Software Requirements Specification

for

BOOK STORE

**Version 1.0 approved**

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**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Initial | 27/09/2024 | The first version of SRS | 1.0.0 |
|  |  |  |  |

# Introduction

## Document Purpose

This document describes the software requirements for the Online Bookstore Management System (BookStore). The system is designed to optimize the business processes of the bookstore, including inventory management, sales monitoring, order management, and customer interaction. The main objective of the system is to provide a convenient book shopping experience for customers while reducing the workload for the bookstore staff and owners.

This document serves the stakeholders as follows:

* **Developers:** To clearly understand functional and non-functional requirements, ensuring that the system development aligns with the set objectives.
* **Project Management:** To track progress, manage timelines, and ensure that the final product meets the specified requirements.
* **Users:**
  + **Admin:** Manages the system, including books, staff, customers, and transactions.
  + **Staff:** Manages invoices, books, inventory, and customer service.
  + **Customers:** Browse books, place orders, make payments, and participate in promotional programs.
* **Testers:** Design and test to ensure the system operates according to the functional requirements and desired performance.
* **Documentation Writers:** To create user guides, technical manuals, and other relevant documents that will support the training and onboarding of end users. This document will serve as the foundational reference for preparing the necessary documentation for all user types.

This document ensures that all relevant stakeholders have a clear understanding of the system's objectives, functionalities, and expectations, providing a structured roadmap for both the development and deployment phases.

## Document Conventions

This document adheres to the IEEE SRS standard.

Symbols used in the document:

* FR: Functional Requirement
* NFR: Non-functional Requirement

## Project Scope

The BookStore Management System project aims to develop a comprehensive bookstore management system that serves both business needs and customer experiences. The system will provide an e-commerce platform combined with internal management tools to ensure process optimization and enhanced customer service quality.

* For Customers: Customers can search for books, make purchases, pay online, and contact support staff through a real-time chatbox.
* For Staff and Admin: The system provides tools to manage inventory, invoices, customers, finances, and human resources, helping streamline daily operations and minimize manual errors.
* Real-time Connectivity: The system uses WebSocket for the chat feature to improve interaction between customers and staff, enhancing customer support efficiency.

## Key Objectives:

* Efficiency and Automation
  + Automate processes such as inventory management, order processing, invoicing, and payroll to reduce manual errors.
  + Provide real-time reports on financials, sales, and inventory, enabling staff and managers to make quick decisions.
  + Employee schedule management: Admins can easily assign shifts and monitor employee performance.
* Improved Customer Experience
  + Easy ordering and payment: Customers can search for books, add them to their cart, and complete payments quickly with multiple payment methods (COD, credit card, e-wallet).
  + Real-time order updates: Users can track their order status through automated notifications.
  + Real-time support chatbox: Staff can respond to customer queries immediately via WebSocket, improving customer satisfaction.
  + Smart recommendations: Based on shopping history, the system suggests books that match customers' interests.
* Data-Driven Decision Making
  + Detailed analytics and reporting: Provide daily, monthly, and yearly charts and reports to monitor revenue and inventory.
  + Customer data analysis: Store and analyze customer interactions to create targeted marketing campaigns and promotions.

## Major Features in This Release (Version 1.0):

* **Đăng nhập và phân quyền người dùng**:
  + Phân quyền rõ ràng cho admin, nhân viên và khách hàng để bảo đảm an ninh dữ liệu.
  + Khách hàng và nhân viên có tài khoản riêng để truy cập và thực hiện các chức năng liên quan.
* **Quản lý sản phẩm**:
  + Admin có thể thêm, chỉnh sửa và cập nhật thông tin sách (tựa đề, tác giả, thể loại, giá cả và số lượng).
  + Khách hàng có thể tìm kiếm, xem chi tiết và đánh giá sách.
* **Quản lý hóa đơn và đơn hàng**:
  + Admin và nhân viên có thể xác nhận, chỉnh sửa và xem chi tiết hóa đơn.
  + Khách hàng theo dõi đơn hàng của mình và xem trạng thái thanh toán.
* **Hỗ trợ thanh toán đa hình thức**: Thanh toán qua thẻ tín dụng, ví điện tử, và COD, giúp người dùng linh hoạt lựa chọn phương thức phù hợp.
* **Quản lý khách hàng và tương tác trực tiếp**: Khách hàng có thể cập nhật thông tin cá nhân, xem lịch sử mua hàng và yêu cầu hỗ trợ thông qua chatbox.
* **Chatbox thời gian thực**: Hệ thống **WebSocket** cho phép khách hàng và nhân viên giao tiếp ngay lập tức, tăng cường sự hài lòng của khách hàng và cải thiện hiệu suất dịch vụ.

