

# **Hotel Management System [HMS] Requirements Specification**

**Version 5.0**

**May 29th, 2025**

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# 1. Executive Summary

## 1.1 Project Overview

The **Hotel Management System (HMS)** is a comprehensive solution designed to streamline and enhance the operations of a luxury hotel. While it covers all standard hotel services, it goes a step further by integrating premium amenities such as a casino, gym, restaurant, and bar—offering guests an elevated and seamless hospitality experience.

# 2. Product/Service Description

## 2.1 Product Context

HMS is a centralized system (meaning that the system acts as a single unified platform for managing all hotel operations and data).

### **Characteristics of the Centralized HMS Core Operations:**

- All **data** is stored in a centralized database, meaning that the data is consistent throughout the major components.
- End-Users can access the system through a single dashboard without the need of multiple systems or tools. The users would only be able to see features and data relevant to their roles.
- **Real-Time Updates** meaning changes made in one component/module are immediately reflected across all other modules (e.g guest checking-in activating the update of the room status for housekeeping and billing).
- Maintaining one system is proven to be more cost-effective than maintaining multiple.

## Internal Functional Components

HMS is composed of the following functional areas, each represented in the system's design through behavioral and structural models:

- **Room Booking and Reservation**  
Handles room search, availability checks, booking creation, and OTA synchronization. Also manages booking ID generation and associated guest data.
- **Check-In and Digital Key Assignment**  
Manages guest check-in, room assignment, and generation of digital keys for room access.
- **Billing and Invoicing**  
Tracks guest expenses from facilities, services, and minibar usage. Generates interim and final invoices and handles payment processing logic.
- **Room Access Control**  
Uses secure digital keys to unlock guest rooms, with validation logic encapsulated using the Proxy Pattern.
- **Guest Checkout and Feedback Collection**  
Manages the checkout process, consolidates invoices, revokes room access, and collects guest feedback.

- **Housekeeping and Room Status Updates**  
Updates room statuses (e.g., occupied, dirty, clean) and assigns cleaning tasks based on booking lifecycle events or manual triggers.
- **Finance and Transaction Tracking**  
Covers payroll processing, expense tracking, and the conceptual design for generating financial summaries and statements.
- **Reporting and Analytics**  
Allows administrative and managerial roles to generate reports such as occupancy rates, staff performance, guest feedback summaries, and financial reports.
- **User Management and Role-Based Access Control**  
Handles account creation, staff registration, and access control based on user roles (e.g., admin, receptionist, housekeeper, manager).
- **Facility Access and Service Logging**  
Enables controlled guest access to hotel facilities (e.g., gym, casino, restaurant) based on booking status and room assignment.

HMS, while centralized, is **not** fully independent, it relies on third-party integrations for many of its core functionalities. Without these related systems, it would be difficult to make tasks like updating availability and processing payments possible and, in the worst case, those tasks might take manual intervention. This hybrid approach has the benefits of centralization combined with the external tools that would best require dedicated systems.

## **External System Interfaces**

HMS supports **integration with third-party systems**, allowing for real-world compatibility and extensibility:

- **Online Travel Agencies (OTAs)** – Provide booking data via integration for real-time room sync.
- **Payment Gateways (e.g., Stripe, PayPal)** – Used for secure transaction processing.
- **Flexipass SDK (Digital Keys)** – Connects mobile guest keys with room locks securely.
- **Notification Services** – Deliver booking confirmations, task assignments to staff, invoices, and feedback reminders via email or SMS.

These external services are **represented in sequence diagrams** and are **abstracted from core logic** using design patterns (e.g., Strategy and Proxy) to ensure flexibility and decoupling.

**User Interface Overview:**

The HMS is designed with multiple layers of user interfaces to cater to different user groups and functions. The interfaces are structured to provide both an intuitive experience for guests and a robust, role-specific interface for staff. The following outlines the key interface components:

**1. Guest-Facing Interface: Mobile Guest Portal**

**• Purpose:**

Provides guests with a self-service platform to manage their stay, including booking rooms, submitting service requests, accessing digital keys, and viewing billing details.

**• Key Features:**

**• Guest Profile Management:**

Allows guests to create and update their personal information.

**• Reservation and Booking:**

Enables room booking, modification of reservations, and real-time availability checks.

**• Service Requests:**

Offers a streamlined process to request housekeeping, room service, or other amenities.

**• Digital Key Access:**

Facilitates room entry using a digital key, integrated via the Flexipass SDK.

**• Feedback Submission:**

Automatically collects post-stay feedback to enhance service quality.

## **2. Staff Interface: Secure Staff Login and Dashboards**

### **Purpose:**

Provides internal users (receptionists, housekeeping, department managers, facility staff, and administrators) with secure, role-based access to the various operational modules of the HMS.

### **Login Process:**

#### **Authentication:**

Staff members log in using a secure login interface where they provide credentials (username and password). These credentials are validated against a centralized user database.

#### **Role-Based Access Control (RBAC):**

Post-authentication, the system identifies the user's role and restricts access to only those modules relevant to their responsibilities.

#### **Session Management and Security:**

Upon successful login, a secure session is initiated. All user activities are tracked through audit logs maintained by the Security and Administration Module.

#### **Dashboard and Module Access:**

#### **Customized Dashboards:**

After logging in, staff are directed to a role-specific dashboard. For example:

- **Receptionists:** Access the Front Desk Module for check-in/check-out operations and payment processing.
- **Housekeeping Staff:** Use a simplified interface for updating room statuses.
- **Department Managers:** View department-specific performance metrics and manage staff schedules.
- **Administrators:** Access advanced tools for system monitoring, user management, and security settings.

The HMS is designed to cater to a diverse set of users (customers and staff), each with unique needs and technical expertise. Below are the general customer profiles:

### **User Characteristics**

- **Guests:**

**Profile:** Primary users of the system, interacting with it to manage their stay, access services, and handle payments..

**Experience:** Varies from tech-savvy to novice.

**Technical Expertise:** Basic.

**Other Characteristics:** Use the Mobile Guest Portal for booking rooms, making service requests, and viewing bills.

- **Receptionists:**

**Profile:** Front-line staff managing guest check-ins, check-outs, and payments.

**Experience:** Familiar with hotel operations and customer service.

**Technical Expertise:** Moderate; comfortable using software for reservations, billing, and room management.

**Other Characteristics:** Verify guest IDs, assign rooms, process payments, and generate invoices.

- **Housekeeping Staff:**

**Profile:** Housekeeping staff use the system to update the status of rooms. They need a straightforward and minimalistic interface to quickly log room status without requiring advanced technical skills.

**Experience:** Skilled in cleaning operations.

**Technical Expertise:** Low (basic UI interaction).

**Other Characteristics:** Update room status (clean/occupied) via a simplified interface.

- **Facility Staff (Casino, Gym, Restaurant, Bar):**

**Profile:** Staff managing access and usage of premium facilities.

**Experience:** Operate gyms, casinos, or restaurants.

**Technical Expertise:** Low (scan/verify Booking IDs).

**Other Characteristics:**

- Verify guest access to facilities using Booking IDs.
- Log service usage and charges.

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- **Department Manager (Housekeeping, Food & Beverage, Casino, Front Desk, Gym):**  
**Profile:** Managers overseeing specific departments (areas of the hotel) and their staff.  
**Experience:** Experienced in department-specific operations, staff management, and decision-making.  
**Technical Expertise:** Moderate (comfortable using analytics, reports, and staff management tools).  
**Other Characteristics:**
  - View department-specific metrics (e.g., occupancy, staff performance).
  - Manage staff schedules, attendance, and performance within their department.
- **Finance Team / Financiers:**  
**Profile:** Handles daily financial operations including payroll, and financial reporting.  
**Experience:** Proficient in hotel accounting practices and financial management.  
**Technical Expertise:** Moderate; uses the Finance Module for processing payments and generating financial statements.  
**Other Characteristics:**
  - Manages payroll and oversees tax calculations and compliance.
  - Generates financial statements such as profit and loss, balance sheets, and cash flow reports.
- **General Manager:**  
**Profile:** Oversees all hotel operations, including financial performance, staff management, and accounting.  
**Experience:** Experienced in hotel management, decision-making, leadership, and financial oversight.  
**Technical Expertise:** Moderate to High (comfortable using analytics, reports, and financial tools).  
**Other Characteristics:**
  - Monitor overall hotel performance (e.g., occupancy, revenue).
  - Oversee payroll, tax compliance, and financial reporting through the Finance Module.
  - Full access to every metric and employee data.
  - Ensure accurate billing and financial transactions across all modules.
- **Administrators:**  
**Profile:** Administrators are responsible for maintaining the system, ensuring security, and managing user access. They require advanced tools for technical configuration, monitoring, and troubleshooting to keep the system running smoothly.  
**Experience:** High (technical configuration).  
**Technical Expertise:** High (technical configuration).  
**Other Characteristics:** Manage user accounts, permissions, audit logs, and system backups.

## **2.2 Assumptions**

- **Internet Connectivity:** Staff and guests have reliable internet access for real-time system use.
- **Device Availability:** Staff have access to devices (PCs/tablets) to interact with the system.
- **Third-Party Systems:** OTAs, POS, and payment gateways are operational and accessible.
- **Staff Training:** Users receive basic training to navigate their assigned modules.
- **Guest Compliance:** Guests provide valid IDs and adhere to hotel policies during check-in.

## **2.3 Constraints and Dependencies**

It is important to consider constraints for the Hotel Management System's design and implementation, the constraints focus on resource, technical and security constraints. The criticality of the system should also be considered as the system is designed to be used by a business (in this case a hotel), considerations are made for the system as it impacts the operations, revenue and guest satisfaction. Audit trails are also important for ensuring transparency and compliance, key considerations will be made regarding Audit Logging and Trailing.

### **Constraints**

#### **Resource Constraints (Hardware, Software, Human):**

- The HMS must handle a number of concurrent users.
- Ensure sufficient server resources to avoid bottlenecks.
- To support the **digital key system**, compatible hardware is needed (e.g. IoT enabled door locks).
- The Mobile Guest Portal must be compatible with a wide range of devices (iOS, Android) and screen sizes.
- Integrate with external third-party systems (e.g. OTAs, Payment Gateways) using APIs.
- Skilled developers are needed in the development team.
- Staff must be trained to use the HMS effectively.

#### **Security Constraints (Data Protection, Audit Trails, Vulnerability Management):**

- Sensitive data (e.g. guest information, payment details) should be encrypted both in transit and at rest
- Role-based Access Control (RBAC) to restrict access to sensitive modules
- Ensure digital keys are encrypted and can be revoked instantly if compromised.
- Conduct regular security assessments to identify and fix vulnerabilities.
- Keep all software components (e.g., operating systems, libraries) up to date with security patches.

#### **Criticality Constraints (Impact of the Business, Downtime Costs, Disaster Recovery)**

- Handling of booking, payments, billing, crucial to the revenue of the business.
- Poor guest experiences caused by malfunctioning of the system.
- Downtime of the system can result in bookings being lost, leading to revenues also being lost.
- Implement regular backups of the database and system configurations.

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- Ensure quick restoration in case of data loss or system failure.

### **Audit Trails**

- **Audit Logging:** Log all actions performed by users (e.g. check-ins, billing adjustments and log all system events (e.g. every API call, error messages).
- Ensure all logs are stored in a location that is secure and tamper-proof.
- Define a log retention policy of 7 years (year is specified for this project).
- Monitor logs in real-time.
- Maintain logs in a format that can be easily reviewed during audits.

## ***Dependencies***

### **Internal Dependencies**

#### **Centralized Database:**

- **Dependency:** A unified data repository that serves all modules (reservations, billing, housekeeping, etc.).
- **Impact:** Ensures consistency and real-time updates across different operations. Database performance and uptime are critical for overall system functionality.

#### **Mobile Guest Portal:**

- **Dependency:** Interface for guests to manage bookings, check-in/out, service requests, and payments.
- **Impact:** Must be compatible with various devices and screen sizes, as well as reliably communicate with the centralized database.

#### **Inter-Module Communication:**

- **Dependency:** Seamless integration among internal modules (Reservation, Front Desk, Housekeeping, Billing, Reporting, etc.).
- **Impact:** Efficient inter-module communication is necessary to maintain data consistency and to trigger real-time updates across different areas of the hotel.

## **Third-Party Integrations**

### **Online Travel Agencies (OTAs):**

- **Dependency:** Real-time room availability synchronization and reservation updates.
- **Impact:** Without active OTA integration, booking data may not be up-to-date, affecting occupancy and revenue.

**Payment Gateways (e.g., Stripe, PayPal):**

- **Dependency:** Processing guest payments and handling refunds.
- **Impact:** Reliance on these services for secure payment processing is critical; any downtime or security issue can directly affect financial transactions.

**Flexipass SDK:**

- **Dependency:** Generation and management of digital keys for guest room access.
- **Impact:** This integration is crucial for ensuring secure and convenient digital key issuance. Disruptions could impact the guest check-in experience.

## 3. Requirements

### 3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SWE Reviewed / Approved
FR_GST_01	The guest shall be able to register into the Mobile Guest Portal		1	22/03/2025	Sidrit Zela
FR_GST_02	The guest shall be able to log into the Mobile Guest Portal.		1	22/03/2025	Hazis Voda
FR_GST_03	The system shall allow the guests to search for available rooms by room type, check-in and check-out dates and price range through the OTAs or by the Mobile Guest Portal.		1	22/03/2025	Endri Baku
FR_GST_04	The system shall allow the guests to complete their booking on the Mobile Guest Portal either by starting a direct booking or by including the selected room from OTAs.		1	22/03/2025	Endri Baku
FR_GST_05	The system shall allow the guest to cancel a booking before check-in.		1	22/03/2025	Endri Baku
FR_GST_06	The system shall allow the guest to request a booking modification before check-in (e.g. room type, check-in date). The system shall then send the request to the receptionist. The receptionist can check if the modification is possible (e.g. new specified room type is available) and confirm it.		1	22/03/2025	Sidrit Zela
FR_REC_01	The system shall provide to the receptionist a real-time inventory of room status (available, booked, under maintenance). The real-time availability list shall be displayed on the receptionist's dashboard.		1	22/03/2025	Sidrit Zela

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Req#	Requirement	Comments	Priority	Date Rvwd	SWE Reviewed / Approved
FR_REC_02	The system shall allow the receptionist to modify a booking in special cases (e.g. room is under maintenance) and shall send a notification to a guest.		1	22/03/2025	Sidrit Zela
FR_GST_07	The system shall allow guests to check-in through the mobile app or the receptionist can complete the check-in for them. After the check-in the system shall generate the digital key for the room (valid for the duration of stay) which a customer can store in their phone.		1	22/03/2025	Hazis Voda
FR_GST_08	The guest shall be able to access their room by the digital key connected to the room lock via Flexipass.		1	22/03/2025	Hazis Voda
FR_GST_09	A guest can access facilities and use services of the hotel after a facility staff member has scanned their digital key in the mobile guest portal.		1	22/03/2025	Hazis Voda
FR_GST_10	The system shall register each expense made by the guest to their final invoice.		1	22/03/2025	Jurgen Hila
FR_GST_11	The guest can request room service through the mobile guest portal.		2	22/03/2025	Jurgen Hila
FR_FS_01	Facility staff members could use the system to view their work hours.		3	22/03/2025	Daron Delvina
FR_GST_12	The system shall allow guests to view their expenses at any time through the mobile guest portal.		1	22/03/2025	Jurgen Hila

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Req#	Requirement	Comments	Priority	Date Rvwd	SWE Reviewed / Approved
FR_GST_13	When a guest is checking out, the system shall generate an itemized invoice, which guests can pay online through payment gateways or at the front desk and shall revoke the digital key.		1	22/03/2025	Xhois Cano
FR_GST_14	The system can automatically send a survey through the mobile guest portal to collect feedback after check-out.		3	22/03/2025	Xhois Cano
FR_GM_01	The system should generate reports for the general manager summarizing post check-out guest survey feedback.		2	22/03/2025	Xhois Cano
FR_GST_15	The system should track the cleaning schedule for each room based on guest preferences. The guests might indicate whether they want daily cleaning or a different schedule. A room is automatically scheduled for cleaning when the guest has checked-out or when the guest hasn't specified a custom schedule (in that case daily cleaning).		1	22/03/2025	Orgest Baçova
FR_HK_02	The housekeeping staff shall be able to view a list with the rooms assigned to them for cleaning.		1	22/03/2025	Daron Delvina
FR_HKM_01	The system should be able to provide housekeeping department managers with a real-time view of all room cleaning statuses. Room status must be either Dirty or Clean.		3	22/03/2025	Daron Delvina
FR_HK_02	The system shall allow housekeeping staff to notify of a maintenance issue (e.g. plumbing or electrical) to the housekeeping department manager, making the room unavailable after issue has been resolved.		2	22/03/2025	Orgest Baçova

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Req#	Requirement	Comments	Priority	Date Rvwd	SWE Reviewed / Approved
FR_GST_16	The system can allow guests to request urgent cleaning by specifying the reason of the request. The housekeeping staff on duty shall be alerted for the request.		3	22/03/2025	Orgest Baçova
FR_HKM_02	The system should allow Housekeeping Department Managers to assign cleaning tasks to housekeeping staff.		2	22/03/2025	Daron Delvina
FR_HK_03	The housekeeping staff shall be able to update the status of the room after cleaning.		1	22/03/2025	Sidrit Isufi
FR_DM_01	All Department managers shall schedule shifts for all staff in their department.		1	22/03/2025	Sidrit Zela
FR_DM_02	Department managers shall be able to view details about department staff, like staff list, performance and attendance for members of staff of their department(e.g. task completion time).		1	22/03/2025	Sidrit Isufi
FR_GST_17	The Mobile Guest Portal shall provide a simple form for guests to submit complaints to the relevant department manager regarding the complaint type and should therefore alert that manager.		2	22/03/2025	Orgest Bacova
FR_GM_02	The general manager shall be able to view staff performance, attendance for the entire hotel.		1	22/03/2025	Hazis Voda
FR_GM_03	The general manager shall have access to hotel metrics including occupancy rates, revenue and expenses.		1	22/03/2025	Sidrit Isufi
FR_GM_04	The system shall generate customizable reports according to filters specified by the general manager.		2	22/03/2025	Sidrit Isufi
FR_GM_05	The system shall grant the General Manager full access to all financial statements, including profit and loss reports, balance sheets and cash-flow statements.		1	22/03/2025	Jurgen Hila

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Req#	Requirement	Comments	Priority	Date Rvwd	SWE Reviewed / Approved
FR_FL_01	The system shall allow the Finance Team to calculate, process and manage staff payroll, including tax deductions, bonuses and compliance, overseen by the General Manager.		2	22/03/2025	Endri Baku
FR_FL_02	The system shall allow the Finance Team to generate financial reports, including, profit and loss statements, balance sheets, and cash-flow reports.		2	22/03/2025	Endri Baku
FR_FL_03	The system shall track for the finance team all financial transactions such as guest invoices, staff payroll, and refunds.		2	22/03/2025	Endri Baku
FR_ADMIN_01	The administrator shall be able to manage user access, and grant and revoke permissions for each employee.		1	22/03/2025	Daron Delvina
FR_ADMIN_02	The administrator shall be able to back up the system and restore it in case of system failure.		1	22/03/2025	Xhois Cano
FR_ADMIN_03	The Administrator shall maintain audit logs of all system activities (user actions, billing charges, etc).		1	22/03/2025	Jurgen Hila
FR_ADMIN_04	The system shall allow the Administrator to register new staff members by entering their personal details, assigning them a role, department, and generating a unique username and initial password for access to the system.		2	22/03/2025	Xhois Cano

### **3.1.1 Product Requirements**

Requirements which specify that the delivered product must behave in a particular way e.g. execution speed, reliability, etc.

#### **3.2.1.1 Usability Requirements**

The system needs to be easy and intuitive for users to interact with the system, these are the usability requirements:

- The system's interface must be intuitive and easy to use, requiring no more than 1 hour of training for new employees to perform basic operations.
- The user interface should incorporate best practices in UX design, ensuring users can efficiently navigate through the system without extensive guidance.
- The system must be designed for accessibility, with settings like high contrast, text-to-speech, and alternative text for images.
- The system should have a complete documentation showcasing the detailed roles, privileges, and permissions for each user type, ensuring that users using the system are guided on their respective functionalities.

#### **3.2.1.2 Performance Requirements**

##### **Scalability:**

- The system shall be designed to handle up to 500 simultaneous users (guests and staff) without any degradation in performance.
- The system shall be scalable to accommodate future growth, supporting up to 1000 users without requiring major architectural changes.

##### **Response Time:**

- The system must process room booking requests, in less than 3 seconds per transaction under normal load conditions.
- All user interactions, including guest check-in/check-out, transaction processing, and room service requests, must be completed with minimal delays (within 2 seconds) to enhance the user experience.

##### **System Performance:**

- The system must be capable of handling up to 1000 database transactions per minute without slowdowns or system crashes.
- The database should be optimized to ensure fast query execution, especially during high-traffic periods (e.g., check-in/check-out times).
- Load testing must be conducted regularly to simulate peak usage and ensure the system meets performance benchmarks.

#### **3.2.1.3 Availability**

- The system shall maintain an uptime of 99.9% during business hours (6 AM–12 AM local time).
- Outside business hours, the system shall maintain an uptime of 99.5%.
- Critical modules (e.g., booking, check-in/out, payment processing) shall have 99.99% availability during peak hours (9 AM–11 AM and 6 PM–8 PM).
- **Scheduled Maintenance:** Maintenance windows shall not exceed 2 hours per month and shall occur during off-peak hours (2 AM–4 AM local time).

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- **Scheduled Maintenance:** Users shall be notified of scheduled maintenance 72 hours in advance via email and in-system notifications.
- **Unscheduled Maintenance:** The system shall notify users immediately upon detecting an issue and provide regular updates until resolution.
- **Unscheduled Maintenance:** Unscheduled maintenance shall not exceed 1 hour per quarter.
- The system shall have a *Mean Time Between Failures* of  $\geq 10,000$  hours.
- The system shall not exceed 1 system-wide failure per quarter.
- For individual modules (e.g., booking, billing), the maximum permitted failures shall be  $\leq 2$  per month.
- The system must ensure that room availability is synced in real-time across both the OTA and Mobile Guest Portal. Any update to the availability of rooms, whether by booking, cancellation, or status change, must be reflected within 5 seconds across both platforms to ensure accurate data and avoid double-booking.

### **3.2.1.4 Security**

The system shall follow the following requirement procedures:

#### **Encryption:**

- All sensitive data (e.g., guest details, payment information, keycard data, transaction data) shall be encrypted using AES-256 encryption.
- Financial data and reports must be encrypted both in transit and at rest to protect sensitive information.
- 

#### **Activity:**

- The system shall log 100% of user actions (e.g., logins, bookings, payments) with timestamps, user IDs, and IP addresses.
- Audit logs shall be retained for 7 years for compliance and auditing purposes.
- Audit logs shall be accessible only to authorized administrators and protected from tampering.

#### **Role-Based Access Control:**

- Modules shall communicate only with authorized modules based on predefined roles and permissions (e.g., housekeeping cannot access billing data).
- User sessions shall expire after 15 minutes of inactivity and require re-authentication.

#### **Data Integrity Checks:**

- The system shall perform daily checksum validation on critical data sets (e.g., guest profiles, booking records) to detect tampering.

#### **Malware and Intrusion Prevention:**

- The system shall run real-time antivirus and anti-malware scans on all servers and endpoints.
- The system shall include an IDS to detect and block unauthorized access attempts.

### **3.1.2 Organizational Requirements**

The system needs to follow these following organizational policies and procedures:

#### **Environmental Requirements:**

- These requirements focus on sustainability, energy efficiency, and ethical considerations:
- The system shall minimize resource usage (e.g., CPU, memory) to reduce energy consumption.

## **Operational Requirements:**

### **Security and Access Control**

- All users (staff and administrators) shall use strong passwords (minimum 12 characters, including uppercase, lowercase, numbers, and special characters) that expire every 90 days.
- All security incidents (e.g., data breaches, unauthorized access) shall be reported to the IT security team within 15 minutes of detection.

### **Backup and Recovery**

- The system shall perform daily automated backups of all critical data (e.g., bookings, guest details, transactions).
- A disaster recovery plan shall be in place, with a maximum recovery time objective (RTO) of 1 hour for critical modules.

### **Vendor and Third-Party Management**

- All third-party vendors (e.g., payment gateways, OTAs) shall comply with the organization's security and privacy policies.
- Third-party vendors shall undergo annual security audits to ensure compliance with organizational standards.

## **Development Requirements:**

- The system shall be implemented in phases, starting with core modules (e.g., booking, check-in/out) and gradually adding more advanced features.
- A pilot implementation shall be conducted at one hotel location for 3 months to identify and resolve issues before full rollout.
- The system shall be developed using Agile methodologies, with bi-weekly sprints, daily stand-ups, and sprint reviews.

### **3.1.3 External Requirements**

#### **Interoperability Requirements**

##### **Third-Party Integrations:**

- The system shall integrate with Online Travel Agencies (OTAs) (e.g., Booking.com, Expedia) for real-time room availability synchronization.
- The system shall integrate with Point-of-Sale (POS) systems (e.g., Square, Toast) for restaurants and bars to log orders and link charges to guest bills.
- The system shall integrate with payment gateways (e.g., Stripe, PayPal) to process guest payments securely.

## Legislative Requirements

### GDPR/CCPA Compliance:

- The system shall provide tools for guest data consent, deletion requests, and access logs to comply with GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act).

### PCI DSS Compliance:

- Payment processing modules shall comply with PCI DSS v4.0 standards to ensure secure handling of credit card information.
- The system shall automatically apply region-specific taxes (e.g., VAT, tourism taxes) to invoices to comply with local tax laws.

## Globalization Requirements

- The system shall support 5 languages (e.g., English, Spanish, French, Mandarin, Arabic) for guest and staff interfaces.
- The system shall support 10 currencies for payments and billing, with real-time exchange rate updates.

