

Informatics Institute of Technology

Software Engineering Principles and Practice

5SENG007C.1

Coursework -01

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Task 1: Project Background

Hotel Booking System

Currently, the client runs a medium-sized hotel with reservations available both online and physically. Most of their booking operations, guest records, and tracking of payments are presently managed by hand using spreadsheets and physical files. This has resulted in frequent overbookings, misplaced guest records, and inefficiency in managing room availability. The client would like to automate this process by developing a hotel booking system that will provide the customers with an online booking facility, the reception staff with an easy-to-use booking administration system, and the management with performance and occupancy rate tracking.

Current Business Operations

Bookings are made through the following channels: phone calls, email inquiries, walk-ins, and third-party booking websites. The reception staff uses a simple desktop application for checking-in/check-out purposes. Manual credit card processing, limited integration. Spreadsheet-based room availability tracking. Primarily through email and phone calls.

Task 2: Problem and motivation

2.1 Problem Statement

The hotel business presently encounters critical operational challenges in the absence of an integrated booking management system. The most major problem is the lack of real-time room availability synchronization across different booking channels. The up dation of the room inventory is done through spreadsheets, wherein delays are common and overbooking situations often result in promising the same room to several guests. It leads to disappointed customers, last-minute deliberations seeking alternative accommodation, and a bad reputation for the hotel.

Another big issue is the poor customer experience for potential guests wanting to make bookings. While competitors offer the guest instant online booking, the guest needs to call during business hours or send inquiries via email and wait for a response, losing bookings to other hotels that can provide immediate confirmation. Manual administrative work weighs heavily on the workload of front desk personnel as they have to spend too much time on activities like booking details entry, manually checking the availability in multiple systems, taking payments separately, and preparing invoices either manually or with some basic software.

Hotel managers cannot get business performance insight due to a lack of real-time data visibility. Decisions are based on prior reports, manually compiled from various sources, which prevents proactive revenue management and strategic planning. Guest information, booking records, and payment histories remain scattered on paper records, spreadsheets, or email threads. Therefore, personalized service and maintenance of accurate customer relationships have become impossible. Furthermore, the current setup presents a host of security and compliance risks, with payment information and guest data being handled in a very manual way that does not provide either encryption or audit trails necessary under the GDPR and PCI-DSS regulations.

2.2 Motivation

The elaboration of a complete hotel booking system will benefit all parties involved. It also provides an easy online reservation, accessible 24/7, immediate confirmation, clear prices, room details for guests, easy modification or cancellation of reservations, and special experiences upon their next visits.

To the hotel manager, it offers real-time analytics and occupancy and revenue reports for better decision-making. This also supports dynamic pricing. It helps in targeted marketing and enhances the brand image of your hotel through modern and efficient technology.

Task 3: Project aim and objectives

3.1 Project Aim

This is to design and develop an integrated, user-friendly hotel booking system that automates reservation processes, offers guests seamless online booking experiences, streamlines operational workflows of hotel staff, provides managers with actionable business insights, and provides secure and compliant handling of sensitive data while improving business efficiency, customer satisfaction, and revenue generation across all properties.

3.2 Objectives

1.Integrate Online Booking Platform with Real-Time Availability

The interface should provide real-time room availability across all hotel properties through a web-based booking interface that will enable guests to complete bookings independently without requiring staff intervention. functionality.

2. Integrate Secure Payment Processing System

The second objective is the implementation of a PCI-DSS-compliant payment gateway, integrating various payment methods such as credit cards, debit cards, and different forms of digital wallets, like PayPal.

3. Centralized Staff Management Dashboard Development

The third objective is to develop an administrative interface that provides role-based access control to different staff types, like front desk personnel, housekeeping, maintenance, and managers, for the purpose of managing bookings, room status, and guest information from one platform.

4. Ensure System Security and Compliance

The last objective incorporates thorough security measures: data encryption at rest and in transit, role-based access control, auditing of performed activities, and full compliance with both GDPR and PCI-DSS standards.