## Long-Term Vision:

*This document covers the requirements for version 1.0 of the system. Future releases will build upon this foundation by incorporating mobile compatibility, third-party integrations (e.g., external booking platforms), and advanced analytics to further enhance the system's capabilities and meet evolving business needs.*

*For more detailed information about the long-term vision of the product, refer to the Vision and Scope Document.*

## References

* *ISO/IEC 9126: Software Engineering - Product Quality*
* *User Interface Guidelines for Modern Web Applications*

# Overall Description

## Product Perspective

*This system replaces an older system that requires manual processes for most operations. The new system will automate tasks like booking management, payment processing, and customer feedback, and it will provide real-time data for managers.*

## User Classes and Characteristics

* ***Admin****: Full access to all features (rooms, services, payments, reports).*
* ***Receptionist****: Can manage bookings, payments, and customer check-ins.*
* ***Customer****: Can book rooms, view their booking history, and manage their profiles.*

## Operating Environment

* ***Hardware****: Web-based application running on desktop and mobile devices.*
* ***Software****: Modern web browsers (Chrome, Firefox, Edge) with backend in Node.js and frontend in React.*
* ***Database****: PostgreSQL.*

## Design and Implementation Constraints

* *Regulatory compliance (e.g., GDPR for customer data).*
* *Integration with external payment gateways.*
* *Compatibility with existing hotel management tools.*

## Assumptions and Dependencies

Assumptions and Dependencies for the Hotel Management System (HMS) Project

During the development of the Hotel Management System (HMS), several assumptions and dependencies have been identified that may affect the project’s requirements and overall success. These factors must be considered throughout the development lifecycle to ensure the desired outcomes are achieved.

* + 1. ***Assumption***
       1. User Accessibility to Technology
          - Users (administrators, receptionists, and guests) will have access to devices (computers, tablets, or smartphones) capable of running modern web browsers such as Chrome, Firefox, or Safari.
          - Users will have a stable internet connection to use online features, including room booking, payment, and service management.
       2. Familiarity with Digital Systems

It is assumed that hotel staff and guests have a basic understanding of online management systems and electronic payment platforms, making it easy for them to navigate the HMS.

* + - 1. Availability of Third-party Services
         * The system will integrate successfully with online payment gateways (such as Stripe or PayPal) and notification services (Twilio or SendGrid) to send SMS and email notifications to customers.
         * It is assumed that these services will maintain stable uptime throughout the development and operational phases.
      2. Compliance with Legal Regulations

The development team will adhere to legal regulations related to customer data protection (e.g., GDPR). The system must be designed to manage personal data securely, including encryption and obtaining user consent.

* + - 1. Stakeholder Engagement
         * The project depends on timely collaboration and feedback from stakeholders (hotel administrators, receptionists, and guests) to ensure the system’s functionality aligns with their needs.
         * Third-party APIs, including payment gateways and notification services, must integrate seamlessly to ensure smooth operations.
    1. ***Dependencies***
       1. 1. Third-party Components
          - The system depends on the successful integration of payment gateways (such as Stripe, PayPal) to support both online and manual payments.
          - SMS and email notification services (e.g., Twilio, SendGrid) will be used to send booking confirmations, payment notifications, and other important messages to customers.
       2. Regulatory Environment

The project’s progress and requirements may be affected by changes in legal regulations related to personal data and electronic transactions. Compliance with new regulations may require additional features or adjustments to the existing design.

* + - 1. User Feedback and Testing

The project relies on timely feedback from hotel administrators, receptionists, and guests during testing phases. Any delays in gathering feedback could affect the project timeline.

* + - 1. Resource Availability

The success of the project depends on the availability of the development, testing, and supporting teams. Changes in staffing or resource availability could impact the timeline and quality of the project.

# System Features



## Room Management

### Description

*The room management feature allows hotel staff to create, update, delete, and manage room information, including room types, prices, and availability. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: The user adds a new room by entering details (room type, price).****Response****: The system stores the new room in the database and updates the room list.*

***Stimulus****: User updates room information (e.g., changes price).****Response****: The system applies updates and refreshes the room list.*

***Stimulus****: The user deletes a room.****Response****: The system removes the room from the list and database.*

### Functional Requirements

***FR1****: The system must allow users to create new rooms by entering room type, price, and cleaning costs.*

***FR2****: The system must allow users to edit existing room details (e.g., price, type).*

***FR3****: The system must allow users to delete room information.*

***FR4****: The system must display room availability (e.g., available, booked, under maintenance).*

***FR5****: The system must respond with an error if the room deletion fails due to existing bookings.*

## Service Management

### Description

*This feature allows hotel staff to create, edit, delete, and manage the additional services offered to customers (e.g., laundry, and dining). It also manages service requests. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: The user creates a new service (e.g., laundry).****Response****: The system stores the service information in the database and displays it in the service list.*

