



Tribhuvan University
Faculty of Humanities and Social Sciences

APPOINTMENT BOOKING FOR SANGAM AUTO WORKSHOP

Submitted to
Department of Computer Application
Golden Gate International College

In partial fulfillment of the requirements for the Bachelors in Computer Application

Submitted by
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Under the Supervision of
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Supervision's Recommendation

I hereby recommend that this project is prepared under my supervision by UJJWAL SHRESTHA entitled "APPOINTMENT BOOKING FOR SANGAM AUTO WORKSHOP" in partial fulfillment of the requirements for the degree of Bachelor of Computer Application is recommended for the final evaluation.

SIGNATURE

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LETTER OF APPROVAL

This is to certify that this project is prepared by UJJWAL SHRESTHA entitled “APPOINTMENT BOOKING FOR SAW” in partial fulfillment of the requirements for the degree of Bachelor’s in Computer Application has been evaluated. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

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SIGNATURE of Internal Examiner	SIGNATURE of External Examiner

Abstract

The "Appointment Booking for SAW" project is a robust web-based software solution designed to streamline vehicle maintenance and repair service management. It enables customers to book garage services conveniently by inputting vehicle details and service requirements through a user-friendly interface. This digital system significantly improves efficiency over the current manual system by offering a graphical user interface (GUI) tailored for web platforms. The project addresses limitations of traditional garage management processes by automating booking procedures, enhancing efficiency, and ensuring accurate record-keeping of bookings and vehicle information.

The web application simplifies the service booking process, which typically involves time-consuming tasks, by supporting various garage services including maintenance, repairs, and servicing. It comprises two main modules: Admin and User. Admin functionalities include managing customer information, viewing bookings, and handling user appointments. Users can register, log in, check service availability, and book appointments through the platform. Additionally, users can update their profile and vehicle information to ensure accurate and up-to-date records.

Keywords: appointment booking, automated system, efficiency, repair services, user-friendly interface, vehicle maintenance, web-based software.

Acknowledgement

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UJJWAL SHRESTHA
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List of Abbreviations

BCA	: Bachelor in Computer Application
CSS	: Cascading Style Sheets
DBMS	: Database Management System
Fig	: Figure
MySQL	: My Structured Query Language
PHP	: Hypertext Preprocessor
SAW	: Sangam Auto Workshop

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Chapter 1: Introduction

1.1.Introduction

Appointment Booking for SAW is a web-based platform that provides user with new experience and interaction between user and business owners for easy vehicle maintenance and repairs.

The Appointment Booking for SAW provides flexibility to people as it saves time much more and services are simplified to match user. Appointment Booking for SAW provides features such as book appointment for vehicle, updating customer information and vehicle, etc. The main objective of Appointment Booking for SAW is to provide a user-friendly website that improves the user experiences and save valuable time.

We didn't settle for a fancy system, we focused on creating one that genuinely helps in the real world. It's not just for show, it's designed to make managing garages practical and straightforward. Welcome to the "Appointment Booking for SAW," where we're not just changing the way garages operate but making your life a bit easier in the process.

1.2.Problem Statement

- Absence of appointment services.
- Poor and insufficient communication about vehicle services.
- Increased wait times at local garages due to lack of service scheduling systems.
- Limited digital access to vehicle service history, causing repeated issues and miscommunication.

1.3.Objectives

- To creating online platform for booking an appointment for vehicle repairing.
- To improve speed and simplify car repairs.
- To provide users and workshop admins with real-time access to booking status and service history.

1.4.Scope and Limitation

The scope and limitations outline the boundaries of the system's capabilities and the constraints faced during implementation.

1.4.1. Scope

- To maintain relationship of customer information and contact details.
- To track the registration of vehicle with details including brand, model, year, license plate and owner information.
- To record service history.

1.4.2. Limitation

- Users must have basic skills to navigate the platform, update information, and access service history records.
- The platform may face performance issues as the number of customers and service records increases, potentially requiring upgrades for optimal operation.
- Challenges may include integrating existing customer records, training staff, and ensuring accurate data migration during the initial phase.

1.5.Development Methodology

For the development of the Appointment Booking System for Sangam Auto Workshop (SAW), we adopted an Agile Development Methodology. The development was broken down into focused sprints, with each sprint targeting a core module of the system. This allowed continuous integration of feedback and progressive system enhancement.

The project was divided into sprints, each focusing on core functionalities:

Sprint 1: User registration, login, and profile management

Sprint 2: Vehicle management (add, update, delete vehicle info)

Sprint 3: Appointment form development and slot selection algorithm

Sprint 4: Admin dashboard implementation with appointment filtering and status management

Sprint 5: Testing, feedback collection, and final refinements

The database schema was designed to support relationships between users, vehicles, and appointments.

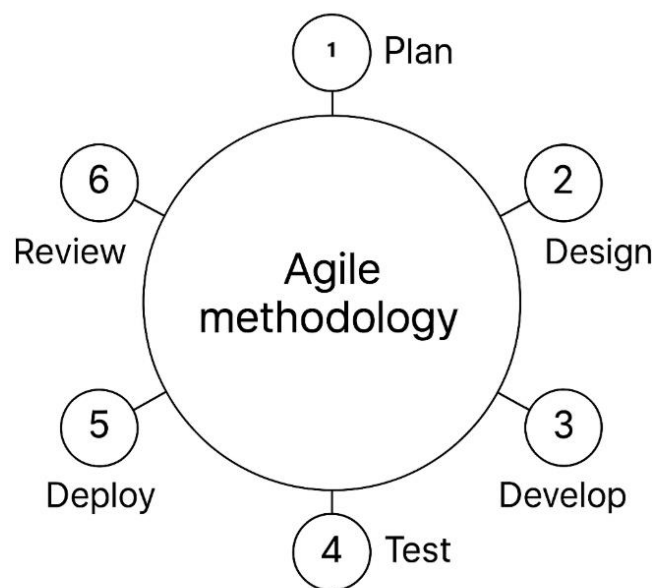


Figure 1: Agile Methodology for SAW

By using Agile practices like task breakdowns, sprint-based development, regular testing, and user feedback sessions, we ensured the platform was built efficiently and adapted to evolving requirements. This approach helped us create a functional, user-friendly, and scalable appointment booking system for Sangam Auto Workshop.

1.6.Report organization

In report organization, we will be discussing about the chapters of this project documentation.

- **Introduction:**

Provides an introduction to appointment booking for SAW, its objectives, problem statement and its limitations.

- **Literature Review:**

Reviews existing website related to garage management system platforms specially focused on service based on Nepal. This includes examining the market landscape, trends, challenges, and successes of existing platform.

- **System Analysis and Design:**

Analyzes the requirements of Garage Management System, designs the system architecture, and outlines the functionalities and features of the platform.

- **Implementation and Testing:**

Describes the actual implementation process of Garage Management System, including, coding, integration, and testing phases to ensure the platform functions as intended.

- **Conclusion and Recommendations:**

Summarizes the findings of the report, provides insights into the effectiveness of Garage Management System, and suggest recommendations for future enhancements and improvements, based on the reviewed literature and the implementation experience.

Chapter 2: Background Study and Literature Review

2.1. Background Study

This section outlines the key concepts behind the Appointment Booking for SAW, a web-based platform designed to simplify vehicle service appointments and workshop management for Sangam Auto Workshop.

Fundamental Concepts:

Garage Management Systems (GMS):

Digital platforms that streamline workshop operations by automating tasks like appointment scheduling and customer communication.

Online Appointment Booking:

Customers can book service appointments online, offering convenience and reducing the need for in-person or phone-based scheduling.

Admin-Centric Operations:

Admins handle appointment bookings, user management, and vehicle records, ensuring organized and efficient service delivery.

Web-Based Application:

Built using PHP, MySQL, HTML, CSS, and JavaScript, the system is accessible via any internet-enabled device.

Data Integrity and Security:

User and vehicle data are securely handled, with access controlled through login authentication.

2.2.Literature Review

In our research, we analyzed various websites and applications to gather valuable insights and ideas for Appointment Booking for SAW. While the number of relevant websites and applications was limited, we identified several key examples that provided useful features and design elements. The notable websites and their key features are outlined below:

Bike Repairs Nepal [1]

Appointment Booking: This feature allows users to book appointments for bike repairs and services online.

Location Details: Provides detailed information about the workshop's location, including a map and contact information.

Internal Page Design: Includes well-designed internal pages such as login, register, and dashboard interfaces

Kathmandu Automotive [2]

Car Services and Descriptions: Offers comprehensive details about various car services provided by the workshop.

Contact Page: Features a dedicated contact page with a form for inquiries, contact details, and location information.

Frontend Design: Showcases an attractive and user-friendly frontend design, enhancing the overall user experience.

These examples have informed the development of our own features and design considerations for Appointment Booking for SAW, ensuring a comprehensive and user-centric approach.

Chapter 3: System Analysis and Design

3.1. System analysis

System analysis involves examining and evaluating a system to understand its components, processes, and interactions, aiming to improve efficiency and effectiveness. It typically includes requirements gathering, problem identification, and solution design to meet business objectives.

3.1.1. Requirement analysis

This chapter delves into system analysis and design in developing effective systems that meet user needs. It creating a well-structured design to ensure optimal performance.

I. Functional Requirements

Functional requirements detail what a system must do, outlining specific behaviors and functions authentication, data management, and reporting. These requirements ensure the system performs necessary tasks to meet user needs and business objectives effectively.

