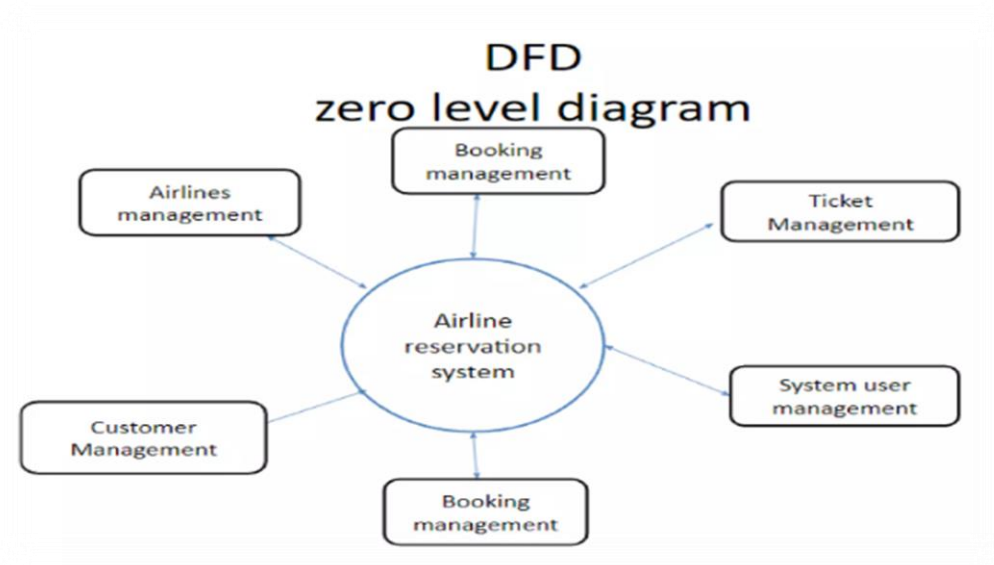


FIGURE: 5.1

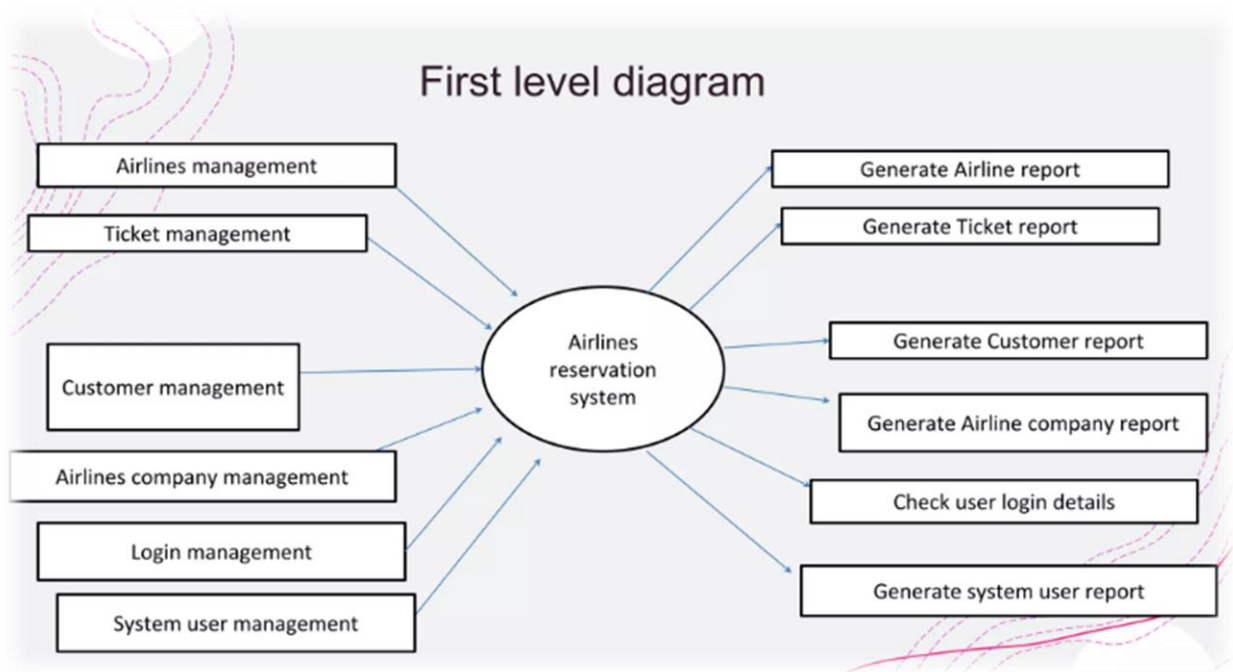


FIGURE: 5.2

PROJECT FLOW

Requirement Analysis

This step focuses on understanding the functional and non-functional requirements of the system. It includes the following:

- **Functional:** Search flights, book tickets, payment integration, booking management (cancellations, reschedules).
- **Non-Functional:** Security, scalability, and performance.
- **Database:** Design tables (e.g., flights, bookings).
- **Architecture:** Client-server model with a web interface and backend APIs.
- **UI:** User-friendly design with flight search and booking functionalities.

Implementation:

- Develop the frontend (HTML, CSS, JavaScript).
- Backend logic (Java).

Testing & Validation:

- **Functional:** Test booking, payment, and cancellation.
- **Security:** Test for vulnerabilities.
- **Performance:** Test system scalability and responsiveness.

Deployment:

Launch on a production server, ensuring all components are connected and working live.

Maintenance:

Monitor, fix bugs, and add enhancements based on user feedback.