***Stimulus****: Customer submits a request for a service.****Response****: The system records the request and notifies staff.*

### Functional Requirements

**FR1**: The system must allow users to create new services by entering details (e.g., name, cost).

**FR2**: The system must allow users to edit service information.

**FR3**: The system must allow users to delete services.

**FR4**: The system must track customer service requests and display them to staff.

**FR5**: The system must notify staff when new service requests are submitted by customers.

## Booking Management

### Description

*This feature enables customers to book rooms and manage their bookings, while hotel staff can view and update booking statuses. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Customer submits a room booking.****Response****: The system stores booking details, sends a confirmation email, and updates room status.*

***Stimulus****: Customer cancels a booking.****Response****: The system applies cancellation fees and updates room availability.*

### Functional Requirements

**FR1**: The system must allow customers to book rooms by specifying check-in, check-out dates, and room type.

**FR2**: The system must provide booking history to customers.

**FR3**: The system must send booking confirmations via email.

**FR4**: The system must allow customers to cancel bookings, applying a cancellation fee as configured by the admin.

**FR5**: The system must allow hotel staff to check in and check out customers, updating room statuses accordingly.

**FR6**: The system must notify customers if a room becomes unavailable after booking.

## Payment Management

### Description

*This feature allows for both online and manual payments after room bookings, generating receipts, and managing invoices. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Customer completes an online payment after check-out.****Response****: The system processes the payment and sends a confirmation receipt via email.*

***Stimulus****: Receptionist inputs manual payment at check-out.****Response****: The system records payment and generates a receipt.*

### Functional Requirements

**FR1**: The system must integrate with a payment gateway to handle online payments.

**FR2**: The system must allow staff to record manual payments at the front desk.

**FR3**: The system must generate and email payment receipts to customers.

**FR4**: The system must display a summary of outstanding payments and transaction histories.

**FR5**: The system must notify the admin in case of payment errors or failures.

## Customer Management

### Description

*The customer management feature enables the hotel to create, edit, and track customer profiles and stay history. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: The receptionist creates a new customer profile.****Response****: The system stores the customer information and adds it to the customer database.*

***Stimulus****: Customer registers as a member through the system.****Response****: The system creates a profile, registers membership, and sends a confirmation email.*

### Functional Requirements

**FR1**: The system must allow staff to create and edit customer profiles.

**FR2**: The system must maintain customer stay history, including bookings and service usage.

**FR3**: The system must allow customers to register for hotel membership.

**FR4**: The system must enable email marketing campaigns to registered customers.

**FR5**: The system must track blacklisted customers and block further bookings from them.

## Employee Management

### Description

*This feature handles employee information, roles, and attendance through a clock-in/clock-out system. This is a* ***Medium-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Admin adds a new employee profile.****Response****: The system records the employee information and assigns roles.*

***Stimulus****: Employee clocks in for their shift.****Response****: The system logs the time and updates the attendance record.*

### Functional Requirements

**FR1**: The system must allow admins to create, edit, and delete employee profiles.

**FR2**: The system must enable role-based access (e.g., admin, receptionist).

**FR3**: The system must track employee clock-in and clock-out times for attendance purposes.

**FR4**: The system must notify an admin of attendance irregularities.

## Promotions & Discounts

### Description

*This feature allows the hotel to create and manage promotional codes and service packages, applying discounts based on conditions. This is a* ***Medium-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Admin creates a new discount code with specific conditions.****Response****: The system stores the discount and makes it available during bookings.*

***Stimulus****: Customer applies a valid discount code during booking.****Response****: The system applies the discount and recalculates the total price.*

### Functional Requirements

**FR1**: The system must allow admins to create, edit, and delete discount codes.

**FR2**: The system must allow admins to define discount conditions (e.g., minimum spending).

**FR3**: The system must enable customers to apply discount codes during booking and payment.

**FR4**: The system must track discount usage and generate reports for promotional effectiveness.

## Maintenance and Cleaning Management

### Description

*This feature helps manage room maintenance and cleaning schedules. It includes logging maintenance actions and inspection results. This is a* ***Medium-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Staff schedules maintenance for a room.****Response****: The system logs the schedule and notifies the assigned staff.*

***Stimulus****: Staff completes cleaning and submits inspection results.****Response****: The system updates the room status to available and stores the inspection details.*