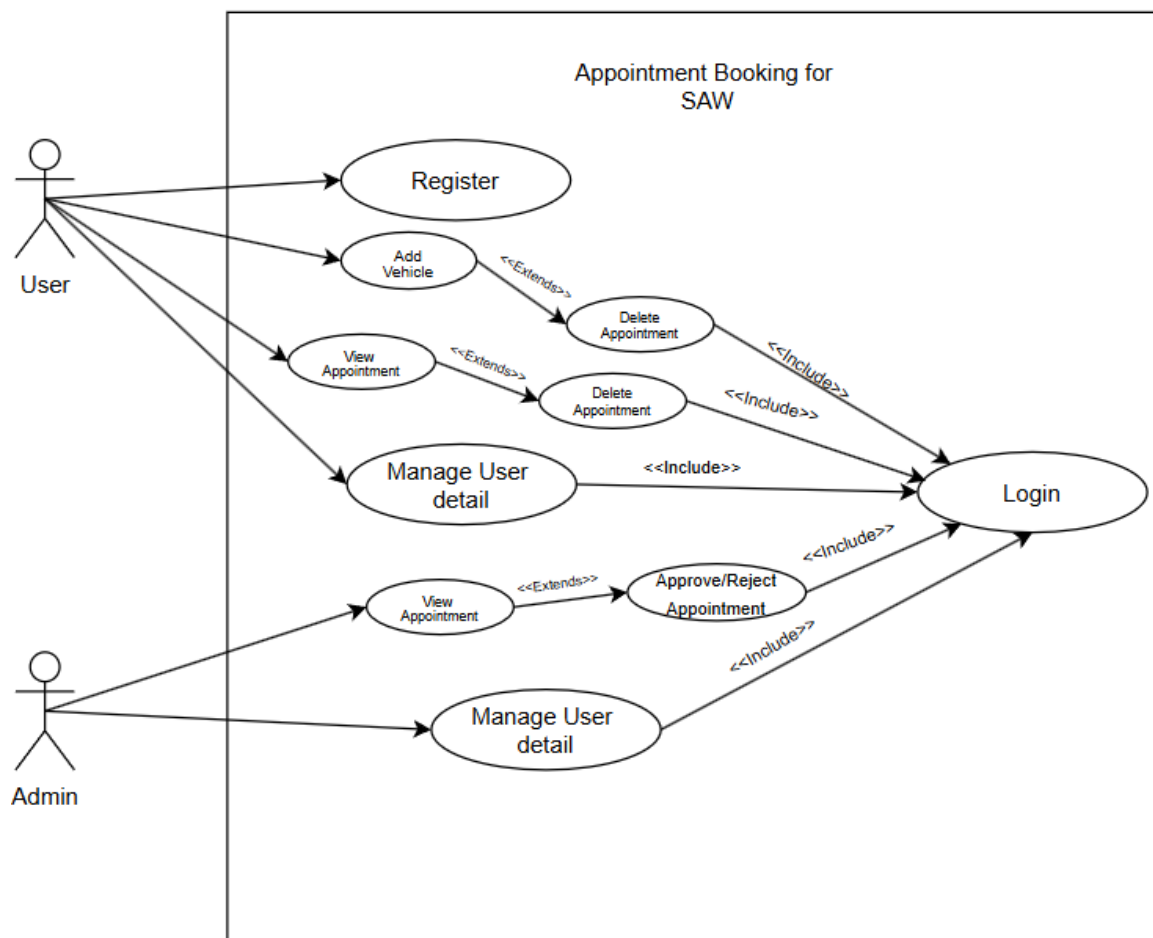


Figure 2: Use Case Diagram of appointment booking for SAW

This use case diagram for the Garage Management System outlines the interactions between users and the system. Here are the key points:

a. Actors:

- User: Represents customers who interact with the system.
- Admin: Represents the administrative staff managing the system.

b. Use Cases:

- Login/Register: Users can log in or register to access the system.
- Add/Manage Vehicle: Users can add, edit, or delete information about their vehicles.
- View/Manage Appointment: Users can schedule appointments or delete.
- Update appointment: Admin can update the status.
- Update user detail: Both admin and user can update.

c. Relationships:

- The diagram illustrates how users and admins interact with various functionalities within the system.
- The User interacts with "Login/Register", "Add/Manage Vehicle", "View/Manage Appointment" and "Update user detail".
- The admin interacts with all use cases, including "Login", "View /Manage Appointment", "Update user detail" and "Update Appointment."

II. Non-Functional Requirements

Non-functional requirements specify the system's operational qualities, such as performance, security, and usability. They ensure the system is efficient, secure, and user-friendly.

a. Availability:

The Appointment Booking for SAW will be accessible online, allowing users to use it 24 hours a day, 7 days a week. In the event of any major malfunctions, the system aims to resume availability within 1 to 2 working days to minimize disruption to business processes.

b. Security:

Ensuring user privacy, the system prioritizes security. User information will be protected, and access will be restricted through usernames and passwords, preventing unauthorized entry.

c. Performance:

The system is designed for optimal performance, providing a smooth user experience. It aims for high performance even in demanding situations, with a target response time of approximately 300ms for highly complex tasks and 20ms to 150ms for less complicated tasks.

d. Reliability:

Users can rely on the Appointment Booking for SAW to consistently deliver its services, fostering a dependable experience for all users.

3.1.2. Feasibility Analysis

Feasibility analysis is a systematic evaluation of a project's potential success based on technical, economic, and operational criteria. It helps stakeholders make informed decisions about whether to proceed with a project or business idea.

a. Technical

We took considerations from various report and suggestion and interest of business owner were service and appointment handling, schedule management, attendance, etc. All the requirements set by the client can be met by using the current knowledge that the project developer is capable of performing. Html and CSS can be used as front web, php and JavaScript can be used to handle query and make website interesting and MySQL to handle database.

b. Operational

This project system uses basic technology and knowledge to develop the platform and uses only simple mechanics for a simple website making its operation easy smooth and feasible.

c. Economic

The garage system will not use any features and system that will require recurring charges so drastically reducing the operational and maintenance cost. The total cost will be only the initial cost at the beginning of the study and maintenance charge at the end of the project.

d. Schedule

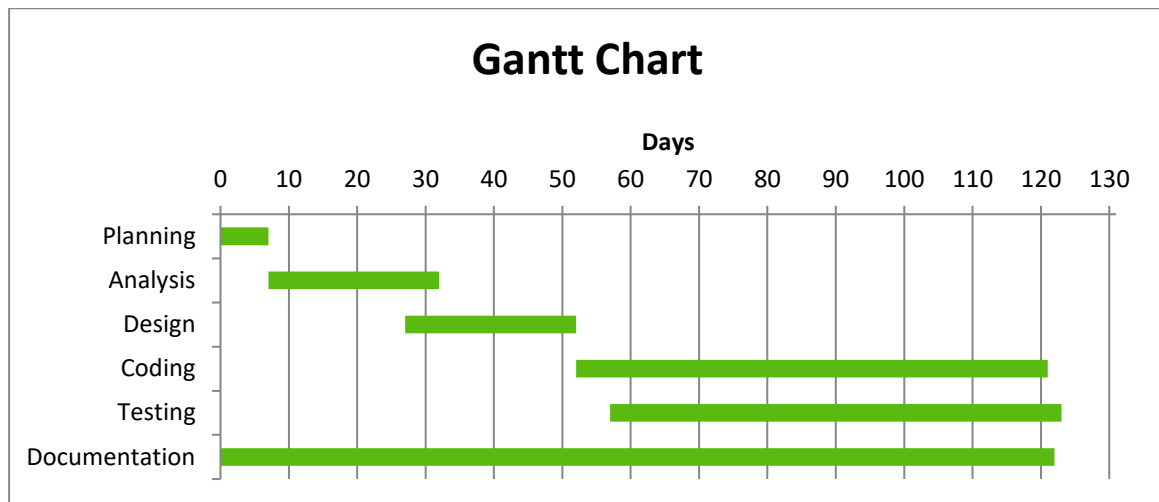


Figure 3: Gantt chart

Gantt Chart Summary

Planning: Nov 12 – Nov 19, 2081 (7 days)

Analysis: Nov 19 – Dec 13, 2081 (25 days)

Design: Dec 9, 2081 – Jan 2, 2082 (25 days)

Coding: Jan 3 – Mar 12, 2082 (69 days)

Testing: Jan 8 – Mar 13, 2082 (66 days)

Documentation: Nov 12, 2081 – Mar 13, 2082 (122 days)

3.1.3. Data Modeling (Entity Relationship Diagram)

The entity relationship diagram for our Appointment Booking system at SAW is akin to a detailed map, depicting the interconnections between various components. It highlights relationships between entities—such as customers, vehicles, and appointments—and their respective attributes. For instance, a customer entity can perform actions like adding vehicles, booking appointments, and updating their profile. Each vehicle, in turn, is characterized by attributes like brand, license number, model, and year. By visualizing these connections and interactions, it enables us to optimize our processes, enhance customer service, and ensure efficient management of workshop operations.

