

# ■ Redbus – Bus Booking System (Final Report)

## ■ 1. Introduction

The Redbus Bus Booking System is a web-based application built with Python, Streamlit, MySQL, and Pandas that enables users to search and book bus tickets conveniently. The system integrates data storage in MySQL and provides a user-friendly front end using Streamlit.

The project mimics real-world bus booking platforms like Redbus, focusing on:

- Ease of use
- Interactive filters
- Live data from database
- Clean UI with background visuals

## ■ 2. Objectives

- Develop a bus search & booking system with an intuitive interface.
- Provide filtering options for Departure and destination cities, Bus name, Bus type (A/C Sleeper, Non A/C Sleeper, A/C Seater, Non A/C Seater including their varieties), Price range, Star rating, Seats availability, Departure time range.
- Display results in an attractive card format with booking links.
- Enable fallback to CSV data when the database is unavailable.
- Enhance UI with a background image (20% opacity) to improve aesthetics.

## ■ 3. System Architecture

**\*\*Frontend (User Interface):\*\***

- Built with Streamlit
- Sidebar filters for user input
- Dynamic results displayed as styled cards
- Background image applied globally for better visual experience

**\*\*Backend (Database & Processing):\*\***

- MySQL database to store bus details
- Pandas for data processing and filtering
- Fallback to bus\_data.csv when DB is not available

## ■ 4. Technologies Used

- Python 3.12
- Streamlit – frontend development
- Pandas – data manipulation
- PyMySQL – MySQL connection
- MySQL – database management
- HTML/CSS + JS (via Streamlit markdown) – custom styling & interactivity

## ■ 5. Features Implemented

- Database Integration – Fetch bus data from MySQL (bus\_data table).
- CSV Fallback – Automatically loads from bus\_data.csv if DB not connected.

- Filters – From City → To City, Bus Name, Bus Type (supports all varieties via `.str.contains()`), Price Range, Rating Range, Seats Availability, Departure Time.
- Results Display – Buses shown in card format with details (Route, Departure, Duration, Arrival, Price, Seats Available, Star Rating, Direct booking link).
- UI Enhancements – Full-screen bus background image at 20% opacity with custom CSS styling for cards, buttons, and layout.

## ■ 6. Database Schema (MySQL)

**\*\*Table: bus\_data\*\***

- state (VARCHAR) – State of operation
- route\_name (VARCHAR) – Route in format From to To
- route\_link (VARCHAR) – Booking link
- busname (VARCHAR) – Name of the bus operator
- bustype (VARCHAR) – Bus type (A/C Sleeper etc.)
- departing\_time (VARCHAR) – Departure time (HH:MM)
- duration (VARCHAR) – Duration of journey
- reaching\_time (VARCHAR) – Arrival time
- star\_rating (FLOAT) – Rating (0.0 – 5.0)
- price (INT) – Ticket price
- seats\_available (INT) – Available seats

## ■ 7. Workflow

1. User opens app → Background image loads at 20% opacity.
2. User selects filters in the sidebar.
3. App queries MySQL (or CSV fallback).
4. Results are filtered using Pandas.
5. Filtered buses are shown in styled cards with “Book Now” links.
6. If no buses match, a warning message is shown.

## ■ 8. Sample Output

- Sidebar → Filter controls (city, bus type, price, rating, time).
- Main Page → Title + filtered bus cards.
- Background → Faded bus image covering full screen.  
(Attached screenshots illustrate output.)

## ■ 9. Challenges Faced

- Handling varieties of bus types → solved with `.str.contains()`.
- Database connectivity issues → solved by adding CSV fallback.
- UI layering → fixed using CSS z-index to keep content overlapping image.
- Performance with large images → optimized with base64 encoding.

## ■ 10. Future Enhancements

- Add user login & booking system with seat selection.
- Real-time bus tracking & live availability updates.
- Integration with payment gateway for booking.
- Deploy the app on Streamlit Cloud / Heroku for public access.

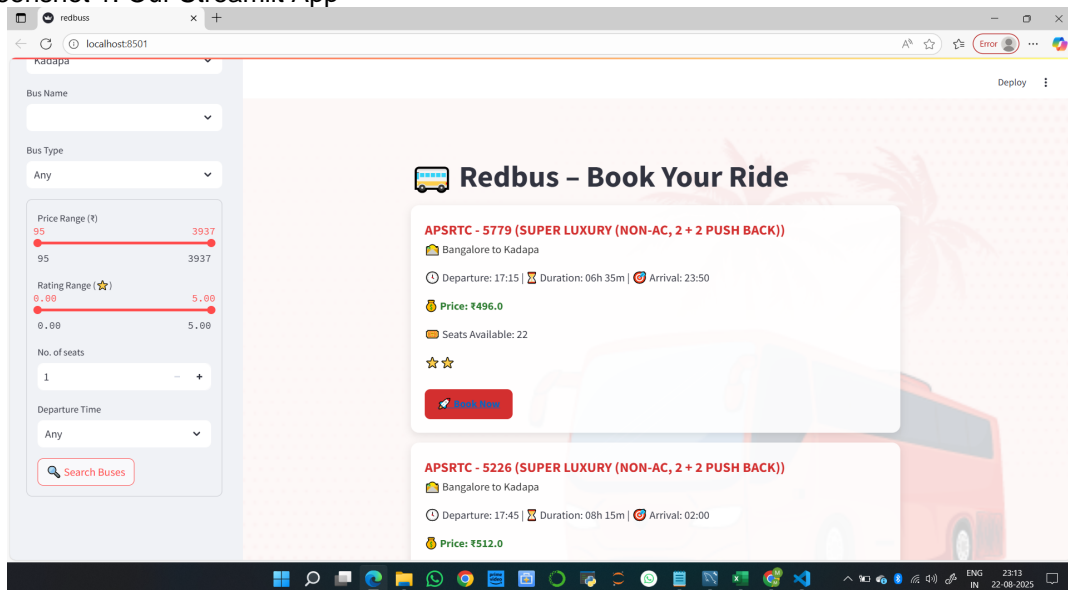
## 11. Conclusion

The Redbus Bus Booking System successfully demonstrates how to build a real-world inspired ticket booking application using Streamlit + MySQL. With advanced filters, interactive UI, and an aesthetic background, the project is both functional and user-friendly.

This system provides a solid foundation for further development into a fully functional bus ticket booking platform.

## 12. Screenshots

Screenshot 1: Our Streamlit App



Screenshot 2: Original Redbus Website (Automation)