### Functional Requirements

**FR1**: The system must allow users to create, edit, and delete maintenance schedules.

**FR2**: The system must enable logging of cleaning schedules with assigned personnel.

**FR3**: The system must store inspection results, including photo uploads, after maintenance or cleaning.

**FR4**: The system must notify staff of upcoming maintenance or cleaning tasks.

## Reporting

### Description

*This feature generates various reports on hotel operations, including financial data, customer activity, and employee performance. This is a* ***High-****priority feature.*

### Stimulus/Response Sequences

***Stimulus****: Admin requests a financial report for the month.****Response****: The system generates the report and displays revenue, expenses, and profits.*

***Stimulus****: Admin requests a room occupancy report.****Response****: The system generates and displays the room availability status.*

### Functional Requirements

**FR1**: The system must generate financial reports (e.g., revenue, expenses, profits).

**FR2**: The system must generate reports on room occupancy and availability.

**FR3**: The system must generate customer activity reports (e.g., bookings, loyalty, blacklists).

**FR4**: The system must provide employee performance reports based on attendance and feedback.

**FR5**: The system must generate reports on promotional campaigns and discount usage.

# Data Requirements

## Logical Data Model

*The main entities include:*

* ***Customer****: Represents guests using the system. Attributes include name, contact information, and stay history.*
* ***Room****: Contains information about rooms available in the hotel. Attributes include room type (single/double), price, and status (available/booked/under maintenance).*
* ***Booking****: Represents reservations made by customers. Attributes include check-in/check-out dates, room type, and booking status.*
* ***Service****: Includes additional hotel services (e.g., laundry, dining). Attributes include service name, cost, and service requests.*
* ***Payment****: Captures information on payments made by customers. Attributes include payment method (online, manual), transaction ID, and status.*
* ***Employee****: Holds employee details such as role (admin, receptionist), clock-in/clock-out times, and contact information.*
* ***Promotions****: Includes discount codes and service packages. Attributes include promotion code, conditions, and usage.*

*Relationships:*

* ***Customer*** *can have many* ***Bookings****.*
* ***Room*** *can be associated with many* ***Bookings****.*
* ***Booking*** *is linked to one or more* ***Services****.*
* ***Payment*** *is linked to* ***Bookings*** *and* ***Customers****.*

*This data model will be implemented as an* ***Entity-Relationship Diagram (ERD)*** *during the design phase, mapping the relationships between the data entities in the system.*

## Data Dictionary

*It includes:*

* ***Customer****:*
  + *Name (String, 50 characters)*
  + *Address (String, 100 characters)*
  + *Phone Number (String, 15 characters, format: +Country Code-Number)*
  + *Email (String, 50 characters, valid email format)*
* ***Room****:*
  + *Room ID (Integer, auto-increment)*
  + *Room Type (Enum: Single, Double)*
  + *Price (Decimal)*
  + *Status (Enum: Available, Booked, Under Maintenance)*
* ***Booking****:*
  + *Booking ID (Integer, auto-increment)*
  + *Customer ID (Foreign Key)*
  + *Room ID (Foreign Key)*
  + *Check-in Date (Date, format: YYYY-MM-DD)*
  + *Check-out Date (Date, format: YYYY-MM-DD)*
  + *Special Requests (String, 255 characters)*
* ***Payment****:*
  + *Payment ID (Integer, auto-increment)*
  + *Booking ID (Foreign Key)*
  + *Payment Method (Enum: Online, Manual)*
  + *Transaction ID (String, 30 characters)*

*The* ***Data Dictionary*** *can be stored as a separate artifact and referenced when needed for updates or additional information on data structures.*

*The design of this structure will be refined during the design phase.*

## Reports

*The system will generate various reports based on user needs. These reports include:*

* ***Financial Reports****:*
  + *Content: Total revenue, expenses, and profits.*
  + *Characteristics: Summarized by month/quarter/year, with options to filter by payment method and customer type.*
* ***Room Occupancy Reports****:*
  + *Content: Percentage of occupied vs. available rooms.*
  + *Characteristics: Filterable by room type, date range, and booking status.*
* ***Customer Reports****:*
  + *Content: Customer details, loyalty status, and blacklisted customers.*
  + *Characteristics: Can be filtered by registration date, stay history, or spending amount.*
* ***Employee Performance Reports****:*
  + *Content: Clock-in/clock-out times, working hours, customer feedback.*
  + *Characteristics: Evaluates employee performance based on hours worked and customer ratings.*
* ***Promotions Reports****:*
  + *Content: Performance of promotional campaigns (e.g., usage rate, revenue impact).*
  + *Characteristics: Provides insights on promotions’ effectiveness with a graphical comparison between campaigns.*