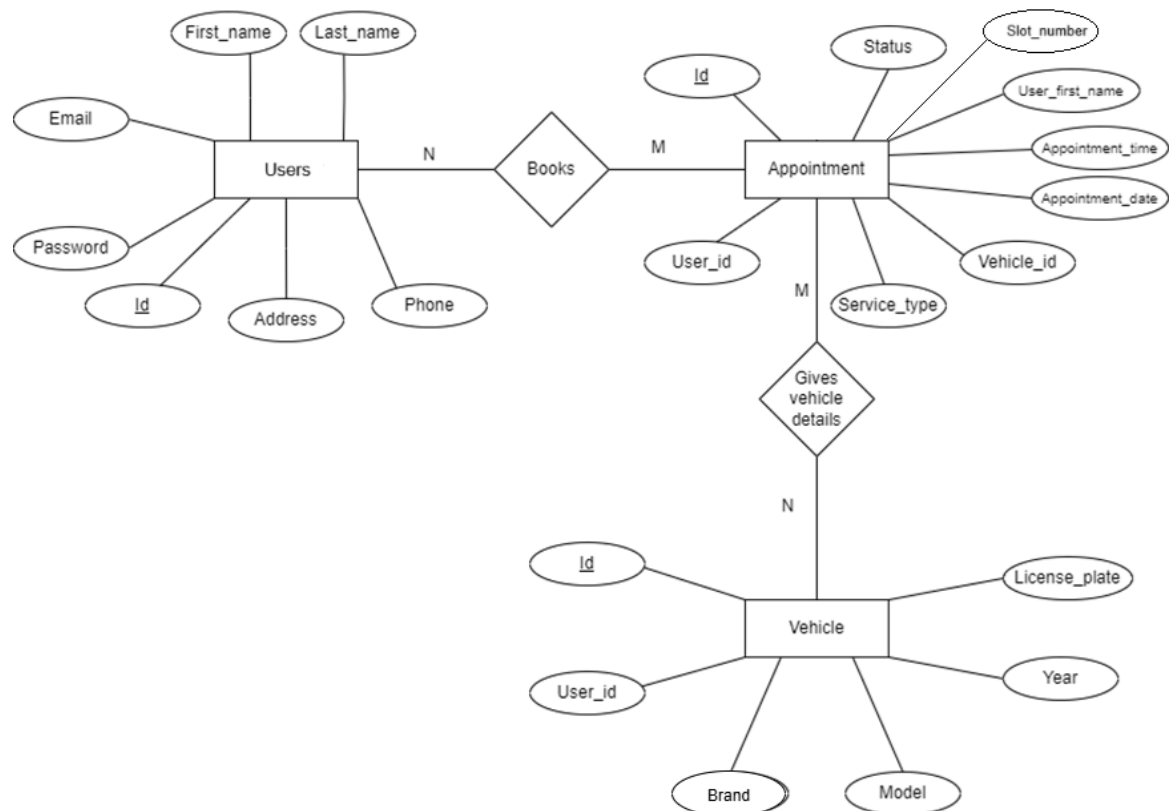


Figure 4: Entity Relationship Diagram of appointment booking for SAW

3.1.4. Process Modeling (DFD)

Data flow diagram (DFD) is used to define the flow of the system and its resources such as information. Data flow diagram is a way of expressing system requirements in a graphical manner. DFD represents one of the most ingenious tools used for structured analysis. A DFD is also known as bubble chat. It has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design.

DFD Diagrams:

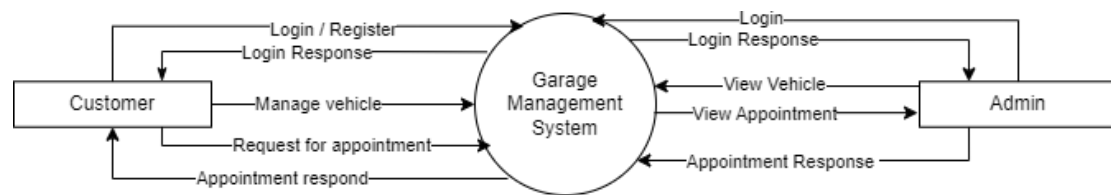


Figure 5: DFD Level 0 of appointment booking for SAW

This diagram illustrates the interactions between the Customer, Admin, and Garage Management System (GMS). Here are the key points:

Customer Actions:

- Login / Register: Customer initiates login or registration.
- Login Response: System provides a response to the customer's login attempt.
- Manage Vehicle: Customer manages vehicle information.
- Request for Appointment: Customer requests an appointment.
- Appointment Respond: System responds to the customer's appointment request.

Admin Actions:

- Login: Admin initiates login.
- Login Response: System provides a response to the admin's login attempt.
- View Vehicle: Admin views vehicle information.
- View Appointment: Admin views appointments.
- Appointment Response: Admin provides a response to the appointments.

System Role:

The Garage Management System (GMS) acts as an intermediary, processing and responding to actions from both the customer and admin.

This diagram is a more detailed representation of the Garage Management System (GMS) interactions, divided into three main sections: Login Management, Vehicle Management, and Appointment Management. Here's a concise description of each section:

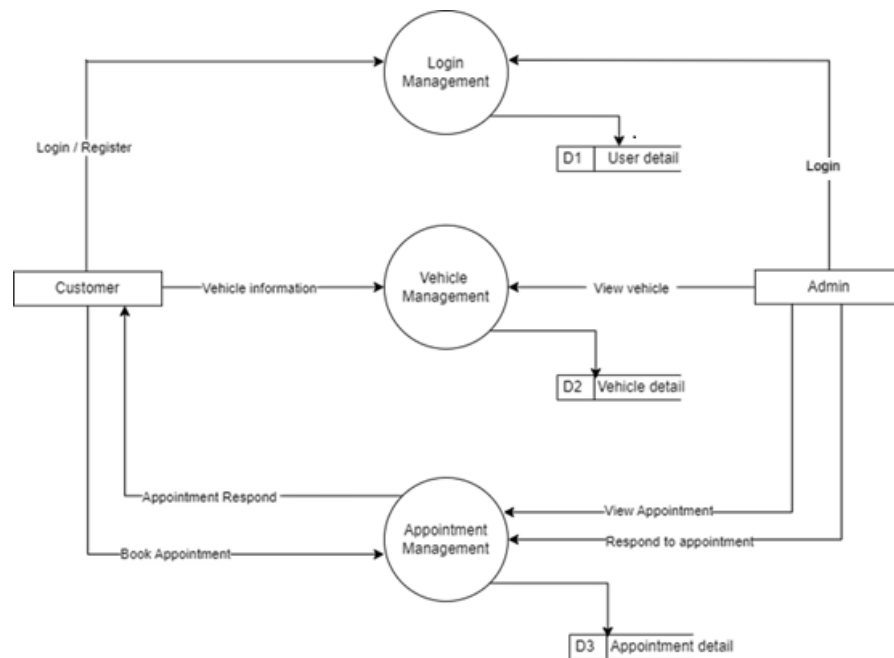


Figure 6: DFD Level 1 of appointment booking for SAW

Login Management:

a. Customer:

Login / Register: Customer initiates the process to log in or register.

b. Admin:

Login: Admin initiates the process to log in.

c. System:

D1 (User Detail): Stores and manages user details.

Vehicle Management:

a. Customer:

Vehicle Information: Customer manages their vehicle information.

b. Admin:

View Vehicle: Admin views vehicle details.

c. System:

D2 (Vehicle Detail): Stores and manages vehicle details.

Appointment Management:

a. Customer:

Book Appointment: Customer books an appointment.

Appointment Respond: Customer receives a response to their appointment request.

b. Admin:

View Appointment: Admin views appointment requests.

Respond to Appointment: Admin responds to appointment requests.

c. System:

D3 (Appointment): Stores and manages appointment details.

3.2.System Design

System design is the process of planning and defining the architecture, modules, components, and data structures that fulfill the requirements of a system. It involves translating user needs and business goals into a working solution with appropriate technologies and design patterns. Given the clear objectives, well-documented requirements, and stable technologies involved in this project, the Agile methodology is used to develop the system.

Designing the Appointment Booking for Sangam Auto Workshop (SAW) using the Agile model allows for iterative, flexible development that adapts to evolving needs. At the beginning, key features for both admin and user roles were identified. These include booking appointments, managing vehicle records, viewing appointment status, and handling admin-side approvals or updates.

Users can register, log in, add vehicles, and book or cancel appointments. The admin can view all bookings, update their statuses, and manage user and vehicle information. Each feature is developed and tested during short iterations called sprints. For example, Sprint 1 focuses on user login and registration, Sprint 2 on vehicle management, Sprint 3 on appointment booking and slot selection, and Sprint 4 on admin panel and appointment status updates.

The backend is built using PHP and MySQL, while HTML, CSS, and JavaScript are used for the frontend interface. The database contains tables for users, vehicles, appointments, and admin credentials, ensuring structured data handling and smooth functionality.

Throughout the development, Agile principles like sprint planning, daily progress tracking, and frequent feedback reviews ensure the system is continuously improved and aligned with user expectations. This incremental approach allows for the gradual yet stable development of a reliable, scalable, and user-friendly garage appointment booking platform.

3.2.1. Architectural Design

The Appointment Booking for SAW is designed with a modular and scalable architecture, leveraging modern technologies to ensure efficiency and flexibility. The system comprises three main layers: Presentation, Application, and Data Access.

Presentation Layer:

User Interface (UI): Developed using HTML, CSS, and JavaScript to provide an intuitive and responsive interface for both administrators and customers.

Security Measures: User authentication, authorization, and data encryption implemented to protect sensitive information.

Application Layer:

Business Logic: Manages core functionalities such as service booking, vehicle management, and customer interactions.

Backend Services: Developed using PHP and SQL to handle complex business processes.

Service Modules: Dedicated modules for service booking, vehicle management, customer registration, and administrative tasks.

Data Access Layer:

Database System: Utilizes for efficient storage and retrieval of data.

Data Models: Organized schema with tables for Admins, Customers, Vehicles, Services, and their relationships.

Relationship Tables: Ensures seamless connections between Admin, Customers, Vehicles, and Appointment.

Technological Stack:

Frontend Technologies: HTML, CSS, JavaScript.

Backend Technologies: PHP, SQL.