## 4. User Scenarios/Use Cases

*The guest shall be able to register into the Mobile Guest Portal — (Sidrit Zela)*

UC Name	<i>Guest Register to Mobile Guest Portal UC_GST_01</i>
Summary	<i>This UC allows the guest to create an account in the Mobile Guest Portal to access booking, check-in, and other services.</i>
Dependency	-
Actors	- Primary Actor: Guest
Preconditions	<ul style="list-style-type: none"> <li><i>The guest has no existing account(or chooses to create a new one).</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li><i>Step 1: The guest selects “Register” in the Mobile Guest Portal.</i></li> <li><i>Step 2: The guest fills in the registration form (email, password, personal details).</i></li> <li><i>Step 3: The guest submits the form.</i></li> <li><i>Step 4: The system validates data (email address, password strength).</i></li> </ul>

	<ul style="list-style-type: none"> <li>● <i>Step 5: The system creates account and sends verification email.</i></li> <li>● <i>Step 6: The guest clicks verification link to activate the account.</i></li> <li>● <i>Step 7: The system logs the guest in automatically.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 4a: The system highlights problems (invalid email address), and prompts the guest to retry.</i></li> <li>● <i>Step 4b: An account already exists with the given email, so the system prompts the guest to log in or reset password.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The data collection shall be in compliance with GDPR regulations.</i></li> <li>● <i>The system shall complete the registration in less than 3 seconds.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>A new guest account has been created and verify.</i></li> <li>● <i>The guest can log into their new account and access services.</i></li> </ul>

*The guest shall be able to log into the Mobile Guest Portal. — (Hazis Voda)*

UC Name	<i>Guest Login to Mobile Guest Portal UC_GST_02</i>
Summary	<i>This UC allows the guest to log in to the mobile application's guest portal.</i>
Dependency	<i>UC_GST_01: Register to Mobile Guest Portal</i>
Actors	<i>Primary Actor: Guest</i>
Preconditions	<ul style="list-style-type: none"> <li>- <i>Mobile application is installed and functional.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Guest opens the mobile application to log in.</i></li> <li>● <i>Step 2: Guest inputs the login information for their account (their credentials).</i></li> <li>● <i>Step 3: System verifies user login information.</i></li> <li>● <i>Step 4: System redirects guest to their interface.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 3A - If login details are incorrect, the system prompts for re-entry.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>- <i>The system must allow the user access to their mobile app.</i></li> <li>- <i>The system must validate the guest's login request by checking if his details correct.</i></li> <li>- <i>The system must quickly redirect the user to their interface once successfully logging in.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>- <i>The guest is successfully logged in.</i></li> </ul>

*The system shall allow the guests to search for available rooms by room type, check-in and check-out dates and price range through Online Travel Agencies or the Mobile Guest Portal.*  
**— (Endri Baku)**

UC Name	<b>Search for Available Rooms</b> <b>UC_GST_03</b>
Summary	<i>This use case describes the process of a user searching for available rooms through Online Travel Agencies (OTA) or through the Mobile Guest Portal.</i>
Dependency	
Actors	<i>Primary Actor: Guest</i>
Preconditions	<ol style="list-style-type: none"> <li>1. The Guest has access to an Online Travel Agency or the Mobile Guest Portal.</li> <li>2. The Hotel's room availability is synced with Online Travel Agencies and is up-to-date</li> <li>3. The Mobile Guest Portal is operating.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• <b>Step 1:</b> Guest visits OTA or the Mobile Guest Portal.</li> <li>• <b>Step 2:</b> Guest enters search criteria and specifies room type, check-in and check-out dates, price range.</li> <li>• <b>Step 3:</b> The system processes the request and retrieves available rooms based on the search criteria.</li> <li>• <b>Step 4:</b> The system returns a list of available rooms.</li> <li>• <b>Step 5:</b> The system (based on where the guest is searching from) displays the list of available rooms to the guest on the platform where the search criteria was entered.</li> <li>• <b>Step 6:</b> Guest selects their preferred room.</li> <li>• <b>Step 7:</b> Guest continues to complete booking on the Mobile Guest Portal.</li> </ul>
Description of	<b>Step 4a - No Rooms Available:</b> <ul style="list-style-type: none"> <li>• Step 1: The system finds no available rooms that match the</li> </ul>

the Alternative Sequence	<p>guest's criteria.</p> <ul style="list-style-type: none"> <li>Step 2: The system displays an error message with the message that there were no available rooms that match the specified criteria and suggests the guest to specify alternative criterias.</li> </ul>
Non functional requirements	<p><b>Performance:</b> The search shouldn't take longer than 3 seconds.</p> <p><b>Availability:</b> The system must ensure that room availability is synced in real-time across both the <b>Online Travel Agencies</b> and <b>Mobile Guest Portal</b>. Any update to the availability of rooms, whether by booking, cancellation, or status change, must be reflected within 5 seconds across both platforms to ensure accurate data and avoid double-booking.</p>
Postconditions	<ol style="list-style-type: none"> <li>Guest is either redirected from an Online Travel Agency or has searched directly in the Mobile Guest Portal.</li> <li>Guest has selected a room and can proceed with booking.</li> </ol>

*The system shall allow the guests to complete their booking on the Mobile Guest Portal. — (Endri Baku)*

UC Name	<b>Guest Books on Mobile Guest Portal</b> <b>UC_GST_04</b>
Summary	<i>This use case describes the process of the guest that completes booking on the Mobile Guest Portal.</i>
Dependency	<b>UC_GST_03: Search Room</b>
Actors	<p>Primary Actor: Guest</p> <p>Secondary Actor: Receptionist, Front Desk Manager</p>
Preconditions	<ol style="list-style-type: none"> <li>Guest has selected a room and has proceeded with booking</li> <li>Guest has logged into the Mobile Guest Portal</li> <li>Mobile Guest Portal is operating.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li><b>Step 1:</b> Guest views booking summary that contains the selected room, dates and price from the Mobile Guest Portal.</li> <li><b>Step 2:</b> The guest enters personal and payment details and submits the booking requests.</li> <li><b>Step 3:</b> The system validates the personal and payment details.</li> <li><b>Step 4:</b> Upon successful verification, the system submits the booking request to the Front desk Manager</li> <li><b>Step 5:</b> The Front Desk Manager assigns the booking to the receptionist.</li> <li><b>Step 5:</b> The receptionist receives a notification for the new booking</li> </ul>

	<p>request.</p> <ul style="list-style-type: none"> <li>● <b>Step 6:</b> The receptionist reviews the booking details (guest details, room availability, personal and payment details).</li> <li>● <b>Step 7:</b> The receptionist approves the booking request.</li> </ul>
Description of the Alternative Sequence	<p><b>Step 2a - Invalid Personal and Payment Details</b></p> <ul style="list-style-type: none"> <li>● If the personal or payment details provided by the guest are incorrect, then the system displays to the guest an error message that the details provided are not valid.</li> <li>● The system prompts the user to enter those details again until the details are approved from the system and can proceed to the next step.</li> </ul> <p><b>Step 6a - Room becomes Unavailable when Receptionist is reviewing.</b></p> <ul style="list-style-type: none"> <li>● The system checks room availability when the Receptionist reviews the request.</li> <li>● If the room that is selected from the guest is no longer available, the receptionist has two options: <ul style="list-style-type: none"> <li>○ Suggest alternative rooms with similar criterias to the guest.</li> <li>○ Reject the booking request.</li> </ul> </li> <li>● If an alternative room is offered, Guest receives a notification about the new booking suggestion.</li> <li>● Guest either: <ul style="list-style-type: none"> <li>○ Accepts the booking request with the updated room.</li> <li>○ Rejects the booking request with the updated room.</li> </ul> </li> </ul>
Non functional requirements	<p><b>Performance:</b> The booking requests shall be processed within 2 seconds after submission.</p> <p><b>Scalability:</b> In transit, guest search data should be encrypted.</p> <p><b>Availability:</b> The Mobile Guest Portal should maintain 99.9% uptime.</p>
Postconditions	<ol style="list-style-type: none"> <li>1. The receptionist has approved the booking.</li> <li>2. The system confirms the booking and notifies the guest.</li> <li>3. The room is reserved in the system.</li> </ol>

*The system shall allow the guest to cancel a booking before check-in. — (Endri Baku)*

UC Name	<b>Guest Cancels Booking before Check-In</b> <b>UC-GST_05</b>
Summary	<i>This use case describes the process of the guest cancelling a booking before check-in.</i>
Dependency	
Actors	<i>Primary Actor: Guest</i>
Preconditions	<ol style="list-style-type: none"> <li>1. <i>The guest has already booked a room.</i></li> <li>2. <i>The guest is already logged into the Mobile Guest Portal.</i></li> <li>3. <i>The booking is within the allowed cancellation period</i></li> <li>4. <i>Mobile Guest Portal is operating.</i></li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• <b>Step 1:</b> <i>The guest accesses their booking details in the Mobile Guest Portal</i></li> <li>• <b>Step 2:</b> <i>The guest selects the option to cancel the booking.</i></li> <li>• <b>Step 3:</b> <i>The system verifies if the booking is within the allowed cancellation frame.</i></li> <li>• <b>Step 4:</b> <i>If a cancellation fee applies based on the hotel's policy, the system calculates it.</i></li> <li>• <b>Step 5:</b> <i>The system displays the cancellation fee to the user.</i></li> <li>• <b>Step 6:</b> <i>Guest chooses to accept the cancellation.</i></li> <li>• <b>Step 7:</b> <i>System sends payment request to the Payment Gateway to charge the cancellation fee.</i></li> <li>• <b>Step 8:</b> <i>The system cancels booking.</i></li> <li>• <b>Step 9:</b> <i>A cancellation confirmation notification is sent to the guest.</i></li> <li>• <b>Step 10:</b> <i>The system marks the room as available.</i></li> </ul>
Description of the Alternative	<b>Step 4a - No Cancellation Fee</b> <ol style="list-style-type: none"> <li>1. <i>If the guest cancels with a no cancellation fee policy, the system confirms no cancellation fee is required.</i></li> </ol>

## Hotel Management System [HMS] Requirements Specification

Sequence	<ol style="list-style-type: none"> <li>2. System proceeds with cancelling the booking without charging the Guest.</li> <li>3. A cancellation confirmation notification is sent to the guest.</li> </ol>
Non functional requirements	<p><b>Usability:</b> The cancellation process should be user-friendly and require minimal steps.</p> <p><b>Scalability:</b> The system should handle multiple cancellations simultaneously without delays or errors.</p> <p><b>Availability:</b> The cancellation feature should be available 24/7 to allow guests to cancel at any time. In case of a system failure, the cancellation process should be queued when the system is back up again.</p>
Postconditions	<ol style="list-style-type: none"> <li>1. Booking is successfully cancelled</li> <li>2. The cancellation fee is charged, if applicable.</li> <li>3. The guest receives a confirmation notification.</li> <li>4. The room is marked as available again.</li> </ol>

*The system shall allow the guest to request a booking modification before check-in (e.g. room type, check-in date). The system shall then send the request to the receptionist. The receptionist can check if the modification is possible (e.g. new specified room type is available) and confirm it. — (Sidrit Zela)*

UC Name	<b>Guest Requests Booking Modification before Check-In</b> <b>UC_GST_06</b>
Summary	<i>This UC allows the guest to request a change to their reservation, like the check-in date or room type. This request is sent to the receptionist for approval.</i>
Dependency	<i>UC_GST_04: Guest Books a Room</i>
Actors	<i>Primary Actors: Guest, Receptionist</i>
Preconditions	<ul style="list-style-type: none"> <li>• The guest must be signed in the mobile guest portal</li> <li>• The guest must already have a confirmed booking</li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• Step 1: The guest goes to the “My Bookings” page.</li> <li>• Step 2: The guest clicks on the booking they want to modify.</li> <li>• Step 3: The guest clicks “Modify Booking”.</li> <li>• Step 4: The guest makes changes to the check-in date</li> </ul>

	<p><i>or room type.</i></p> <ul style="list-style-type: none"> <li>● <i>Step 5: The guest submits the changes.</i></li> <li>● <i>Step 6: The system sends the modification request to the receptionist.</i></li> <li>● <i>Step 7: The receptionist reviews and approves the request.</i></li> <li>● <i>Step 8: The system sends a confirmation notification to the guest.</i></li> <li>● <i>Step 9: The system updates the booking details.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 5a: The guest cancels the modification request.</i></li> <li>● <i>Step 7b: The receptionist reviews and declines the request.</i></li> <li>● <i>Step 8b: The system sends a denial notification to the guest.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The system must make sure the changes proposed by the guest are possible (a certain room type is available in the given dates).</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>The booking details are updated (if approved).</i></li> <li>● <i>Guest receives confirmation/denial notification.</i></li> </ul>

*The system shall provide to the receptionist a real-time inventory of room status (available, booked, under maintenance). The real-time availability list shall be displayed on the receptionist's dashboard. — (Sidrit Zela)*

UC Name	<i>Real-time Inventory of room status for Receptionist.</i> <u>UC_REC_01</u>
Summary	<i>This UC allows the receptionist to access a real-time dashboard of room statuses (available, booked, under maintenance).</i>
Dependency	-
Actors	<i>Primary Actors: Receptionist</i>
Preconditions	<ul style="list-style-type: none"> <li>● <i>The receptionist must be logged into the system.</i></li> </ul>
Description of	<ul style="list-style-type: none"> <li>● <i>Step 1: The receptionist opens the "Room Inventory"</i></li> </ul>

the Main Sequence	<p><i>dashboard.</i></p> <ul style="list-style-type: none"> <li>● <i>Step 2: The system gets and displays the current status for each room (color-coded: green=available, red=booked, yellow=maintenance).</i></li> <li>● <i>Step 3: The receptionist filters the dashboard by status, room type or floor.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 2a: The system cannot retrieve room data from the database.</i></li> <li>● <i>Step 3a: The system shows a “Room Data Loading Failed” alert.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The system shall sync in real-time with the room database and update the dashboard when a change is made.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>The receptionist has a real-time view of the room statuses.</i></li> </ul>

*The system shall allow the receptionist to modify a booking in special cases (e.g. room is under maintenance) and shall send a notification to a guest. — (Sidrit Zela)*

UC Name	<i>Receptionist modifies booking in special cases.</i> <b>UC_REC_02</b>
Summary	<i>This UC allows the receptionist to modify a guest's booking (e.g., reassigns room) due to maintenance issues.</i>
Dependency	<i>UC_REC_01: Real-Time Inventory Status</i>
Actors	<ul style="list-style-type: none"> <li>- <i>Primary Actors: Receptionist</i></li> <li>- <i>Secondary Actors: Guest</i></li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>● <i>The receptionist must be logged into the system.</i></li> <li>● <i>The room must have the “Under Maintenance” status.</i></li> <li>● <i>The room must have an upcoming booking.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: The receptionist opens the “Bookings” page.</i></li> <li>● <i>Step 2: The receptionist selects the booking affected by the maintenance issues.</i></li> <li>● <i>Step 3: The receptionist assigns another available room to the guest.</i></li> <li>● <i>Step 4: The receptionist confirms the changes.</i></li> </ul>

	<ul style="list-style-type: none"> <li>● <i>Step 5: The system updates the booking details.</i></li> <li>● <i>Step 6: The system notifies the guest through email and the Mobile Guest Portal.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 3a: If no rooms are available, the receptionist must cancel the current booking.</i></li> <li>● <i>Step 4a: The guest is refunded for the booking.</i></li> <li>● <i>Step 5a: The guest is notified about the reason of the cancelation and prompted about scheduling another booking.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>All booking changes must be tracked in the audit log.</i></li> <li>● <i>The notification must be sent within one minute to the guest.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>The booking is updated.</i></li> <li>● <i>The guest is notified.</i></li> </ul>

*The system shall allow guests to check-in through the mobile app or the receptionist can complete the check-in for them. After the check-in the system shall generate the digital key for the room (valid for the duration of stay) which a customer can store in their phone. — (Hazis Voda)*

UC Name	<i>Check-in through mobile app or receptionist, generate digital key</i> <b>UC_GST_07</b>
Summary	<i>This UC allows the users to check-in through the mobile app or the receptionist can complete the check-in for them and after the check-in the digital key is generated and stored in the user's phone.</i>
Dependency	<i>UC_GST_04: Guest Books a Room</i>
Actors	<i>Primary Actor: Guest Secondary Actor: Receptionist</i>

Preconditions	<ul style="list-style-type: none"> <li>- <i>Mobile application is installed and functional.</i></li> <li>- <i>Guest is logged into the mobile guest portal.</i></li> <li>- <i>Guest has a confirmed booking.</i></li> <li>- <i>Receptionist is logged into the Staff interface and has access to the system.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Guest initiates check-in via the application.</i></li> <li>● <i>Step 2: System verifies booking details.</i></li> <li>● <i>Step 3: System assigns a room.</i></li> <li>● <i>Step 4: System generates a digital room key valid for the duration of the stay.</i></li> <li>● <i>Step 5: Digital Key is delivered to the guest's mobile application.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1A - If booking details are incorrect, the system prompts for re-entry or escalates to the receptionist.</i></li> <li>● <i>Step 1B – If guest has issues checking-in, the receptionist can take over for them.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>- <i>The system must validate the guest's request by checking if his details correct.</i></li> <li>- <i>The system must validate the check-in request by checking if the booking details are correct.</i></li> <li>- <i>The system must assign an available room to the guest.</i></li> <li>- <i>The system must generate a valid digital room key that is connected with the room.</i></li> <li>- <i>The system must save the digital key on the guest's mobile application.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>- <i>The guest is successfully checked in.</i></li> <li>- <i>A digital room key is generated and stored on the guest's phone.</i></li> </ul>

*The guest shall be able to access their room by the digital key connected to the room lock via Flexipass. — (Hazis Voda)*

UC Name	<i>Connect Digital Key to room lock using Flexipass.</i> <b>UC_GST_08</b>
Summary	<i>Flexipass SDK is used to connect the digital key provided to the guest with the lock in their room.</i>
Dependency	<i>UC_GST_07: Guest Check-In</i>
Actors	<i>Primary Actor: Guest Secondary Actor: Flexipass SDK</i>
Preconditions	<ul style="list-style-type: none"> <li>- <i>Mobile application is installed and functional.</i></li> <li>- <i>Guest is logged into the mobile guest portal.</i></li> <li>- <i>Guest has successfully checked in and received a digital key.</i></li> <li>- <i>Room lock is equipped with the generated Flexipass digital key.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: System pairs the digital key to the designated room lock using Flexipass.</i></li> <li>● <i>Step 2: System validates the pairing for the duration of the guest's stay.</i></li> <li>● <i>Step 3: Guest uses the digital key to unlock their room.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1A - If pairing fails, the system retries or prompts the receptionist for assistance.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>- <i>The system must allow the guest to enter their room if the digital key is successfully paired with the room lock.</i></li> <li>- <i>The system must allow the guest to enter their room if the digital key is identical to the room lock.</i></li> <li>- <i>The system must allow the guest to enter their room if they are within their allowed duration of stay.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>- <i>Digital key is successfully connected to the room lock via Flexipass.</i></li> <li>- <i>Guest can access the room using the digital key.</i></li> </ul>

A guest can access facilities and use services of the hotel after a facility staff member has scanned their digital key in the mobile guest portal. — (**Hazis Voda**)

UC Name	<i>Access facilities and services using digital key</i> <b>UC_GST_09</b>
Summary	<i>The UC allows a guest to access facilities or use services of the hotel after a facility staff member has scanned their digital key in the mobile guest portal.</i>
Dependency	<b>UC_GST_07: Guest Check-In</b>
Actors	<i>Primary Actor: Guest Secondary Actor: Facility Staff Member (Receptionist, Department Manager etc)</i>
Preconditions	<ul style="list-style-type: none"> <li>- <i>Mobile application is installed and functional.</i></li> <li>- <i>Guest is logged into the mobile guest portal.</i></li> <li>- <i>Guest possesses a valid digital key stored in the mobile guest portal.</i></li> <li>- <i>Facility staff member i has access to the scanning system.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Guest presents their digital key stored in the mobile guest portal</i></li> <li>● <i>Step 2: Facility staff member scans the digital key and matches it with the guest's booking.</i></li> <li>● <i>Step 3: The system verifies the digital key and matches it with the guest's booking.</i></li> <li>● <i>Step 4: Access is granted to the requested facility/service.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1A - If the digital key verification fails, system prompts staff to check booking details or re-scan the key.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>- <i>The system must allow the guest to enter the facility or access the service if the digital key is successfully scanned.</i></li> <li>- <i>The system must allow the guest to enter the facility or access the service if they are within their allowed duration of stay in the hotel.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>- <i>Guest is granted access to the facility or service.</i></li> <li>- <i>The system updates the guest's facility/service usage record for tracking/invoice purposes.</i></li> </ul>

***Hotel Management System [HMS] Requirements Specification***

*The system shall register each expense made by the guest to their final invoice. — (Jurgen Hila)*

UC Name	<i>Register guest expenses to final invoice UC_GST_10</i>
Summary	<i>Record guest expenses on the final invoice.</i>
Dependency	<i>UC_GST_07: Check-In</i>
Actors	<i>Guest is the primary actor.</i>
Preconditions	<ol style="list-style-type: none"> <li>1. Guest Check-In: The Guest must be registered in the system they have checked in to the facility, hotel, or venue.</li> <li>2. Guest must have used a facility or requested room service, and has to be charged for the service.</li> <li>3. Expense Logging Mechanism: The system or staff must have the tools or processes in place to register expenses accurately.</li> <li>4. Staff Availability (if applicable): If manual expense entry is required, relevant staff should be available to handle it.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• Step 1: <i>The system updates the guest's interim invoice in real-time to include the registered expense</i></li> <li>• Step 2: <i>Optionally, the guest reviews their interim invoice to confirm accuracy during their stay</i></li> <li>• Step 3: <i>At checkout, the system consolidates all expenses to generate the final invoice</i></li> <li>• Step 4: <i>The system generates and provides the final invoice to the guest, including a detailed expense summary.</i></li> </ul>

Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● Step 1: The guest disputes an expense. Staff verifies the charge and either removes it or corrects the invoice.</li> <li>● Step 2: The system encounters a failure while registering an expense. Staff manually logs the expense and updates the system later.</li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● The system must process and register expenses within 2 seconds of receiving input to ensure smooth operation.</li> <li>● The system should support simultaneous usage by at least 100 staff members without performance degradation.</li> <li>● The interface must be user-friendly and intuitive, enabling staff to log expenses with minimal training.</li> <li>● The system must have 99.9% uptime to ensure uninterrupted operation for registering guest expenses.</li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● The guest's account has been updated with the newly registered expense, including all relevant details such as the description, amount, and timestamp.</li> <li>● The interim or final invoice associated with the guest reflects all registered expenses accurately.</li> <li>● The system maintains a log of the transaction for future reference or auditing purposes.</li> <li>● The data integrity of the guest's account and overall system is ensured, with no errors or inconsistencies introduced during the process.</li> </ul>

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*The guest can request room service through the mobile guest portal. — (Jurgen Hila)*

UC Name	<i>Request room service through mobile guest portal.</i> <b>UC_GST_11</b>
Summary	<i>Guests can request room service via the mobile portal.</i>
Dependency	<i>UC_GST_07: Check-In</i>
Actors	<i>Guest is the primary actor.</i>
Preconditions	<ul style="list-style-type: none"><li>• Active Guest Profile: The guest must have an active account or profile in the system, linked to their stay details.</li><li>• Operational Mobile Portal: The mobile portal must be functional and accessible to the guest via a supported device.<ul style="list-style-type: none"><li>• Guest Authentication: The guest must be logged into the mobile portal with valid credentials.</li><li>• Room Service Availability: Room service must be operational, with items or services available for request.</li><li>• Network Connection: The guest's device must have a stable internet connection to access the mobile portal.</li></ul></li></ul>

Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: The mobile portal displays the available room service items and services for selection.</i></li> <li>● Step 2: The guest chooses desired items or services and adds them to their order.</li> <li>● Step 3: The mobile portal provides an order summary for the guest to review and confirm</li> <li>● Step 4: The guest submits the room service order through the portal.</li> <li>● Step 5: <i>The system logs the guest's request and forwards it to the appropriate staff or service department</i></li> <li>● Step 6: <i>The staff processes the order and prepares it for delivery.</i></li> <li>● Step 7: <i>The ordered items or services are delivered to the guest's room.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● Step 1: Certain room service items or services are temporarily unavailable. The system informs the guest and suggests alternatives, if applicable.</li> <li>● Step 2: <i>The guest cancels a service or item after it has been registered.</i></li> <li>● Step 3: The guest's order is delayed due to operational constraints. Staff communicates the delay and ensures a resolution.</li> <li>● Step 4: The system encounters a failure while processing the guest's request. The guest is prompted to resubmit the order or contact staff for assistance</li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The mobile portal must be intuitive, with clear navigation and accessibility for users of all skill levels.</i></li> <li>● The system must handle 99.9% uptime, ensuring guests can request room service without interruptions</li> <li>● The portal must securely authenticate users and encrypt all data, ensuring privacy and protection of guest information.</li> <li>● The mobile portal must be available 24/7 to allow guests to place orders at any time.</li> <li>● The system must function seamlessly across different devices (e.g., smartphones, tablets) and platforms (e.g., iOS, Android).</li> </ul>

Postconditions	<ul style="list-style-type: none"> <li><i>The guest's room service request is successfully recorded in the system, with all relevant details (e.g., items requested, quantity, and time of order).</i></li> <li><i>The system notifies the appropriate staff or service department to prepare and deliver the order.</i></li> <li><i>The expense associated with the room service request is added to the guest's account and reflected in their interim or final invoice</i></li> <li><i>The guest receives a confirmation message through the mobile portal, acknowledging the successful submission of their request.</i></li> <li><i>The guest can track the status of their room service order via the mobile portal.</i></li> </ul>
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*Facility staff members could use the system to view their work hours. — (Daron Delvina)*