ER DIAGRAM

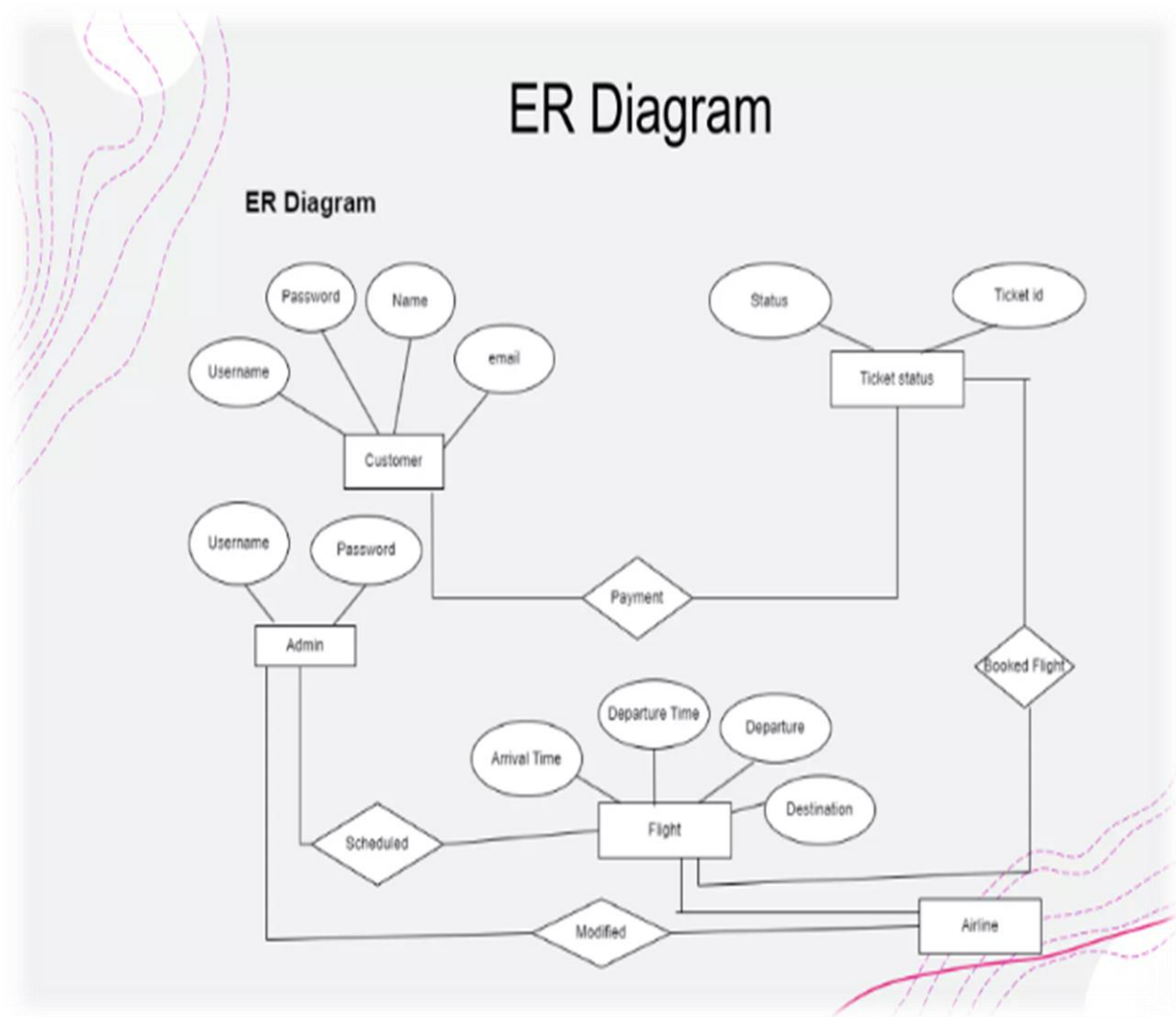


FIGURE: 5.3

USE CASE DIAGRAM

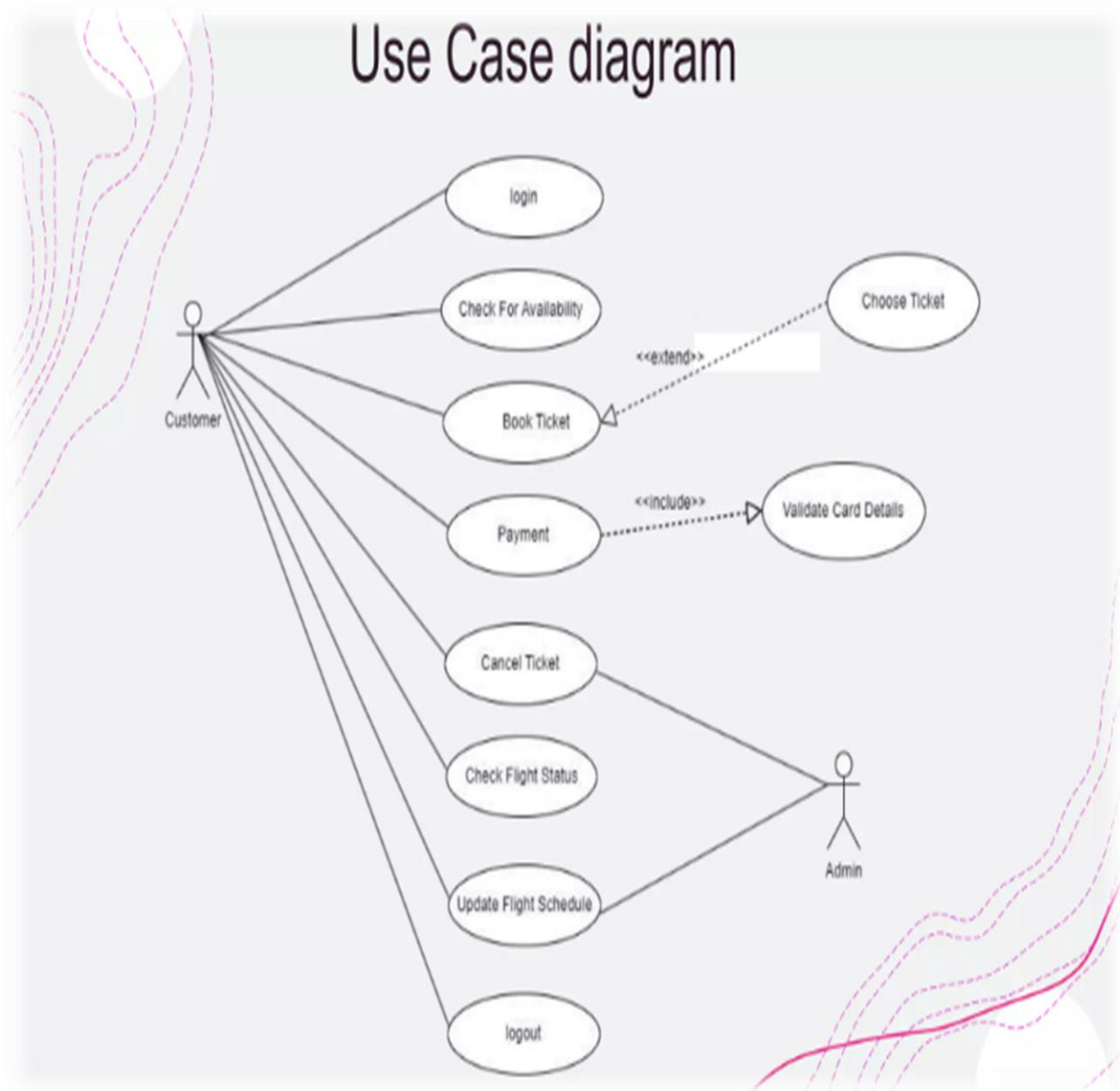


FIGURE: 5.4

PROJECT OUTCOMES

6.1.User Interface:

Users can easily navigate the system, quickly search for flights, and complete bookings without confusion, enhancing overall user satisfaction.