Database: MYSQL

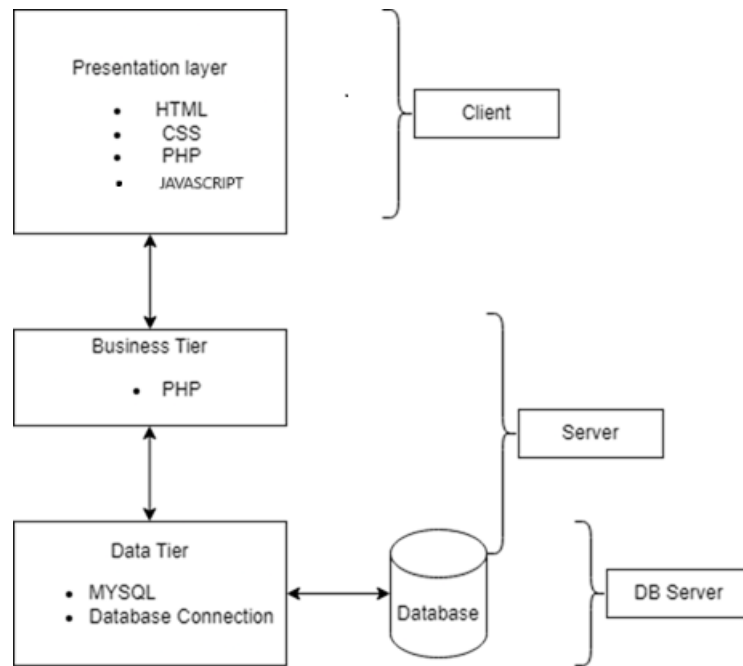


Figure 7: Architecture Design of appointment booking for SAW

Below is the system flowchart of the system. It describes how our system will work.

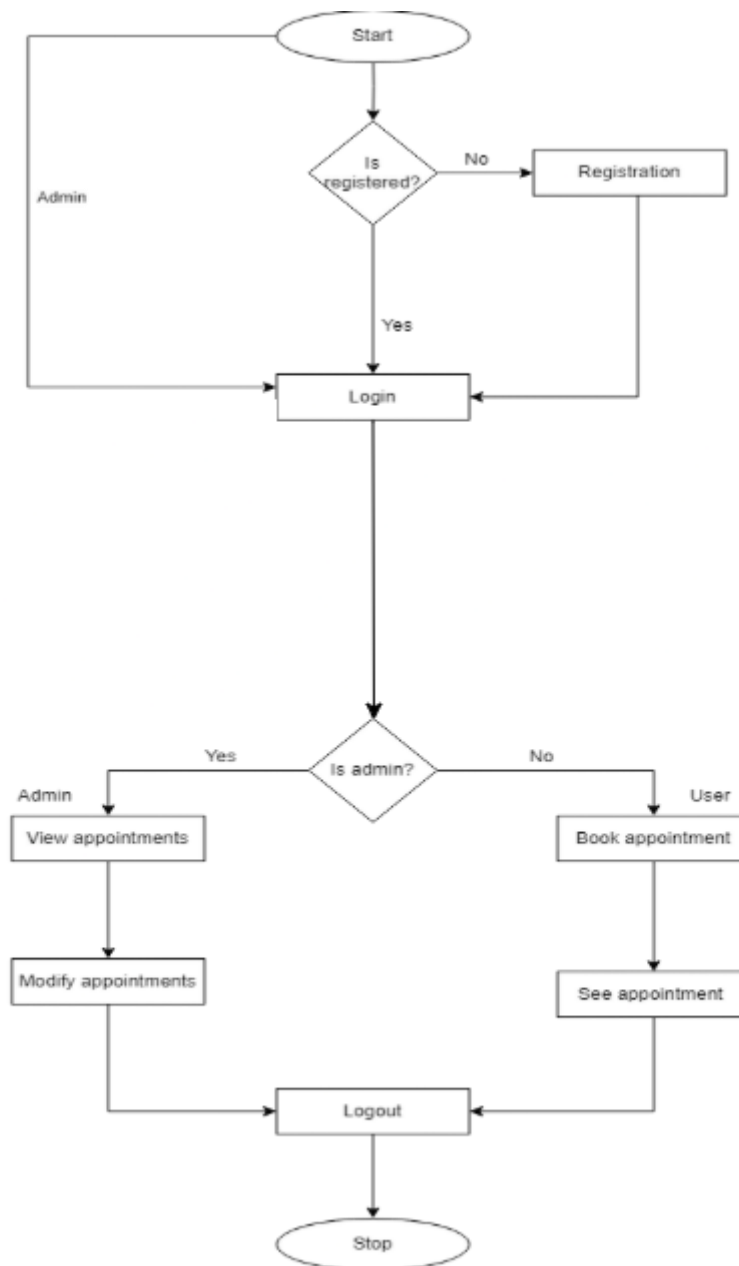


Figure 8: System flow chart of appointment booking for SAW

3.2.2. Database Schema Design

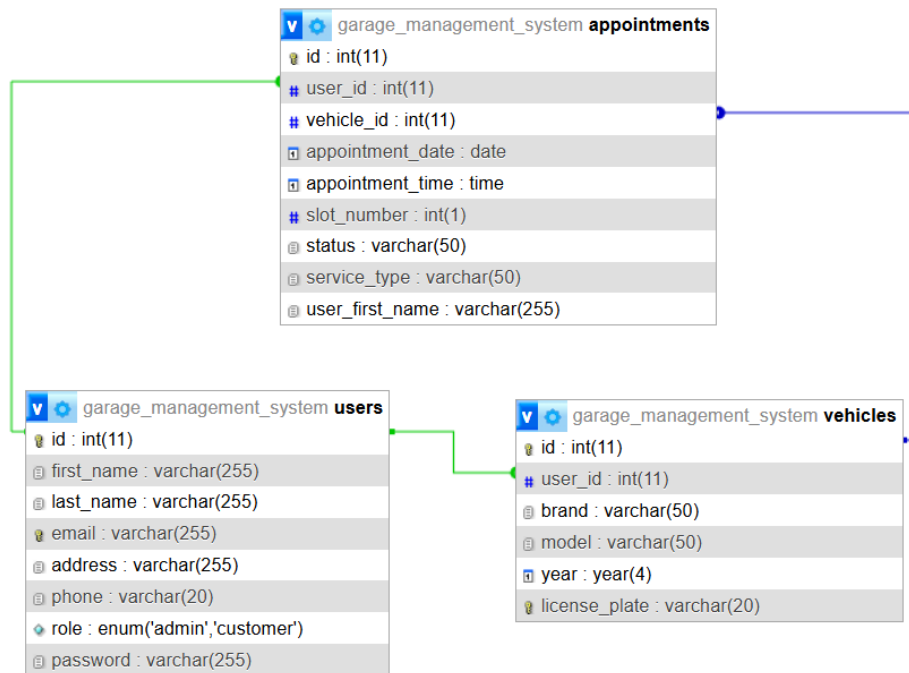


Figure 9: Design of Schema of appointment booking for SAW

The tables created in the database are displayed in the above figure. A relational database's logical configuration, in whole or in part, is represented by its database schema. It can be represented visually or as a set of mathematical formulas called integrity constraints that control a database. SQL is one of the data definition languages used to express these formulas.

3.2.3. Interface Design

Interface Design focuses on creating user interfaces that are intuitive, efficient, and visually appealing, enhancing the overall user experience. It encompasses layout, interaction patterns, and aesthetics to ensure seamless user interactions with the system. The user interface of the application has been designed using Figma.

i) Homepage

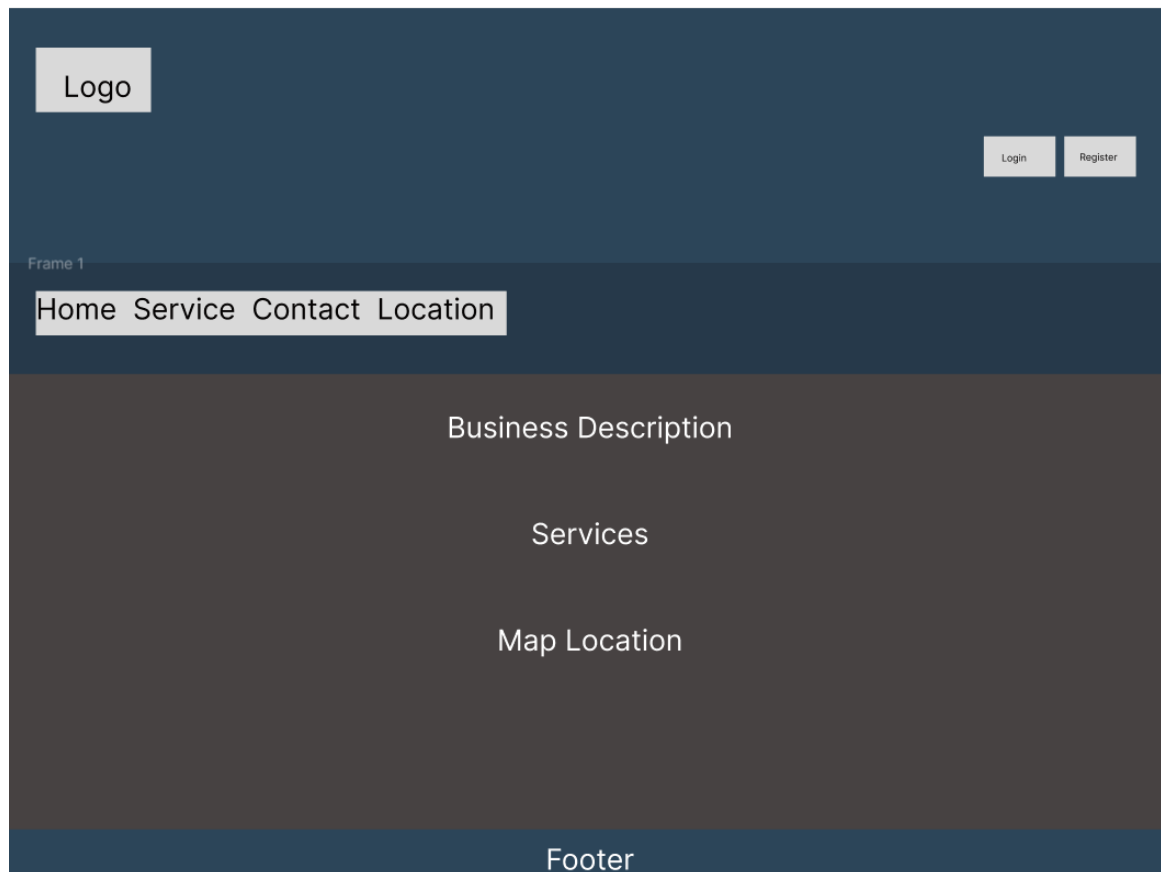


Figure 10: Homepage

ii) Login

The login form is centered on a blue background. It consists of four stacked rectangular boxes. The first three are light gray and contain the text 'Login as', 'Email', and 'Password' respectively. The fourth box is dark blue with the text 'login' in white. Below these boxes, there are two lines of text: 'Don't have an account? [Register here.](#)' and 'Go back to homepage? [Click here.](#)'

