

# Car Wash Reservation Management System with Membership and Promotional Features

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**Abstract:** The standard of individuals has increased. This has driven the growth of the number of people owning a private car since it is time-saving and convenient. This, in turn, has increased the need for car wash service providers which has led to the demand for car wash management systems to manage their customers. Car Wash Management System with Membership and Promotional Features has been developed to help car service providers to manage their customers to schedule their car wash timeslot booking and manage their membership benefits and help the car wash service administrator to manage their customer reservations and payment processing.

**Key words:** Car Wash Management System; Booking System; Information Management

## Introduction

Businesses are transforming rapidly in this software era. An increasing number of conventional industries are now utilizing software in their business processes including having a dedicated website and mobile application. Traditional auto maintenance includes the vehicle cleaning services sector. The majority of car wash businesses lack a reservation management system to efficiently manage clients' reservations, memberships, reward programs, and other systems. Hence, the development of a reservation management system for car washes will assist the sector in creating a faultless management structure and enable customers to gain more value from the car wash services provider

## Problem Statement and Research Questions

The majority of car wash businesses still manage reservations in a traditional manner, and the sector continues to overlook the potential advantages of having a thorough reservation management system. Inefficient workflow is caused by the high rate of human error in the manual reservation administration at the car wash center. This is especially true when communication breakdowns result in disagreements, confusion, and misunderstandings.

Using automation and algorithms in business processes to generate additional value for clients is a major problem for the sector because car wash companies lack a comprehensive reservation management system with membership and promotional features.

The research questions are as follows:

1. What are the challenges faced by the car wash industry without the implementation of a reservation management system?
2. What are the key features required for the reservation management system to ensure its relevance to the car wash industry?
3. What is the additional value creation that can be offered to the customers of the car wash companies with the implementation of a reservation management system?

## Solution and the Impact of Innovation

The solution entails developing a single mobile application with a clear and straightforward user interface for customers to conveniently schedule car washes and manage their membership benefits, and a separate mobile application for car wash center administrators to carry out their crucial duties, such as managing customer reservations and processing payment.

Customers can now instantly reserve their vehicle wash appointments using the mobile application, saving time on calls to the car wash center for appointment inquiries, thanks to the solution. The membership system, which can be seen and managed through the same application, also offers customers extra benefits.

Low administrative error rates and great operating efficiency have a positive impact on car wash businesses by increasing client satisfaction and customer retention rates. The application's promotional capabilities also assist car wash businesses in ensuring the success of their marketing and promotion plans.

## Research Methodology

A sequential, plan-driven process is the waterfall model. Before beginning the project, the user must plan and organize all of the actions. The waterfall model depicts each activity as a distinct stage that proceeds in a linear

fashion. Requirements, design, implementation, testing, deployment, and maintenance made up the six stages of the waterfall model. The requirements are gathered and examined in the first stage. The requirements specification file will contain a complete list of all potential requirements for the system being created. To understand the needs, brainstorm and practice. To determine if the requirements could be tested or not, it was crucial to conduct a requirement feasibility test. The system design was to be prepared in the second step, which involved studying the requirements specifications from the previous stage. The system design aids in defining the overall system architecture as well as the hardware and system requirements. The third stage's implementation was based on the system designer's suggestions. The system was initially created in a little program known as a unit, and it was then incorporated in the following stage. Unit testing refers to the development and functional testing of each unit.

The fourth stage then involved testing each unit and integrating all of the ones created during the implementation stage into a single system. After integration, test the entire system for errors and faults. Verify the system runs without a hitch. When both functional and non-functional tests are finished in the fifth stage, the system is deployed in the customer environment or made available for purchase. The user environment's system may have some issues in the sixth stage. In order to address these issues, the system would regularly release patches. Better versions had also been released to improve the product. To introduce these modifications into the user environment, perform maintenance.

Before moving on to the next stage, one or more documents from each stage must be accepted. In reality, though, these steps may overlap and even give each other information. The resulting documents may need to be altered to reflect changes because the software process was not linear. The waterfall model is simple to comprehend and apply. After the specification is finished, the customer is just minimally involved. It is rigid and thus it cannot change to accommodate new circumstances. Until the very end, the user cannot inspect or test the software. The waterfall model was well suited for use because the project had a thorough understanding of the requirements and was not expected to change them significantly.