6.2. Admin Panel:

Administrators can efficiently manage flight schedules and bookings, reducing manual errors and improving operational workflows through real-time insights.

6.3. Efficient Database:

Data storage and retrieval are fast and reliable, minimizing downtime and ensuring that critical information is always available when needed..

6.4. Responsive Design:

Users enjoy a consistent and functional experience across devices, increasing accessibility and user engagement.

6.5. System Optimization:

Faster load times and a streamlined process result in higher user retention and a smooth, secure platform for both customers and administrators.

ADMIN LOGIN PAGE :

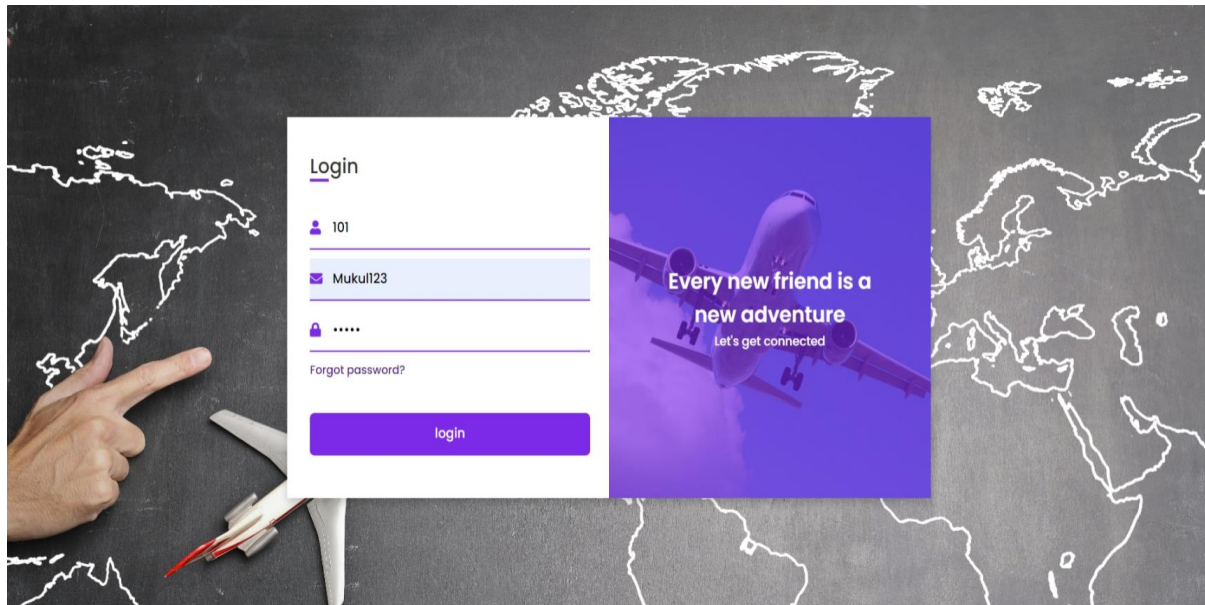


FIGURE : 6.1

AFTER ADMIN LOGIN PAGE :

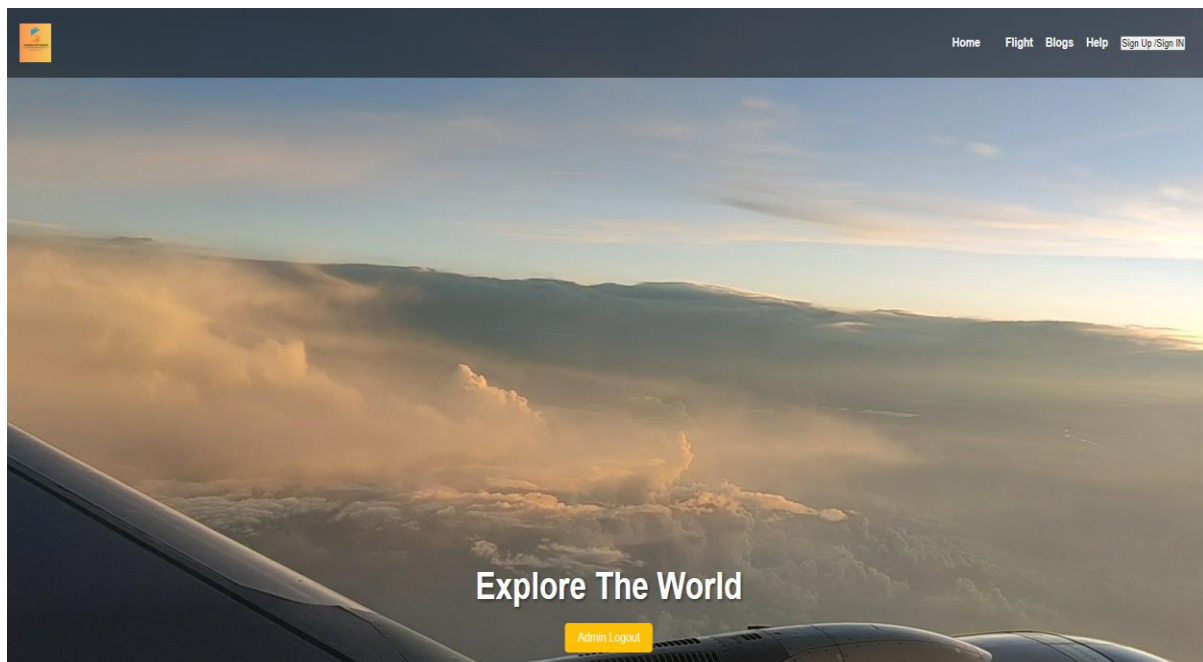


FIGURE : 6.2

CUSTOMER SIGN UP PAGE:

