**BIS 698 - Information Systems**

**Master of Science in Information Systems**

**Vehicle Service & Maintenance Management System**

**Client – BookMyRepair**

**Date-**

**Submitted by**

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Contents

[1. Background 1](#_Toc192179073)

[2. Business Problems 1](#_Toc192179074)

[3. Project Description 1](#_Toc192179075)

[4. Project Feasibility 2](#_Toc192179076)

[5.0 Use Case Diagrams 3](#_Toc192179077)

[5.1 User Registration 3](#_Toc192179078)

[6.0 Process Model with DFD 6](#_Toc192179079)

[6.1 Context Diagram 6](#_Toc192179080)

[6.2 Level 0 DFD 7](#_Toc192179081)

[6.3 Entities and Data Stores: 7](#_Toc192179082)

[**1. User (Customer)** 7](#_Toc192179083)

[**2. Mechanic (Service Provider)** 8](#_Toc192179084)

[**3. Admin** 8](#_Toc192179085)

[**4. Data Stores (System Databases)** 8](#_Toc192179086)

[**1.0 User Registration** 8](#_Toc192179087)

[**2.0 Book Appointment** 8](#_Toc192179088)

[**3.0 Provides Resources (Mechanic Management)** 9](#_Toc192179089)

[**4.0 Service Management** 9](#_Toc192179090)

[8.0 Critical Path 11](#_Toc192179091)

[9.0 ERD: 11](#_Toc192179092)

[10.0 Screen Designs 12](#_Toc192179093)

[**Registration Screen** 12](#_Toc192179094)

[Admin Dashboard 13](#_Toc192179095)

[Conclusion: 18](#_Toc192179096)

## 1. Background

Managing vehicle maintenance and repair services efficiently remains a significant challenge for vehicle owners and mechanics. Traditional garage management systems are often limited in scope, focusing only on in-house service tracking without providing users with the flexibility to choose mechanics based on location and availability. The Vehicle Service & Maintenance Management System, developed for BookMyRepair, aims to bridge this gap by enabling users to search for mechanics based on ZIP codes, book services, and track repair status.

This system is designed for independent mechanics and small-to-medium-sized auto repair shops like who are looking to streamline their service management. It also provides customers with seamless experience by allowing them to schedule repairs either at a garage or at their preferred location.

## 2. Business Problems

The vehicle repair industry faces several key challenges that this system aims to solve:

* **Lack of a centralized mechanic search system** – Customers struggle to find reliable mechanics nearby.
* **Inefficient booking process** – Most small garages rely on manual appointment scheduling, leading to inefficiencies.
* **Unclear service timelines** – Customers often lack visibility into how long repairs will take.
* **No structured pricing system** – Service costs vary widely, leading to confusion for customers.
* **Absence of a digital invoicing system** – Many mechanics still use paper invoices, making record-keeping difficult.

This system addresses these challenges by **providing a structured digital solution** that enhances both customer experience and mechanic/repair shops efficiency.

## 3. Project Description

#### 3.1 System Purpose

The **Vehicle Service & Maintenance Management System** is designed to simplify vehicle repair service management by:

* Allowing customers to search for mechanics based on ZIP code.
* Enabling mechanics to register their businesses and receive admin approval.
* Providing a simple appointment booking system for users to schedule services.
* Offering the option for home service or workshop visits.
* Generating basic invoices for completed services.

#### 3.2 Core Functional Requirements

The system will include the following **key features**:

**For Customers (Vehicle Owners):**

* **Search for Mechanics** – Locate mechanics based on ZIP code.
* **Mechanic Profile View** – View mechanic details, services offered, and pricing.
* **Basic Service Booking** – Book a repair service with a mechanic/repair shop.
* **Choose Service Mode** – Select Home Service or Workshop Visit.
* **Basic Service Status Updates** – View simple updates like "In Progress" or "Completed."
* **Basic Invoice Generation** – Download a PDF invoice for completed services.