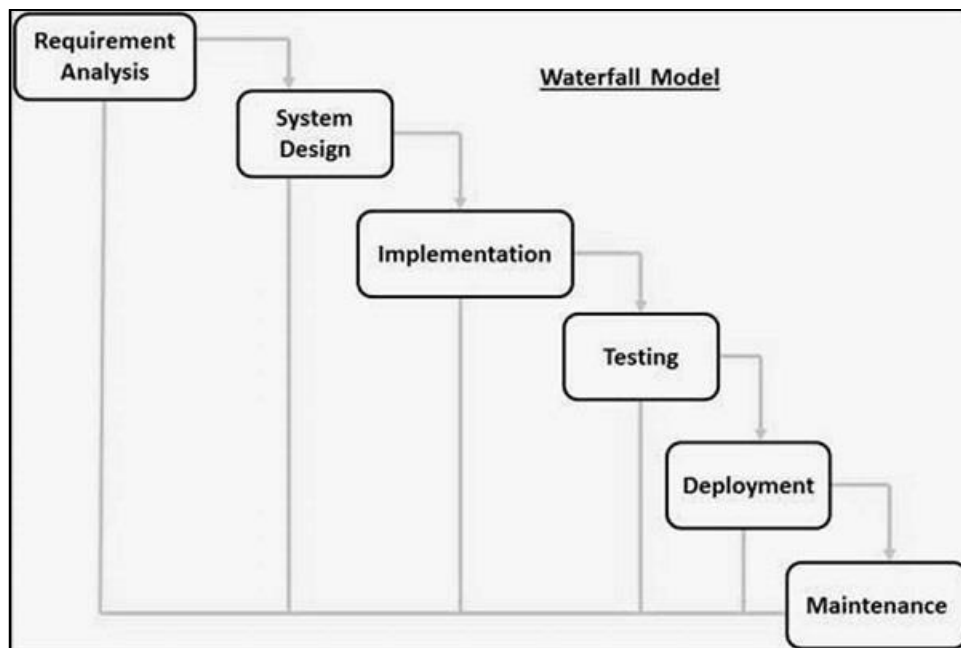


Figure 1: Waterfall Model

**Expected Result**

The expected result for this system's functionalities is described in Table 1 below.

Table 1: System Functionalities and Expected Output

Functionalities	Expected Output
Login	Verified and authenticated system user redirected to home page.
Account Registration	A new account was created with the user's details.
Reservation Management	View, filter, create, pay, update, or cancel car grooming services for registered users.
Notification	All notification(s) displayed successfully.
Membership	Membership level and member point(s) are correctly shown.
Subscription	New subscription shown and allowed direct purchase with all purchased packages displayed.
Log out	The user logged out of his or her account and was redirected to the Login page.

Reservation Management (Admin)	Admin(s) view and sort reservations.
Package Management (Admin)	Admin(s) add, edit, and delete packages.
Notification Management (Admin)	New notifications can be viewed, inserted, edited, and deleted for marketing purposes.
Referral management (Admin)	Referral rewards can be edited.
Member Point Management (Admin)	The rule for member points earned from the amount spent can be modified.
User Management (Admin)	User status can be viewed, deactivated, or reactivated by the admin.
Branch Management (Admin)	Branch status can be viewed, deactivated, or reactivated by admin.
Service Management (Admin)	Service provided by the car wash center can be added, modified, removed, or viewed.
Refund	Users can receive the refunded amount successfully and the corresponding confirmation.

**Findings and Discussion**

With this innovation, some additional findings were discovered that may be of interest to users. While registering, the car wash reservation management system did not use SMS verification. The authorized user's authenticity is not achieved in this way. A message with an SMS permission code will be sent to them if SMS verification was provided. After that, the user will be required to enter the code into the program or website. The SMS code's verification can confirm a user's identification. Hence, SMS authentication was a quick and affordable way to verify user identity.

Second, the car washing reservation management system only accepts payments made online through bank cards. Hence, having just one payment option was a hassle for users. Sales would rise if a variety of payment options, like e-wallets, internet banking, etc., were supported.

Third, there is no reminder function offered by the car wash reservation management system. The user was not asked for the reservation time when it was getting close to it. Users can find it simpler to forget their appointment as a result. Besides, the navigation of the vehicle washing reservation management system is not flawless, which may cause consumers to have a bad experience and make them less inclined to use the system again.

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