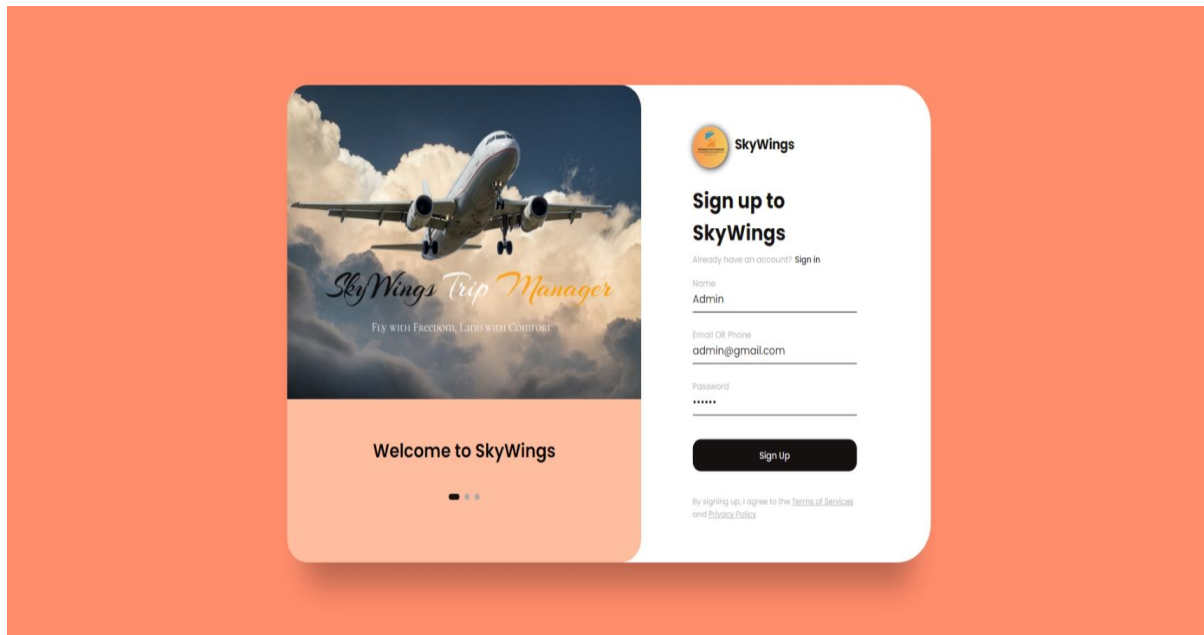


FIGURE : 6.3

CUSTOMER SIGN IN PAGE :