Sri Lanka-based Weblook International describes their hotel-reservation engine “SaaSbeds” which supports online bookings, hotel room management, pricing controls and reports. [1]

Exely advertises its hotel-sales &-management software with over 200 clients in Sri Lanka, 100+ integrations, and features aimed at simplifying hotel operations, bookings and revenue management in the Sri Lankan market [2]

Task 4: Stakeholder identification and analysis

Direct Users (Core Layer)

- **Hotel Guests**
- **Hotel Managers**

Operational Support (Middle Layer)

- **IT Support Team**
- **System Administrators**
- **Finance Department**

External Stakeholders (Outer Layer)

- **Payment Gateway**
- **Government Regulatory**
- **Third-party Booking Platforms**
- **Hotel Vendors**
- **Developers**

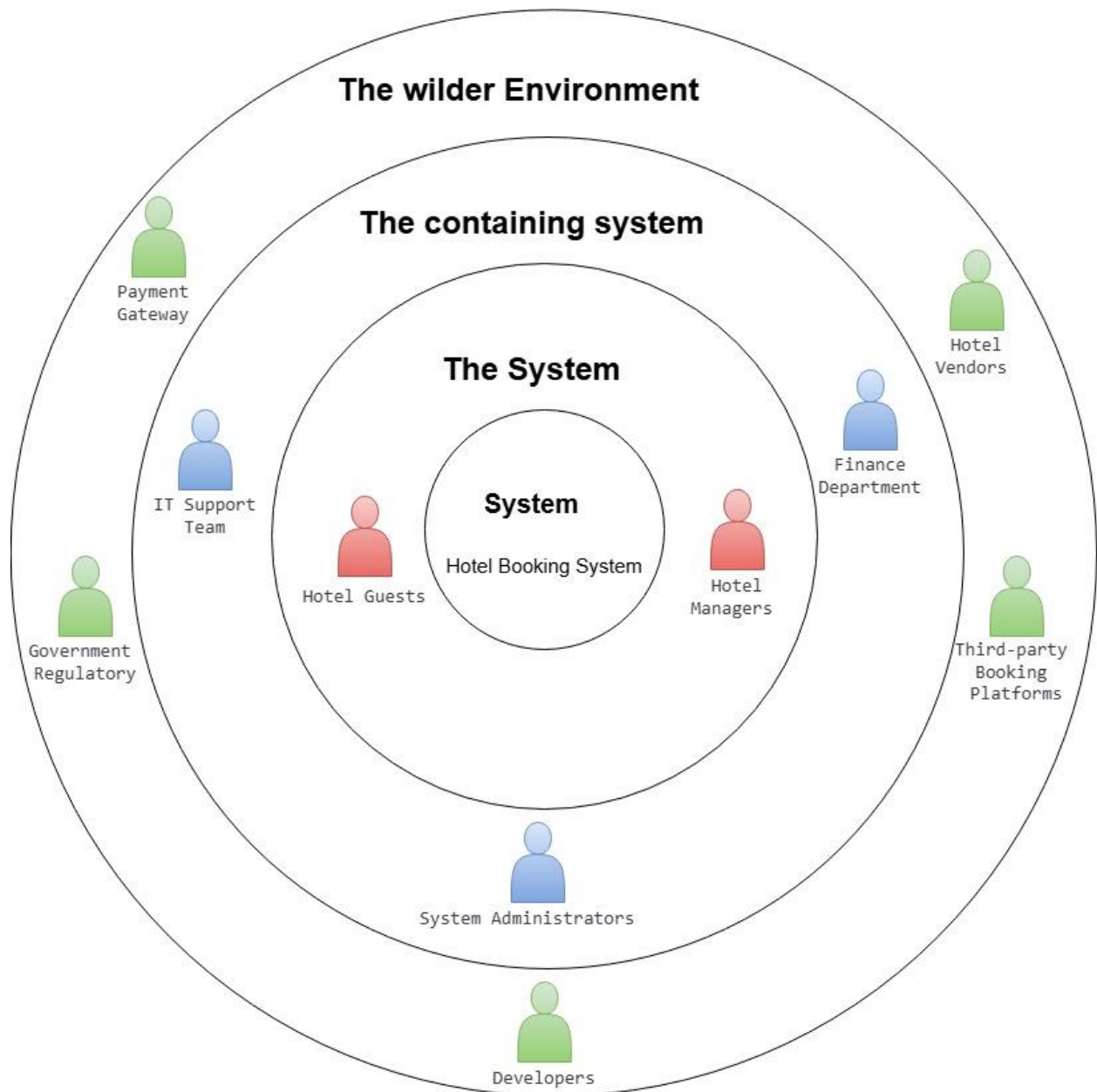


Figure 1: onion diagram

Task 5: Requirements elicitation and analysis

User Requirement

- Users should be able to check real-time room availability.
- Guests should be able to make, edit, or cancel bookings online.
- The system should send instant booking confirmations via email.
- Guests should be able to make secure online payments through multiple methods.
- Hotel staff should be able to manage bookings, check-ins, and check-outs easily.
- Managers should be able to view occupancy and revenue reports for decision-making.