UC Name	<b>Facility Staff Viewing Work Hours</b> <u>UC_FS_01</u>
Summary	<i>Facility staff members can use the system to view their work hours, ensuring they are informed about their schedules and any changes.</i>
Dependency	None.
Actors	<ul style="list-style-type: none"> <li><i>Primary: Facility Staff Member</i></li> </ul>
Preconditions	<ul style="list-style-type: none"> <li><i>The facility staff member must have valid login credentials.</i></li> <li><i>The system must have stored work hour data for the staff member.</i></li> </ul>
Description of the Main Sequence	<ol style="list-style-type: none"> <li><i>The facility staff member logs into the system.</i></li> <li><i>The system authenticates the user.</i></li> <li><i>The staff member navigates to the "View Work Hours" section.</i></li> </ol>

	<ol style="list-style-type: none"> <li>4. <i>The system retrieves and displays the work hours for the staff member.</i></li> <li>5. <i>The staff member reviews the displayed work hours.</i></li> </ol>
Description of the Alternative Sequence	<ol style="list-style-type: none"> <li>1. <i>If the authentication fails, the system prompts the staff member to re-enter credentials.</i></li> <li>2. <i>If no work hour data is available, the system displays an appropriate message.</i></li> <li>3. <i>If the system experiences an error, it provides an error message and suggests retrying later.</i></li> </ol>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The system should load work hour data within 2 seconds.</i></li> <li>● <i>The interface should be user-friendly and accessible on both desktop and mobile devices.</i></li> <li>● <i>Secure authentication must be ensured to prevent unauthorized access.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>The staff member has successfully viewed their work hours.</i></li> <li>● <i>The system logs the activity for record-keeping purposes.</i></li> </ul>

*The system shall allow guests to view their expenses at any time through the mobile guest portal. — (Jurgen Hila)*

UC Name	<i>View expenses through mobile guest portal.</i> <b>UC_GST_12</b>
Summary	<i>Guests can access and view their expenses anytime via the mobile portal.</i>
Dependency	<i>UC_GST_07: Check-In</i>
Actors	<i>Guest is the primary actor.</i>

Preconditions	<ol style="list-style-type: none"> <li>1. Guest Account Setup: The guest must have an active account in the system with their expenses correctly linked.</li> <li>2. Mobile Portal Accessibility: The mobile portal must be functional and accessible via compatible devices (smartphone, tablet).</li> <li>3. Guest Authentication: The guest must be logged into the portal using valid credentials to securely access their information.</li> <li>4. System Data Synchronization: The system must ensure all expense data is updated and synchronized in real-time.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• <i>Step 1: The guest accesses the mobile portal using their valid credentials.</i></li> <li>• <i>Step 2: The portal retrieves and displays the guest's expenses in an organized format (itemized list).</i></li> <li>• <i>Step 3: The guest selects specific expenses to view detailed information (date, amount, description).</i></li> <li>• <i>Step 4: The guest reviews their interim invoice, which consolidates all recorded expenses.</i></li> <li>• <i>Step 5: The system ensures the displayed expenses are up-to-date and synchronized with the central database.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>• <i>Step 1: The guest is unable to log into the mobile portal due to forgotten credentials or technical issues. Staff assists the guest in resetting their credentials or resolving the issue.</i></li> </ul>

	<ul style="list-style-type: none"> <li>● <i>Step 2:</i> The system fails to retrieve expense details due to a technical issue. A message is displayed to the guest, and staff is notified to resolve the error</li> <li>● <i>Step 3:</i> The displayed expenses are outdated due to a synchronization delay. The system refreshes the data and updates the portal in real-time once the issue is resolved.</li> <li>● <i>Step 4:</i> The guest's device is incompatible or has connectivity issues. Staff provides an alternative method to review expenses, such as printed statements or accessing a kiosk.</li> <li>● <i>Step 5:</i> The guest notices incorrect expense details while reviewing their account. They report the issue via the portal or directly to staff, who investigate and resolve it</li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>● <i>The mobile portal must feature a user-friendly interface with clear navigation for all guests.</i></li> <li>● <i>All data, including guest credentials and expense details, must be encrypted and securely stored to maintain privacy.</i></li> <li>● The mobile portal must be compatible with all popular operating systems (iOS, Android) and browsers.</li> <li>● The portal must adhere to accessibility standards to cater to guests with disabilities, such as screen reader support.</li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>● <i>The guest successfully views an up-to-date, itemized list of their expenses through the mobile portal.</i></li> <li>● <i>The system ensures that the expense details displayed match the information stored in the central database, with no discrepancies.</i></li> <li>● <i>The system records the guest's access attempt for auditing and monitoring purposes.</i></li> <li>● <i>The session ends securely, ensuring no unauthorized access to the expense details post-interaction.</i></li> </ul>

*When a guest is checking out, the system shall generate an itemized invoice, which guests can pay online through payment gateways or at the front desk and shall revoke the digital key.*  
**— (Xhois Cano)**

UC Name	<i>Generate itemized invoice at checkout, revoke digital key.</i> <b>UC_GST_13</b>
Summary	<i>This UC allows the receptionist to generate, revoke, and invoice for the guests.</i>
Dependency	<b>UC_GST_07: Guest Check-In</b>
Actors	<i>Primary actor: Guest Secondary actor: Receptionist, Flexipass SDK</i>
Preconditions	<i>The guest has checked in and stayed at the hotel. All the expenses (services, room charges ,etc.) have been logged in the system. The guest is ready to check out</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>The guest initiates the checkout process via the Mobile Guest Portal or at the front desk.</i></li> <li>● <i>The system retrieves all logged expenses (room charges, services, etc.) for the guest.</i></li> <li>● <i>The system generates an itemized invoice, including a breakdown of all charges.</i></li> <li>● <i>The system presents the invoice to the guest for review at the Mobile Guest Portal.</i></li> <li>● <i>The guest confirms the invoice and selects a payment method (online or at the front desk).</i></li> <li>● <i>The system processes the payment and generates a receipt.</i></li> <li>● <i>The system revokes the guest's digital key, ensuring they no longer have access to the room or facilities.</i></li> <li>● <i>The system updates the room status to "Needs Cleaning" for housekeeping.</i></li> </ul>
Description of the Alternative Sequence	<ol style="list-style-type: none"> <li>1. <i>If the guest disputes any charges:</i> <ol style="list-style-type: none"> <li>1.1 <i>The receptionist reviews the charges and makes adjustments if necessary.</i></li> <li>1.2 <i>The system regenerates the invoice and presents it to</i></li> </ol> </li> </ol>

	<p><i>the guest for approval.</i></p> <p>2. <i>If payment fails:</i></p> <p>2.1 <i>The system notifies the guest and prompts them to try another payment method.</i></p> <p>2.2 <i>If payment still fails, the receptionist handles the situation manually.</i></p>
Non functional requirements	<p><i>The system must generate the invoice within 2 seconds of the guest initiating checkout. The digital key revocation process must be instantaneous to ensure security. The system must ensure all financial transactions are encrypted and comply with PCI DSS standards.</i></p>
Postconditions	<p><i>The guest has received an itemized invoice and paid their bill. The guest's digital key has been revoked, and they no longer have access to the room or facilities. The room status has been updated to "available" for housekeeping.</i></p>

*The system should automatically send a survey through the mobile guest portal to collect feedback after check-out. — (Xhois Cano)*

UC Name	<p><i>Send post check-out survey to collect feedback.</i></p> <p><i>UC_GST_14</i></p>
Summary	<p><i>This UC describes the process of sending a post check-out survey to the guest to collect feedback about their stay.</i></p>
Dependency	<p><i>UC_GST_13: Guest Check-out</i></p>
Actors	<p><i>Primary actor: System</i></p> <p><i>Secondary actor: Guests</i></p>
Preconditions	<p><i>The guest has successfully checked out of the hotel.</i></p> <p><i>The guest's contact information (email or phone number) is available in the system.</i></p>
Description of	<ul style="list-style-type: none"> <li><i>The system automatically triggers a post check-out</i></li> </ul>

the Main Sequence	<p><i>survey after the guest checks out.</i></p> <ul style="list-style-type: none"> <li>● <i>The system sends the survey to the guest via email or SMS, depending on their preferred contact method.</i></li> <li>● <i>The guest completes the survey and submits their feedback.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>If the guest does not respond to the survey within 24 hours:</i> <i>The system sends a reminder email or SMS.</i></li> <li>● <i>If the guest opts out of receiving surveys:</i> <i>The system does not send the survey and logs the opt-out preference.</i></li> </ul>
Non functional requirements	<i>The survey must be sent within 1 hour of checkout. The survey interface must be mobile-friendly and easy to complete. The system must ensure guest data privacy and comply with GDPR/CCPA regulations.</i>
Postconditions	<i>The guest has received and completed the post check-out survey.</i>

*The system should generate reports for the general manager summarizing post check-out guest survey feedback. — (Xhois Cano)*

UC Name	<b>Generate Guest Survey Post Check-Out Reports for General Manager.</b> <b>UC_GM_01</b>
Summary	<i>This UC describes the process of generating reports that summarize guest feedback collected from post check-out surveys.</i>
Dependency	<i>UC_GST_14: Guest Send Check-Out Feedback</i>
Actors	<i>Primary actor: General manager</i>
Preconditions	<i>Guest feedback has been collected and stored in the Reporting and Analytics Module.</i> <i>The General Manager has access to the Reporting and Analytics Module.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>The General Manager logs into the HMS.</i></li> <li>● <i>The General Manager selects the option to generate a guest feedback summary report.</i></li> <li>● <i>The system retrieves all guest feedback data from the database.</i></li> <li>● <i>The system analyzes the feedback data and generates a summary report, including metrics such as average ratings, common complaints, and positive feedback.</i></li> <li>● <i>The system presents the report to the General Manager in a customizable format (e.g., charts, graphs, tables).</i></li> <li>● <i>The General Manager reviews the report and uses it for decision-making.</i></li> </ul>

Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>• <i>If no feedback data is available:</i> <i>The system notifies the General Manager that no feedback data is available for the selected time period.</i></li> </ul>
Non functional requirements	<i>The report must be generated within 5 seconds of the request. The system must ensure data accuracy and consistency in the report. The report interface must be user-friendly and support filtering by date range, department, or feedback type.</i>
Postconditions	<i>The General Manager has received a summary report of guest feedback.</i>

*The system should track the cleaning schedule for each room based on guest preferences. The guests might indicate whether they want daily cleaning or a different schedule. A room is automatically scheduled for cleaning when the guest has checked-out or when the guest hasn't specified a custom schedule (in that case daily cleaning). — (Orgest Baçova)*

UC Name	<i>Track cleaning schedule based on guest preferences</i> <b>UC_GST_15</b>
Summary	<i>This UC allows the guest to select their preferred cleaning preferences during check-in or via the Mobile Guest Portal. The updated cleaning schedule will be available to the housekeeping staff.</i>
Dependency	
Actors	<i>Primary actor: Guest Secondary actors: Housekeeping staff</i>
Preconditions	<ol style="list-style-type: none"> <li>1. <i>The guest must have access to the Mobile Guest Portal.</i></li> <li>2. <i>The guest must be logged in the software.</i></li> <li>3. <i>The housekeeping staff must be logged in the software.</i></li> <li>4. <i>The housekeeping staff must be able to view the cleaning</i></li> </ol>

	<i>schedules of the guests.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• Step 1: The guest checks into the hotel or logs into the Mobile Guest Portal.</li> <li>• Step 2: The guest clicks on the “Room preferences” section.</li> <li>• Step 3: The guest specifies their preferred cleaning schedule (daily, every other day, never etc.).</li> <li>• Step 4: The system validates and saves the guest’s choices.</li> <li>• Step 5: The system updates the task list of the housekeeping staff.</li> <li>• Step 7: The housekeeping staff logs into the software and checks their schedule.</li> <li>• Step 8: After completing their tasks, the housekeeping staff updates the room status (cleaned).</li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>• Step 3a: In the case that the guest wants to change their cleaning schedule mid-stay, they navigate to the “Room preferences” section of the Mobile Guest Portal.</li> <li>• Step 3b: The guest updates his cleaning schedule.</li> <li>• Step 4b: The system validates and updates the new cleaning schedule.</li> </ul>
Non functional requirements	<ol style="list-style-type: none"> <li>1. The system updates the cleaning schedule immediately upon the guest’s request.</li> <li>2. The housekeeping staff must be notified about their daily tasks immediately upon their change/update.</li> <li>3. The system must log all cleaning history for auditing purposes later.</li> </ol>

*The housekeeping staff shall be able to view a list with the rooms assigned to them for cleaning. — (Daron Delvina)*

UC Name	<p><i>View assigned rooms for cleaning</i></p> <p style="text-align: center;"><i>UC_HK_02</i></p>
Summary	<p><i>Housekeeping staff can view a list of rooms assigned to them for cleaning, allowing them to manage their workload efficiently.</i></p>
Dependency	<p><i>UC_GST_15: Guest Room Cleaning Preferences</i></p>
Actors	<ul style="list-style-type: none"> <li>● Primary: Housekeeping Staff</li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>● The system is operational.</li> <li>● Housekeeping staff are logged in.</li> </ul>
Description of the Main Sequence	<ol style="list-style-type: none"> <li>1. The system displays a list of assigned rooms.</li> <li>2. The housekeeping staff selects a room to begin cleaning.</li> <li>3. The housekeeping staff updates the room status upon completion.</li> </ol>
Description of the Alternative Sequence	<p><i>If no rooms are assigned, the system displays a message indicating no tasks.</i></p>
Non functional requirements	<ul style="list-style-type: none"> <li>● The assigned room list should load within 2 seconds.</li> <li>● The system should be accessible on mobile devices.</li> </ul>

Postconditions	<i>Housekeeping staff successfully view their assigned cleaning tasks.</i>
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*The system should be able to provide housekeeping department managers with a real-time view of all room cleaning statuses. Room status must be either Dirty or Clean. — (Daron Delvina)*

UC Name	<i>Real-time view of room cleaning statuses</i>  <i>UC_HKM_01</i>
Summary	<i>The housekeeping manager can view real-time updates on the cleaning status of all rooms in the hotel. This helps in managing housekeeping operations efficiently and ensuring room availability for guests.</i>
Dependency	<i>UC_HK_03: Housekeeping Staff Update Room Cleaning Status</i>
Actors	<ul style="list-style-type: none"> <li>• Primary: Housekeeping Manager</li> <li>• Secondary: Housekeeping Staff</li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>• The system is operational.</li> <li>• Housekeeping staff have access to update room statuses.</li> </ul>
Description of the Main Sequence	<ol style="list-style-type: none"> <li>1. Housekeeping staff updates the cleaning status of a room.</li> <li>2. The system records the update and refreshes the status in real-time.</li> <li>3. The housekeeping manager accesses the system</li> </ol>

	<p><i>dashboard.</i></p> <p>4. <i>The system displays the updated cleaning statuses.</i></p>
Description of the Alternative Sequence	<ol style="list-style-type: none"> <li>1. <i>If a room status update fails, an error message is displayed to the housekeeping staff.</i></li> <li>2. <i>The system prompts for re-entry or manual correction.</i></li> </ol>
Non functional requirements	<ul style="list-style-type: none"> <li>• <i>The system should update room statuses within 2 seconds.</i></li> <li>• <i>The interface should be intuitive and accessible on multiple devices.</i></li> </ul>
Postconditions	<p><i>The housekeeping manager successfully views updated room statuses.</i></p>

*The system shall allow housekeeping staff to notify of a maintenance issue (e.g. plumbing or electrical) to the housekeeping department manager, making the room unavailable after issue has been resolved. — (Orgest Bacova)*

UC Name	<i>Notify maintenance issues to housekeeping manager UC_HK_02</i>
Summary	<i>This UC allows the housekeeping staff to report maintenance issues to the housekeeping manager, which reviews them and offers solutions.</i>
Dependency	-
Actors	<i>Primary actor: Housekeeping staff Secondary actors: Housekeeping manager</i>
Preconditions	<i>1. The housekeeping staff must be logged in the software. 2. The maintenance issue reported must be associated with an existing/active room in the hotel.</i>
Description of the Main	<ul style="list-style-type: none"> <li>● Step 1: The housekeeping staff clicks on the “Report Maintenance Issue” section.</li> </ul>
Sequence	<ul style="list-style-type: none"> <li>● Step 2: The housekeeping staff enters the details necessary (room number, issue name, general description).</li> <li>● Step 3: The system logs the request.</li> <li>● Step 4: The system notifies the housekeeping manager.</li> <li>● Step 5: The housekeeping manager reviews and assigns the issue to the appropriate maintenance team.</li> <li>● Step 6: The system updates the request status to: “In progress”.</li> <li>● Step 7: After solving the issue, the maintenance team assigned, updates the request status to: “Resolved”.</li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● Step 6a: In the case that there is no response from the housekeeping manager (in 10-15 minutes), the system notifies the general manager.</li> </ul>

Non functional requirements	<ol style="list-style-type: none"> <li>1. The system must validate the housekeeping staff's request by checking the info entered is correct.</li> <li>2. The system must notify the housekeeping manager within 5 seconds of validating the request.</li> <li>3. The system must log all maintenance issue requests for auditing purposes later.</li> </ol>
Postconditions	<ol style="list-style-type: none"> <li>1. Once finished, the request from the housekeeping staff is marked as "Resolved."</li> <li>2. The room status is updated in the system (no issues).</li> </ol>

*The system can allow guests to request urgent cleaning by specifying the reason of the request. The housekeeping staff on duty shall be alerted for the request. — (Orgest Bacova)*

UC Name	<i>Request urgent cleaning, alert housekeeping staff.</i> UC_GST_16
Summary	<i>This UC allows the guest to request urgent cleaning of the room he has booked, thus alerting the appropriate staff (housekeeping).</i>
Dependency	UC_GST_07: Guest Check-In
Actors	<i>Primary actor: Guest Secondary actors: Housekeeping staff</i>
Preconditions	<ol style="list-style-type: none"> <li>1. The guest must be logged in the software.</li> <li>2. The guest must have a room booked at the moment of requesting the cleaning.</li> <li>3. The housekeeping staff must be logged in the software in order to get the request.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• Step 1: The guest logs in the Mobile Guest Portal.</li> <li>• Step 2: The guest clicks on the "Housekeeping" section.</li> <li>• Step 3: The guest selects "Request Urgent Cleaning" and specifies the reason.</li> <li>• Step 4: The system makes sure the request is valid by checking the guest ID and room number are correct and logs it.</li> </ul>

	<ul style="list-style-type: none"> <li>● Step 5: The system notifies the housekeeping staff available.</li> <li>● Step 6: A housekeeping staff accepts the request.</li> <li>● Step 7: The system updates the request status to: "In progress".</li> <li>● Step 8: After cleaning, the housekeeping staff member updates the request status to: "Completed".</li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● Step 5a: In the case that no housekeeping staff is available, the system notifies the corresponding department manager (housekeeping).</li> <li>● Step 6a: In the case that there is no response from at least one member of the housekeeping staff (in 10-15 minutes), the system notifies the corresponding department manager (housekeeping).</li> </ul>
Non functional requirements	<ol style="list-style-type: none"> <li>1. The system must validate the guest's request by checking if his info is correct.</li> <li>2. The system must notify the housekeeping staff within 5 seconds of validating the request from the guest.</li> <li>3. The system must log all Urgent cleaning requests for auditing purposes later.</li> </ol>
Postconditions	<p><i>The room status is updated and visible to relevant stakeholders, such as the front desk and management.</i></p>

*The system should allow Housekeeping Department Managers to assign cleaning tasks to housekeeping staff. — (Daron Delvina)*

UC Name	<p><i>Assign cleaning tasks to housekeeping staff</i></p> <p><i>UC_HKM_02</i></p>
Summary	<p><i>The housekeeping manager assigns cleaning tasks to staff members, ensuring an even distribution of workload and timely room maintenance.</i></p>
Dependency	<p><i>UC_HKM_01: Real-time view of room cleaning statuses</i></p>
Actors	<ul style="list-style-type: none"> <li>• Primary: Housekeeping Manager</li> <li>• Secondary: Housekeeping Staff</li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>• The system is operational.</li> <li>• Housekeeping staff are registered in the system.</li> <li>• Housekeeping manager is logged in.</li> </ul>
Description of the Main Sequence	<ol style="list-style-type: none"> <li>1. The system displays available rooms requiring cleaning.</li> <li>2. The manager selects a room and assigns it to a housekeeping staff member.</li> <li>3. The system notifies the assigned housekeeping staff member.</li> <li>4. The assigned housekeeping staff member acknowledges the task.</li> </ol>
Description of the Alternative Sequence	<ol style="list-style-type: none"> <li>1. If a housekeeping staff member is unavailable, the system prompts the manager to select another staff</li> </ol>

***Hotel Management System [HMS] Requirements Specification***

	<p><i>member.</i></p> <p>2. <i>If a room is already assigned, the system prevents duplicate assignments.</i></p>
Non functional requirements	<ul style="list-style-type: none"><li>● <i>Task assignments should be processed within 3 seconds.</i></li><li>● <i>Notifications should be sent in real-time.</i></li></ul>
Postconditions	<i>Cleaning tasks are successfully assigned and acknowledged.</i>

***Hotel Management System [HMS] Requirements Specification***

*The housekeeping staff shall be able to update the status of the room after cleaning.*

— **(Sidrit Isufi)**

UC Name	<i>Update Room Status After Cleaning UC_HK_03</i>
Summary	<i>The housekeeping staff shall be able to update the status of a room after completing the cleaning process.</i>
Dependency	<i>UC_HK_01: View assigned rooms for cleaning</i>
Actors	<i>Primary Actor: Housekeeping Staff Secondary Actor: Hotel Management System</i>
Preconditions	<i>The housekeeping staff must be logged into the system. The room must exist in the system database.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● 1. The housekeeping staff selects a room from the list.</li> <li>● 2. The staff updates the cleaning status (e.g., "Clean", "Needs Maintenance").</li> <li>● 3. The system saves the updated status.</li> <li>● 4. A confirmation message is displayed.</li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● 1. If the room is not found, an error message is displayed.</li> <li>● 2. If the staff does not have the required permissions, access is denied.</li> </ul>
Non functional requirements	<i>The system should update the room status in real-time. The interface must be user-friendly for quick updates. Data security must be ensured for staff access.</i>
Postconditions	<i>The room status is updated and visible to relevant stakeholders, such as the front desk and management.</i>

***Hotel Management System [HMS] Requirements Specification***

*All Department managers shall schedule shifts for all staff in their department.*

— (Sidrit Zela)

UC Name	<i>Department Manager Schedules Staff Shifts</i> <b>UC_DM_01</b>
Summary	<i>This UC allows the department managers to schedule the shifts of all members in their staff.</i>
Dependency	
Actors	<ul style="list-style-type: none"> <li>- Primary Actor: Department Manager</li> <li>- Secondary Actor: Department Staff</li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>• <i>The department manager is logged into the system.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• <i>Step 1: The manager opens the “Timetable page”.</i></li> <li>• <i>Step 2: The system displays the timetable with the current assignments.</i></li> <li>• <i>Step 3: The manager drags and drops staff members in shifts.</i></li> <li>• <i>Step 4: The manager saves the changes.</i></li> <li>• <i>Step 5: The system notifies staff members whose shifts have changed via email.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>• <i>Step 3a: If a manager has assigned no hours or too many hours to a staff member, the system shall alert the manager.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>• <i>The notification must be sent within one minute to the staff members.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>• <i>Staff members are assigned new shifts and notified about changes.</i></li> </ul>

## ***Hotel Management System [HMS] Requirements Specification***

*Department managers shall be able to view details about department staff, like staff list, performance and attendance for members of staff of their department(e.g. task completion time). — (Sidrit Isufi)*

UC Name	<b><i>View Staff Department Details</i></b> <b><i>UC_DM_02</i></b>
Summary	<i>Department managers shall be able to view details about their staff, including the staff list, performance, and attendance (e.g., task completion time).</i>
Dependency	<i>UC_DM_01: Department Manager Schedules Staff Shifts</i>
Actors	<i>Primary Actor: Department Manager</i>
Preconditions	<i>The department manager must be logged into the system. Staff data must be stored and accessible in the system.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● 1. <i>The department manager logs into the system.</i></li> <li>● 2. <i>The manager selects their department.</i></li> <li>● 3. <i>The system displays the staff list.</i></li> <li>● 4. <i>The manager selects an employee to view performance and attendance details.</i></li> <li>● 5. <i>The system retrieves and displays relevant data.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● 1. <i>If the staff data is unavailable, the system displays an error message.</i></li> <li>● 2. <i>If the manager lacks the necessary permissions, access is denied.</i></li> </ul>
Non functional requirements	<i>The system must ensure data security and privacy. Information should be retrieved in real-time with minimal delay. The interface must be intuitive and user-friendly.</i>

***Hotel Management System [HMS] Requirements Specification***

*The Mobile Guest Portal shall provide a simple form for guests to submit complaints to the relevant department manager regarding the complaint type and should therefore alert that manager. — (Orgest Bacova)*

UC Name	<i>Guest Submits Complaint to Department Manager UC_GST_17</i>
Summary	<i>This UC allows the guests to submit complaints to the relevant department manager (according to the type of the complaint) via the Mobile Guest Portal.</i>
Dependency	-
Actors	<i>Primary actor: The guest Secondary actors: The system, respective department manager</i>
Preconditions	<i>1. The guest must have access to the Mobile Guest Portal.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• Step 1: The guest logs into the Mobile Guest Portal.</li> <li>• Step 2: The system verifies the guest's details/credentials are correct.</li> <li>• Step 3: The guest clicks on the "Submit a complaint" section/form.</li> <li>• Step 4: The guest selects one of the complaints suggested by the system or types a new one under the "other complaint" subsection where he also selects the type of complaint.</li> <li>• Step 5: The guest submits the complaint.</li> <li>• Step 6: The system stores the complaint and assigns it to the respective department manager.</li> <li>• Step 7: The system notifies the appropriate department manager.</li> </ul>

Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 4a: In the case that the guest does not fill mandatory fields for the complaint, an error message appears and prompts him to do so.</i></li> </ul>
Non functional requirements	<ol style="list-style-type: none"> <li>1. <i>The system must be able to verify the guest's details when logging into the Mobile Guest Portal.</i></li> <li>2. <i>The system must store submitted complaints in less than 3 seconds.</i></li> <li>3. <i>The system must notify the respective department manager in less than 3 seconds.</i></li> <li>4. <i>Complaints must be saved and stored for auditing purposes later.</i></li> </ol>
Postconditions	<ol style="list-style-type: none"> <li>1. <i>The complaint is submitted and stored successfully.</i></li> <li>2. <i>The appropriate department manager is made aware of the complaint.</i></li> </ol>

***Hotel Management System [HMS] Requirements Specification***

*The general manager shall be able to view staff performance, attendance for the entire hotel.*  
**— (Hazis Voda)**

UC Name	<i>View Hotel-Wide Staff Performance and Attendance</i> <b>UC_GM_02</b>
Summary	<i>This UC describes how the general manager accesses and views comprehensive information about staff performance and attendance across all departments of the entire hotel.</i>
Dependency	-
Actors	<b>Primary Actor:</b> General Manager
Preconditions	<ul style="list-style-type: none"> <li>- <i>The general manager is authenticated in the system.</i></li> <li>- <i>The general manager has the appropriate permissions to view hotel-wide staff information.</i></li> <li>- <i>Staff performance and attendance data is available in the system for all departments.</i></li> </ul>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: General manager navigates to the hotel management dashboard in the system.</i></li> <li>● <i>Step 2: System displays the hotel management dashboard with available options.</i></li> <li>● <i>Step 3: General manager selects "View Staff Performance &amp; Attendance" option.</i></li> <li>● <i>Step 4: System retrieves and displays an overview of staff performance and attendance metrics for the entire hotel.</i></li> <li>● <i>Step 5: General manager reviews the hotel-wide performance and attendance statistics.</i></li> <li>● <i>Step 6: General manager navigates between different views (e.g., performance summary, attendance summary, department comparisons).</i></li> <li>● <i>Step 7: System updates the display according to the selected view.</i></li> <li>● <i>Step 8: General manager exits the staff overview section.</i></li> </ul>

Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 4A: If data is still being processed or unavailable, the system notifies the general manager and provides estimated time for completion.</i></li> <li>● <i>Step 5A: General manager filters the data by department, role, time period, or performance metrics.</i></li> <li>● <i>Step 5B: General manager searches for specific employees across all departments.</i></li> <li>● <i>Step 6A: General manager selects a specific department to view detailed performance metrics for that department.</i></li> <li>● <i>Step 6B: General manager selects trending or historical data views to analyze patterns over time.</i></li> <li>● <i>Step 7A: General manager exports the data to a report format (PDF, Excel, etc.).</i></li> <li>● <i>Step 7B: General manager sets up scheduled reports to be generated automatically.</i></li> </ul>
Non functional requirements	<ul style="list-style-type: none"> <li>- <i>Hotel-wide data should be retrieved and displayed within 5 seconds even with large datasets.</i></li> <li>- <i>Access to hotel-wide staff information must be strictly limited to general management.</i></li> <li>- <i>Aggregated data should be available without compromising individual privacy concerns.</i></li> <li>- <i>The interface should provide intuitive visualization tools and comparison features.</i></li> <li>- <i>Data should be consistently accurate and up-to-date, with last-update timestamps visible.</i></li> <li>- <i>The system should handle viewing data for hotels of varying sizes without performance degradation.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li>- <i>The requested hotel-wide staff performance and attendance information has been displayed to the general manager.</i></li> <li>- <i>All access and view activities are logged in the system for audit purposes.</i></li> <li>- <i>Any generated reports are saved in the system and/or delivered as requested.</i></li> <li>- <i>The system state remains unchanged with respect to the underlying data (view-only operation).</i></li> </ul>

*The system shall grant the General Manager full access to all financial statements, including profit and loss reports, balance sheets and cash-flow statements. — (Jurgen Hila)*

UC Name	<b>General Manager Financial Access</b> <b>UC_GM_05</b>
Summary	<i>Provide the General Manager with full access to all financial statements.</i>
Dependency	
Actors	- <i>General Manager: is the primary actor</i>
Preconditions	<p>1) User Role: The General Manager must be designated within the system as having the appropriate administrative role.</p> <p>2) Authentication: The General Manager must be authenticated (through a username and password or other secure method).</p> <p>3) Data Availability: The financial statements, including profit and loss reports, balance sheets, and cash-flow statements, must exist and be up-to-date within the system.</p> <p>4) System Configuration: The system must have the functionality enabled to grant access to financial statements.</p>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Authentication: The General Manager logs into the system using valid credentials.</i></li> <li>● <i>Step 2: Role Verification: The system verifies that the user has the "General Manager" role with appropriate permissions.</i></li> <li>● <i>Step 3: Access Request: The General Manager navigates to the financial statements section and requests access to specific reports (e.g., profit and loss, balance sheets, or cash-flow statements).</i></li> <li>● <i>Step 4: Data Retrieval: The system fetches the requested financial data and displays it to the General Manager.</i></li> </ul>

	<p><i>requested financial statements from the database.</i></p> <ul style="list-style-type: none"> <li>● <i>Step 5: Access Granted: The system displays the financial statements in an accessible format, ensuring proper formatting and readability.</i></li> <li>● <i>Step 6: Audit Log Update: The system records the access event for auditing purposes, including the user's identity, date, time, and type of reports accessed.</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Authentication Failure: If the General Manager enters invalid credentials, the system denies access and prompts them to re-enter the correct credentials or reset their password.</i></li> <li>● <i>Step 2: Role Verification Failure: If the user does not have the "General Manager" role, the system denies access to financial statements and displays an error message stating insufficient permissions.</i></li> <li>● <i>Step 3: Data Unavailability: If the requested financial statements (profit and loss reports, balance sheets, or cash-flow statements) are not available or up-to-date in the system, an error message is displayed, suggesting the user try again later or contact the IT/Finance department.</i></li> <li>● <i>Step 4: System Error: If there is a technical issue (e.g., the database connection fails), the system provides a notification to the user and logs the error for further investigation by the technical team.</i></li> </ul>
Non functional requirements	<ol style="list-style-type: none"> <li>1. Performance: The system shall grant access to financial statements within 3 seconds under normal load conditions.</li> <li>2. Availability: The system shall maintain 99.9% uptime to ensure consistent access to financial statements.</li> <li>3. Security: Access to financial statements shall require encrypted communication (e.g., HTTPS) and two-factor authentication to protect sensitive data.</li> <li>4. Scalability: The system shall handle concurrent access requests from up to 500 users without degradation in performance.</li> </ol>

	<ol style="list-style-type: none"><li>5. Usability: The interface for accessing financial statements shall be intuitive and user-friendly, requiring no more than three clicks to view a report.</li><li>6. Maintainability: The system shall allow for easy updates to financial statements formats or features without disrupting existing functionality.</li><li>7. Compliance: The system shall adhere to applicable financial regulations and data privacy laws, such as GDPR.</li></ol>
Postconditions	<ol style="list-style-type: none"><li>1. <b>Successful Access:</b> The General Manager gains access to the financial statements and can review them as required.</li><li>2. <b>Audit Logging:</b> The system records details of the access event, such as the user's identity, time of access, and the specific reports viewed.</li><li>3. <b>Data Accuracy:</b> The financial statements displayed to the General Manager remain accurate and consistent throughout the session.</li><li>4. <b>Secure Logout:</b> After the session ends, the system ensures no unauthorized access can occur to the viewed data.</li><li>5. <b>System Updates:</b> Any changes to financial data during the session are saved and correctly reflected in subsequent reports.</li></ol>

## ***Hotel Management System [HMS] Requirements Specification***

*The system shall allow the Finance Team to calculate, process and manage staff payroll, including tax deductions, bonuses and compliance, overseen by the General Manager.*  
**— (Endri Baku)**

UC Name	<b><i>Finance Team Processes Staff Payroll</i></b> <b><i>UC_FI_01</i></b>
Summary	<i>This use case case describe the process of the finance team processing staff payroll, with the General Manager as observer</i>
Dependency	
Actors	<i>Primary Actor: Finance Team Secondary Actor: General Manager</i>
Preconditions	<ol style="list-style-type: none"> <li>1. <i>Finance Team is logged into the staff interface and has permission to process staff payroll.</i></li> <li>2. <i>The system contains salary details for employees, payroll rules, and tax configuration.</i></li> <li>3. <i>General Manager has access to the payroll management section for review.</i></li> <li>4. <i>The system is able to send email notifications.</i></li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <b><i>Step 1:</i></b> <i>Finance Team selects “Process Payroll” from the finance team’s dashboard.</i></li> <li>● <b><i>Step 2:</i></b> <i>The Finance Team choose the payroll period (e.g., monthly or bi-weekly) to process.</i></li> <li>● <b><i>Step 3:</i></b> <i>The system displays a list of payroll records for that period.</i></li> <li>● <b><i>Step 4:</i></b> <i>The Finance Team reviews each payroll item, including net salary and other details. If needed, they apply bonus and deduction changes.</i></li> <li>● <b><i>Step 5:</i></b> <i>Once ready, the Finance Team submits all payroll records together for approval.</i></li> <li>● <b><i>Step 6:</i></b> <i>The system sends a summary email to the General Manager with the payroll batch details.</i></li> <li>● <b><i>Step 7:</i></b> <i>The General Manager reviews the payroll batch and approves or rejects individual payrolls.</i></li> <li>● <b><i>Step 8:</i></b> <i>After approval, when the payroll period is due, the Finance Team proceeds to process payments for each approved payroll.</i></li> </ul>
Description of the Alternative Sequence	<p><b><i>Step 7a - General Manager Requests Modifications</i></b></p> <ul style="list-style-type: none"> <li>● <b><i>Step 1:</i></b> <i>General Manager rejects the payroll summary and requests modifications.</i></li> <li>● <b><i>Step 2:</i></b> <i>The Finance Team receives the General Manager’s feedback by email and makes readjustments to the rejected payrolls and resubmits the payroll batch for approval at a later time, before payroll is due.</i></li> </ul>

Non functional requirements	<p><b>Performance:</b> The system should process payroll data and calculations within 2 minutes for a workforce of up to 500 employees.</p> <p><b>Availability:</b> The system should be available for payroll processing during working hours and on weekends for urgent payroll adjustments, unless there is planned downtime.</p> <p><b>Reliability:</b> The system should guarantee 99.9% reliability in calculating and processing payroll without errors.</p>
Postconditions	<ul style="list-style-type: none"> <li>● The payroll summary has been reviewed by the Finance Team and General Manager and approved in accordance to hotel regulations and policies.</li> <li>● The system has initiated the payment distribution process based on the payroll.</li> <li>● All payroll transaction details have been recorded into the system.</li> <li>● Employee records are updated with the final payroll information.</li> </ul>

*The system shall track for the finance team all financial transactions such as guest invoices, staff payroll, and refunds. — (Endri Baku)*

UC Name	<b><i>Track Financial Transactions</i></b> <b><i>UC_FI_02</i></b>
Summary	<i>This use case describes the process of a finance team tracking all financial transactions in the hotel (guest invoices, staff payroll) within the system.</i>
Dependency	
Actors	<b><i>Primary Actor:</i></b> Finance Team
Preconditions	<ol style="list-style-type: none"> <li>1. Finance Team is logged into the staff interface and has permission to track financial transactions.</li> <li>2. The system's financial data is up-to-date.</li> </ol>
Description of the Main	<ul style="list-style-type: none"> <li>● <b><i>Step 1:</i></b> Finance Team selects "Financial Transactions" from the finance team's dashboard.</li> </ul>

Sequence	<ul style="list-style-type: none"> <li>● <b>Step 2:</b> The finance team selects a transaction type to track from a list of transaction types (guest invoices, staff payroll).</li> <li>● <b>Step 3:</b> The system displays a list of transactions of the selected type with their relevant details.</li> <li>● <b>Step 4:</b> Finance Team can filter from the list transactions based on date, amount, or specific guests or staff.</li> <li>● <b>Step 5:</b> The system displays the list of filtered transactions.</li> <li>● <b>Step 6:</b> The Finance Team clicks on any transaction to view more detailed information about it (e.g. invoice breakdown for guest invoices and payroll deductions for staff payroll).</li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <b>Step 5a - No Transactions found based on filter</b> <ul style="list-style-type: none"> <li>○ If there are no transactions found based on filter criteria, the system displays a message that no transactions were found.</li> <li>○ The finance team modifies the filters to broaden the search.</li> </ul> </li> </ul>
Non functional requirements	<p><b>Reliability:</b> The system should have 99.9% reliability in displaying accurate and up-to-date financial transaction information.</p> <p><b>Activity:</b> The system shall maintain an immutable audit log of all actions performed by the finance team.</p> <p><b>Performance:</b> The system should display financial transactions within 3 seconds of the request.</p>
Postconditions	<ol style="list-style-type: none"> <li>1. The Finance team has reviewed and tracked all relevant financial transactions as per the search criteria they specified.</li> <li>2. The system logs every action performed by the Finance Team for traceability.</li> </ol>

The system shall allow the Finance Team to generate basic financial reports using invoice and payroll data, including, profit and loss statements, balance sheets. — (**Endri Baku**)

UC Name	<b>Generate Financial Reports</b> <b>UC_FI_03</b>
Summary	<i>This use case describe the process of the finance team generating financial reports, including profit and loss statements, balance sheets, and cash-flow reports using invoice and payroll data.</i>
Dependency	<b>UC_FI_02: Track Financial Transactions</b>
Actors	<b>Primary Actor: Finance Team</b>

Preconditions	<ol style="list-style-type: none"> <li>1. <i>Finance Team is logged into the staff interface and has permission to generate financial reports.</i></li> <li>2. <i>The system's financial data is up-to-date.</i></li> <li>3. <i>The system has predefined templates for each type of financial statement.</i></li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>• <b>Step 1:</b> <i>Finance Team selects "Generate Financial Reports" from the finance team's dashboard.</i></li> <li>• <b>Step 2:</b> <i>The system presents the options for report types (profit and loss, balance sheets).</i></li> <li>• <b>Step 3:</b> <i>The finance team selects the report type to generate and the date range (e.g. quarterly, annually) and confirms the report generation.</i></li> <li>• <b>Step 4:</b> <i>The system retrieves the financial data based on the selected parameters and processes the information.</i></li> <li>• <b>Step 5:</b> <i>The system generates the report and displays it to the Finance Team.</i></li> </ul>
Description of the Alternative Sequence	
Non functional requirements	<p><b>Scalability:</b> <i>The system should handle the generation of financial reports for any number of financial periods without performance degradation.</i></p> <p><b>Security:</b> <i>Financial data and reports must be encrypted both in transit and at rest to protect sensitive information.</i></p> <p><b>Performance:</b> <i>Reports with data from longer periods (e.g., 5+ years) should be generated within 30 seconds.</i></p>
Postconditions	<ol style="list-style-type: none"> <li>1. <i>Financial report has been generated successfully, and is made available in a selected format or for printing.</i></li> <li>2. <i>The system logs the report generation activity.</i></li> </ol>

*The administrator shall be able to manage user access, and grant and revoke permissions for each employee.*

— **(Daron Delvina)**

UC Name	<p style="text-align: center;"><i>Administrator Managing User Access</i></p> <p style="text-align: center;"><i>UC_ADM_01</i></p>
Summary	<p><i>The administrator can manage user access, granting and revoking permissions for employees as needed.</i></p>
Dependency	<p><i>None.</i></p>
Actors	<ul style="list-style-type: none"> <li>• <i>Primary: Administrator</i></li> </ul>
Preconditions	<ul style="list-style-type: none"> <li>• <i>The administrator must have valid login credentials with appropriate permissions.</i></li> <li>• <i>The system must contain user account data.</i></li> </ul>
Description of the Main Sequence	<ol style="list-style-type: none"> <li>1. <i>The administrator logs into the system.</i></li> <li>2. <i>The system authenticates the administrator.</i></li> <li>3. <i>The administrator navigates to the "User Access Management" section.</i></li> <li>4. <i>The administrator selects an employee and updates their access permissions.</i></li> <li>5. <i>The system updates the access settings accordingly.</i></li> <li>6. <i>The administrator confirms the changes.</i></li> </ol>
Description of the Alternative Sequence	<ol style="list-style-type: none"> <li>1. <i>If authentication fails, the system prompts the administrator to re-enter credentials.</i></li> <li>2. <i>If the selected employee does not exist, the system displays an appropriate message.</i></li> <li>3. <i>If an error occurs, the system provides an error message and suggests retrying later.</i></li> </ol>

Non functional requirements	<ul style="list-style-type: none"> <li><i>The system should process permission changes within 3 seconds.</i></li> <li><i>Secure logging and audit trails must be maintained.</i></li> <li><i>Only authorized administrators should have access to user management functions.</i></li> </ul>
Postconditions	<ul style="list-style-type: none"> <li><i>The user's access permissions are successfully updated.</i></li> <li><i>The system logs the changes for security and auditing purposes.</i></li> </ul>

*The administrator shall be able to back up the system and restore it in case of system failure.*  
*— (Xhois Cano)*

UC Name	<i>System Backup and Restore</i> <i>UC_ADM_02</i>
Summary	<i>Administrator creates backups of critical data or restores the system after failure.</i>
Dependency	
Actors	<i>Primary: Administrator</i>
Preconditions	<i>Administrator has backup/restore privileges. Storage location is accessible and has space.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li><i>Administrator selects data types to back up (e.g., guest records, bookings).</i></li> <li><i>System encrypts and compresses data.</i></li> <li><i>Backup is stored securely.</i></li> </ul>

	<ul style="list-style-type: none"> <li>Administrator receives a success notification.</li> </ul>
Description of the Alternative Sequence	<i>If backup fails (e.g., network error), the system alerts the administrator and retries</i>
Non functional requirements	<i>Availability: Backups must complete within 15 minutes. Security: Data encrypted with AES-256.</i>
Postconditions	<i>Backup is stored securely, or system is restored to the backup state. Audit log records the action.</i>

*The Administrator shall maintain audit logs of all system activities (user actions, billing charges, etc).*

**— (Jurgen Hila)**

UC Name	Administrator Activity Logging UC ADM_03
Summary	<i>The requirement ensures that the Administrator is responsible for maintaining audit logs to track all system activities, including user actions, billing charges, and other relevant operations. This facilitates monitoring, accountability, and troubleshooting within the system.</i>
Dependency	<i>No dependency</i>
Actors	<i>The Administrator is the primary actor.</i>

Preconditions	<ol style="list-style-type: none"> <li>1. Access Permissions: The Administrator must have the necessary privileges to access and manage audit logs within the system.</li> <li>2. Audit Logging Mechanism: The system must have a functional logging mechanism to capture and store system activities.</li> <li>3. Defined Log Parameters: The system must define what types of activities (e.g., user actions, billing charges) are to be logged.</li> <li>4. Storage Availability: Adequate storage must be available for maintaining audit logs securely.</li> <li>5. System Configuration: The logging features must be properly configured and enabled in the system settings.</li> </ol>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: Administrator logs into the system</i></li> <li>● <i>Step 2: Administrator navigates to the audit log section</i></li> <li>● <i>Step 3: Administrator selects an action (e.g., view, update, export audit logs)</i></li> <li>● <i>Step 4: System validates permissions for the Administrator</i></li> <li>● <i>Step 5: System executes the requested action and updates audit logs as necessary</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>Step 1: System detects an attempt to access audit logs by an unauthorized user.</i></li> <li>● <i>Step 2: System denies access and logs the unauthorized access attempt.</i></li> <li>● <i>Step 3: System notifies the Administrator about the failed access attempt.</i></li> <li>● <i>Step 4: Administrator reviews the unauthorized access attempt log for details.</i></li> </ul>

Non functional requirements	<ol style="list-style-type: none"> <li>1. <b>Performance:</b> The system shall retrieve and display audit logs within 2 seconds to ensure a seamless experience for the Administrator.</li> <li>2. <b>Scalability:</b> The system shall support storing and managing audit logs for up to 10 years without performance degradation.</li> <li>3. <b>Usability:</b> The audit log interface shall be user-friendly and intuitive, allowing the Administrator to perform actions with minimal training.</li> <li>4. <b>Security:</b> Access to the audit logs shall be protected by multi-factor authentication (MFA) to prevent unauthorized access.</li> <li>5. <b>Reliability:</b> The system shall ensure a 99.9% uptime to maintain consistent availability of audit logs.</li> <li>6. <b>Audit Log Integrity:</b> The system shall ensure that all log entries are tamper-proof to maintain the integrity of recorded activities.</li> <li>7. <b>Compliance:</b> The system shall adhere to data protection and regulatory standards (e.g., GDPR) for audit log storage and management.</li> </ol>
Postconditions	<ol style="list-style-type: none"> <li>1. <b>Audit Logs Updated:</b> The system has successfully recorded all relevant system activities (e.g., user actions, billing charges) in the audit logs.</li> </ol>

	<ol style="list-style-type: none"> <li>2. <b>Log Accessibility:</b> The Administrator can view, update, or export audit logs as needed.</li> <li>3. <b>Unauthorized Access Prevention:</b> Any attempts by unauthorized users to access audit logs have been logged and flagged for review.</li> <li>4. <b>Data Integrity:</b> The audit logs remain accurate and tamper-proof after any administrative actions.</li> <li>5. <b>Notification Sent:</b> If any critical changes occur within the audit logs, the system notifies the Administrator for tracking and accountability.</li> </ol>
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*The system shall allow the Administrator to register new staff members by entering their personal details, assigning them a role, department, and generating a unique username and initial password for access to the system.*

— (Xhois Cano)

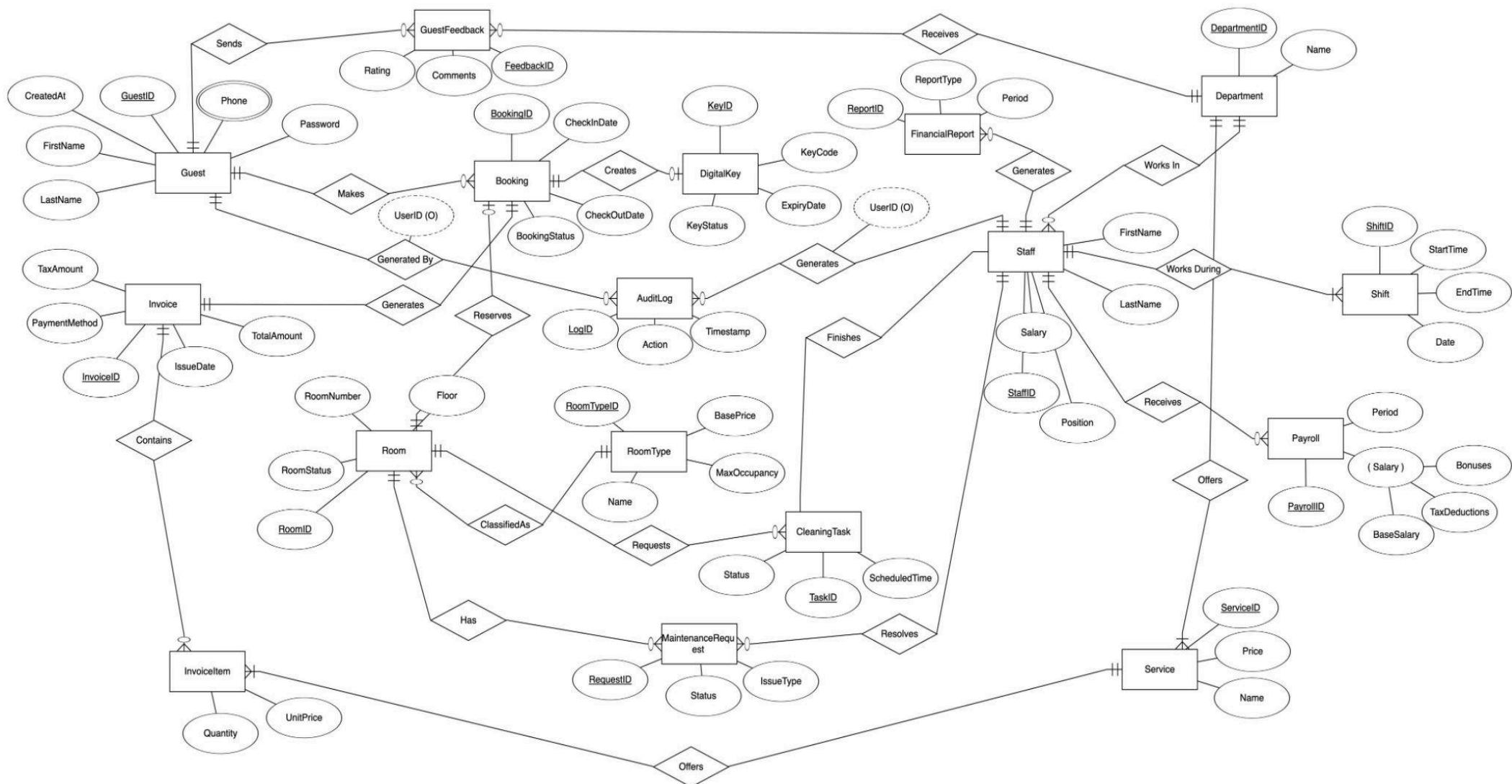
UC Name	<i>FR ADM_04: Register New Staff Member</i>
Summary	<i>Administrator registers new staff members by entering personal details, assigning roles/departments, and generating system credentials.</i>
Dependency	
Actors	<i>Primary Actor: Administrator</i>
Preconditions	<i>Administrator has valid credentials and privileges. Required role/department configurations exist.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> <li>● <i>Administrator navigates to the "Staff Registration" interface.</i></li> <li>● <i>Administrator enters the new staff member's personal details (name, contact info).</i></li> <li>● <i>Administrator assigns a role (e.g., receptionist, housekeeping) and department (e.g., Front Desk, Housekeeping).</i></li> </ul>