**For Mechanics (Service Providers):**

* **Business Registration** – Submit a service listing for admin approval.
* **Admin Approval System** – Mechanic registration requires admin review.
* **View Bookings** – Mechanics can manually check their booked services.
* **Mechanic Pricing Setup** – Mechanics will set standard pricing within the system.

**For Admin:**

* **Manage Mechanic Approvals** – Approve or reject new mechanic registrations.
* **Basic User & Mechanic Management** – Oversee system users and bookings.

#### 3.3 Out-of-Scope Features

* **Advanced Appointment Management** – No dynamic time slots; bookings are manual.
* **Live Repair Tracking** – No real-time GPS tracking, only status updates.
* **Dynamic Availability Scheduling** – Mechanics don’t set detailed work hours.
* **Ratings & Reviews System** – No customer feedback or rating system.
* **Automated Price Adjustments** – Prices are manually set by mechanics.
* **In-App Messaging** – No direct chat feature between users and mechanics.
* **Mechanic Service Status Updates** – Removed mechanic-side status updates for simplicity.

## 4. Project Feasibility

#### 4.1 Economic Feasibility

The system is cost-effective as it eliminates the need for expensive third-party booking platforms. By streamlining service booking and billing, mechanics can reduce administrative overhead, and customers benefit from better service transparency. The potential revenue generation for mechanics through increased customer reach justifies the system’s cost.

|  |  |
| --- | --- |
| **Cost Component** | **Estimated Cost (USD)** |
| **Software Development** | $3,500 - $5,000 |
| **Database & Hosting** | $300 - $800 |
| **Maintenance & Support** | $500 per year |
| **Marketing & Promotion** | $1,000 - $2,000 |
| **Training & Documentation** | $500 |
| **Total Estimated Cost** | $5,800 - $8,800 |

#### 4.2 Technical Feasibility

The system is **technically feasible** with the following stack:

* **Frontend:** Tkinter/Custom Tkinter (for a simple GUI interface)
* **Backend:** MySQL (for database management), Python for App. framework
* **PDF Invoice Generation:** Built-in Python libraries (Report Lab or FPDF)

Given that the technology stack is widely used and well-documented, the project is feasible from a development standpoint.

#### 4.3 Schedule Feasibility

The project is expected to be completed within one academic term.The development timeline will be structured as follows:

* **Week 1-2:** System design and database setup
* **Week 3-4:** Frontend and backend development
* **Week 5-6:** Integration of core functionalities
* **Week 7-8:** Testing and final refinements

#### 4.4 Operational Feasibility

The system is easy to operate for customers, mechanics, and admins, as it requires minimal training. The interface will be designed with simplicity in mind, ensuring smooth adoption by non-technical users.

## Use Case Diagrams

### 5.1 User Registration

|  |
| --- |
| **Use Case Name:** User Registration **ID:** UC-1 **Priority:** High |
| **Actor:** Customer |
| **Description:** Allows customers to register and access the system. |
| **Trigger:** A new user wants to register an account**.** |
| **Type:** External |
| **Preconditions:**   1. **The system is accessible online.** |
| **Normal Course:**   1. The user navigates to the registration page. 2. The user fills in the registration form with name, email, and password. 3. The user submits the form. 4. The system validates the email. a. If the email is unique, the system creates an account. b. If the email exists, an error message is displayed. 5. The system stores user data. 6. The system confirms registration. |
| **Postcondition:**   1. The new user is registered. 2. The user is eligible to log in. |

#### 5.2 User Login

|  |
| --- |
| **Use Case Name:** User Login **ID:** UC-2 **Priority:** High |
| **Actor:** Customer, Admin, Mechanic |
| **Description:** Allows users to log in to the system. |
| **Trigger:** A user attempts to access their account. |
| **Type:** External |
| **Preconditions:**   1. The user must be registered. |
| **Normal Course:**   1. The user navigates to the login page. 2. The user enters login credentials. 3. The system validates the credentials. 4. If correct, access is granted. 5. The user is directed to their dashboard 6. If incorrect, an error message is displayed. |
| **Postcondition:**   1. The user accesses their account. 2. The system logs the user session. |