System Requirement

Functional requirements

- The system must allow booking creation, modification, and cancellation.
- It must show real-time room availability and pricing.
- It must process secure online payments and issue receipts.
- The system must generate reports on bookings, revenue, and occupancy.
- It must support user roles such as guest, staff, and manager with access control.
- It must automatically send booking and payment notifications to users.

Technical requirements

- The system should be web-based and responsive on all devices.
- The frontend should be developed using HTML, CSS, and JavaScript frameworks.
- The backend should use technologies like Node.js, Java, or Python.
- The database should be managed using MySQL or PostgreSQL.
- The system should integrate with payment gateways like PayPal or Stripe.
- Secure protocols such as SSL/TLS and role-based access control must be implemented

Nonfunctional Requirements

- The system should be user-friendly and easy to navigate.
- It should be available 24/7 with minimal downtime.
- All data should be encrypted and handled securely.
- The system should perform efficiently even under high usage.
- It should be scalable to support future expansion.
- The system should include regular data backups and recovery features.

Task 6: Requirement modelling: use case diagram

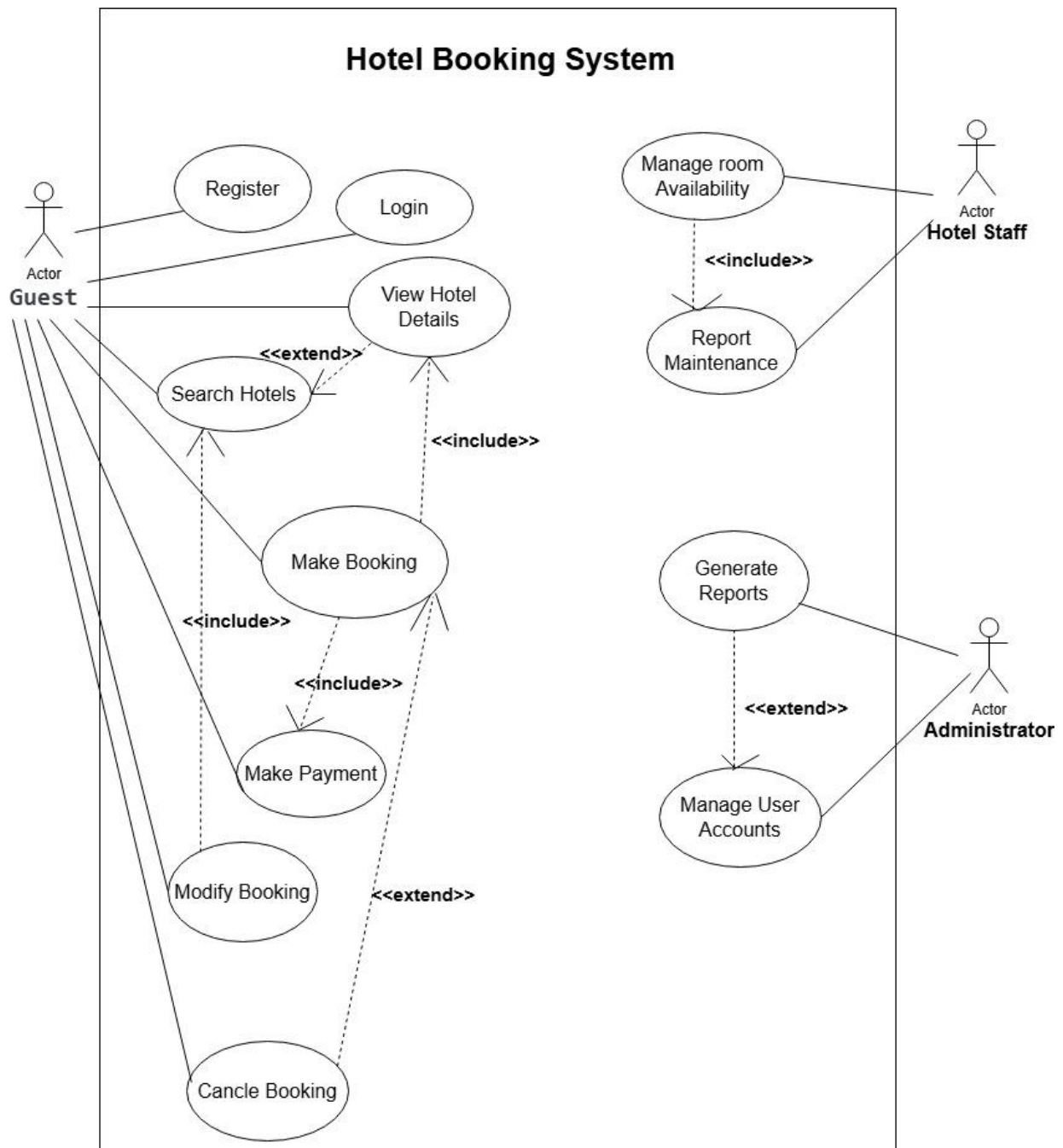


Figure 2: use case diagram

Task 7: A use case description

Table 1: use case description

Booking	
Actors:	Guest
Preconditions:	Guest must be registered or must complete registration before booking. The system must have available rooms.
Postconditions:	The booking is confirmed, payment completed, and booking details saved. A confirmation message or email is sent to the guest.
Flow:	The Guest searches for hotels. The system checks if the Guest is registered . If unregistered, the Guest proceeds to Register ; otherwise, continues to Login . After login, the Guest enters username and password. The system verifies credentials. If credentials are correct, the Guest searches for available rooms. The Guest selects a room type and enters personal details. The Guest confirms reservation details. The system prompts for payment. The Guest enters payment details and confirms payment. The system processes the payment and confirms the booking. Booking confirmation is displayed and sent to the Guest.
Alternative Flows:	A1 – Incorrect Password: If the password is incorrect, the system displays an error and allows the Guest to reset it. A2 – No Available Rooms: If no rooms are available, the system shows a message and prompts to search again. A3 – Payment Failure: If payment fails, the system requests re-entry of payment details or cancels the booking.

Exceptions:	Network or system failure during payment or confirmation. Timeout when communicating with the Payment Gateway.
Requirements:	FR1: Register/Login FR2: Search for Hotels and Rooms FR3: Make Booking FR4: Process Payment NFR1: Security (safe login and payment) NFR2: Reliability (accurate booking confirmation)