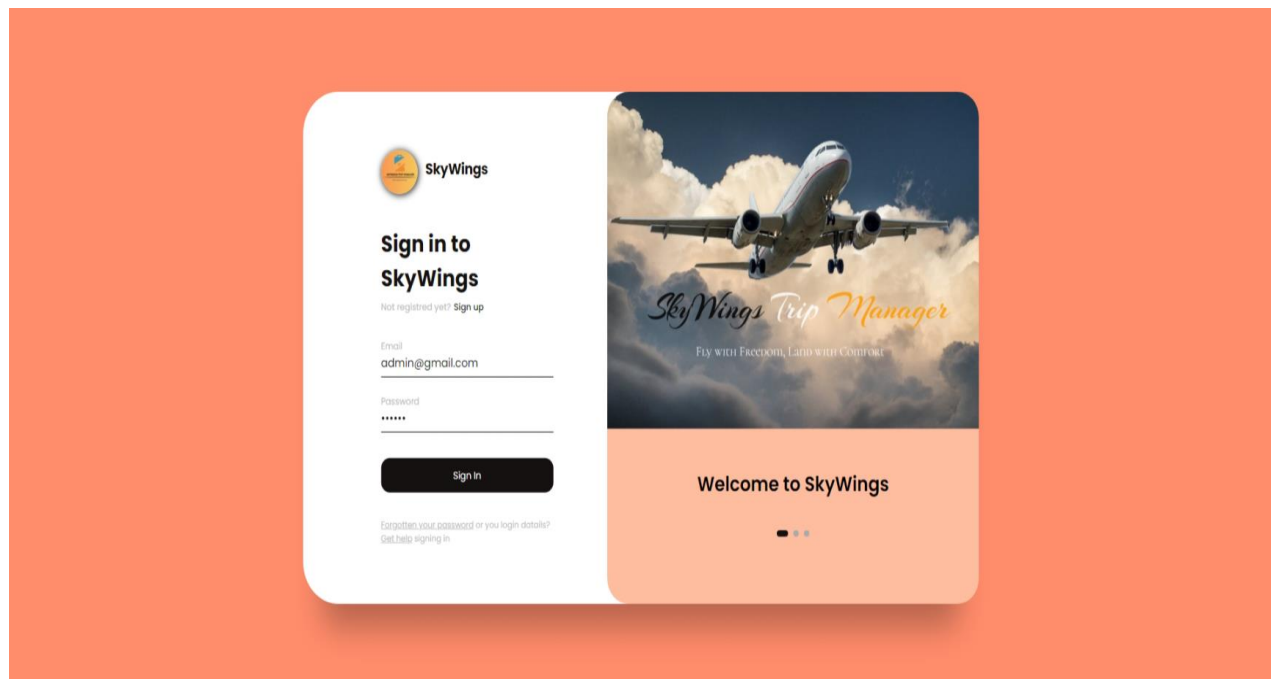


FIGURE : 6.4

HOME (MAIN) PAGE

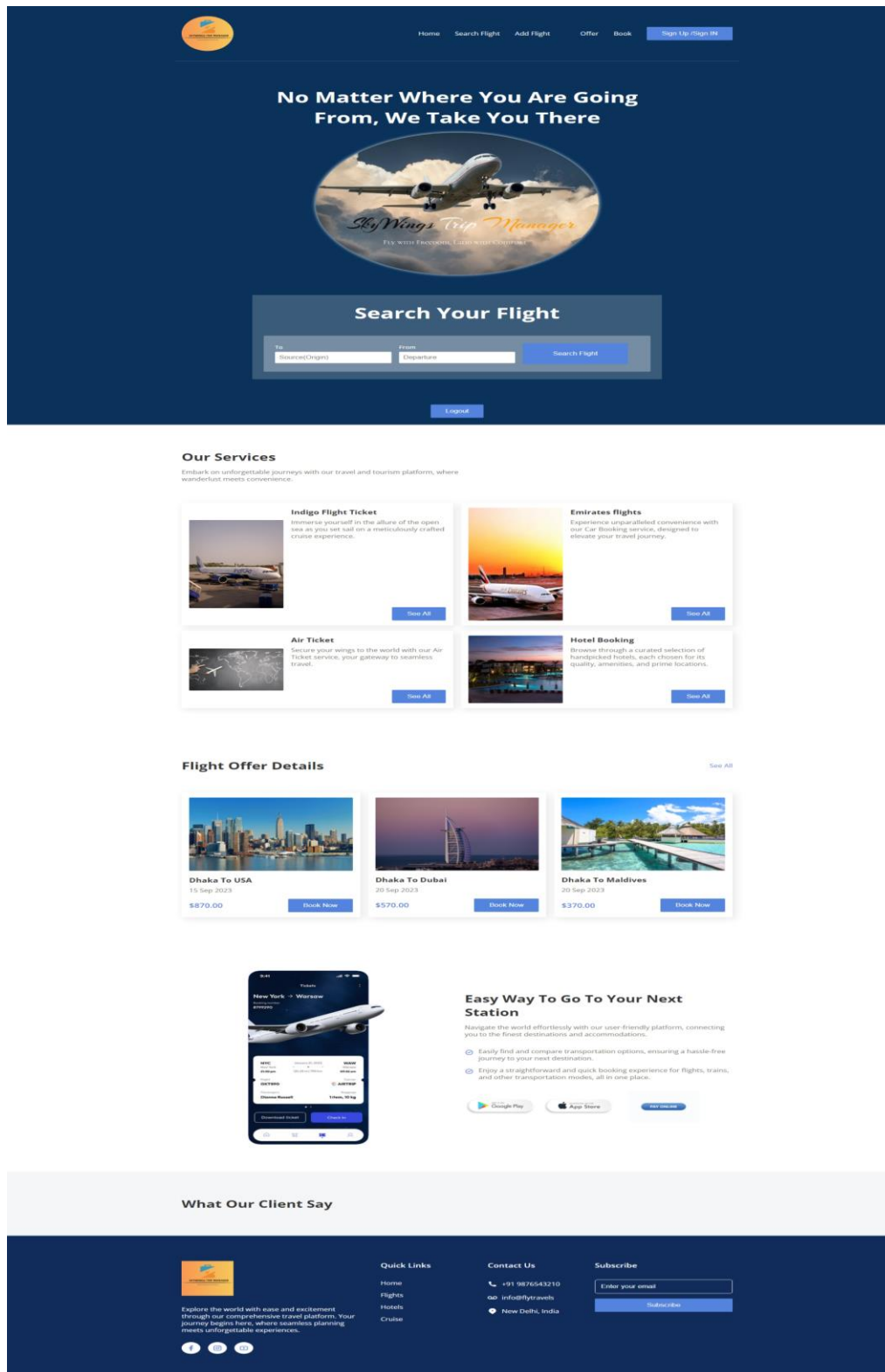
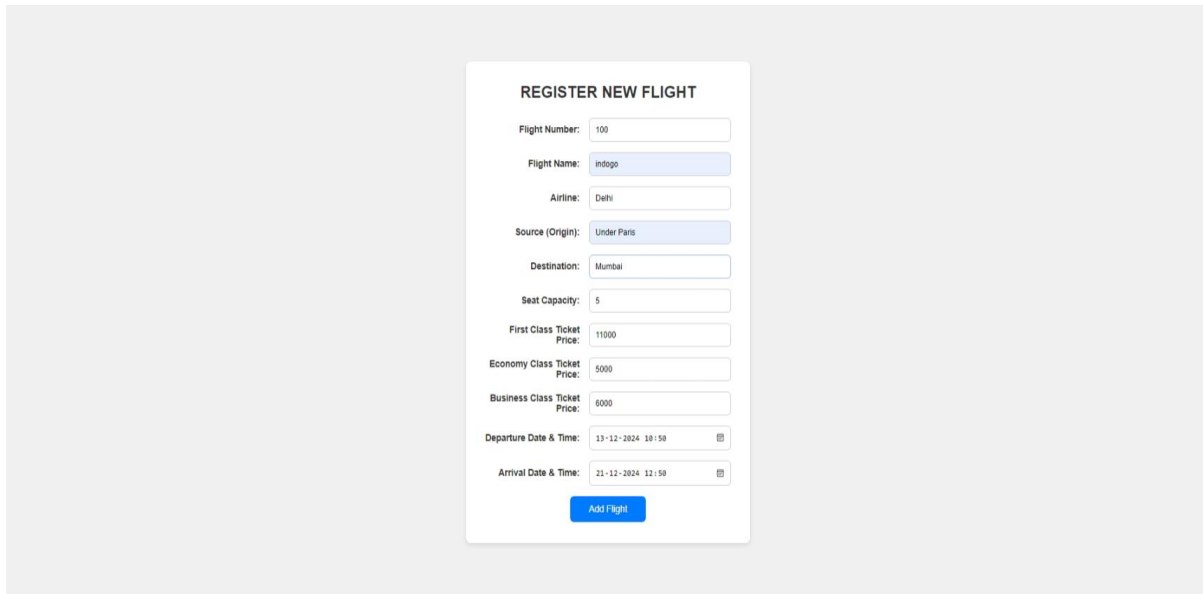


FIGURE : 6.5

REGISTER NEW FLIGHT :



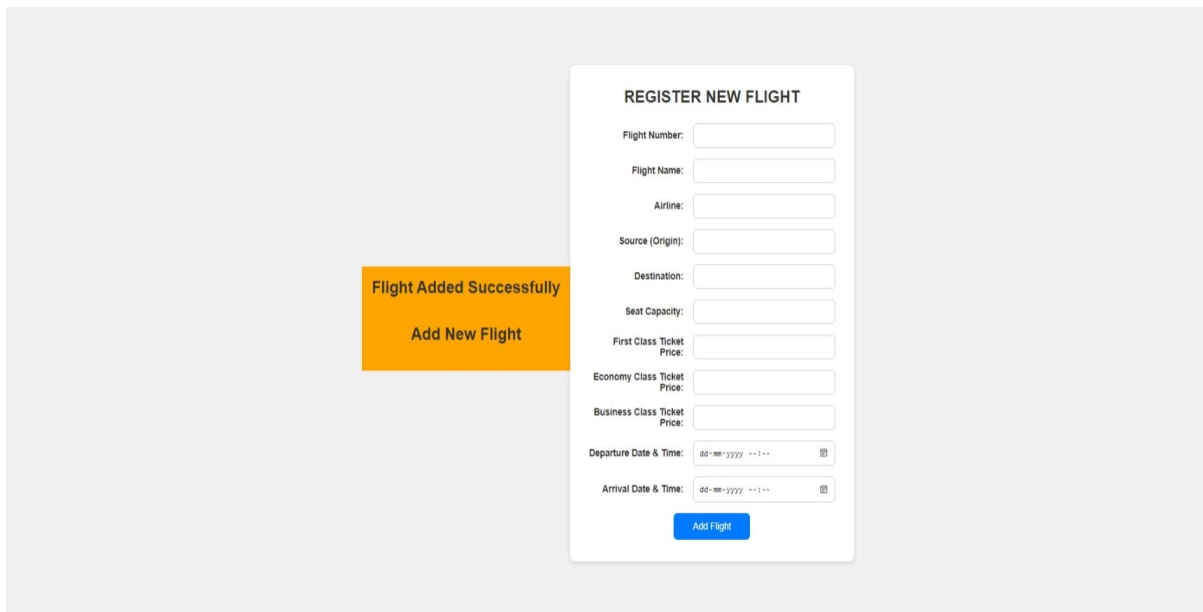
The screenshot shows a web form titled "REGISTER NEW FLIGHT". The form contains the following fields and values:

Field	Value
Flight Number:	100
Flight Name:	indogo
Airline:	Dehi
Source (Origin):	Under Paris
Destination:	Mumbai
Seat Capacity:	5
First Class Ticket Price:	11000
Economy Class Ticket Price:	5000
Business Class Ticket Price:	6000
Departure Date & Time:	13-12-2024 10:50
Arrival Date & Time:	21-12-2024 12:50

At the bottom of the form is a blue button labeled "Add Flight".