*The layout and design of these reports will be refined during the design phase.*

## Data Acquisition, Integrity, Retention, and Disposal

*The system will handle data acquisition and retention through the following mechanisms:*

***Data Acquisition****:*

* *Data is acquired via user input forms (e.g., booking forms, customer registration), external APIs (e.g., payment gateways), and system logs (e.g., employee clock-in/out).*
* *Input validation will ensure data integrity (e.g., required fields, and format checks).*

***Data Integrity****:*

* *Regular backups will be scheduled to ensure data is not lost in case of system failure.*
* *Techniques such as* ***checkpointing*** *and* ***mirroring*** *will be used to maintain data accuracy and integrity.*

***Data Retention****:*

* *Customer data, bookings, and payment information will be retained for* ***7 years****, or according to local laws and regulations. Interim backups will be stored for* ***30 days****.*

***Data Disposal****:*

* *Upon reaching the retention period, data will be securely deleted, ensuring that no residual data remains. This includes deleted records, cached data, and backups. E-waste procedures will be followed for physical hardware disposal.*

# External Interface Requirements

## User Interfaces

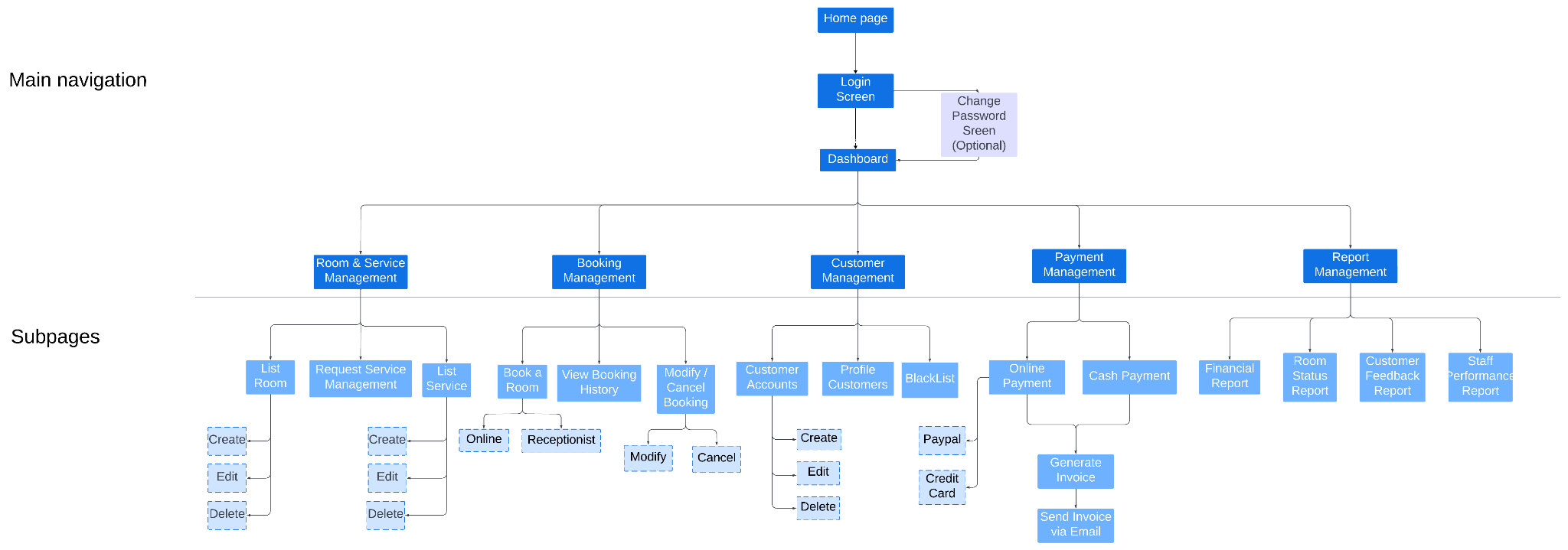
* + 1. Overview

*The user interfaces (UI) will be designed to provide a consistent and intuitive experience for all system users. Key features include:*

* ***Navigation****: Simple and intuitive navigation with a dashboard for quick access to critical tasks (e.g., room management, booking, payments).*
* ***Forms****: Input validation for all forms (e.g., booking forms, customer details) to prevent errors.*
* ***Standard Buttons and Shortcuts****: Common buttons such as "Submit," "Cancel," and "Help" will be used. Keyboard shortcuts will be implemented for frequently used actions (e.g., Ctrl+S for saving).*
* ***Error Messages****: User-friendly error messages will guide users to resolve common issues (e.g., missing required fields).*