	<ul style="list-style-type: none"> <li>● <i>System validates the input data (e.g., unique email, valid department).</i></li> <li>● <i>System generates a unique username and temporary password.</i></li> <li>● <i>System saves the new staff account and notifies the Administrator..</i></li> </ul>
Description of the Alternative Sequence	<ul style="list-style-type: none"> <li>● <i>If duplicate employee data (e.g., existing email) is detected: - System rejects the entry and prompts the Administrator to correct it.</i></li> <li>● <i>If role/department is invalid: - System displays an error and lists valid options.</i></li> </ul>
Non functional requirements	<p><i>Security: Personal data must be encrypted during transmission and storage.</i></p> <p><i>Performance: Registration process completes within 3 seconds.</i></p> <p><i>Compliance: Adhere to GDPR/CCPA for data collection and storage</i></p>
Postconditions	<p><i>New staff member account is created with assigned role/department. - Audit log records the registration action.</i></p>

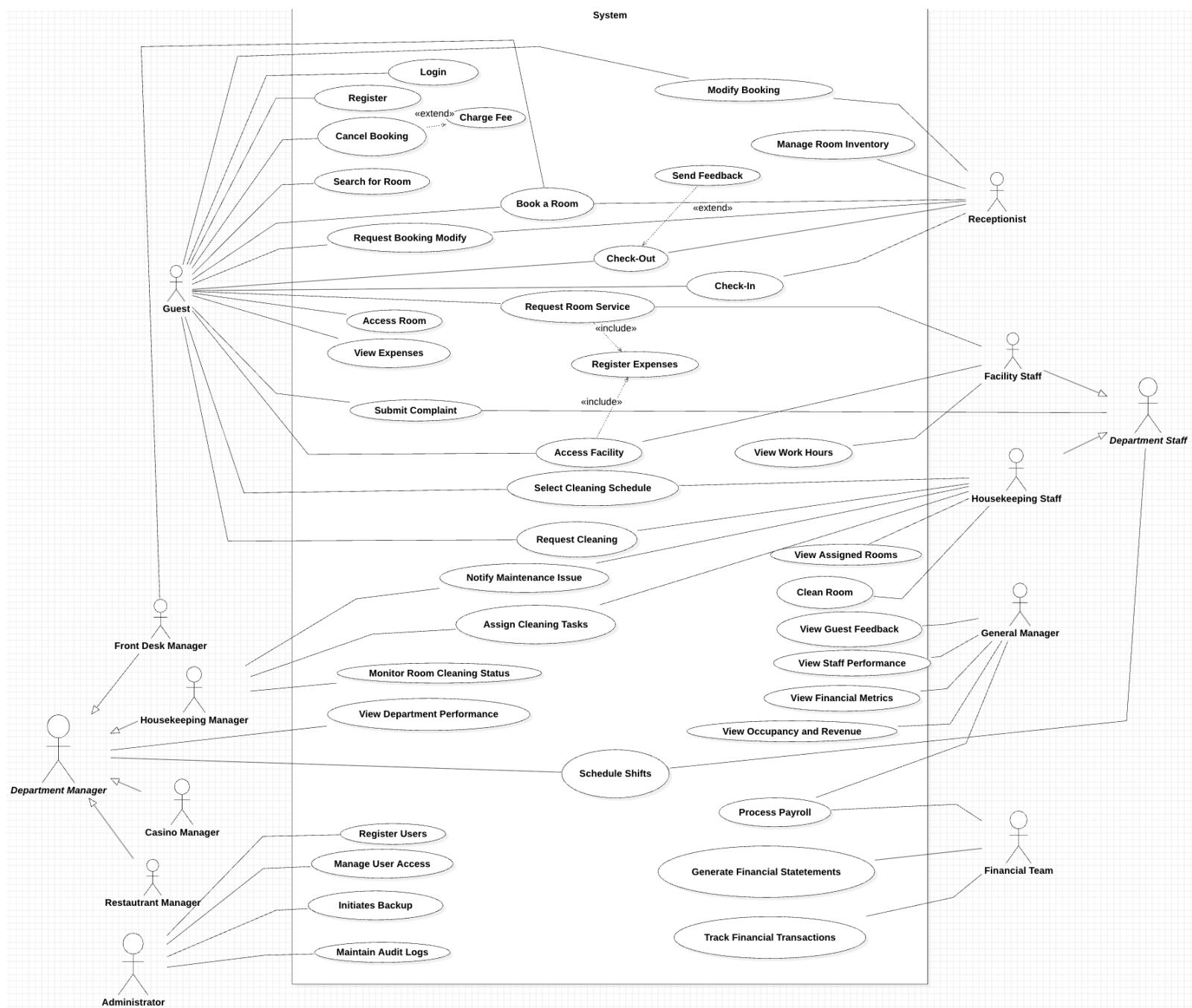
## 5. Diagrams

**ER Diagram (next page)**

## Hotel Management System [HMS] Requirements Specification

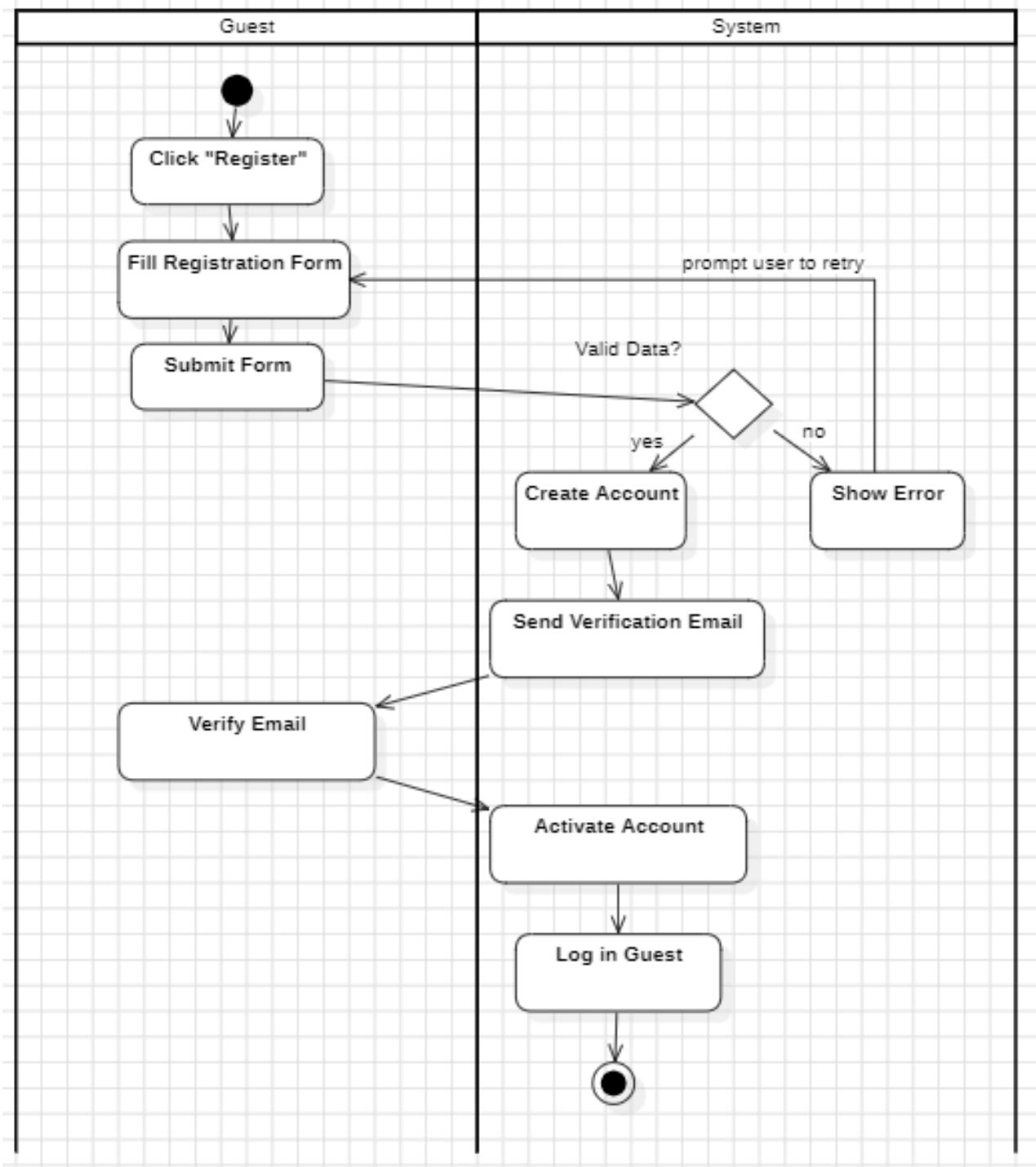


# Use Case Diagram

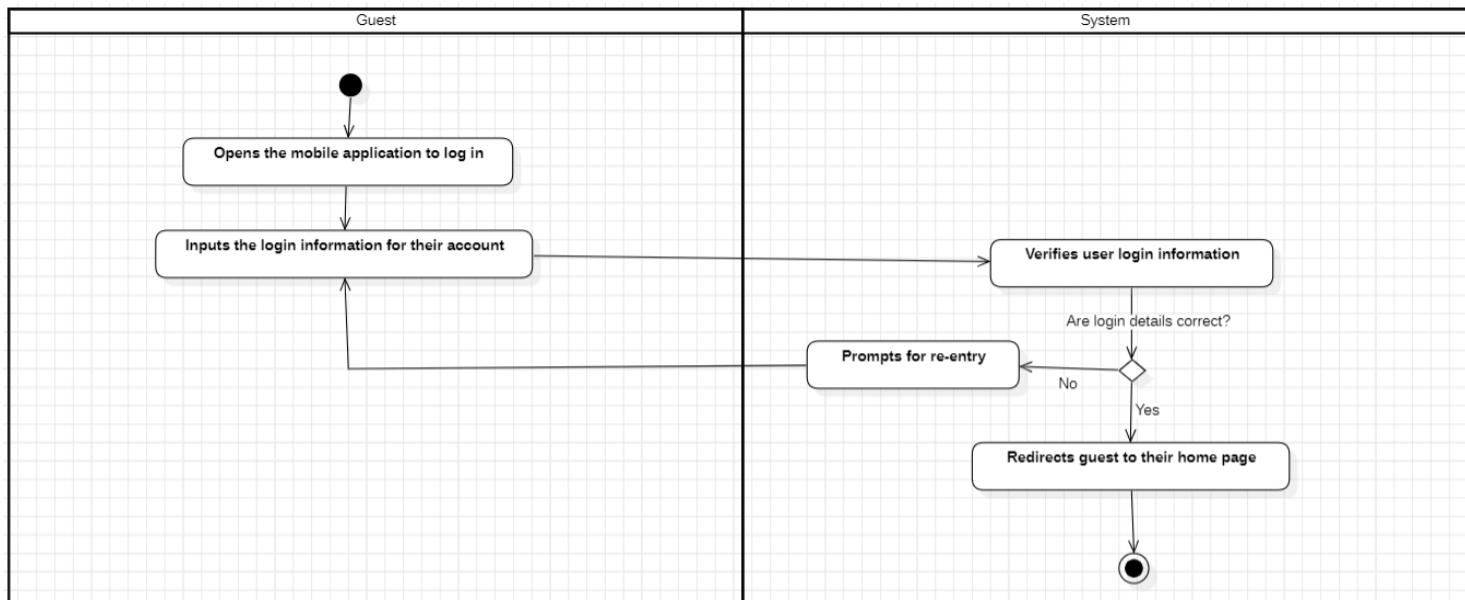


# Activity Diagrams

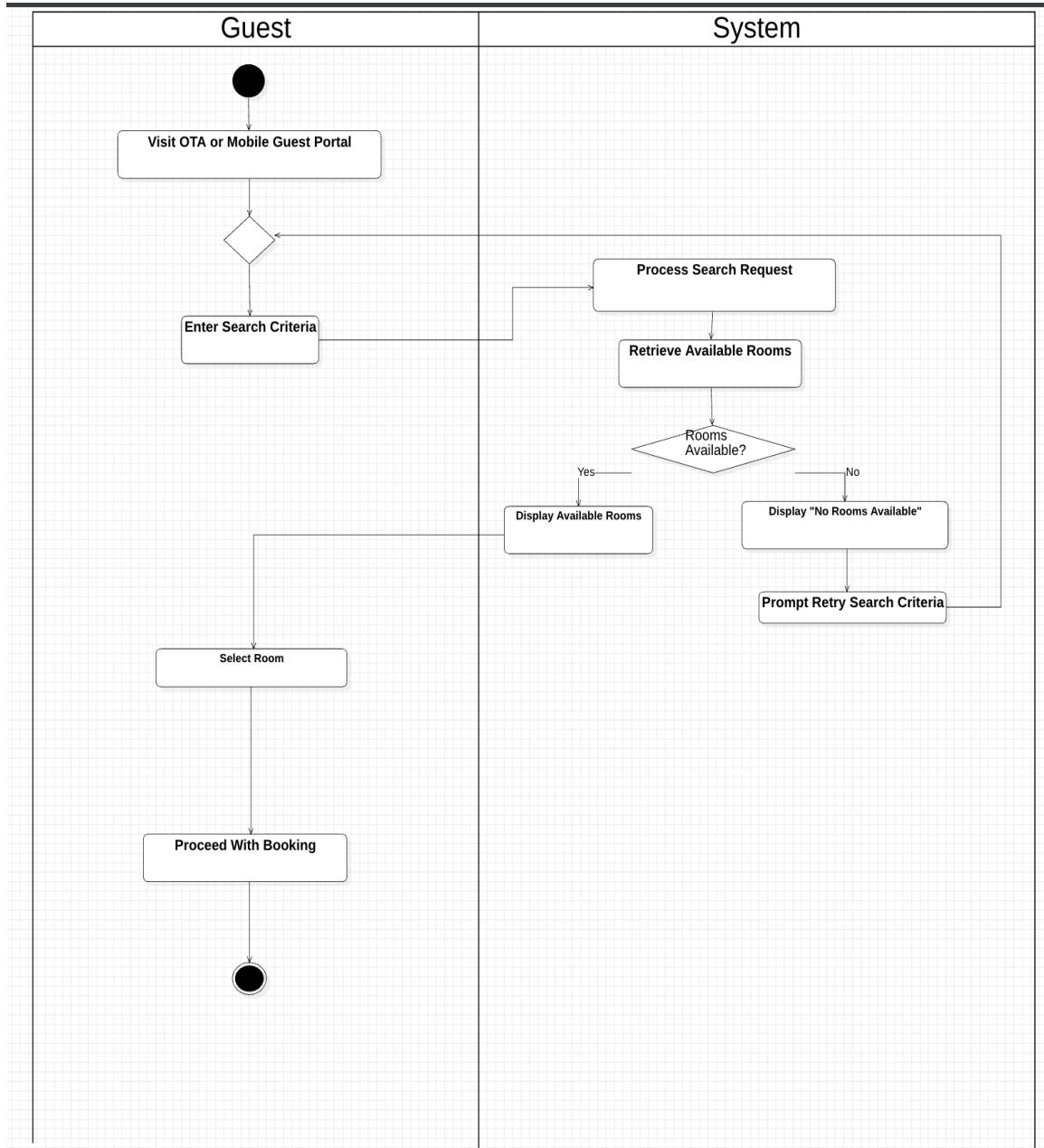
## AC\_GST\_01: Guest Registration — (Sidrit Zela)



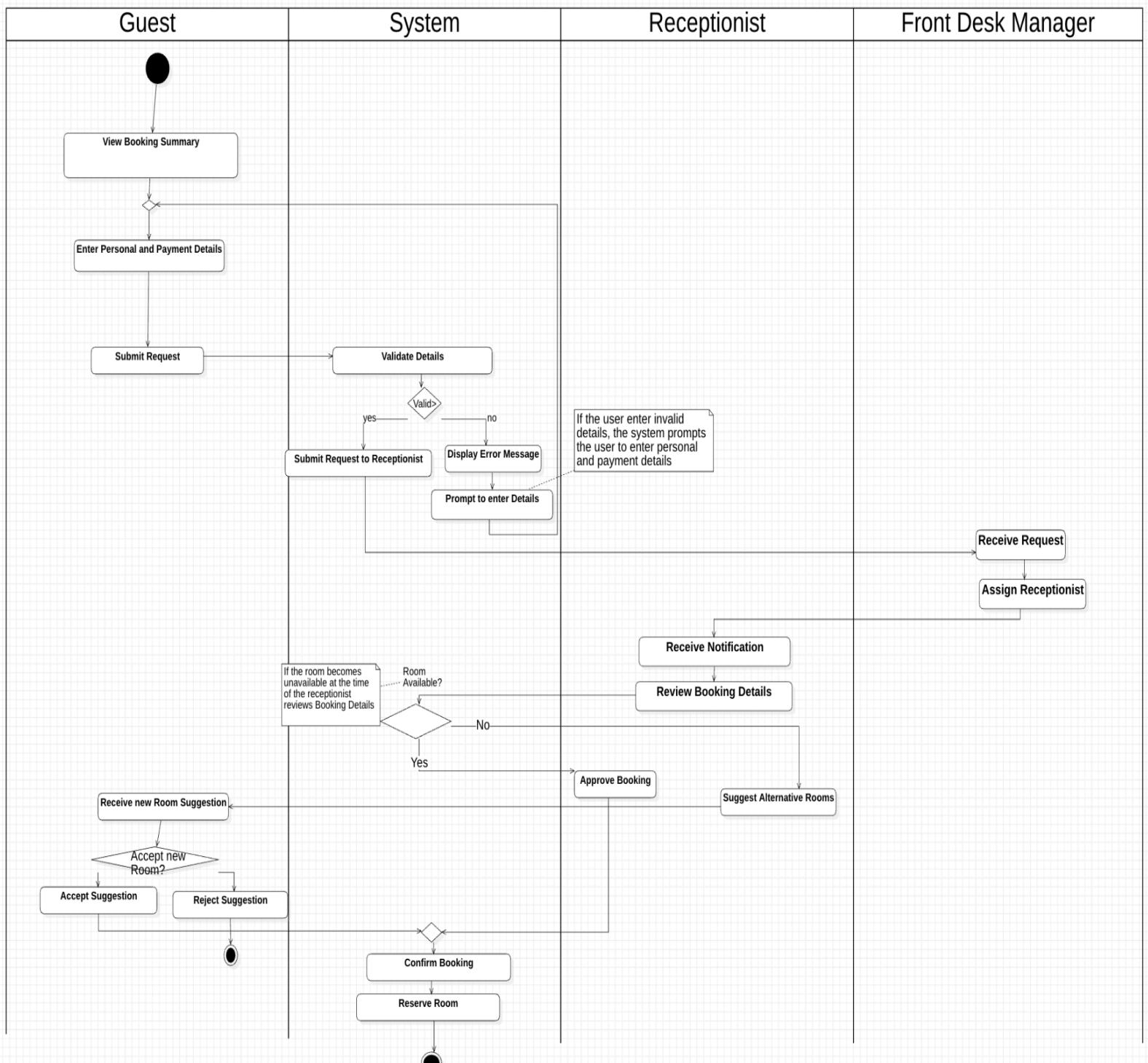
**AC\_GST\_02: Guest Login — (Hazis Voda)**



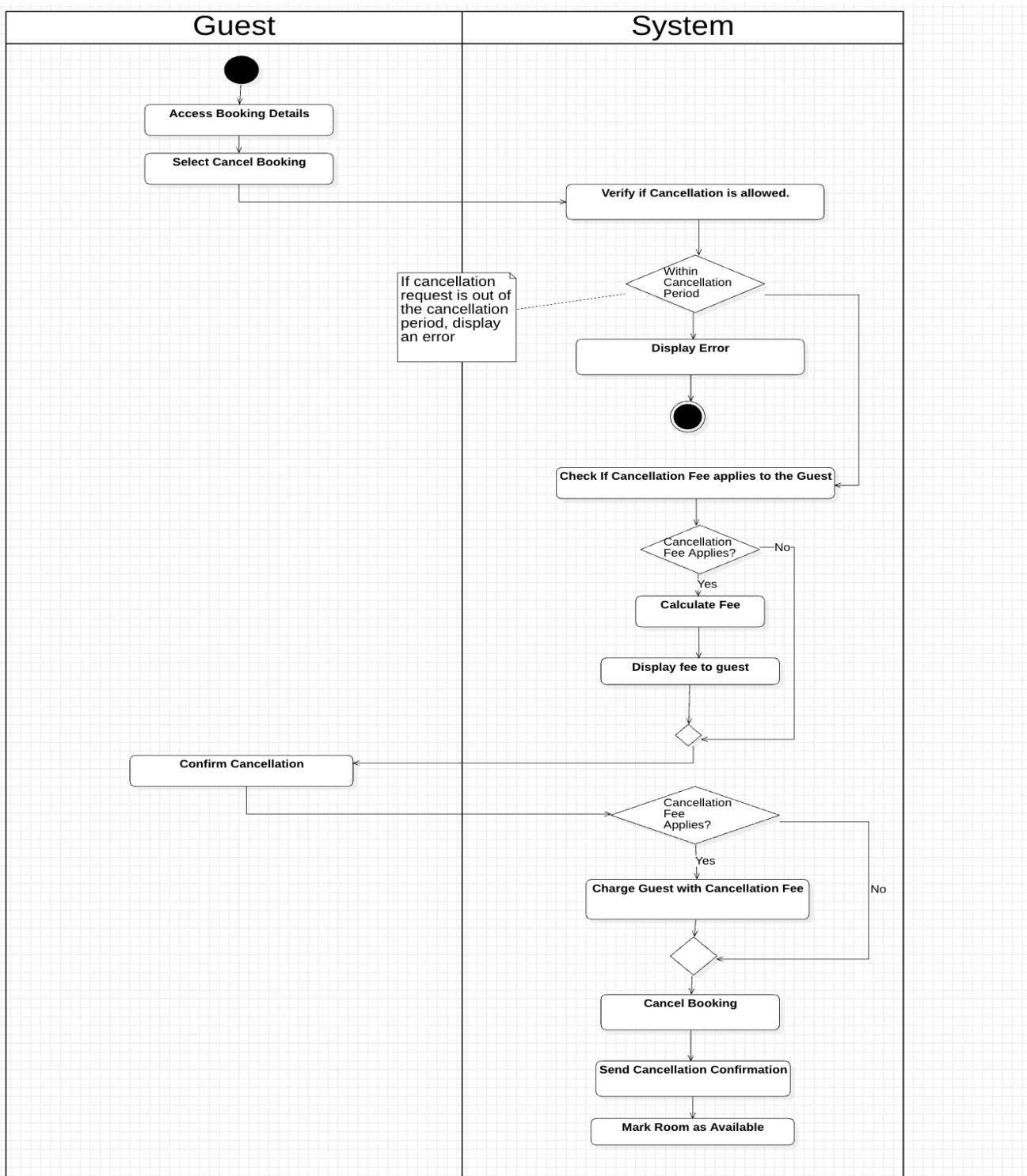
**AC\_GST\_03: Search for Available Rooms — (Endri Baku)**



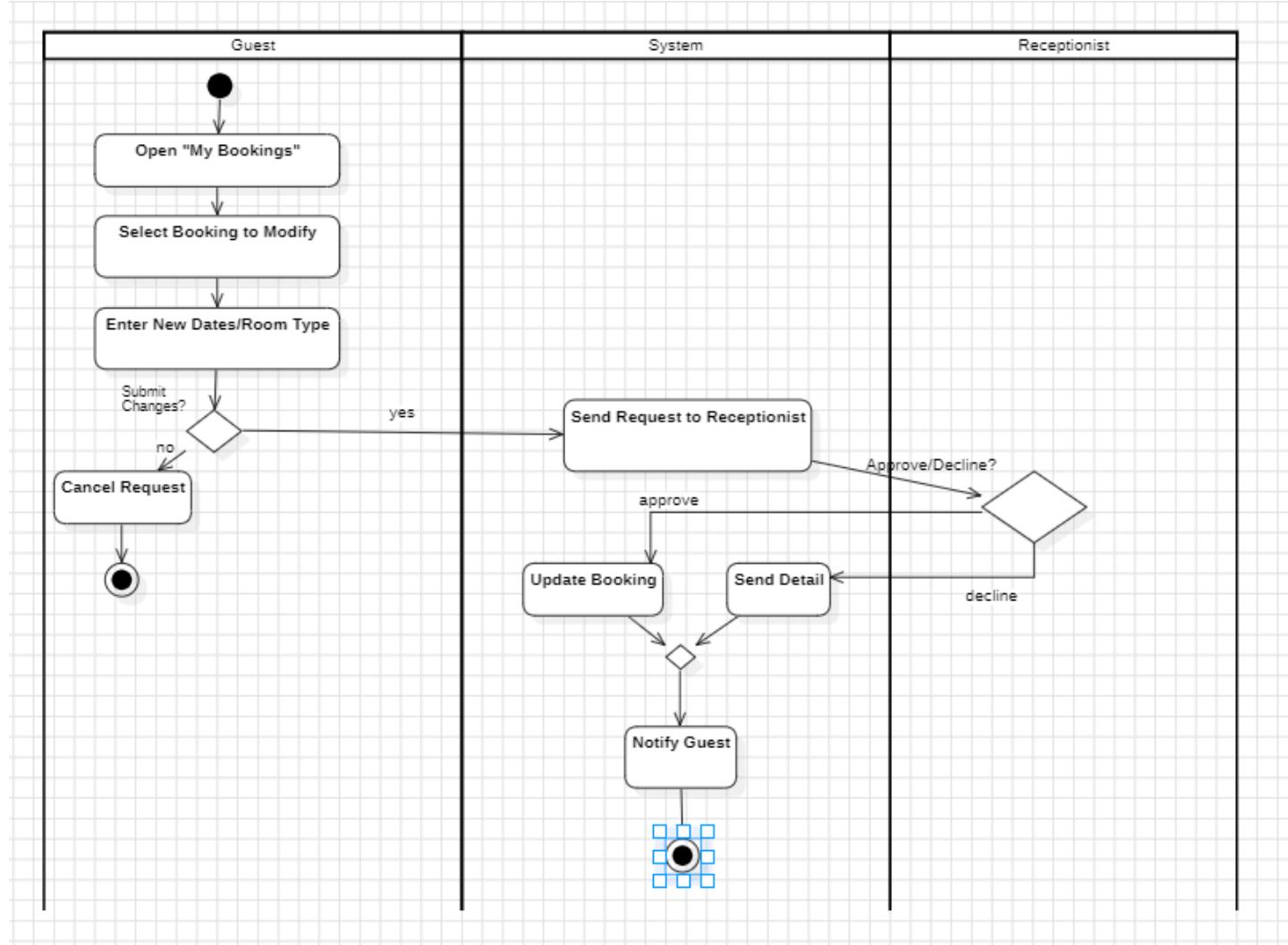
**AC\_GST\_04: Guest Books Room — (*Endri Baku*)**