FIGURE : 6.6

SUCCESSFULLY ADD NEW FLIGHT :



The screenshot shows the same "REGISTER NEW FLIGHT" form as in Figure 6.6, but with a success message overlay. The message is displayed in a yellow box on the left side of the form:

Flight Added Successfully
Add New Flight

The form fields are now empty, and the "Add Flight" button is still present at the bottom.

FIGURE : 6.7

AIRLINE BOOKING FORM :

Airline Booking Form

Booking Details

From:

Under Paris

To:

Delhi

Departure Date & Time:

2024-11-27 16:42:00

Arrival Date & Time:

2024-11-30 20:42:00

Airlines:

Mumbai

Preferred Seating:

Business Class

Adult:

45

Children (2-11 years):

6

Infant (under 2 years):

2

Flight Number:

111

Flight Name:

Indigo

Personal Details

Full Name:

Admin

Phone Number:

8938028737

Email:

Admin@gmail.com

Enter ID Number:

Admin@123

Enter Number of Tickets:

550

Book Now


Clear

FIGURE : 6.8

LIST OF ALL BOOK FLIGHTS :

LIST OF ALL FLIGHTS

The Available Flights



Flight Number	Flight Name	Airline	Source	Destination	Seat Capacity	First Class Ticket Price	Economy Class Ticket Price	Business Class Ticket Price	Departure Date & Time	Arrival Date & Time	Book
102	indigo	Mumbai	Under Paris	Delhi	-549	12000	6000	4000	2024-11-27 16:42:00	2024-11-30 16:42:00	Book
83003923	emirates	india	Under Paris	Delhi	3	12000	6000	4000	2024-11-13 13:48:00	2024-11-21 13:48:00	Book

FIGURE : 6.9

CANCEL FLIGHT

×

HOME

SEARCH FLIGHT

PRINT TICKET

HELP

≡ Option Sidebar

Enter Your Customer Id :