*UI design will follow modern web standards, ensuring mobile responsiveness and accessibility according to* ***WCAG 2.1*** *guidelines.*

* + 1. Sitemap



* Home Page: The entry point for the system. Users will start here and can navigate to the login screen or change their password. This page will provide an overview of the center and the services it provides.
* Login Screen: After accessing the system, users need to log in through this screen to enter the main dashboard.
* Change Password: In case the user forgets the login password, the user can click on the "Forgot password?" link on the Login Screen to navigate to this website and change the password. If the user remembers the full login name and password, users can log in directly to navigate to the Dashboard screen without going through the Change Password screen.
* Dashboard: After successful login, users will be directed to the dashboard, which serves as the central hub of the system. From here, users can navigate to various management functions.
* Key Management Screens:

1. Room & Service Management:
   * Room List:
     + Functions for creating, editing, and deleting room types in the hotel (room type, pricing, room status).
     + Track room status such as vacant, booked, or under maintenance.
2. Service List:
   * Manage accompanying services like food and beverages, laundry, airport transfers.
   * Functions for adding, editing, or deleting services.
3. Service Request Management: Track service requests from customers during their stay and assign staff to fulfill them.
4. Booking Management
   * Online and Reception Booking: Customers can book rooms through the online system or via reception staff.
   * Booking History: Customers can review their previous booking history.
   * Modify or Cancel Booking: Allows customers to change booking information or cancel with flexible cancellation policies.
5. Customer Management
   * Online and Manual Payment: The system integrates with online payment gateways such as credit cards, e-wallets, or supports cash payments at the hotel.
   * Invoice Generation: An invoice is automatically generated for customers after booking a room or using services.
   * Invoice Sending: The invoice is sent to the customer’s email after booking or using services.
6. Payment Management
   * User Account Management: Role-based access control for administrators, receptionists, and customers.
   * Customer Profile Management: Store personal information, stay history, and loyalty programs (VIP members, discounts).
   * Blacklist: Manage customers in the blacklist if there are violations or undesirable incidents.
7. Report Management
   * Financial Report: The system generates reports on revenue from room rentals, accompanying services, and payments.
   * Room Status Report: Displays the status of rooms in the hotel (vacant, booked, under maintenance).
   * Customer Feedback Report: Aggregates and analyzes customer feedback.
   * Performance Analysis: Evaluate performance based on customer feedback, booking history, and reports from staff.

## Software Interfaces

*The system will integrate with several external software components:*

***Payment Gateway****: Integration with third-party payment processors (e.g., Stripe, PayPal) via* ***RESTful APIs*** *to handle online transactions.*

* *Data Format: JSON*
* *Communication: Secure with* ***HTTPS****, using encryption.*

***Email Server****: Integration with external email services (e.g., SendGrid) for sending booking confirmations, invoices, and marketing emails.*

* *Data Format: MIME/SMTP*
* *Communication: Secure with* ***TLS/SSL****.*

***Database****: MySQL/PostgreSQL for managing system data. Queries and transactions between the application and database must be optimized for performance.*

* *Data Format: SQL*
* *Communication: Secure with* ***SSL****.*

## Hardware Interfaces

*This system will not be connecting with any hardware.*

## Communications Interfaces

*The system will support various communication interfaces to ensure smooth operation:*

***Email Communication****: Automated emails for booking confirmations, invoices, and customer feedback forms. Attachments (e.g., receipts) must be supported.*

* *Formatting: HTML for email body, PDF for attachments.*
* *Security: Emails will be sent using secure* ***SMTP*** *with* ***TLS*** *encryption.*

***Web Browser Communication****: The system will be accessed via modern web browsers. Compatibility with* ***Chrome****,* ***Firefox****, and* ***Edge*** *is required.*

* *Security: All communication with the system must be encrypted using* ***HTTPS****.*

***Network Protocols****: Communication between the application server and databases must use secure network protocols such as* ***TCP/IP*** *and* ***SSL****.*

# Quality Attributes

## Usability

*The Hotel Management System must be designed to ensure a* ***user-friendly*** *experience, characterized by the following:*

* ***Ease of use****: Users should be able to navigate the system with minimal training, leveraging intuitive design and straightforward workflows.*
* ***Ease of learning****: The user interface (UI) must allow new users to quickly learn how to operate the system effectively. Tooltips, guided tutorials, and help sections should be provided.*
* ***Memorability****: Users who return to the system after a period of non-use should be able to re-establish proficiency quickly.*
* ***Error avoidance and handling****: The system should minimize errors by providing clear guidance during data entry (e.g., validation checks) and offer easily understandable error messages with solutions.*
* ***Efficiency****: Common tasks (e.g., booking rooms, and check-ins) should be completed in a minimal number of steps. Frequently used features should be easily accessible.*
* ***Accessibility****: The system should be usable by individuals with disabilities, following* ***WCAG 2.1*** *accessibility guidelines.*
* ***Ergonomics****: The design must take into account users who may spend long periods interacting with the system, ensuring a comfortable and efficient experience.*