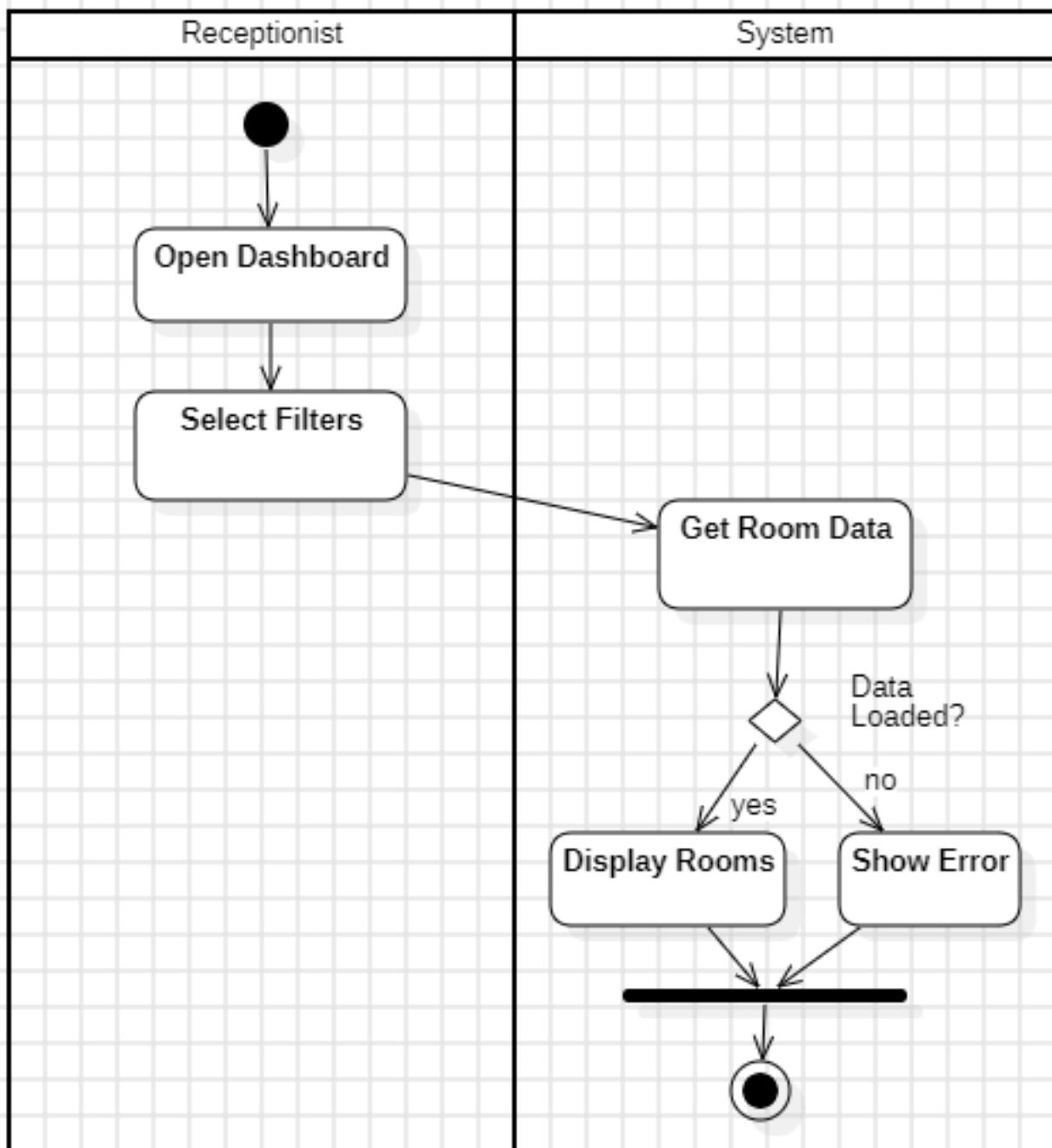
### AC\_GST\_05: Cancel Booking — (*Endri Baku*)



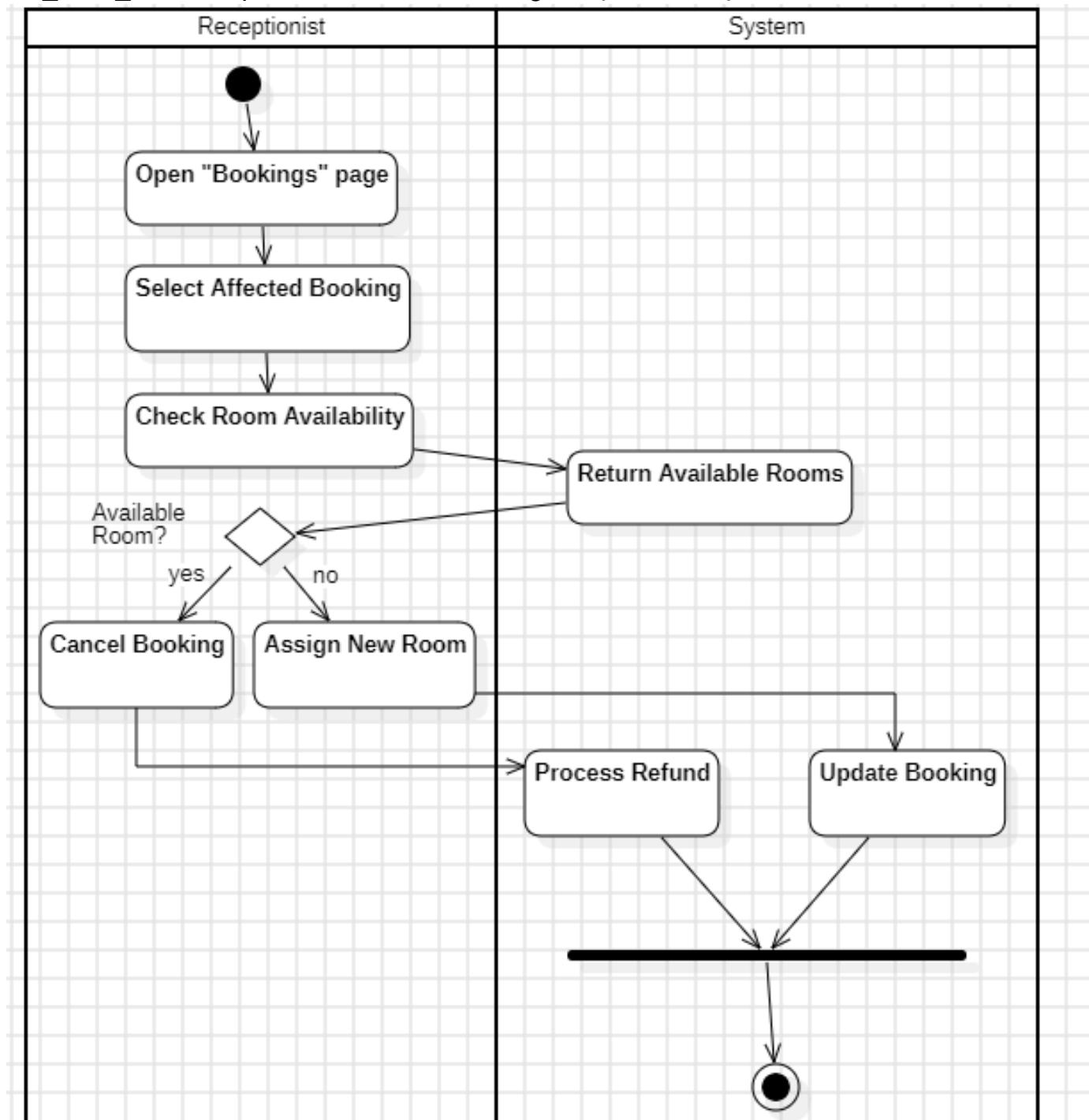
**AC\_GST\_06: Guest Requests Booking Modification — (Sidrit Zela)**



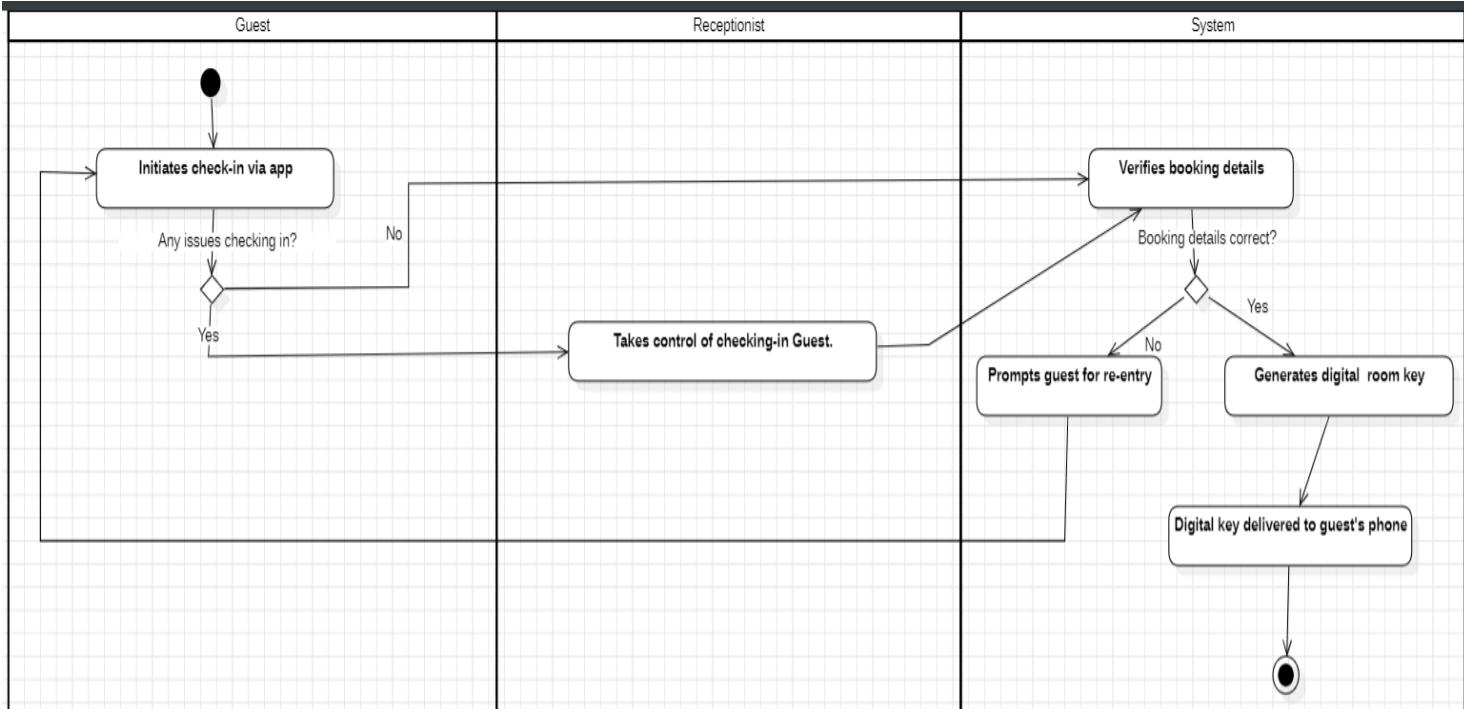
**AC\_REC\_01:** Receptionist Real-Time Room Inventory Status — (**Sidrit Zela**)



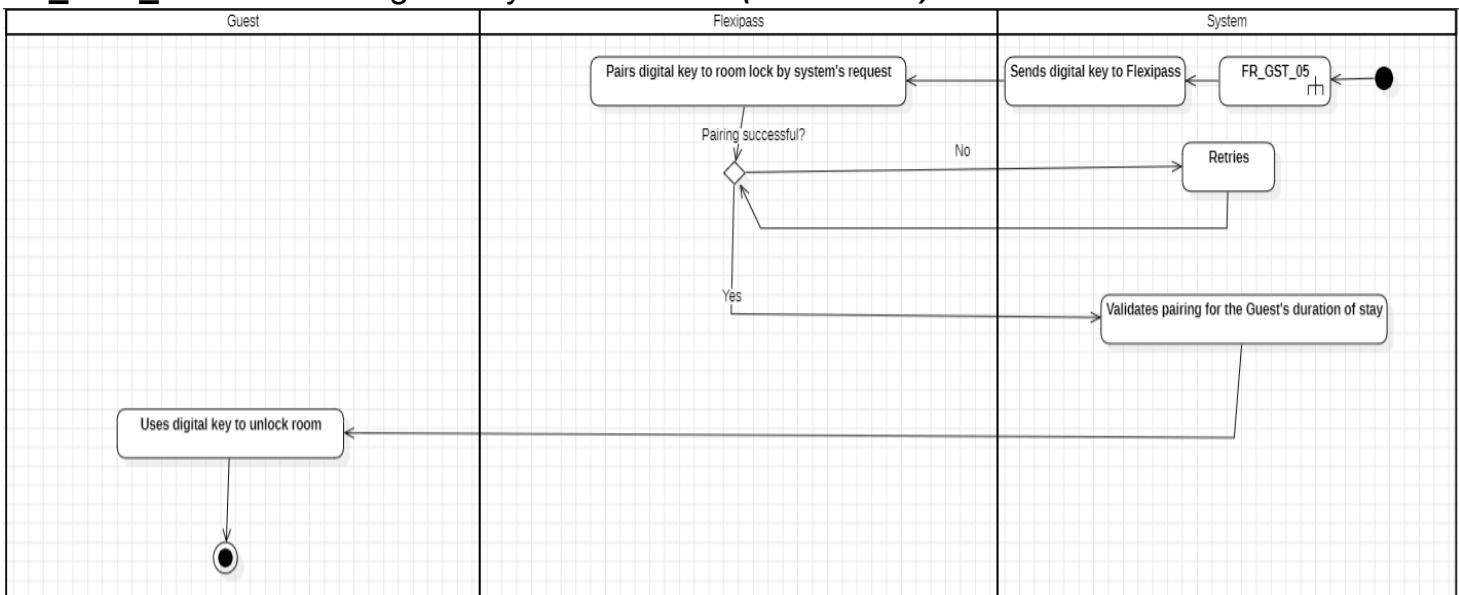
**AC\_REC\_02: Receptionist Modifies Booking — (Sidrit Zela)**



### **AC\_GST\_07: Guest Check-In — (Hazis Voda)**

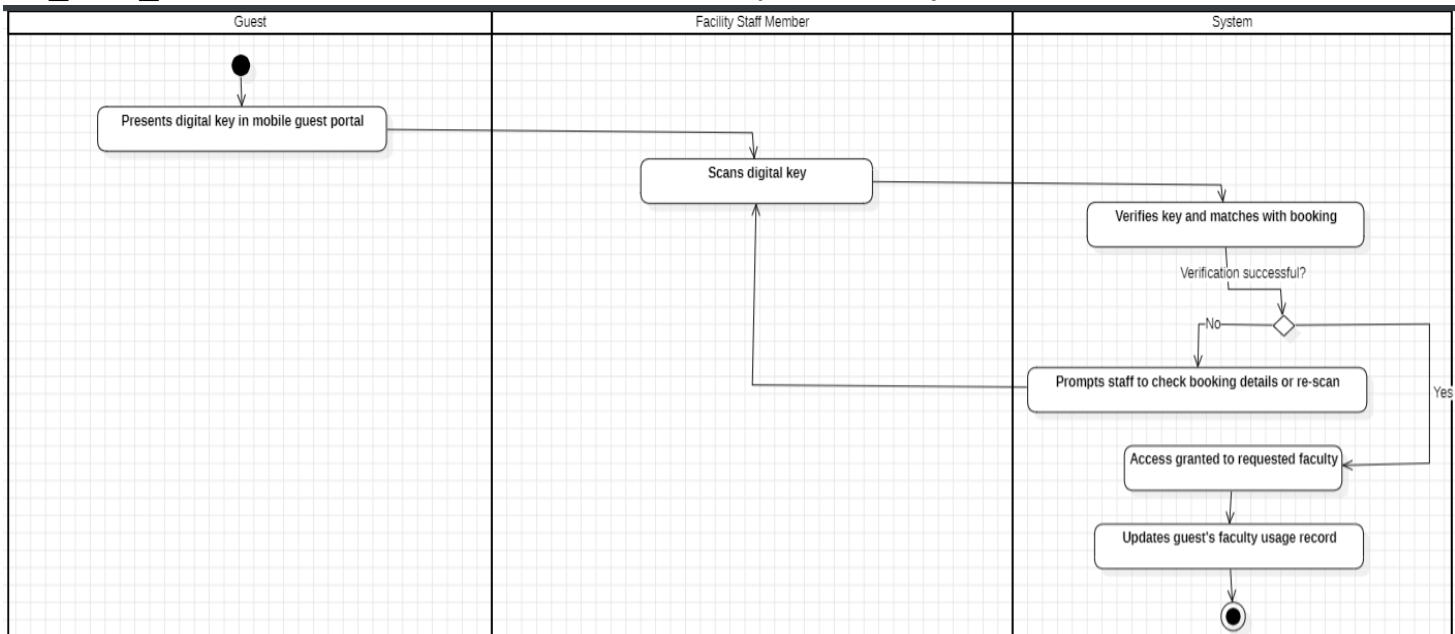


### **AC\_GST\_08: Connect Digital Key To Room — (Hazis Voda)**

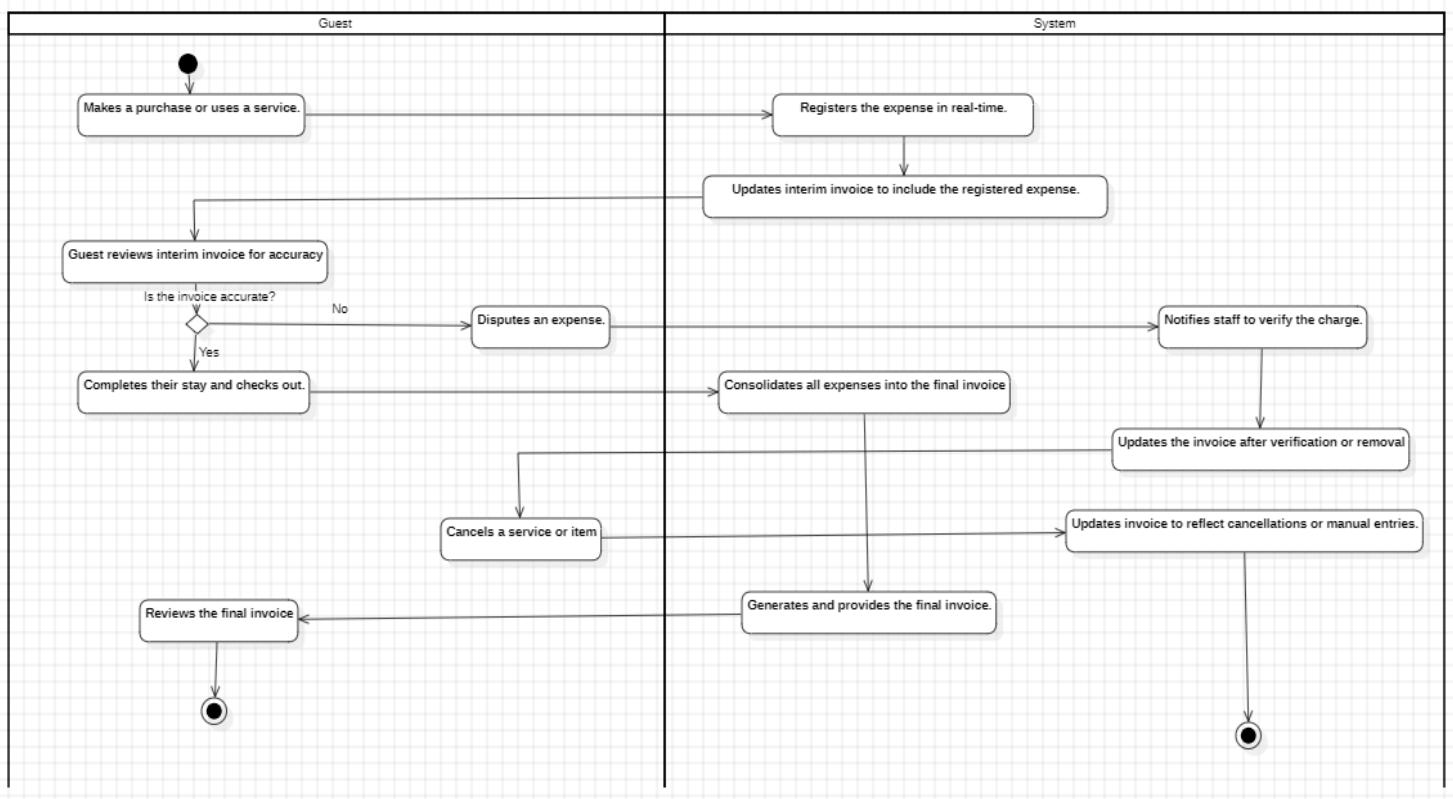


## Hotel Management System [HMS] Requirements Specification

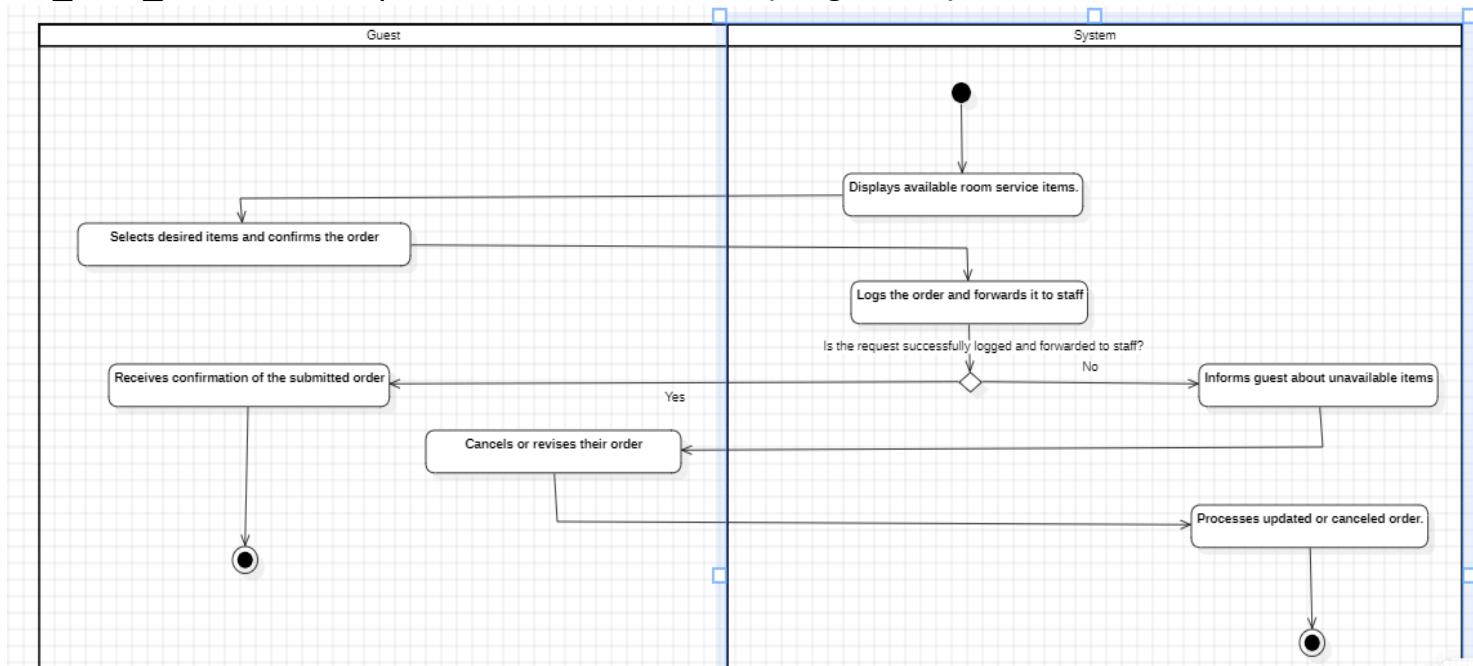
### AC\_GST\_09: Access Facilities and Services — (Hazis Voda)