Task8: Process modelling

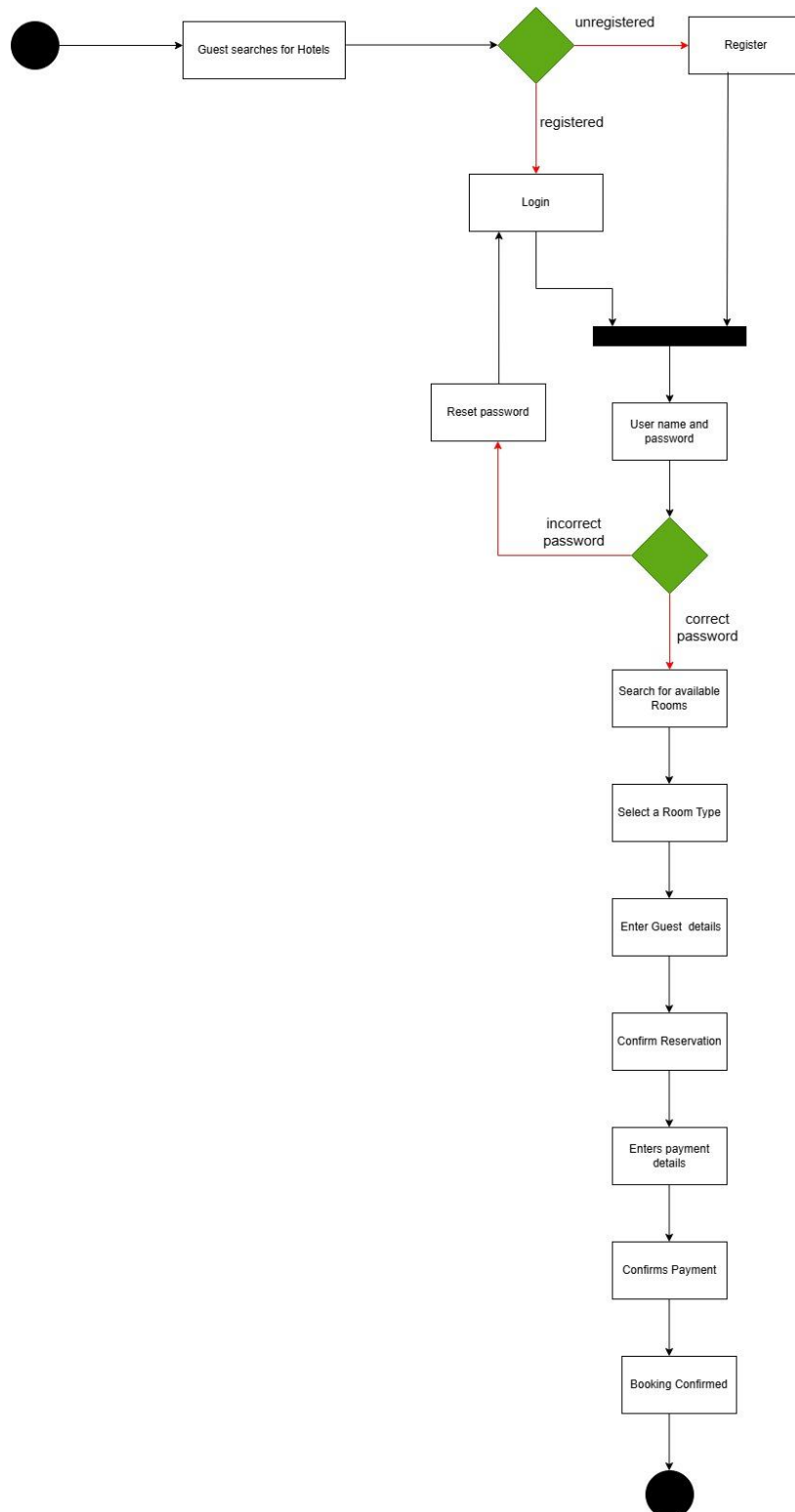


Figure 3: activity diagram

References

- [1] W. International, "Maximise Revenue, Minimise Hassle: The Power of SaaSbeds Reservation System". Weblook International," May 2, 2024.
- [2] Exely, "xely Suite for Empowering Your Hotel Business". Exely (Sri Lanka)," 2025.

Appendix

I am gathering user requirements for a hotel booking system. Could you explain what features a guest would expect from such a system?

Certainly. A **guest** using a hotel booking system would expect the following features:

1. Room Availability Check:

The system should allow guests to view real-time room availability based on their preferred dates and room types.

2. Online Booking Management:

Guests should be able to make, modify, or cancel their bookings easily through the online platform.

3. Instant Booking Confirmation:

Upon successful booking, the system should automatically send an email or SMS confirmation to the guest.

4. Secure Payment Options:

The system should support multiple secure online payment methods such as credit/debit cards, mobile payments, or bank transfers.

5. User-Friendly Interface:

The platform should provide a simple and intuitive interface that enables users to complete their bookings without technical difficulty.



6. Review and Feedback Section:

Figure 4: Chatgpt simulation 1

What about hotel managers? What features would they need for monitoring and decision-making?

Hotel managers would require features that help them **monitor performance, ensure smooth operations, and make informed business decisions**. These include:

1. Comprehensive Dashboard:

A centralized dashboard showing real-time data on occupancy rates, revenue, and booking trends.

2. Analytical and Financial Reports:

Tools to generate and analyze reports on revenue, customer demographics, room utilization, and performance metrics.

3. User Access Management:

The ability to define and control access levels for different employees to maintain data security and accountability.

4. Inventory and Resource Tracking:

Monitoring of room availability, housekeeping status, and other hotel resources for efficient management.

5. Customer Feedback and Review Analysis:

Access to guest reviews and satisfaction metrics  improve service quality and address issues proactively.

Figure 5: : Chatgpt simulation 2

What would hotel staff expect from the system to help manage their daily operations?

Hotel staff would expect the system to provide functionalities that simplify and automate their daily operations. These include:

1. Booking Management:

The system should enable staff to view, modify, and manage guest bookings efficiently, including check-ins and check-outs.

2. Room Allocation and Status Tracking:

Staff should be able to assign rooms, mark them as occupied, vacant, or under maintenance, and update room status in real time.

3. Customer Information Management:

The system should maintain detailed guest records, including contact details, preferences, and stay history, for better service and communication.

4. Payment and Billing Management:

Staff should have access to tools for managing invoices, processing payments, and generating receipts securely.

Figure 6: : Chatgpt simulation 4