*The user interface must conform to modern web design standards, adhering to best practices for responsive design, accessibility, and ease of interaction.*

## Performance

*The system must meet the following performance requirements:*

* ***Response Time****: System responses to user actions (e.g., booking a room or retrieving reports) must be completed within* ***2 seconds*** *for 90% of the actions.*
* ***Throughput****: The system should be capable of processing at least* ***1000 transactions*** *(e.g., bookings, payments) per minute during peak operation hours.*
* ***Scalability****: The system should scale efficiently to handle increased loads, ensuring it can support* ***up to 10,000 concurrent users*** *without performance degradation.*
* ***Database Performance****: Queries for retrieving large datasets (e.g., customer reports, room availability) should not exceed* ***5 seconds****.*

## Security

*The Hotel Management System must incorporate stringent security measures to protect both customer and hotel data:*

* ***Authentication****: The system must use* ***BCRYPT HASING*** *for password and strong password policies for all users. JWT will be applied as an auth guard for the whole system.*
* ***Access Control****: Role-based access control (RBAC) must be implemented to ensure that users only have access to data and functionalities relevant to their role (e.g., receptionist, admin).*
* ***Data Privacy****: The system must comply with* ***GDPR*** *and any applicable local data protection laws. Customer data must not be shared with third parties without explicit consent.*
* ***Data Breach Handling****: A clear data breach response plan must be in place, ensuring that users and relevant authorities are notified in case of security breaches.*

## Safety

*Although safety concerns are minimal in software applications, the following considerations must be accounted for:*

* ***Data Backup****: Regular backups must be scheduled to prevent loss of data in the event of a system failure. Backup recovery time should not exceed* ***1 hour****.*
* ***Transaction Integrity****: Measures must be taken to ensure that no financial loss occurs due to system errors. In the case of payment failure, the system must notify both users and admins immediately, providing recovery options.*
* ***Risk Mitigation****: Any actions that could lead to system downtime or data corruption (e.g., unexpected shutdown during a database update) must be minimized through error-checking and fail-safe mechanisms.*

## Additional Quality Attributes

* ***Availability****: The system must have an uptime of* ***99.9%****, ensuring availability even during peak usage times. Scheduled maintenance should be minimized and communicated to users in advance.*
* ***Modifiability****: The system architecture should allow for easy modifications and extensions (e.g., adding new service types or promotional campaigns) without major rework of the existing codebase.*
* ***Interoperability****: The system must seamlessly integrate with external payment gateways and reporting tools (e.g., Google Analytics, payment APIs) using industry-standard protocols (e.g., RESTful APIs).*
* ***Portability****: The system should be easily deployable on different server environments (e.g., on-premise, cloud platforms like AWS or Azure).*
* ***Reliability****: The system should be reliable under all normal operating conditions, with downtime due to unexpected errors not exceeding* ***0.1%*** *per month.*
* ***Scalability****: The system should handle increased demand without degradation in performance, ensuring that it can scale horizontally by adding more servers or instances as needed.*

# Internationalization and Localization Requirements

# Currency

* The system should support multiple currencies and allow users to choose their preferred currency for transactions.
* Currency conversion rates should be updated regularly or in real-time for accurate transactions.

# Date and Time Formatting

* Users should be able to select their preferred date (e.g., MM/DD/YYYY or DD/MM/YYYY) and time format (12-hour or 24-hour).
* Time zones should adjust automatically based on the user's location, accounting for daylight saving time if applicable.

# Number Formatting

* The system must support different number formats, including regional decimal and thousand separators.
* Inputs should be validated based on local formats to ensure accuracy.

# Language Support

* The system should be available in multiple languages, with easy switching options, and retain user preferences between sessions.
* Regional spelling variations (e.g., British vs. American English) should be supported.

# Address and Phone Formatting

* The system should accommodate various address formats, including country-specific details like postal codes.
* Phone numbers should be validated according to country formats, including country codes.

# Compliance with Local Laws

* The system must comply with regional laws such as data privacy regulations (e.g., GDPR).
* Terms of service should reflect local legal requirements.

# Cultural Sensitivity

* Content, images, and design elements should be culturally appropriate.
* Marketing materials should be localized to avoid offensive or misunderstood content.