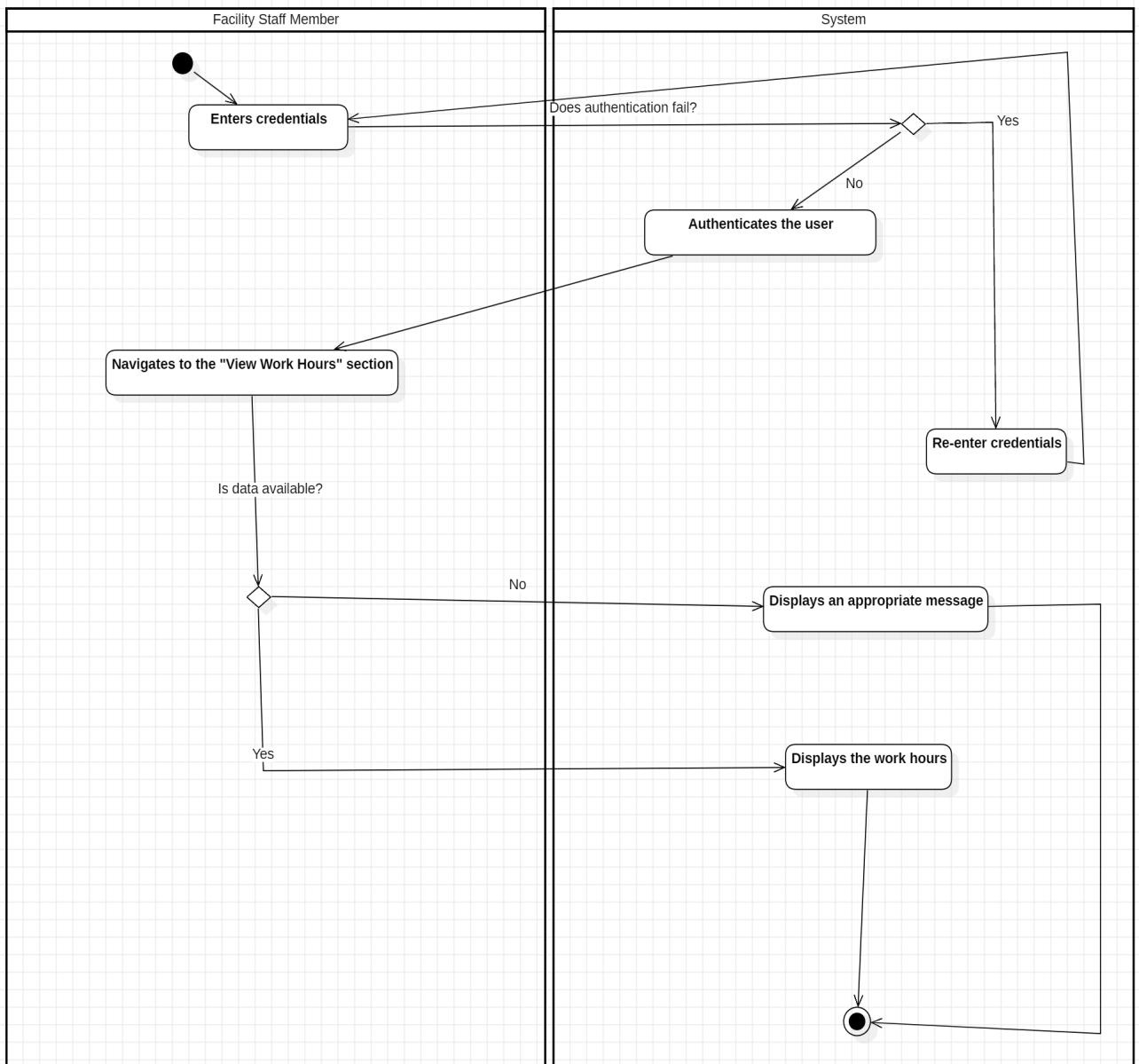
### AC\_GST\_10: Register Guest Expenses — (Jurgen Hila)



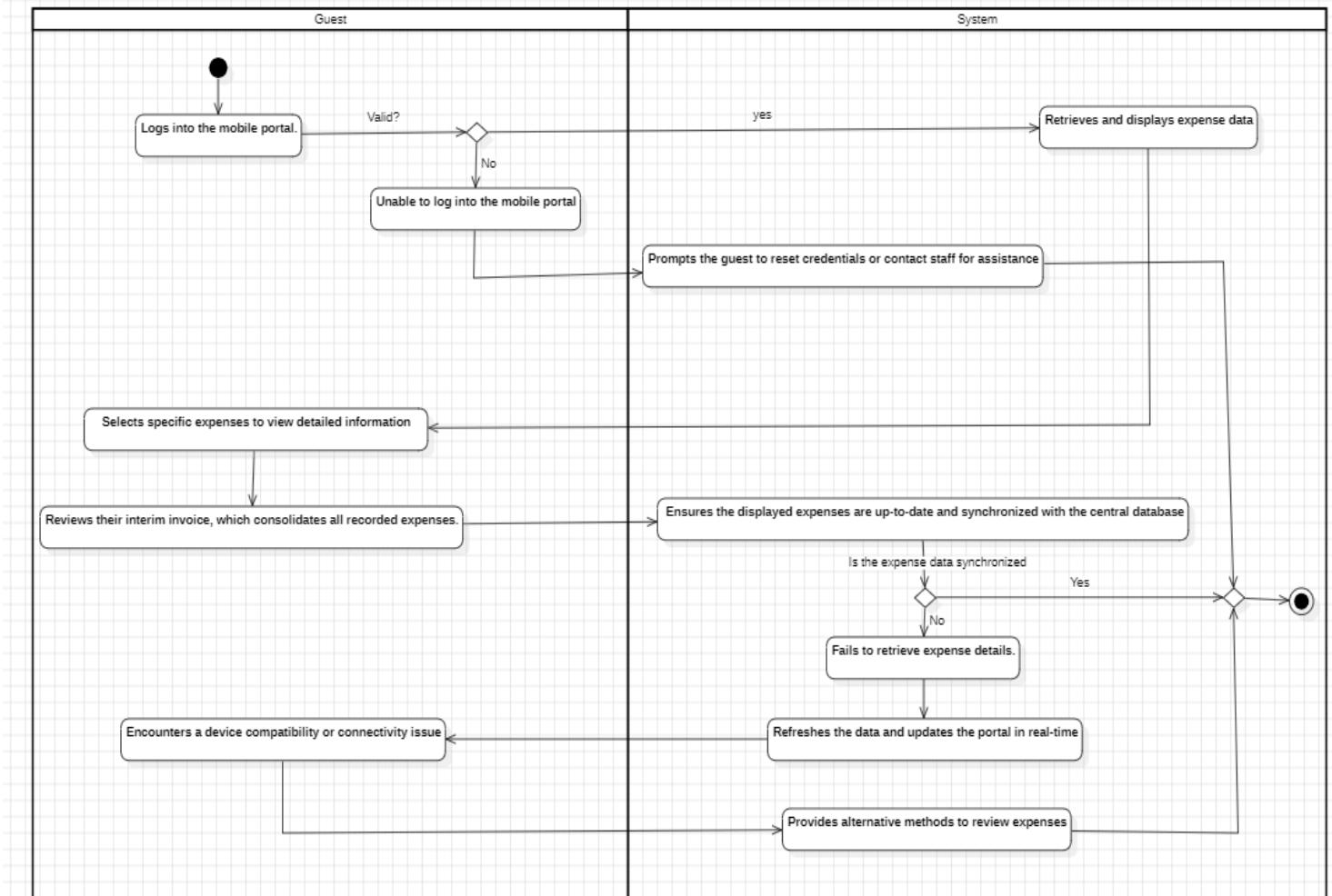
**AC\_GST\_11: Guest Requests Room Service — (Jurgen Hila)**



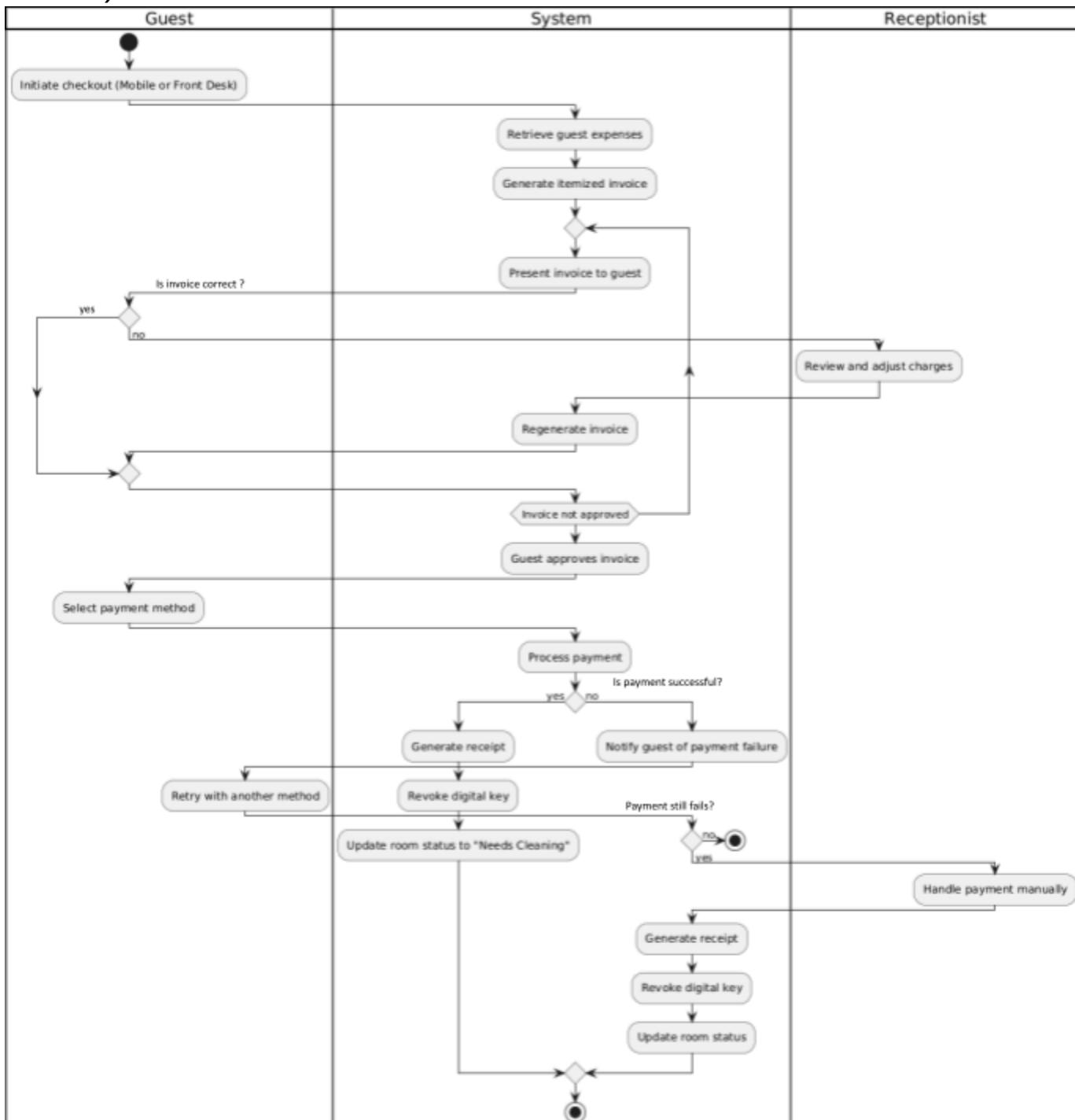
**AC\_FS\_01: Facility Staff Views Work Hours — (Daron Delvina)**



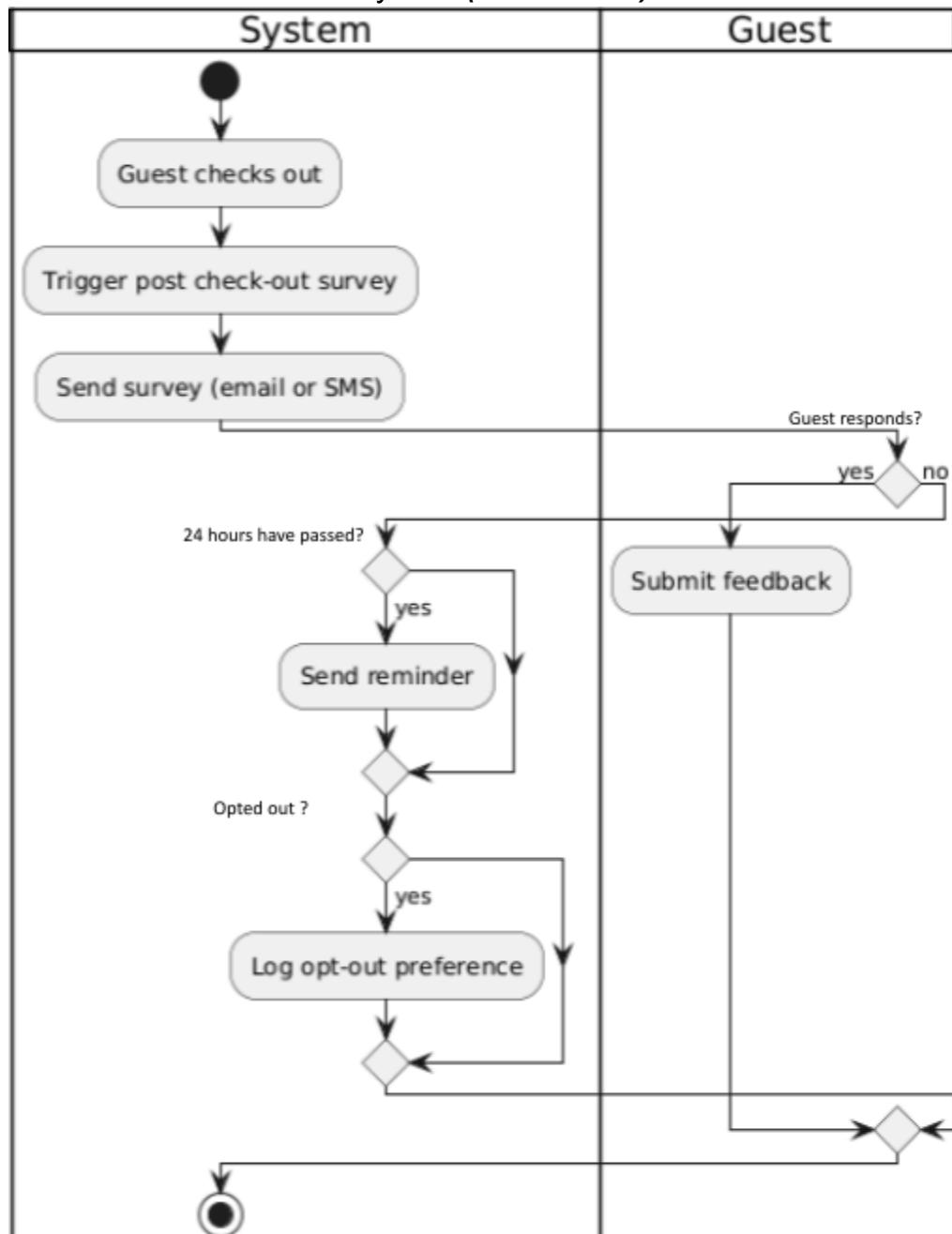
**AC\_GST\_12: View Expenses — (Jurgen Hila)**



**AC\_GST\_13: Check-Out: Generate Itemized Invoice, Revoke Digital Key — (Xhois Cano)**

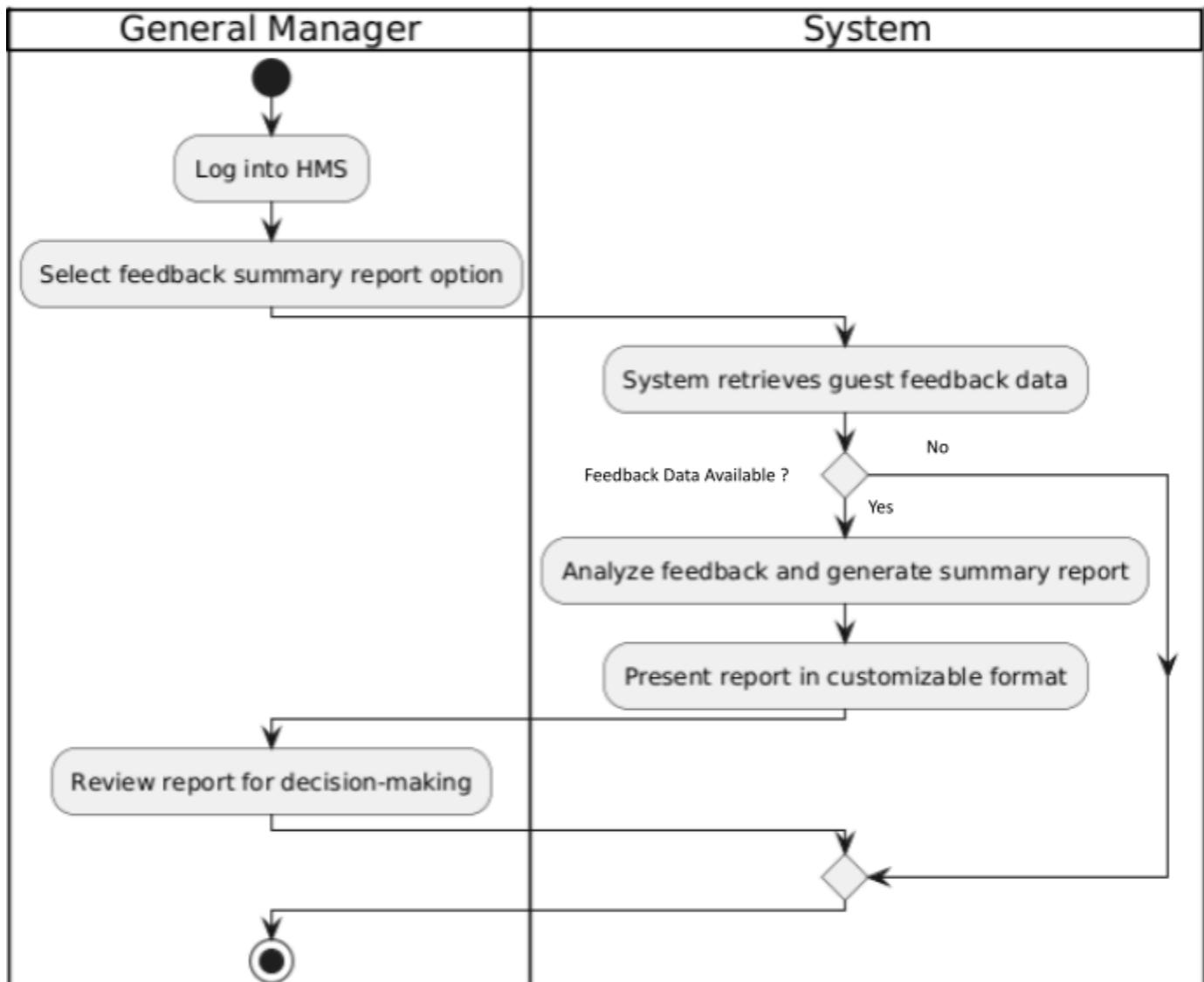


**AC\_GST\_14: Send Post Check-out Survey — (Xhois Cano)**

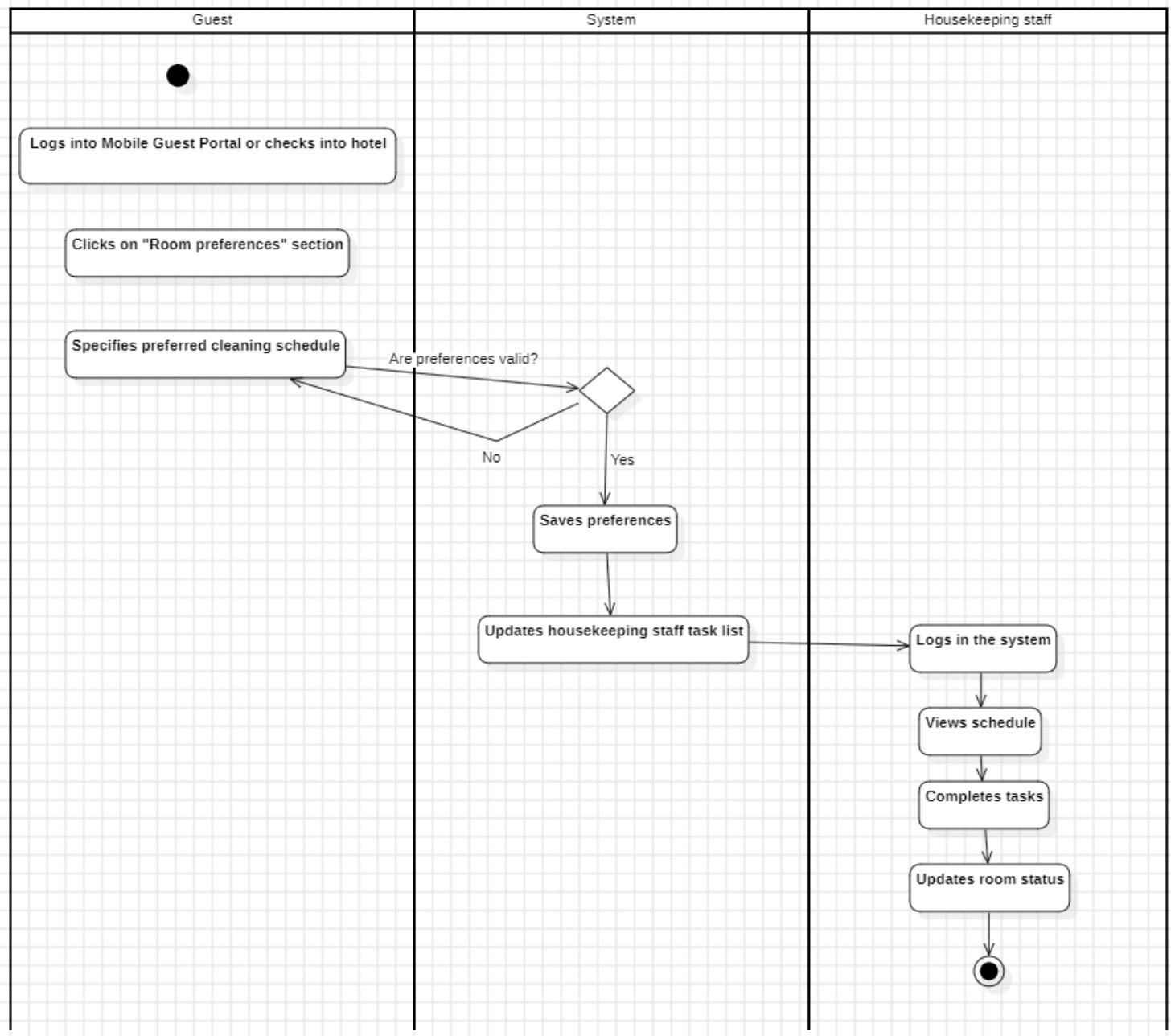


**AC\_GM\_01: Generate Survey Post-Checkout Reports — (Xhois Cano)**

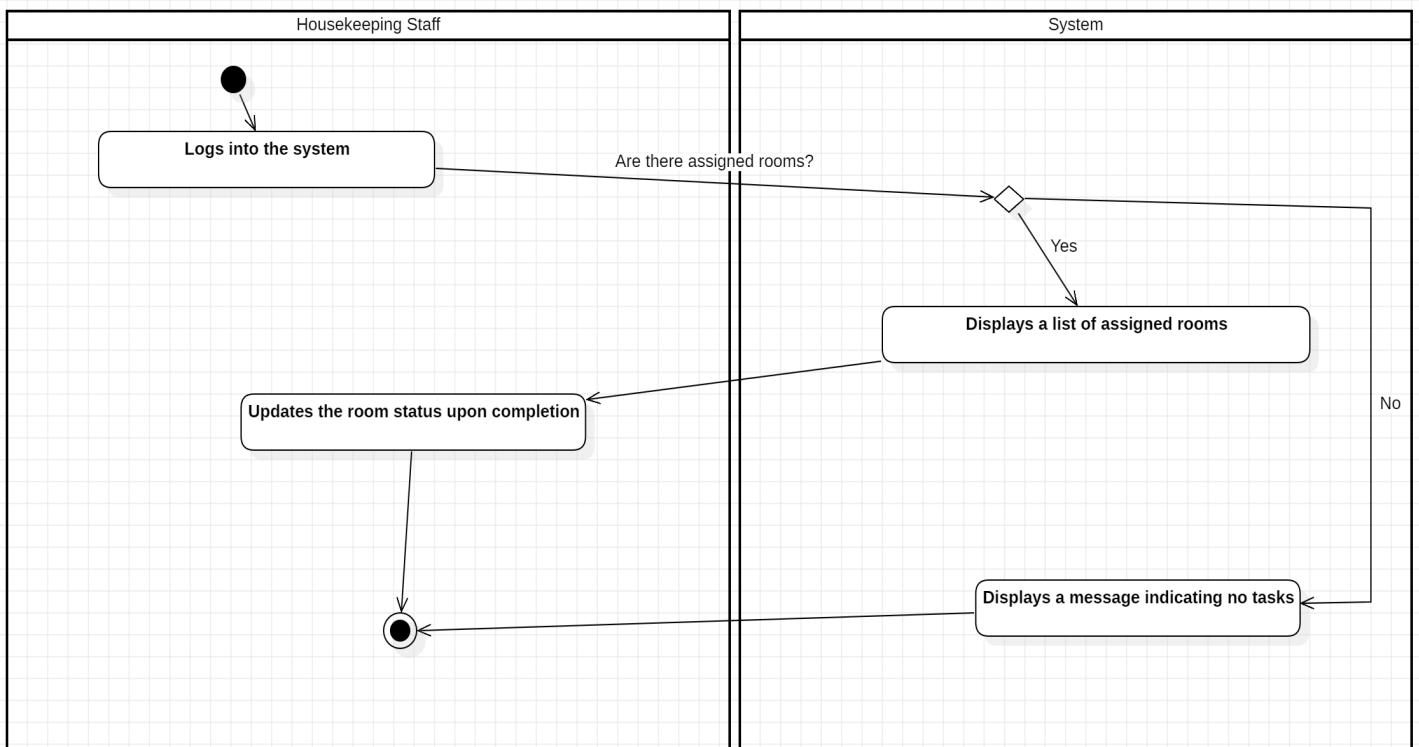
**Activity Diagram for Generating Guest Survey Feedback Reports**