#### 5.3 Service Booking

|  |
| --- |
| **Use Case Name:** Book a Service **ID:** UC-3 **Priority:** High |
| **Actor:** Customer |
| **Description:** Customers can book a mechanical service. |
| **Trigger:** A user wants to book a service. |
| **Type:** External |
| **Preconditions:**   1. The user must be logged in. |
| **Normal Course:**   1. The user searches for available mechanics by ZIP code. 2. The user selects a mechanic and service type. 3. The user selects Home Service or Workshop Visit. 4. The user confirms booking. 5. The system updates the mechanic’s schedule and stores booking details. 6. The system sends booking confirmation |
| **Postcondition:**   1. The service is booked successfully. 2. Notification will be sent to the customer |

#### 5.4 Mechanic Registration

|  |
| --- |
| **Use Case Name:** Mechanic Registration **ID:** UC-4 **Priority:** High |
| **Actor:** Mechanic |
| **Description:** Customers can book a mechanical service. |
| **Trigger:** A user wants to book a service. |
| **Type:** External |
| **Preconditions:**   1. The mechanic must have valid business details |
| **Normal Course:**   1. The mechanic fills out a registration form. 2. The mechanic submits the registration request. 3. The system validates details and stores them. 4. Admin reviews and approves or rejects the request. 5. Upon approval, the mechanic account is activated. |
| **Postcondition:**   1. The service is booked successfully. 2. Notification will be sent to the customer |

#### 5.5 Report Generation

|  |
| --- |
| **Use Case Name:** Generate Report **ID:** UC-5 **Priority:** High |
| **Actor:** System |
| **Description:** Customers can book a mechanical service. |
| **Trigger:** A user wants to book a service. |
| **Type:** External |
| **Preconditions:**   1. At least one service booking must be completed |
| **Normal Course:**   1. The system identifies a completed service. 2. The system generates a PDF with booking details. 3. The system sends the report to the admin |
| **Postcondition:**   1. The report is successfully generated and sent. 2. The admin will have complete booking details. |

## 6.0 Process Model with DFD

### 6.1 Context Diagram

A diagram of a vehicle maintenance management system

AI-generated content may be incorrect.

### A diagram of a software development AI-generated content may be incorrect.6.2 Level 0 DFD

## 6.3 Entities and Data Stores:

**1. User (Customer)**

* The **main actor** who interacts with the system to **register, book a mechanic, and track appointments**.
* Customers can **view available mechanics**, **choose services**, and **receive appointment confirmations**.

**2. Mechanic (Service Provider)**

* The mechanic provides repair services and interacts with the system by accepting bookings, updating service status, and confirming appointments.
* Mechanics must register their business and get admin approval before they can receive bookings.

**3. Admin**

* The admin is responsible for approving mechanics, managing services, and monitoring the overall system performance.
* The admin also processes reports and ensures mechanics comply with system requirements.

**4. Data Stores (System Databases)**

* **D1: User Data Store** – Stores customer registration and login credentials.
* **D2: Appointment Data Store** – Stores booking details, appointment dates, and statuses.
* **D3: Service Data Store** – Stores available repair services and pricing.
* **D4: Mechanic Data Store** – Stores mechanic profiles, availability, and approvals.

**Processes and Their Functions:**

**1.0 User Registration**

* **Purpose:** Allows customers to create an account to book services.
* **Input:** Customer enters name, email, password to sign up.
* **Process:**
  1. The user accesses the registration page.
  2. The system validates user details (checks if the email already exists).
  3. If validation is successful, the system stores the user’s details in D1: User Data Store.
* **Output:**
  1. If the registration is successful, the user can log in and proceed with booking services.
  2. If registration fails (e.g., duplicate email), the user receives an error message.