# Paper Sizes and Units

* The system should support different paper sizes (e.g., A4, Letter) for printing.
* Users should be able to choose between metric and imperial units for relevant data.

# Electrical Standards

* Any hardware integration must consider local electrical and connectivity standards.

This simplifies the system for a global audience, improving user experience and ensuring compliance with local requirements.

# Other Requirements

* ***Legal Compliance****: The system must comply with all applicable legal, regulatory, and financial compliance standards, including* ***PCI DSS*** *for handling credit card payments and* ***GDPR*** *for data protection.*
* ***Installation and Configuration****: The system should include easy installation guides and configuration tools to assist hotel IT teams in setting up the software.*
* ***Logging and Monitoring****: The system must provide comprehensive logging of all system activities, including user actions, errors, and system events. Real-time monitoring tools should alert the admin of any critical issues, such as system failures or security breaches.*
* ***Audit Trail****: The system must maintain an audit trail of all critical actions, including changes made by admins or receptionists (e.g., booking changes, and room management).*

# Glossary

In this section, we define specialized terms, acronyms, and abbreviations relevant to the Hotel Management System (HMS). Understanding these terms is essential for stakeholders involved in the development, implementation, and operation of the system. This glossary serves as a reference throughout the project and will be updated as needed.

* ***RBAC****: Role-Based Access Control. A method of restricting system access to authorized users based on their roles.*
* ***GDPR****: General Data Protection Regulation. European Union law on data protection and privacy.*
* ***PCI DSS****: Payment Card Industry Data Security Standard. A set of security standards designed to ensure that all companies that accept, process, store, or transmit credit card information maintain a secure environment.*
* ***WCAG 2.1****: Web Content Accessibility Guidelines 2.1. A set of guidelines for making web content more accessible, particularly for people with disabilities.*
* ***API (Application Programming Interface)****: A set of protocols and tools for building software and applications that allow different systems to communicate with each other.*
* ***Booking****: The process of reserving a room or service in the hotel system, which can be done online or through a receptionist.*
* ***Check-in/Check-out****: The process of registering a guest’s arrival (check-in) and departure (check-out), tracked by the system to manage room availability.*
* ***Cloud Computing****: The use of remote servers on the internet to store, manage, and process data for the hotel, reducing the need for on-site infrastructure.*
* ***Currency Conversion****: A feature that automatically updates and applies exchange rates for transactions made in different currencies by international guests.*
* ***Dashboard****: The main control panel in the HMS where hotel staff can monitor operations, manage bookings, and access system reports.*
* ***Failover****: A system capability that ensures continuous operation by automatically switching to a backup system if the main system fails.*
* ***Guest Profile****: A record containing personal information, booking history, and preferences of a guest, maintained within the HMS for better customer service.*
* ***Invoice****: An itemized bill generated for the guest after their stay or use of hotel services, including room charges and additional service fees.*
* ***Localization****: The adaptation of the HMS to different languages, currencies, and regional formats, ensuring usability in specific locales.*
* ***Payment Gateway****: An online payment system integrated with the HMS to process payments securely through methods like credit cards, digital wallets, or PayPal.*
* ***Reservation****: A confirmed booking in the system, detailing guest stay dates, room type, and any additional services requested.*
* ***RESTful API****: A web service interface that allows the HMS to interact with other systems or applications through standardized HTTP requests.*
* ***Room Status****: A label indicating the current state of a hotel room, such as "Available," "Occupied," or "Under Maintenance."*
* ***Service Request****: A feature allowing guests to request additional hotel services (e.g., room service, laundry, transportation) during their stay, managed through the system.*
* ***UI (User Interface)****: The visual elements of the HMS through which users (staff, admins, or guests) interact with the system, such as buttons, menus, and forms.*
* ***UX (User Experience)****: The overall user satisfaction when interacting with the HMS, including ease of use, efficiency, and enjoyment.*
* ***User Role****: A designation within the HMS that defines the access level and responsibilities of a user (e.g., Admin, Receptionist, Guest), determining what actions they can perform.*
* ***Compliance****: Ensuring the HMS adheres to relevant laws and regulations, including data privacy standards (e.g., GDPR) and local laws for different regions.*
* ***Customer Feedback****: Input or reviews provided by guests regarding their experience with the hotel’s services and facilities, used to improve service quality.*

*This glossary will be maintained and updated throughout the project lifecycle to ensure consistency and understanding among all stakeholders.*

# Analysis Models

*<This optional section includes or points to pertinent analysis models such as data flow diagrams, feature trees, state-transition diagrams, or entity-relationship diagrams. You might prefer to insert certain models into the relevant sections of the specification instead of collecting them at the end.>*