101

Q

Cancel Ticket

FIGURE : 6.10

BACKEND DATA

FLIGHT DATA

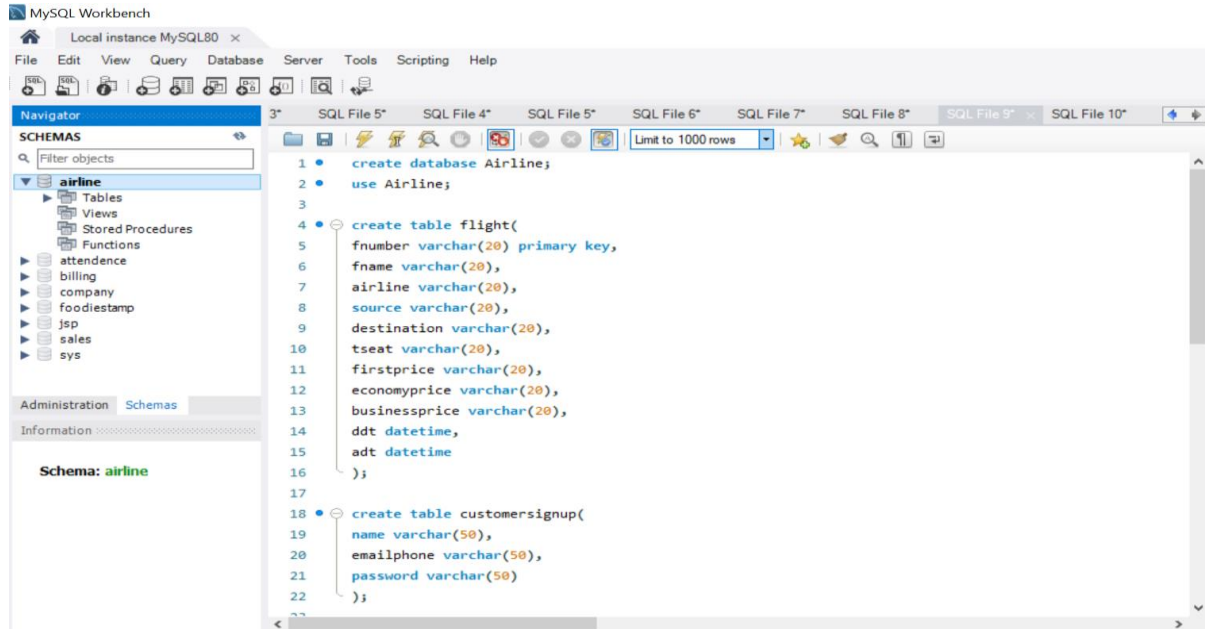


FIGURE : 6.11

ADMIN LOGIN DATA

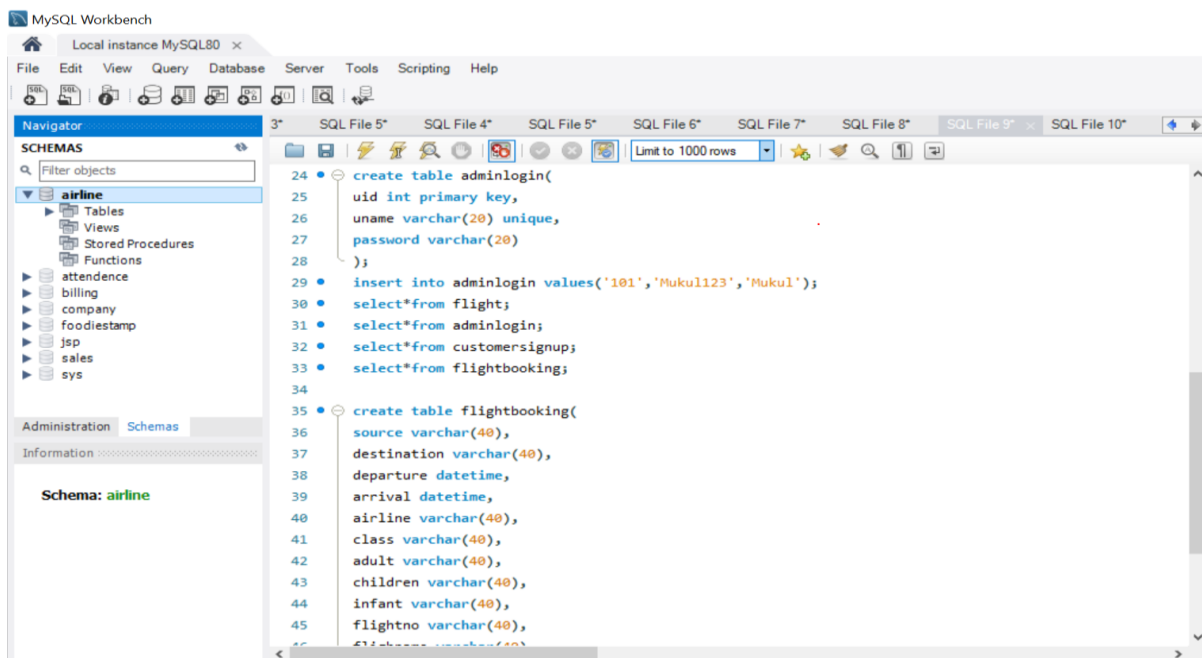


FIGURE : 6.12

FLIGHT BOKKING DATA

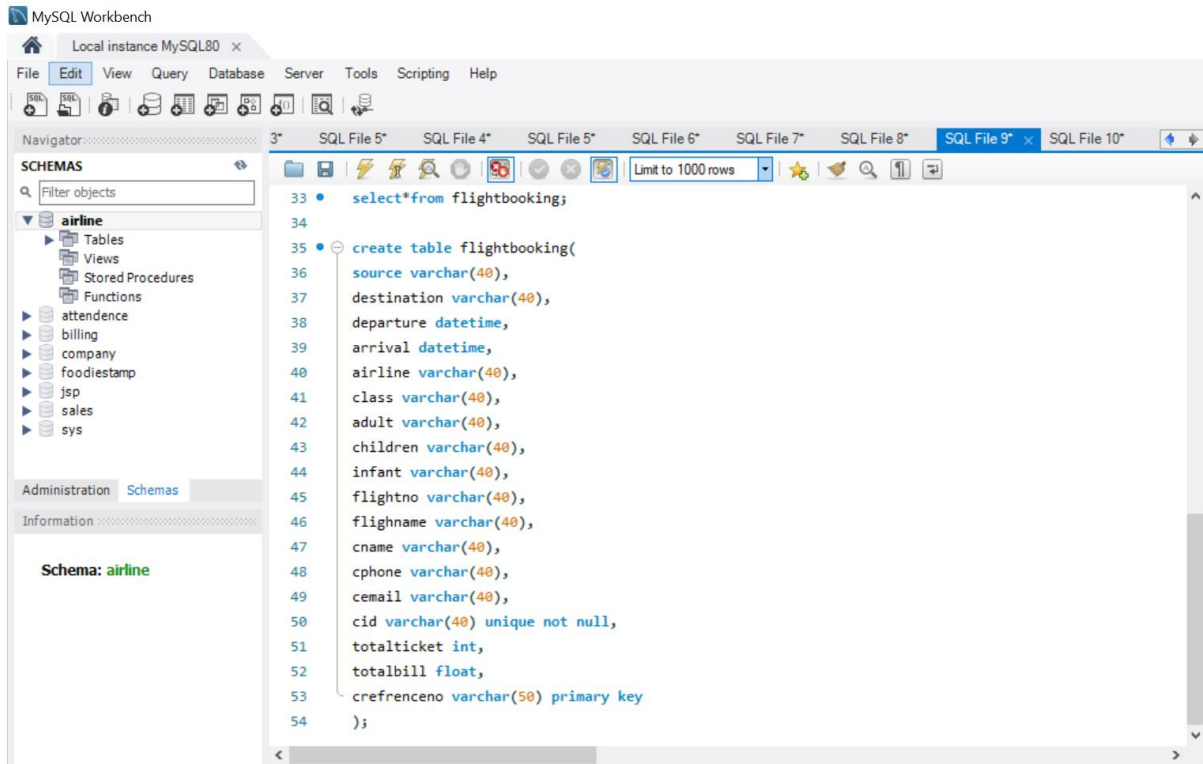


FIGURE : 6.13

ADMIN LOGIN TABLE

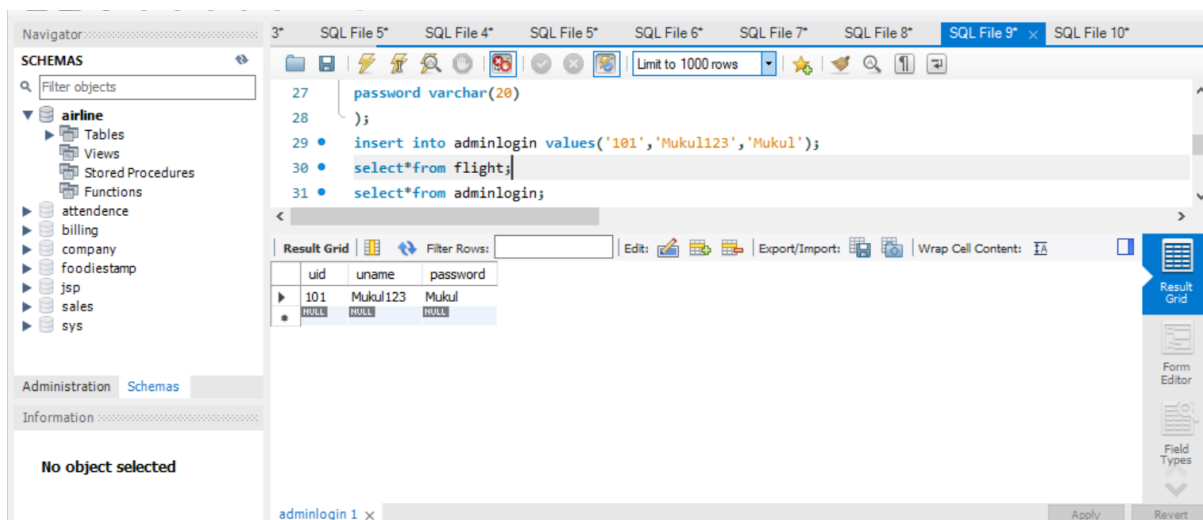


FIGURE : 6.14

CUSTOMER SIGNUP TABLE

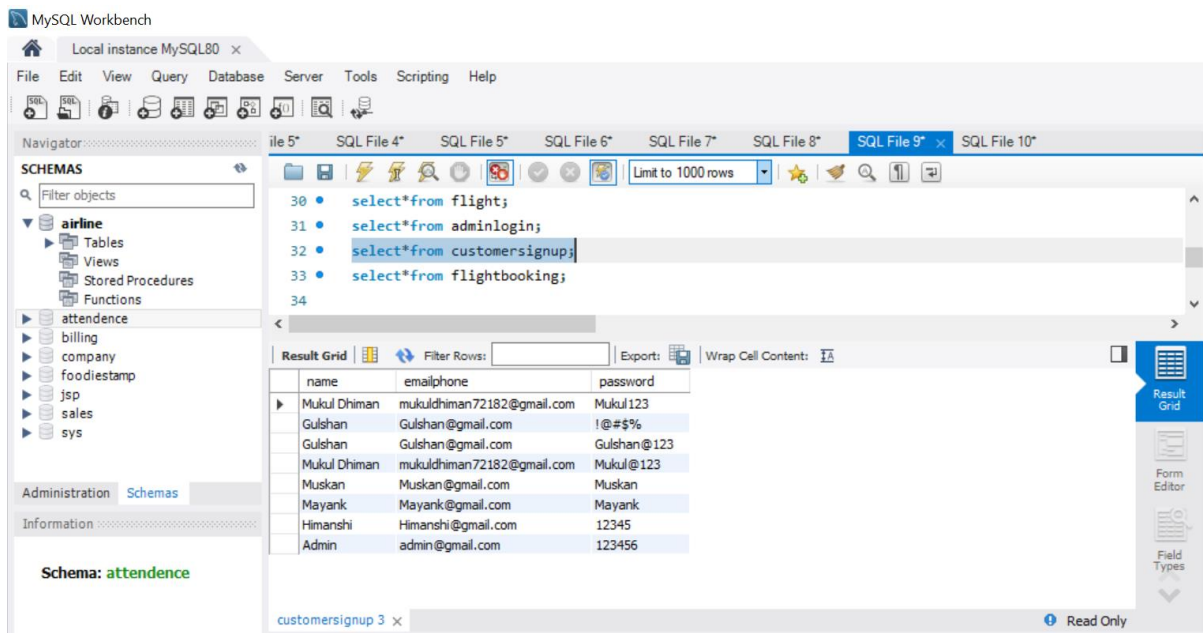