Figure 11: Login

iii) Admin Dashboard

The Admin Dashboard has a dark blue header with the text 'Sangam Auto Workshop'. On the left, there is a sidebar with four blue buttons: 'Click here to go homepage', 'Manage User', 'Appointment list', and 'Logout'. The main content area is light blue and contains an 'Admin Overview' section. This section displays three metrics: 'Total user' with a value of '.', 'Total vehicle', and 'Pending appointments'. At the bottom of the dashboard, there is a dark blue footer with the text '© 2025 Sangam Auto Workshop. ALL RIGHTS RESERVED.'

Figure 12: Admin Dashboard

iv) User Dashboard

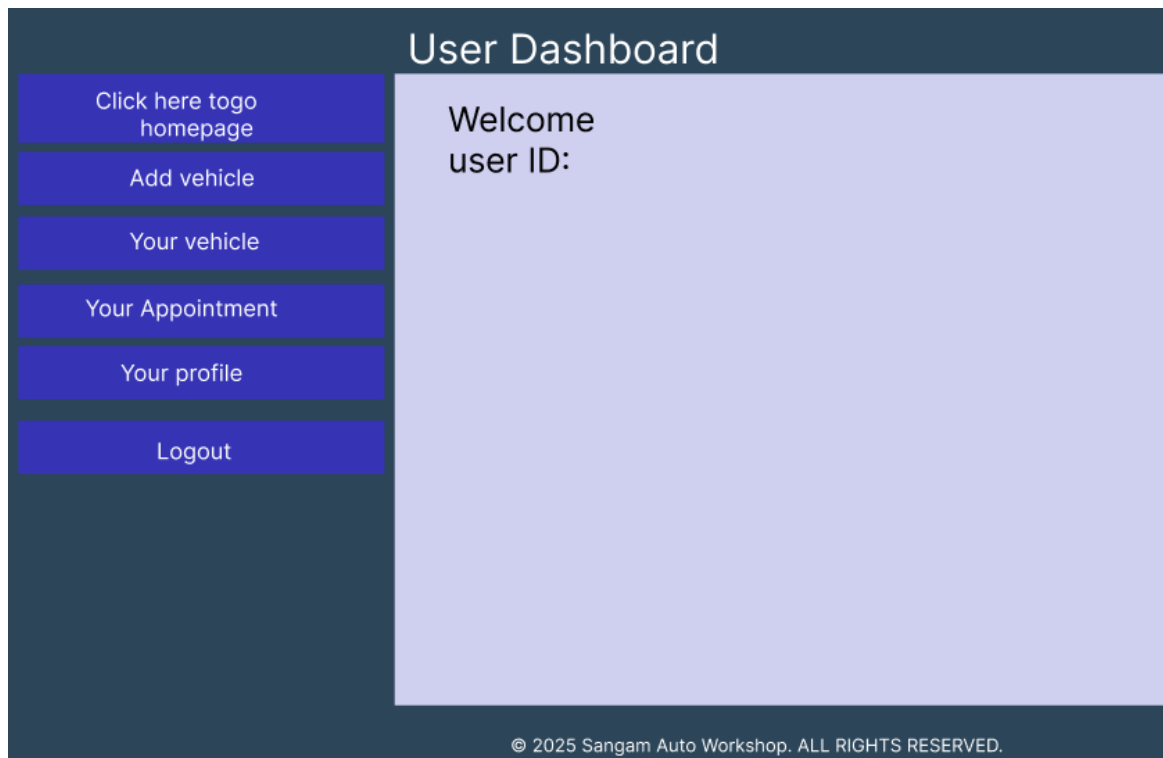


Figure 13: User dashboard

3.2.4. Physical DFD

A Physical DFD shows how the actual system operates in terms of people, hardware, files, and data movement.

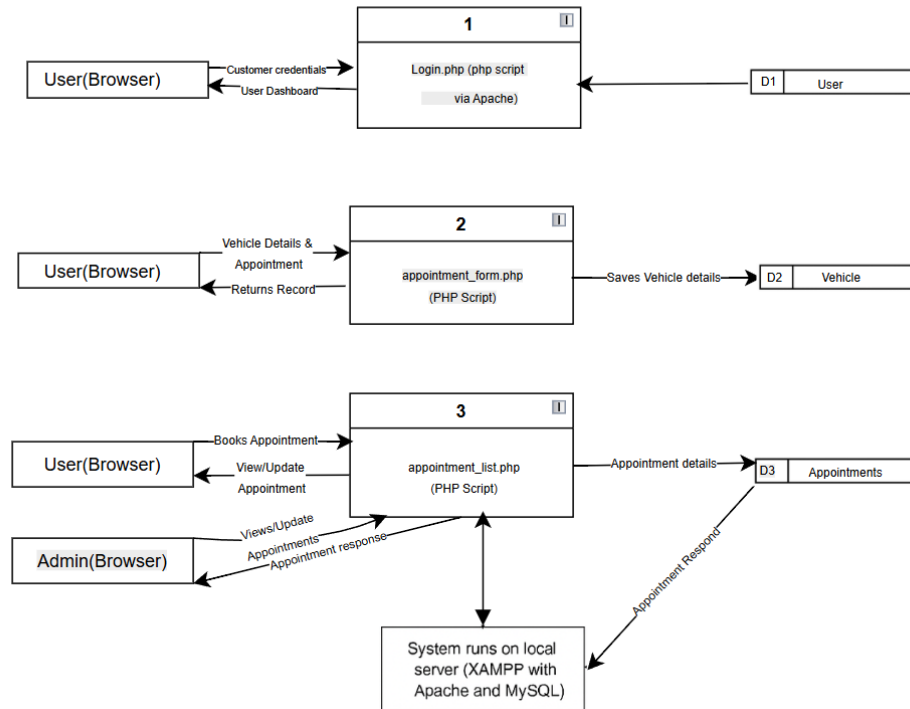


Figure 14: Physical DFD

Components of the Physical DFD:

1) Physical Implementation:

- **Devices:** Users and Admins use PCs with web browsers. The system runs on a local server (XAMPP).
- **Files/Databases:** PHP files handle logic (login, vehicle, appointment), and MySQL stores data in users, vehicles, and appointments tables.

2) Business Processes:

- **User Login:** Validates credentials using the users table.
- **Vehicle Input:** Saves user-entered vehicle data to the vehicles table.
- **Appointment Handling:** Users book; Admins view/update appointments table.

3) Data Processing:

- Entry: Users fill forms (login, vehicle, appointment).
- Storage: Data saved in MySQL tables.
- Retrieval: Displays records for users and admins as needed

3.3.Algorithm

This section outlines the key algorithms implemented in the Appointment Booking for SAW system to enhance functionality and ensure efficient service handling.

1. Appointment Filtering by Priority, User, or Time (Admin Dashboard):

To enable efficient appointment management, the system provides flexible sorting of appointments based on priority level, user identity, or scheduled time. This allows administrators to quickly assess which appointments require immediate attention or to group them by customer.

How It Works:

- The system retrieves all appointment records from the database along with associated user and vehicle data.
- Appointments are assigned a priority level (High, Medium, or Low) based on the type of service requested, using a predefined priority mapping.
- A custom sorting mechanism is implemented using PHP's `usort()` function, which compares appointments based on the selected sort mode:
 - Priority: Higher-priority services appear first, followed by chronological ordering.
 - User: Appointments are grouped by user ID in ascending order.
 - Time: Appointments are sorted by date and time to reflect upcoming schedules.
- The sorted result is then returned as a JSON response to be displayed on the admin interface.

2. Slot Availability Check (User Dashboard):

To avoid scheduling conflicts and ensure smooth operation, the system validates new appointments based on service durations, shop hours, and existing bookings.

How It Works:

- Each selected service has a predefined duration in minutes. The system calculates the total time using:

Total Duration = $\Sigma(\text{service_durations}[\text{each_selected_service}])$

- It computes the appointment's time range:

Start Time = selected date + time

End Time = Start Time + Total Duration

- It checks if the time fits within working hours (07:30–19:30) and detects overlaps with existing appointments using:

Conflict if: $\text{new_start} < \text{existing_end}$ AND $\text{new_end} > \text{existing_start}$

- If valid, the system stores the appointment as 'pending' for admin confirmation. Otherwise, appropriate error messages are shown.

