UE22CS341A: Software Engineering

Case Study

Unit 1 Deliverable

A Software Requirements Specification (SRS) document for an **Online Motorcycle Bike Rental System using the Waterfall Model**.

1. Introduction

1.1 Purpose

This document specifies the requirements for the Online Motorcycle Bike Rental System. The system aims to provide a fast, reliable, and user-friendly platform for renting motorcycles. Users can register, log in, book bikes, and manage their profiles, while administrators manage vehicle listings, bookings, and user accounts.

1.2 Scope

The Online Motorcycle Bike Rental System is designed for customers who wish to rent motorcycles through a web-based platform. The system supports user registration, bike bookings, rental management, and administrative functions such as managing vehicles and bookings.

1.3 Definitions, Acronyms, and Abbreviations

- **PHP:** Hypertext Preprocessor
- **MySQL:** A popular open-source relational database management system
- **UI:** User Interface
- **CRUD:** Create, Read, Update, Delete

1.4 References

- IEEE Standard for Software Requirements Specifications (IEEE Std 830-1998)
- Project-related documentation, including the system design document and user manuals.

1.5 Overview

The document is organized into sections detailing the system's overall description, specific functional and non-functional requirements, external interfaces, and other system attributes.

2. Overall Description

2.1 Product Perspective

The Online Motorcycle Bike Rental System is an independent web application that interacts with a MySQL database to manage user data, vehicle information, and rental transactions. It is accessible via any modern web browser and is intended for use by customers and administrators.

2.2 Product Functions

- **User Registration and Login:** Users can create accounts, log in, and manage their profiles.
- **Bike Search and Booking:** Users can search for available motorcycles, view details, and book them.
- **Booking Management:** Users can view and manage their bookings.
- **Administrative Functions:** Admins can manage vehicle listings, bookings, testimonials, contact queries, and registered users.
- **Dashboard:** Provides a summary of the system's current status, including active rentals, registered users, and system messages.

2.3 User Classes and Characteristics

- **Customers:** Individuals looking to rent motorcycles. They need a simple and intuitive interface to search for and book bikes.
- **Administrators:** Personnel responsible for managing the fleet, bookings, and user accounts. They require detailed access to all system functionalities and data.

2.4 Operating Environment

- **Software:** Web-based application running on PHP with MySQL as the database.
- **Hardware:** The system requires a server capable of running PHP and MySQL. Users access the system via modern web browsers on PCs, tablets, or smartphones.

2.5 Design and Implementation Constraints

- **Security:** The system must ensure the security of user data and transactions.
- **Scalability:** The system must handle an increasing number of users and bookings as the business grows.
- **Compliance:** Adherence to relevant data protection regulations is mandatory.

2.6 Assumptions and Dependencies

- The system assumes reliable internet access for users.
- Regular maintenance of the server and database is assumed for optimal performance.

3. External Interface Requirements

3.1 User Interfaces

- **Web Interface:** User-friendly interface for booking and managing bike rentals.
- **Admin Dashboard:** Comprehensive dashboard for managing system operations, accessible only to authorized administrators.

3.2 Hardware Interfaces

- **Server:** A web server running PHP and MySQL.
- **Client Devices:** Desktops, laptops, tablets, and smartphones with modern web browsers.

3.3 Software Interfaces

- **MySQL Database:** Interface for storing and retrieving data related to users, vehicles, bookings, and other system entities.
- **Payment Gateway:** Integration with a secure payment processor for handling online payments.

3.4 Communication Interfaces

- **HTTPS:** Secure communication between the client and server using SSL/TLS protocols.
- **API Integration:** Possible future integration with third-party services via RESTful APIs.

4. System Features

4.1 User Authentication

- **Description:** Secure user registration and login system.
- **Functional Requirements:**
    - The system shall allow users to register with a valid email and password.
    - The system shall validate user credentials during login.
    - The system shall provide password recovery options.

4.2 Bike Search and Booking

- **Description:** Users can search for available bikes and book them.
- **Functional Requirements:**
    - The system shall allow users to search for bikes by location, brand, or availability.
    - The system shall display detailed information about each bike.
    - The system shall allow users to book bikes and confirm reservations.

4.3 Booking Management

- **Description:** Users can view and manage their bookings.
- **Functional Requirements:**
    - The system shall display a list of all current and past bookings for the user.
    - The system shall allow users to cancel or modify upcoming bookings.

4.4 Admin Management

- **Description:** Administrative functions for managing the system.
- **Functional Requirements:**
    - The system shall allow admins to add, edit, or remove bike listings.
    - The system shall allow admins to manage user accounts and bookings.
    - The system shall generate reports on system usage, bookings, and payments.

5. Non-Functional Requirements

5.1 Performance Requirements

- The system shall handle up to 100 concurrent users with minimal performance degradation.
- The system shall load any page within 3 seconds under normal conditions.

5.2 Security Requirements

- The system shall encrypt all sensitive data, including user passwords and payment information.
- The system shall enforce strong password policies.

5.3 Usability Requirements

- The system shall provide an intuitive and easy-to-navigate user interface.
- The system shall support mobile and desktop browsers.

5.4 Reliability Requirements

- The system shall have an uptime of at least 98 %.
- The system shall be recoverable from a crash within 15 minutes.

6. Other Requirements

6.1 Regulatory Requirements

- The system shall comply with local and international data protection regulations, including GDPR where applicable.

6.2 Environmental Requirements

- The system shall be operational in any environment where a stable internet connection is available.

7. Requirements Traceability Matrix (RTM)

Requirement ID	Requirement Description	Design Specification	Implementation Module	Test Case ID
1	User Registration and Authentication	Section 4.1	Auth Module	TC-001
2	Motorcycle Search and Booking	Section 4.2	Booking Module	TC-002
3	Booking Management	Section 4.3	Booking Module	TC-003
4	Administrative Management	Section 4.4	Admin Module	TC-004
5	Dashboard Overview	Section 4.5	Dashboard Module	TC-005