**2.0 Book Appointment**

* **Purpose:** Allows customers to book a vehicle service with a mechanic.
* **Input:** Customer selects a service and mechanic.
* **Process:**
  1. The user logs in and searches for mechanics based on ZIP code.
  2. The system fetches available mechanics from D4: Mechanic Data Store.
  3. The system retrieves service details from D3: Service Data Store (service types, costs, estimated time).
  4. The user selects a mechanic and chooses service mode (Home Service or Workshop Visit).
  5. The system stores the booking in D2: Appointment Data Store and sends a confirmation to the customer and mechanic.
* **Output:**
  1. Customers receive booking confirmation and estimated repair time.
  2. Mechanics get notified about new service requests.

**3.0 Provides Resources (Mechanic Management)**

* **Purpose:** Ensures mechanics are registered, approved, and assigned bookings.
* **Input:** Mechanics request to register their business.
* **Process:**
  1. Mechanics fill out a registration form.
  2. The system validates mechanic details and stores them in D4: Mechanic Data Store.
  3. The admin reviews the registration request and either approves or rejects the mechanic.
  4. If approved, the mechanic profile becomes active, and they start receiving bookings.
  5. When a customer books an appointment, the system fetches mechanic details from D4: Mechanic Data Store to match them with the correct service.
* **Output:**
  1. Mechanics receive a confirmation of approval.
  2. Admin receives pending registration requests for verification.
  3. Customers can now view and book approved mechanics.

**4.0 Service Management**

* **Purpose:** The admin manages mechanic approvals, service requests, and system **reports**.
* **Input:** The admin processes mechanic approval requests and service data.
* **Process:**
  1. The admin receives mechanic approval requests and verifies their credentials.
  2. If approved, the mechanic is added to the system and can receive service bookings.
  3. The admin monitors services and bookings, making sure the system functions properly.
  4. The system generates reports for the admin, summarizing appointments, user activity, and mechanics’ performance.
* **Output:**
  1. Approved mechanics get access to customer bookings.
  2. Admins receive reports on system performance and service requests.

**Data Flows in the System**

1. **Customer Registration:** Data is stored in D1 (User Data Store).
2. **Booking an Appointment:** The system fetches service details from D3 (Service Data Store), matches a mechanic from D4 (Mechanic Data Store), and stores the appointment in D2 (Appointment Data Store).
3. **Mechanic Approval:** The admin validates mechanic requests and updates D4 (Mechanic Data Store).
4. **Appointment Confirmation:** Customers and mechanics receive notifications about service status updates.

7.0 Task List

A screenshot of a computer

AI-generated content may be incorrect.

## 8.0 Critical Path

A screenshot of a computer

AI-generated content may be incorrect.

## 9.0 ERD:

A screenshot of a computer

AI-generated content may be incorrect.

## 10.0 Screen Designs

Login Screen

A car towing a tow truck

AI-generated content may be incorrect.

**Registration Screen**

A registration form with text and images

AI-generated content may be incorrect.

Mechanic Dashborad

A screenshot of a computer

AI-generated content may be incorrect.

Admin Dashboard

A person working on a car

AI-generated content may be incorrect.

User Dashboard

A screenshot of a user interface

AI-generated content may be incorrect.

Service Booking Screen

A screenshot of a car service

AI-generated content may be incorrect.

Mechanic Appointments Screen

A screenshot of a calendar

AI-generated content may be incorrect.

Mechanic Requests Screen

A screenshot of a computer

AI-generated content may be incorrect.

Appointment Booking Conformation

A black and white image of a gear

AI-generated content may be incorrect.

Users Appointments Booked Screen

A screenshot of a computer

AI-generated content may be incorrect.

Admin Approval Screen

A screenshot of a computer

AI-generated content may be incorrect.

Report Screen

A screenshot of a computer

AI-generated content may be incorrect.

Conclusion: The Vehicle Service & Maintenance Management System enhances the efficiency of vehicle repair services by allowing customers to search for mechanics, book appointments, and track service progress. Mechanics can manage bookings, while admins oversee mechanic approvals and service operations. The Level-0 DFD and use case diagrams illustrate the system’s functionality, ensuring a structured and transparent service workflow. By implementing this system, BookMyRepair can streamline its operations, reduce manual inefficiencies, and improve customer satisfaction