Chapter 4: Implementing and Testing

4.1.1. Tools Used

- DBMS: MySQL
- Operating system: Windows 11
- Platform: PHP
- Web server: XAMPP Server

PHP was used to construct this project since it provided the needed user interface. The primary web technologies that the program will employ are PHP, JavaScript, HTML, and CSS.

This web application is secured by a number of validation methods, and SQL Injections may be avoided.

Appointment Booking for SAW is an online application; you need to have an internet connection.

4.2.Implementation

The implementation phase involved developing the web application using PHP, JavaScript, HTML, and CSS, and integrating it with a MySQL database. This stage ensured all modules function correctly and securely.

4.2.1. Implementation Details of Modules

a. Admin module

The admin module is designed to provide administrative users with the necessary functionalities to manage the overall system and user interactions effectively. This module includes the following features:

1. Manage user information

The admin can view, update, and delete user information. This includes managing user profiles, contact details, and other relevant data. The admin interface provides a form to input and edit user details. Data validation is performed to ensure accuracy and completeness. SQL queries are used to interact with the MySQL database for CRUD (Create, Read, Update, Delete) operations on user data.

2. Manage appointment

This functionality allows the admin to oversee and manage all appointments booked through the system. The admin can view upcoming appointments, modify appointment details, and cancel appointments if necessary. Appointment details can be edited through a form, with changes saved back to the database.

3. View/update total users

This feature provides the admin with a comprehensive view of all registered users, including the ability to update user status and details. The dashboard displays key metrics, such as the total number of users. The admin can filter and search through user records. Bulk update options may be available for changing user statuses or other attributes.

b. User module

The User module is designed to provide regular users with the functionality to manage their vehicles, book appointments, and update their personal information. This module includes the following features:

1. Add/update vehicles

Users can add new vehicles to their profile and update existing vehicle information, such as brand, model, year, and registration details. A form is provided for users to input vehicle details. Data validation checks ensure that all required fields are completed correctly. The information is stored and managed in the MySQL database.

2. Book/update appointment

Users can book new appointments for their vehicles to get serviced and update the details of existing appointments. A booking interface allows users to select a service type, choose a date and time, and specify vehicle details. Appointment data is saved to the database, and availability checks ensure that the chosen slots are free. Users can only cancel appointments through their dashboard, with changes reflected in the system.

3. View/update user information

Users can view and update their personal information, such as contact details, address, and password. A user profile page displays the current information, with editable fields. Data validation and security measures (e.g., password hashing) are implemented to protect user information. Updates are saved to the database, ensuring that user information is current and accurate.

4.3. Testing

Testing is a crucial phase in software development where the application is evaluated to ensure it meets the required standards and functions correctly. It involves various methods such as unit tests and system tests to identify and fix any defects or issues.

4.3.1. Test Cases for Unit Testing

Unit testing in the Appointment Booking for SAW involves testing individual modules against the specifications outlined during the design phase. This testing phase is crucial for verifying the internal logic of each module during the coding process. The objective is to ensure that each module functions correctly according to its intended purpose. Unit tests are conducted as part of the programming stage itself.

Table 1: Add Vehicle

S. N	Data Input	Expected Result	Actual Output	Pass/Fail
1	1. Vehicle Brand: Toyota 2. Vehicle Model: Corolla 3. Vehicle Year: 2020 4. License Plate: ABC1234	A popup message "Vehicle added successfully" appears, and the user is redirected to the user_dashboard.php page.	A popup message "Vehicle added successfully" appears, and the user is redirected to the user_dashboard.php page.	Pass
2	1. Vehicle Brand: Honda 2. Vehicle Model: Civic 3. Vehicle Year: 2018 4. License Plate: ABC1234 (already in the database)	A popup message "Duplicate entry for license plate. Please use a different license plate." appears, and the user remains on the add-vehicle.php page.	A popup message "Duplicate entry for license plate. Please use a different license plate." appears, and the user remains on the add-vehicle.php page.	Pass

Table 2: Delete Vehicle

S. N	Data Input	Expected Result	Actual Output	Pass/Fail
1	Vehicle ID is valid and user is logged in.	A popup message "Vehicle deleted successfully" appears, and the user is redirected to the user_dashboard.php page.	A popup message "Vehicle deleted successfully" appears, and the user is redirected to the user_dashboard.php page.	Pass
2	Vehicle ID is invalid.	A popup message "Invalid request" appears, and the user is redirected to the user_dashboard.php page.	A popup message "Invalid request" appears, and the user is redirected to the user_dashboard.php page.	Pass
3	Deletion fails due to a database error.	A popup message "Error deleting vehicle" appears, and the user is redirected to the user_dashboard.php page.	A popup message "Error deleting vehicle" appears, and the user is redirected to the user_dashboard.php page.	Pass
4	User is not logged in and tries to access the page.	User is redirected to the login page.	User is redirected to the login page.	Pass

Table 3: Update vehicle

S. N	Data Input	Expected Result	Actual Output	Pass/Fail
1	Valid inputs for all fields (brand, model, year, license plate)	Vehicle details are updated successfully, and the user is redirected to the user dashboard with a success alert.	Vehicle details are updated successfully, and the user is redirected to the user dashboard with a success alert.	Pass
2	Empty "brand" field and valid inputs for other fields	An alert is displayed indicating that the "brand" field is required, and the vehicle details are not updated.	An alert is displayed indicating that the "brand" field is required, and the vehicle details are not updated.	Pass
3	Empty "model" field and valid inputs for other fields	An alert is displayed indicating that the "model" field is required, and the vehicle details are not updated.	An alert is displayed indicating that the "model" field is required, and the vehicle details are not updated.	Pass
4	Invalid "year" field (e.g., non-numeric value) and valid inputs for other fields	An alert is displayed indicating that the "year" field must be numeric, and the vehicle details are not updated.	An alert is displayed indicating that the "year" field must be numeric, and the vehicle details are not updated.	Pass

Table 4: Edit profile and vehicle

S. N	Data Input	Expected Result	Actual Output	Pass/Fail
1	Edit Profile with all valid details (first name, last name, email, address, phone)	Profile details are updated successfully, and the user is redirected to the user dashboard.	Profile details are updated successfully, and the user is redirected to the user dashboard.	Pass
2	Edit Profile with an invalid email address	An error message is displayed, and the profile is not updated.	An error message is displayed, and the profile is not updated.	Pass
3	Edit Vehicle with all valid details (brand, model, year, license plate)	Vehicle details are updated successfully, and the user is redirected to the vehicle list page.	Vehicle details are updated successfully, and the user is redirected to the vehicle list page.	Pass
4	Edit Vehicle with invalid year (e.g., year is not a number)	An error message is displayed, and the vehicle is not updated.	An error message is displayed, and the vehicle is not updated.	Pass

4.3.2. Test Cases for System Testing

System testing is a pivotal aspect of quality assurance and serves as the final review of the system's analysis, design, and coding. Test case design is focused on employing various techniques to create tests that meet the overall testing objectives. The primary goal of system testing is to identify any errors in the developed system and rectify them. The scope of system testing encompasses both manual and computerized operations.

System testing evaluates the entire system to verify if it is functioning in alignment with the specified objectives and requirements. All testing activities adhere to the predefined test conditions to ensure comprehensive test coverage and systematic testing procedures. This systematic approach ensures that the testing process is thorough and meets the project requirements effectively.

Table 5: Login

S.N.	Data Input	Expected Result	Actual Output	Pass/Fail
1	Login as an admin with correct credentials	Redirect to admin dashboard	Redirect to admin dashboard	Pass
2	Login as a regular user with correct credentials	Redirect to user dashboard	Redirect to user dashboard	Pass
3	Login with incorrect credentials	Error message displayed	Error message displayed	Pass

Table 6: Signup

S.N.	Data Input	Expected Result	Actual Output	Pass/Fail
1	Register with valid and unique email, phone, and matching passwords	Redirect to login page with success message	Redirect to login page with success message	Pass
2	Attempt to register with an already existing email	Display error message "Email already exists"	Display error message "Email already exists"	Pass
3	Attempt to register with a mismatched password confirmation	Display error message "Passwords do not match"	Display error message "Passwords do not match"	Pass

Table 7: Admin Manage User

S.N.	Data Input	Expected Result	Actual Output	Pass/Fail
1	Delete an existing user	User is deleted from the database	User is deleted from the database	Pass
2	Update an existing user's information	User's information is updated	User's information is updated	Pass
3	View the list of users	List of users is displayed	List of users is displayed	Pass

Table 8: Admin Manage Appointment

S.N.	Data Input	Expected Result	Actual Output	Pass/Fail
1	Update status of an existing appointment	Appointment status is updated	Appointment status is updated	Pass
2	View the list of appointments	List of appointments is displayed	List of appointments is displayed	Pass
3	Cancel an existing appointment	Appointment is marked as canceled	Appointment is marked as canceled	Pass

Table 9:Algorithm

S.N.	Test Case Description	Input Action	Expected Output	Actual Output	Pass/Fail
1	Sort appointments by Priority	Click on "Priority" button	Appointments sorted in order of Priority	As expected	Pass
2	Sort appointments by User ID	Click on "User ID" button	Appointments sorted by ascending User ID	As expected	Pass
3	Sort appointments by Appointment Time	Click on "Appointment Time" button	Appointments sorted by scheduled time	As expected	Pass
4	Sort with no data loaded	Disconnect DB or empty dataset, then sort	"No appointments found" message is displayed	As expected	Pass
5	Sort while server returns error	Trigger a fetch failure (server error)	Error message displayed in `#appointment-container`	As expected	Pass

Chapter 5: Conclusion and Future Recommendations

5.1. Lesson Learnt/ Outcome

Similar to how online platforms are revolutionizing traditional business models, SAW's appointment booking represents a significant shift in the automotive service sector. The incorporation of online functionalities has transformed the way automotive services are accessed and managed, even though physical service centers are still crucial. With the ability to select the services that best meet their needs, customers can now take advantage of the ease of online booking and service delivery.