FIGURE : 6.15

ADD FLIGHT TABLE

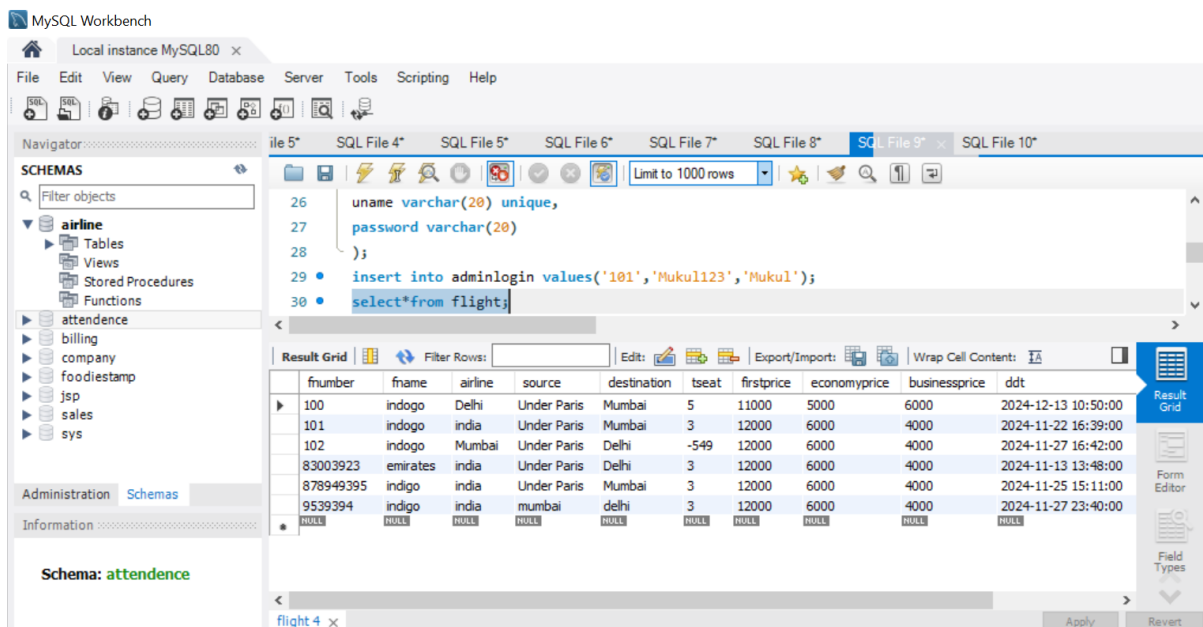


FIGURE : 6.16

FLIGHT BOOKING TABLE

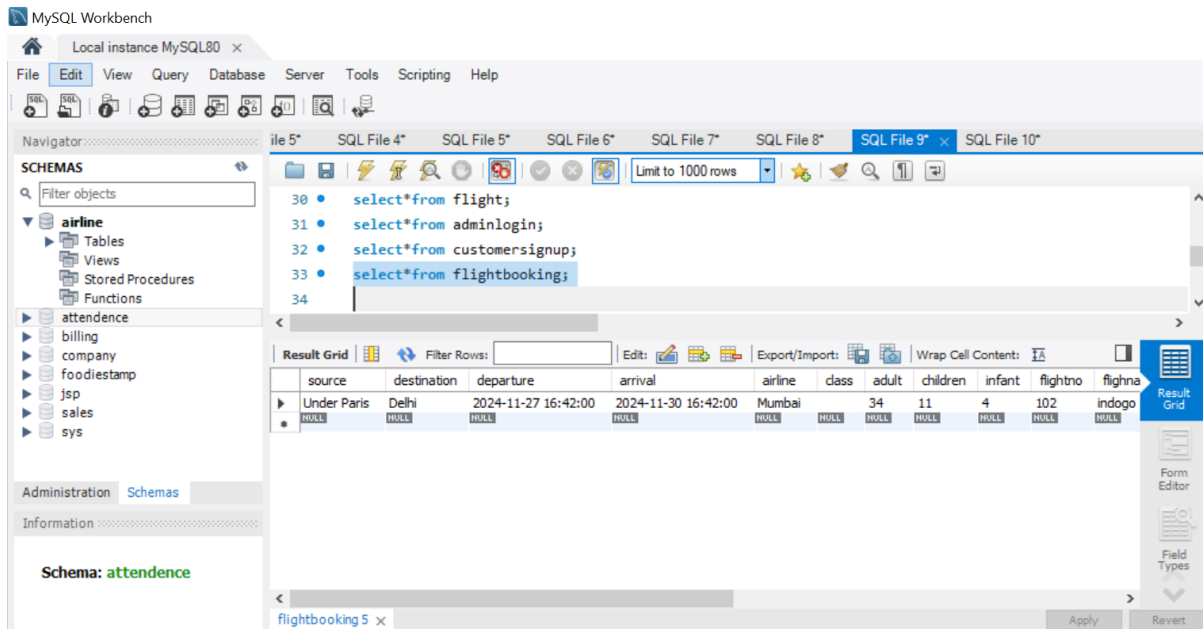


FIGURE : 6.17

PROPOSED TIME DURATION

Phase	Duration
Requirement Analysis	1 Week
System Design	2 Weeks
Development	3 Weeks
Testing	2 Weeks
Deployment	1 Week
Evaluation and Feedback	2 Days

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