5.2. Conclusion

For automotive service providers, the adoption of web-based management systems offers unprecedented opportunities for business growth and customer satisfaction. By embracing digital platforms, service providers can streamline operations, enhance service quality, and effectively meet the evolving needs of modern consumers. The Appointment Booking for SAW stands as a testament to the power of technology in reshaping the automotive service landscape, empowering both service providers and customers alike.

5.3. Future Recommendations

To further enhance the Appointment Booking for SAW and its impact on the automotive service industry, several recommendations can be considered:

Mobile Application Development:

Recommendation: Develop a mobile application version of the Appointment Booking For SAW.

Rationale: With the increasing use of smartphones, a mobile app would offer greater convenience and accessibility for customers, allowing them to book services, receive updates, and manage their profiles on-the-go.

Integration of Payment Gateway:

Recommendation: Incorporate a secure online payment gateway within the system.

Rationale: Enabling online payments would streamline the booking process and offer customers the convenience of cashless transactions, improving overall user experience.

Enhanced Customer Feedback System and notification:

Recommendation: Implement a more robust feedback and rating system for services and service providers with sending notification to the relevance user.

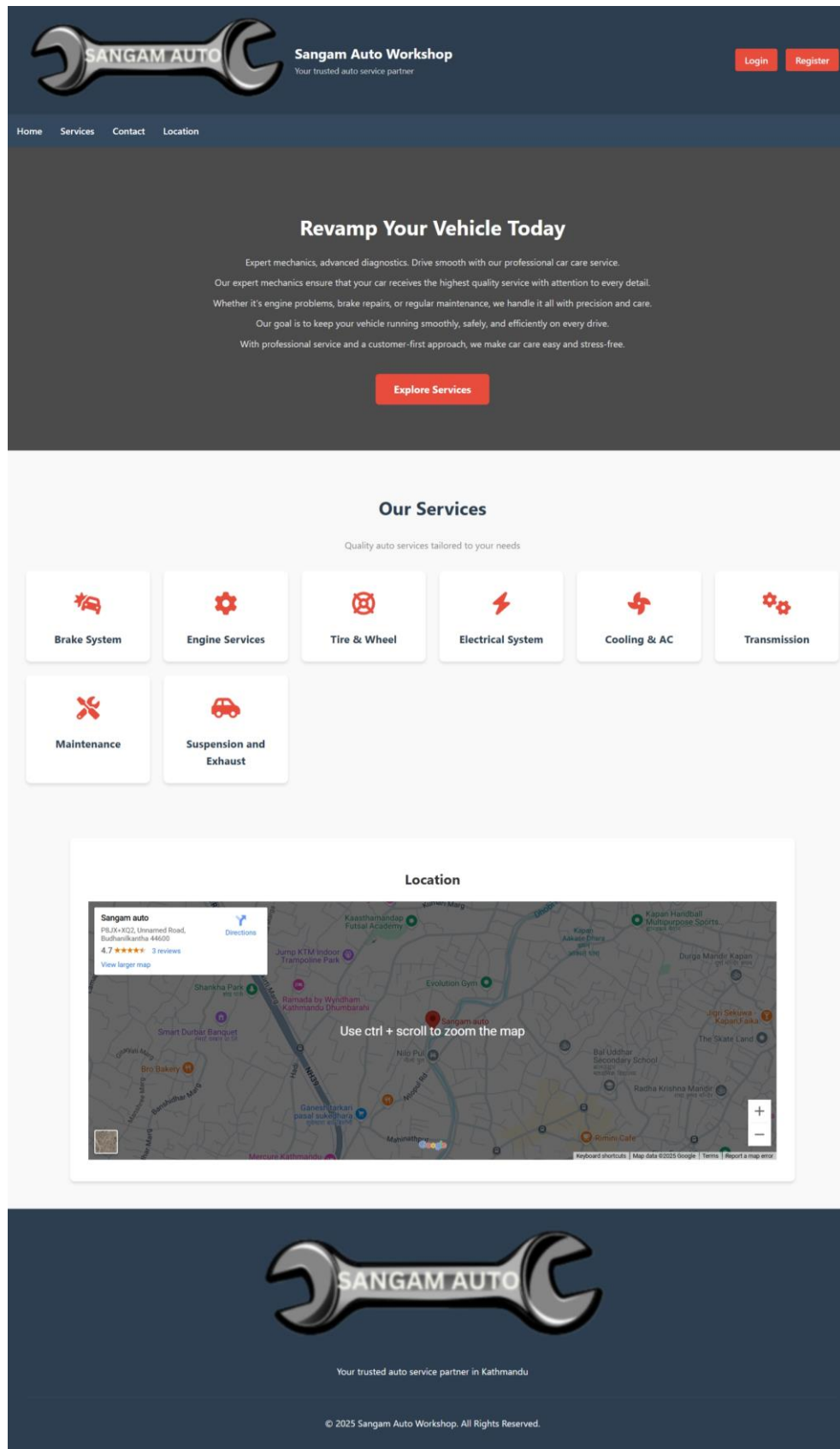
Rationale: Gathering detailed feedback can help improve service quality and customer satisfaction. It also aids in identifying areas for improvement and recognizing top-performing service providers.

References

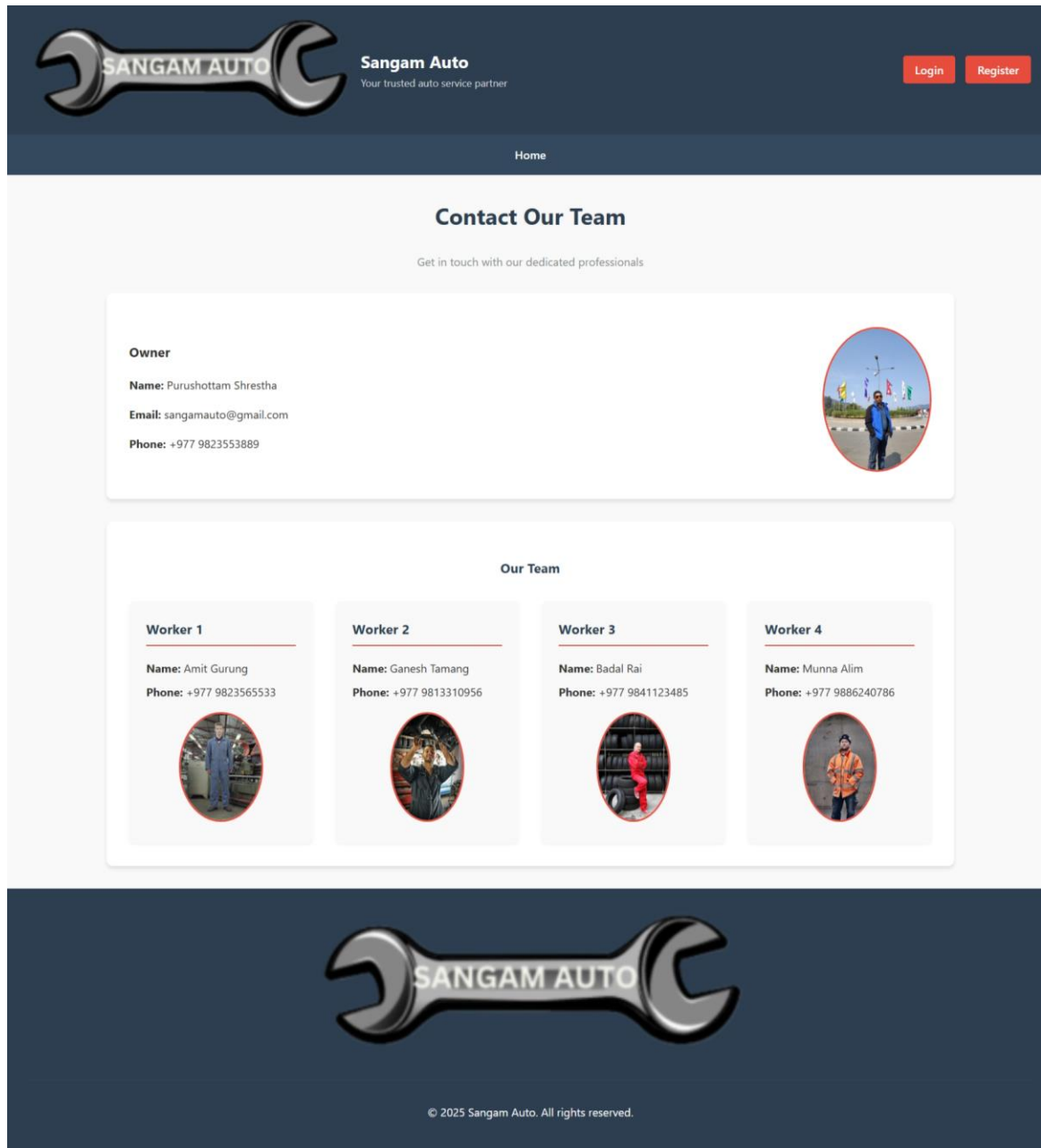
- [1] "Bike Repairs Nepal," [Online]. Available: <https://bikerepairsnepal.com.np>.
- [2] [Online]. Available: <https://kathmanduautomotive.com>.
- [3] B. McLaughlin, PHP & MySQL: The Missing Manual, O'Reilly Media. , 2012.
- [4] R. Nixon, Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5, O'Reilly Media, July 2018.

Appendices

1. Homepage



2. Contact page



3. User registration page

Register for Sangam Auto Workshop

First Name:

Last Name:

Email:

Address:

Phone:


Password (min 8 characters):

Confirm Password:

[Register](#)

Already registered? [Login here](#)

4. Login page



Welcome to Sangam Auto Workshop

Login to manage your appointments

Login as:

User

Email:

Password:

[Login](#)

Don't have an account? [Register here](#).

Go back to homepage? [Click here](#).

5. User Dashboard

User Dashboard

[Click here to Goto Homepage](#)
[Add Vehicle](#)
[Your Vehicles](#)
[Your Appointments](#)
[Your Profile](#)
[Logout](#)

Welcome, Ujjwal!

User ID: 9

Your Vehicles

S.No.	Brand	Model	Year	License Plate	Actions
1	bmw	m3	1998	ba 01 cha 1211	Book Update Delete

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i) Add vehicle

User Dashboard

[Click here to Goto Homepage](#)
[Add Vehicle](#)
[Your Vehicles](#)
[Your Appointments](#)
[Your Profile](#)
[Logout](#)

Welcome, Ujjwal!

User ID: 28

Add Vehicle

Vehicle Brand:

Vehicle Model:

Vehicle Year:

License Plate:

Add Vehicle

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ii) Your vehicle

Click here to Goto
Homepage

Add Vehicle

Your Vehicles

Your Appointments

Your Profile

Logout

User Dashboard

Welcome, Ujjwal!

User ID: 28

Your Vehicles

S.No.	Brand	Model	Year	License Plate	Actions
1	Hundai	City	2009	BA 02 CHA 1111	Book Update Delete
2	suzuki	jeepsi	2010	BA 02 CHA 1112	Book Update Delete

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iii) Book appointment

Book an Appointment


Select Vehicle:

Hundai City (BA 02 CHA 1111) ▾

Date:

07 / 05 / 2025 

Time:

08 : 30 AM 

Shop hours: 7:30 AM to 7:30 PM

Service Bay:

Bay 2 ▾

Service Type(s):

Estimated durations are shown next to each service.

Total Estimated Time: 4h 0m

Brake System

☐ Brake Failure Diagnosis and Repair (2 hrs)

☐ Brake Pad Replacement (1h 30m)

☐ Complete Brake System Check (1 hr)

☒ Brake Fluid Leak Repair (2 hrs)

Engine Services

☐ Engine Won't Start Diagnosis (3 hrs)

☐ Complete Engine Tune-up (4 hrs)

☐ Spark Plug Replacement (1 hr)

☐ Timing Belt Replacement (8 hrs)

☐ Alternator Repair (3 hrs)

☐ Starter Motor Repair (2h 30m)

Tire & Wheel

☐ Flat Tire Repair/Replacement (30 mins)

☐ Professional Tire Rotation (30 mins)

☐ Precision Wheel Alignment (1 hr)

☐ Wheel Balancing (45 mins)

☐ Tire Pressure Check (15 mins)

Electrical System

☐ Battery Replacement (20 mins)

☐ Dashboard Warning Light Diagnosis (1h 30m)

☐ Headlight/Taillight Replacement (30 mins)

☐ Complete Electrical System Diagnostic (4 hrs)

Cooling & AC

☐ AC Not Cooling Diagnosis (1h 30m)

☐ Complete Coolant Flush (1 hr)

☐ Radiator Repair and Maintenance (3 hrs)

Transmission

☐ Transmission Service (4 hrs)

☐ Clutch Repair (8 hrs)

☒ Power Steering Repair (2 hrs)

Maintenance

☐ Oil Change (30 mins)

☐ Air Filter Replacement (15 mins)

☐ Fuel System Cleaning (1 hr)

☐ Regular Maintenance Check (1h 30m)

Suspension & Exhaust

☐ Suspension Repair (5 hrs)

☐ Exhaust System Repair (2 hrs)

Cancel

Book Now

iv) Update vehicle

User Dashboard

Click here to Goto Homepage

Add Vehicle

Your Vehicles

Your Appointments

Your Profile

Logout

Welcome, Ujjwal!

User ID: 9

Update Vehicle

Vehicle Brand:
bmw

Vehicle Model:
m3

Vehicle Year:
1998

License Plate:
ba 01 cha 1211

Update Vehicle

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v) Your Appointment

User Dashboard

Click here to Goto Homepage

Add Vehicle

Your Vehicles

Your Appointments

Your Profile

Logout

Welcome, Ujjwal!

User ID: 9

Your Appointments

Date	Time	License Plate	Brand	Service Type	Status	Action
2025-05-29	14:00:00	ba 01 cha 1211	bmw	Tire Pressure Check	pending	Delete

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vi) Your profile

User Dashboard

[Click here to Goto Homepage](#)

Add Vehicle

Your Vehicles

Your Appointments

Your Profile

Logout

Welcome, Ujjwal!

User ID: 9

Profile

First Name: Ujjwal

Last Name: Shrestha

Email: ujjwalsht123@gmail.com

Address: kamerotar

Phone: 9800000009

Edit Profile

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vii) Edit profile

User Dashboard

[Click here to Goto Homepage](#)

Add Vehicle

Your Vehicles

Your Appointments

Your Profile

Logout

Welcome, Ujjwal!

User ID: 9

Edit Profile

First Name:

Ujjwal

Last Name:

Shrestha

Email:

ujjwalsht123@gmail.com

Address:

kamerotar

Phone:

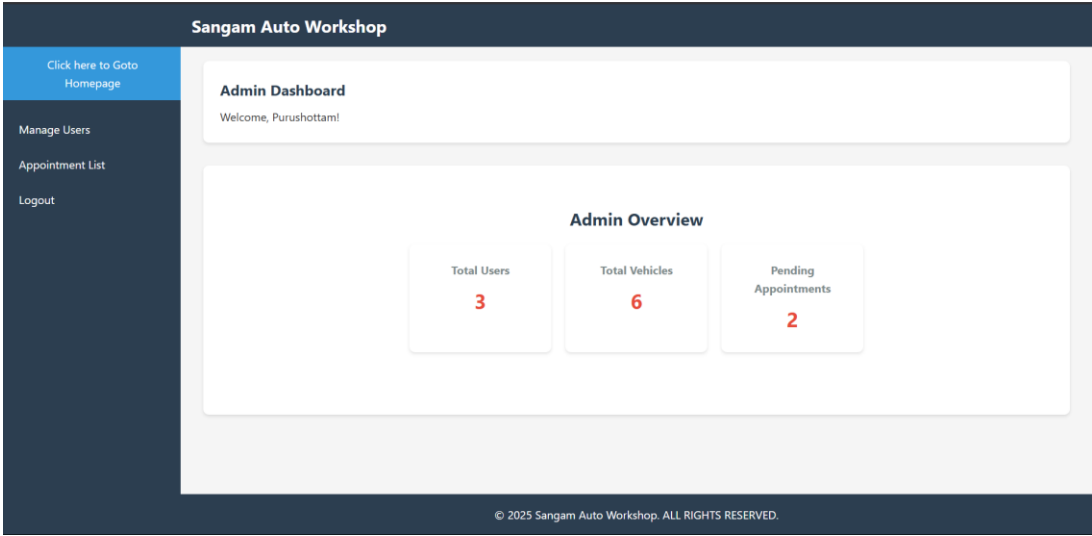
9800000009

Cancel

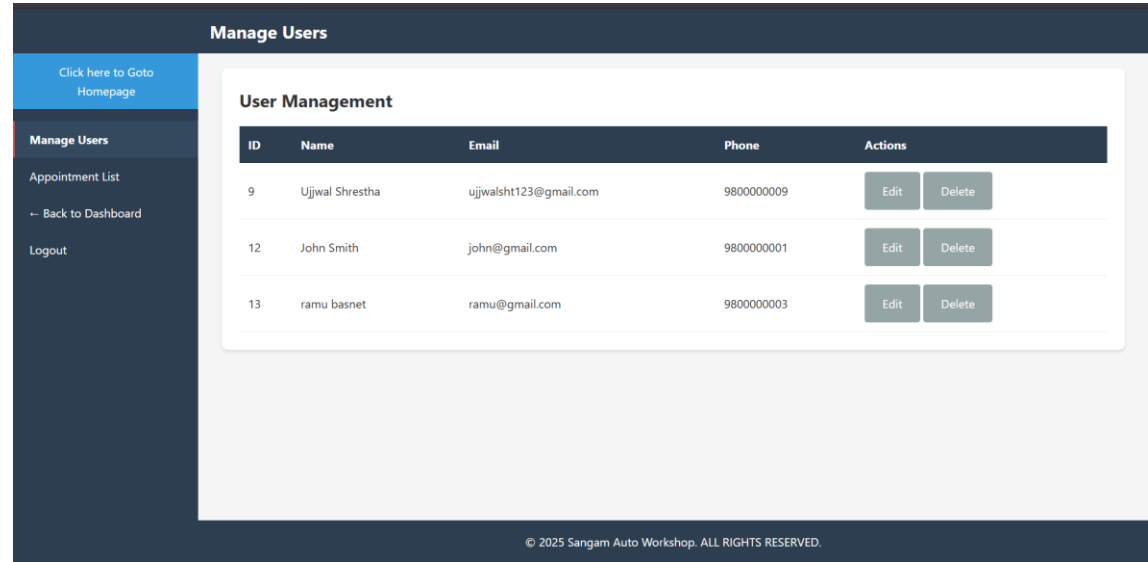
Update

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6. Admin dashboard



I. Manage user



II. Appointment List