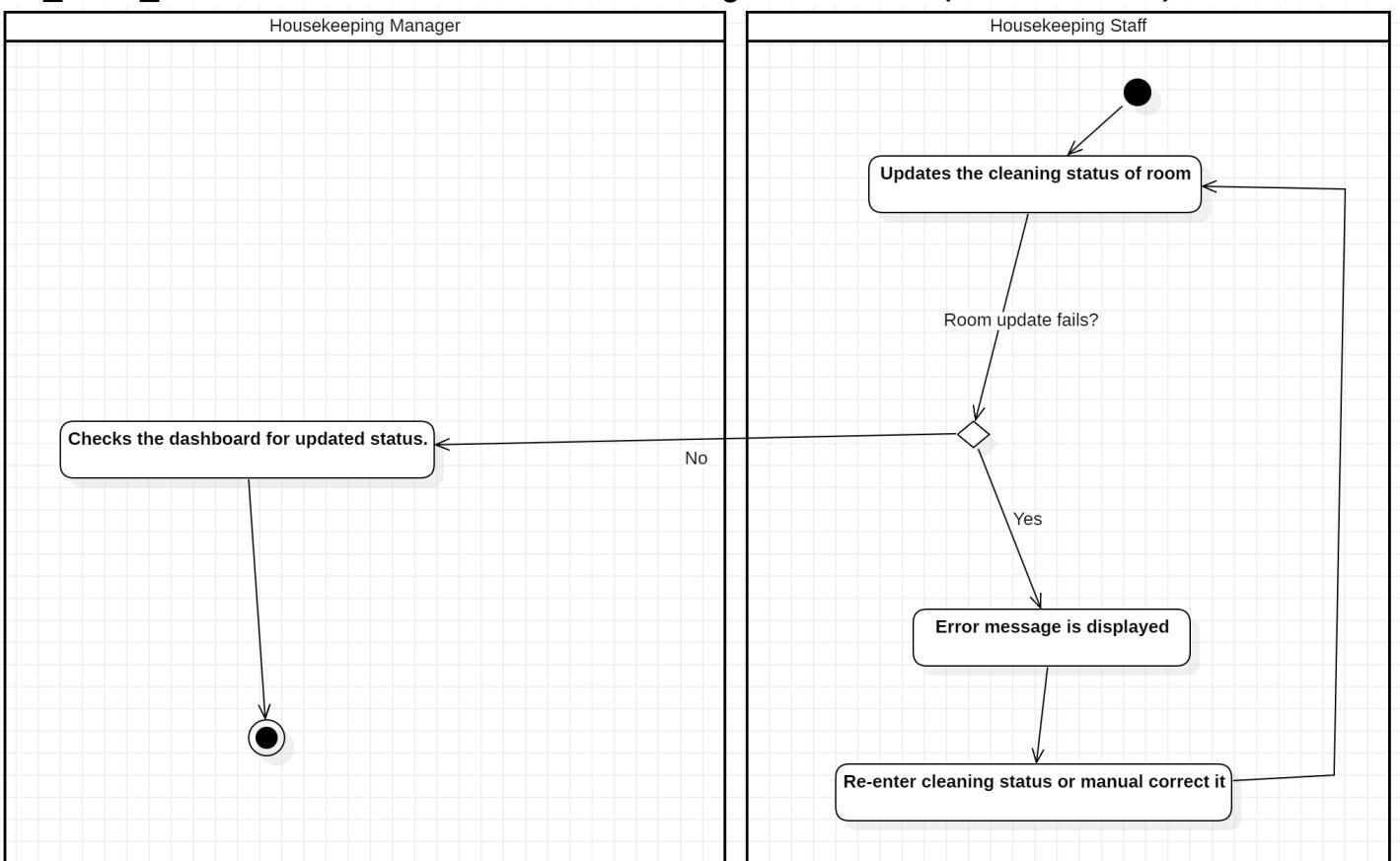
**AC\_GST\_15: Track Cleaning Schedule Based on Guest Preferences — (Orgest Bacova)**



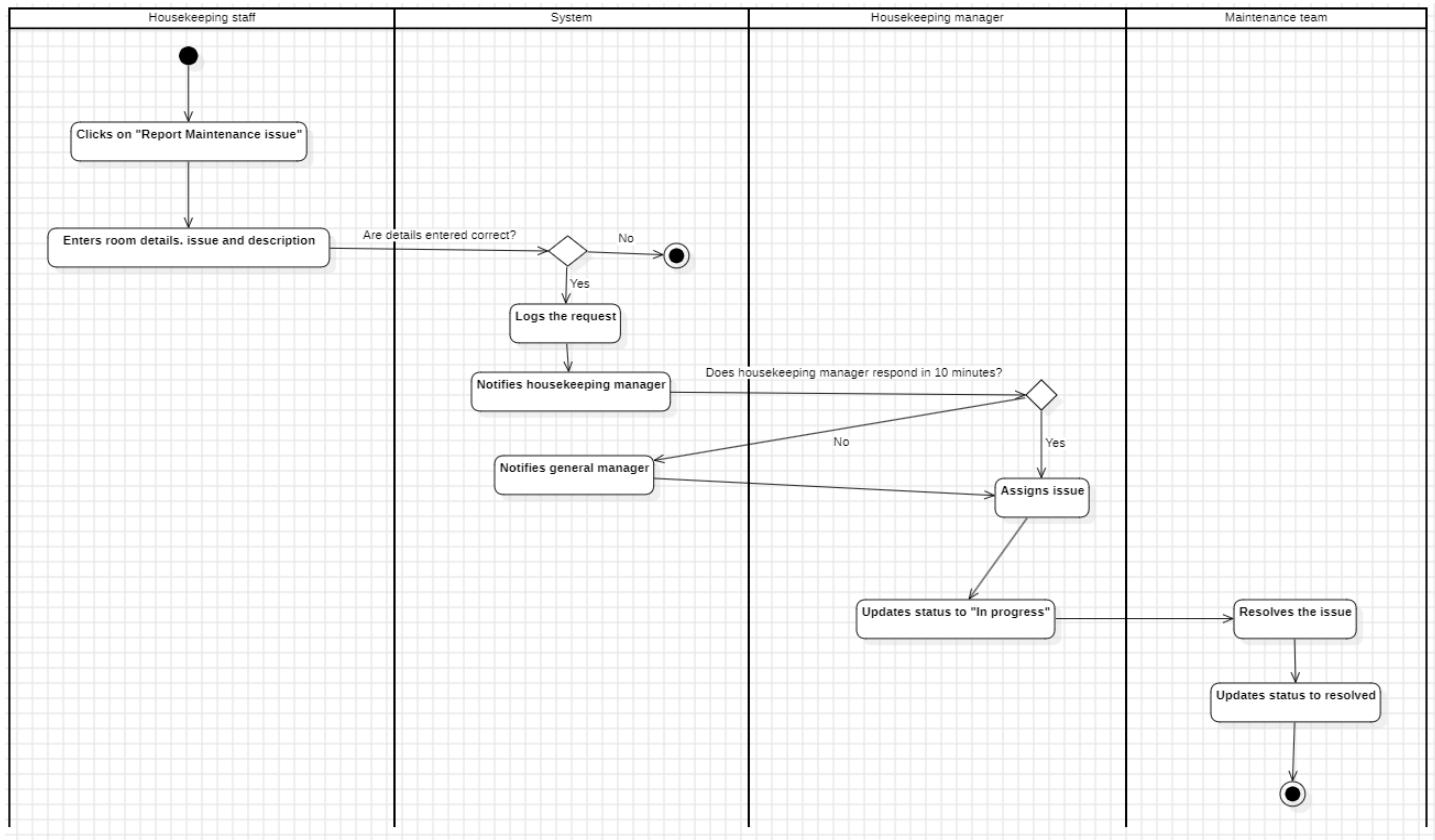
**AC\_HK\_02: View Assigned Rooms for Cleaning — (Daron Delvina)**



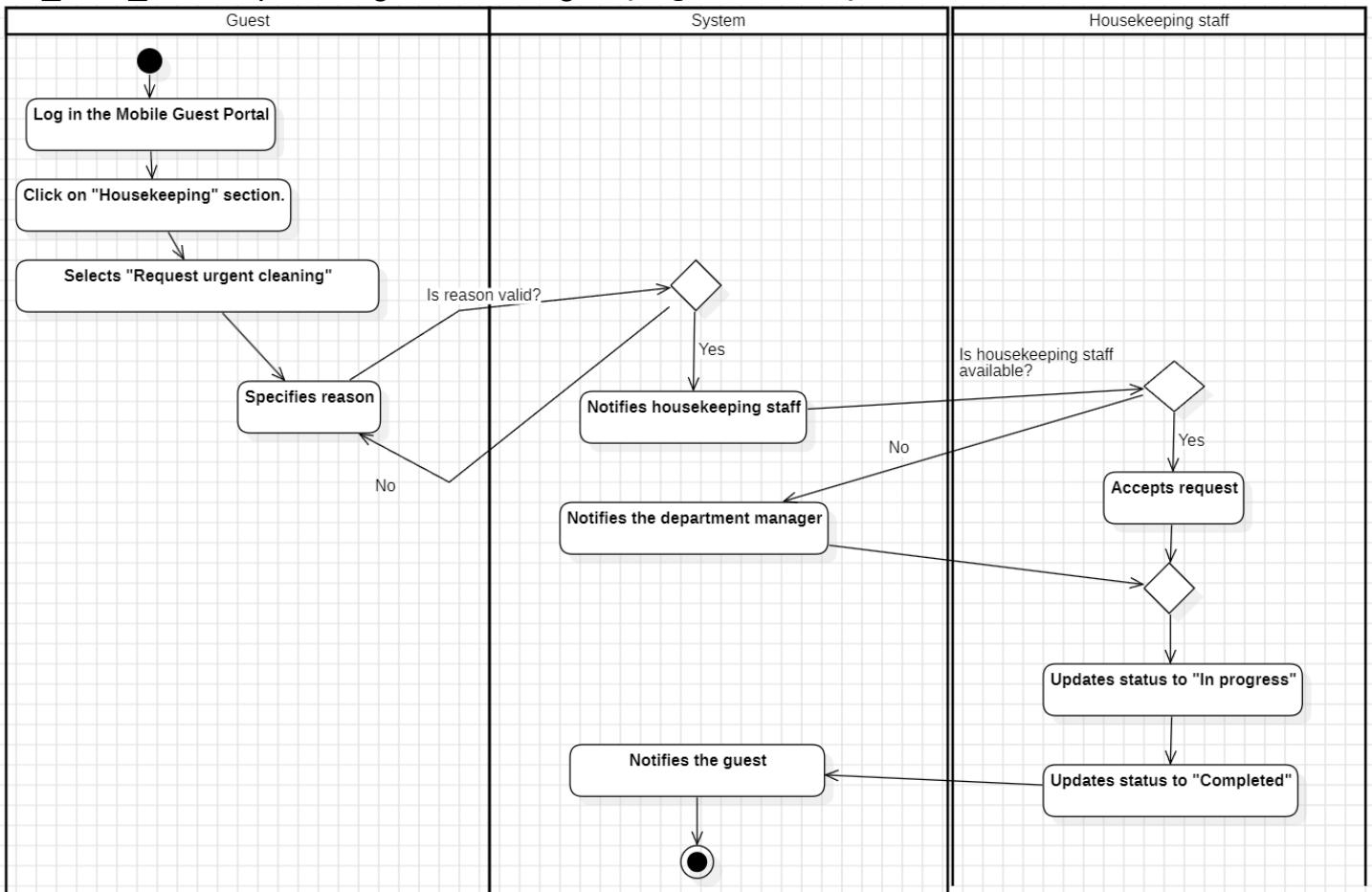
**AC\_HKM\_01: Real-Time View of Room Cleaning Statuses — (Daron Delvina)**



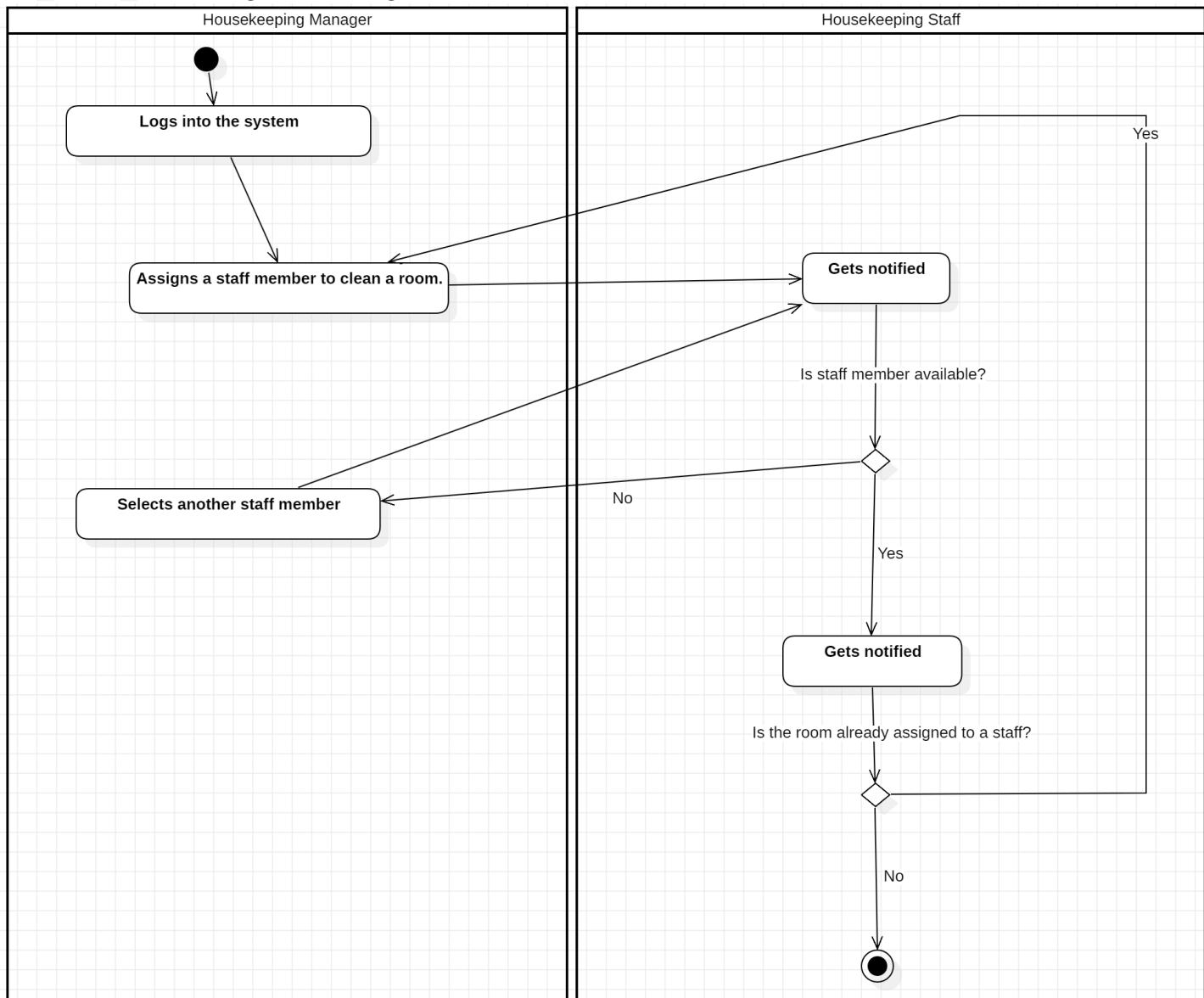
**AC\_HK\_02: Notify Maintenance Issues to Housekeeping Manager — (Orgest Bacova)**



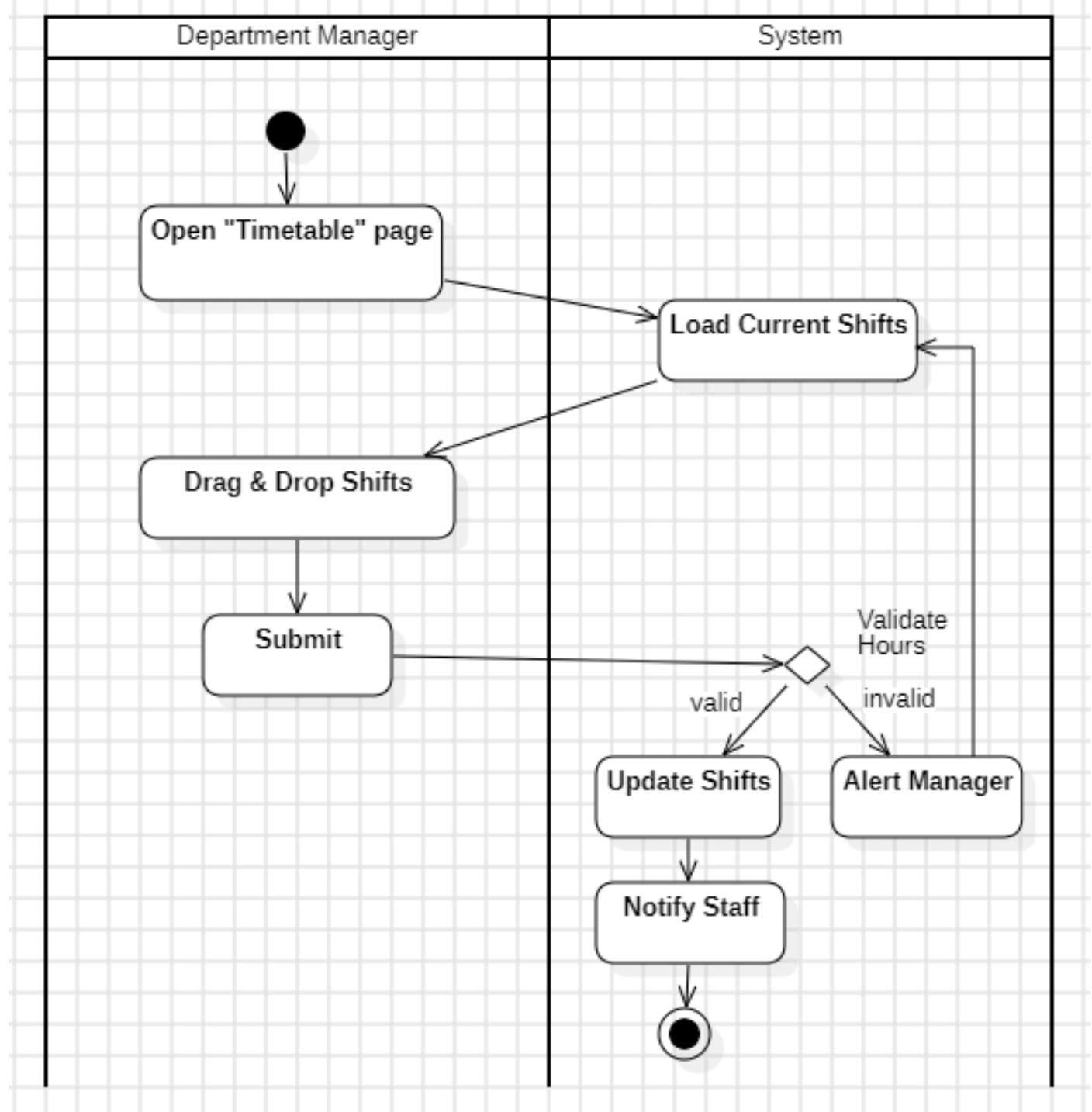
**AC\_GST\_16: Request Urgent Cleaning — (*Orgest Bacova*)**



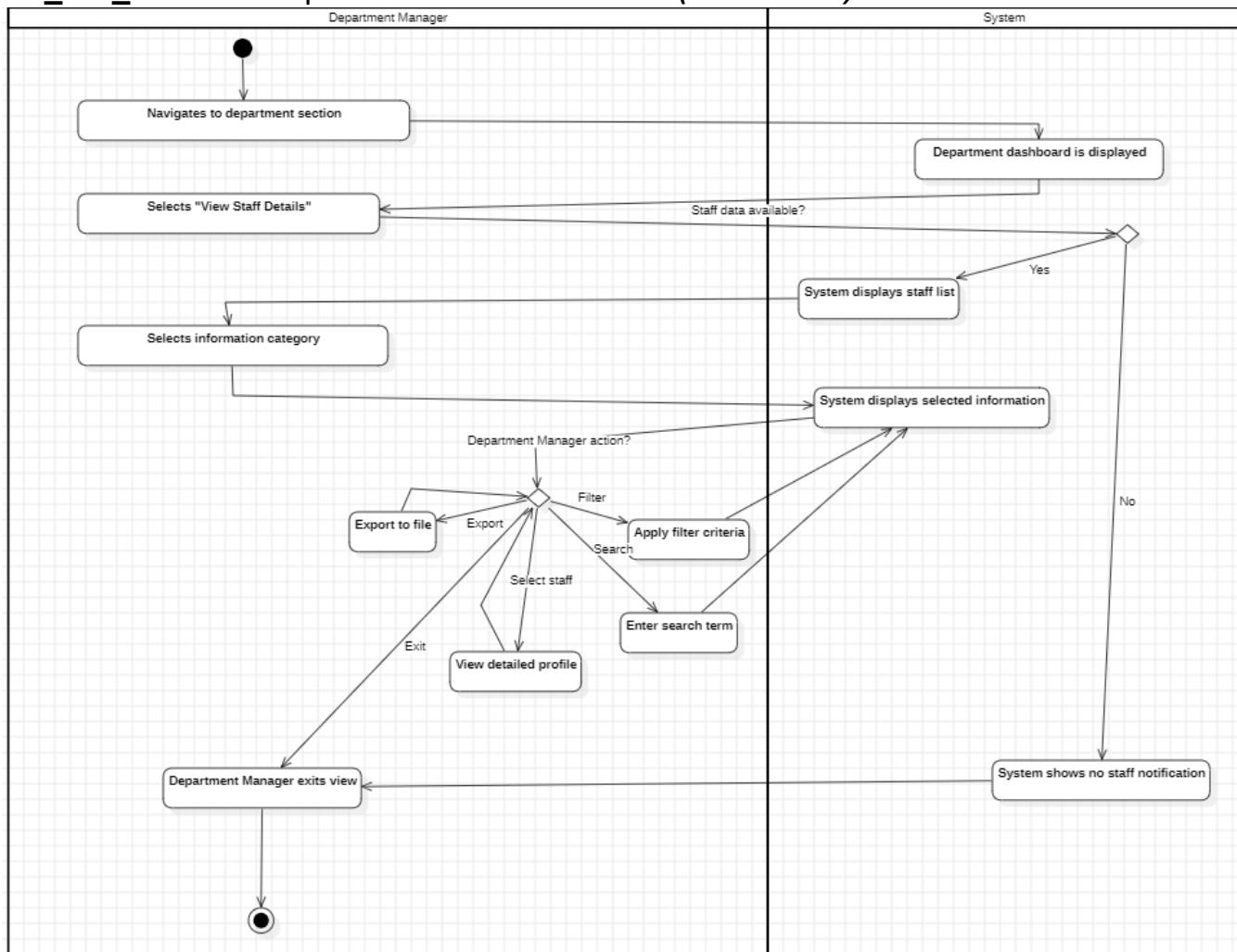
**AC\_HKM\_02: Assign Cleaning Tasks — (Daron Delvina)**



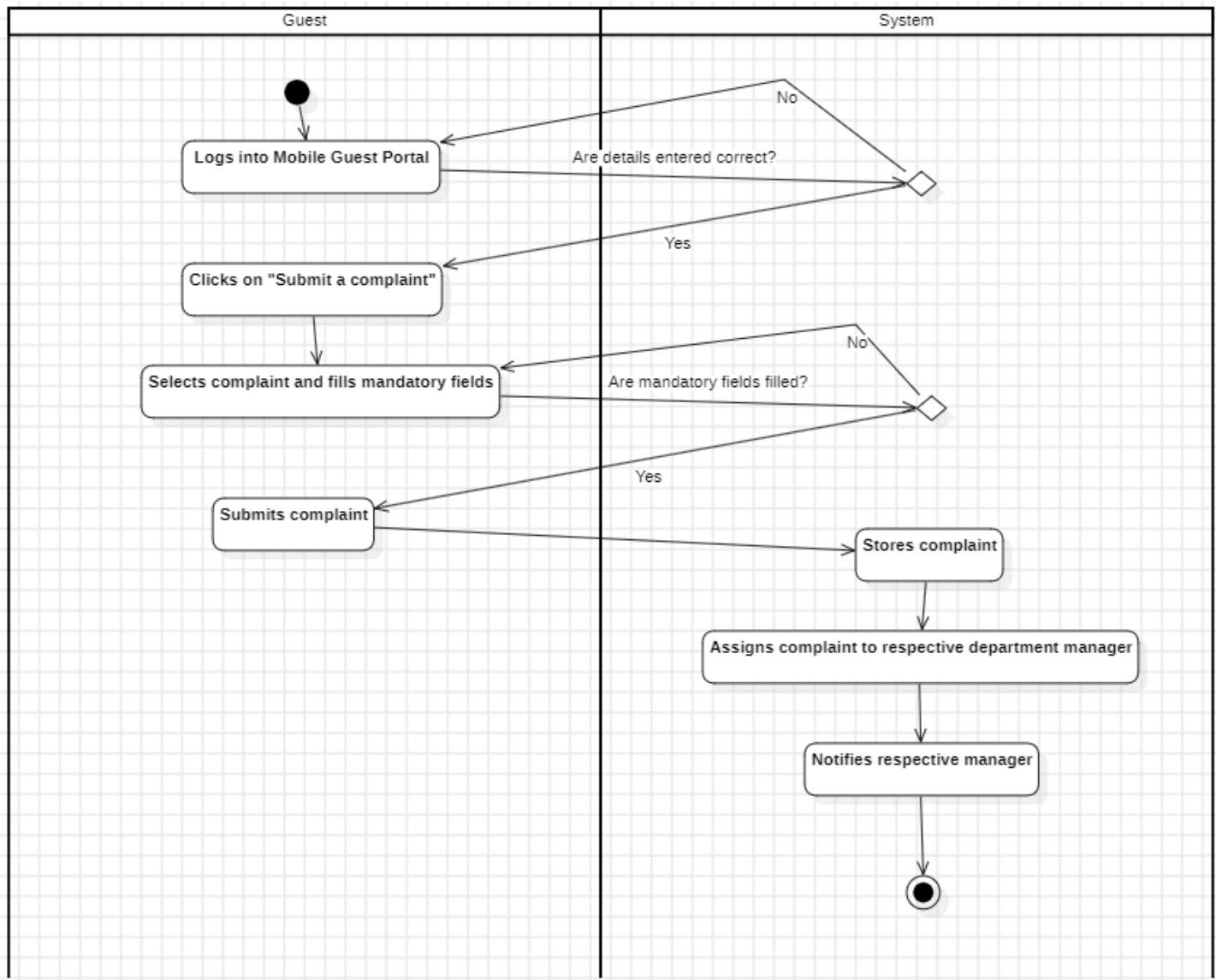
**AC\_DM\_01: Schedule Shifts — (Sidrit Zela)**



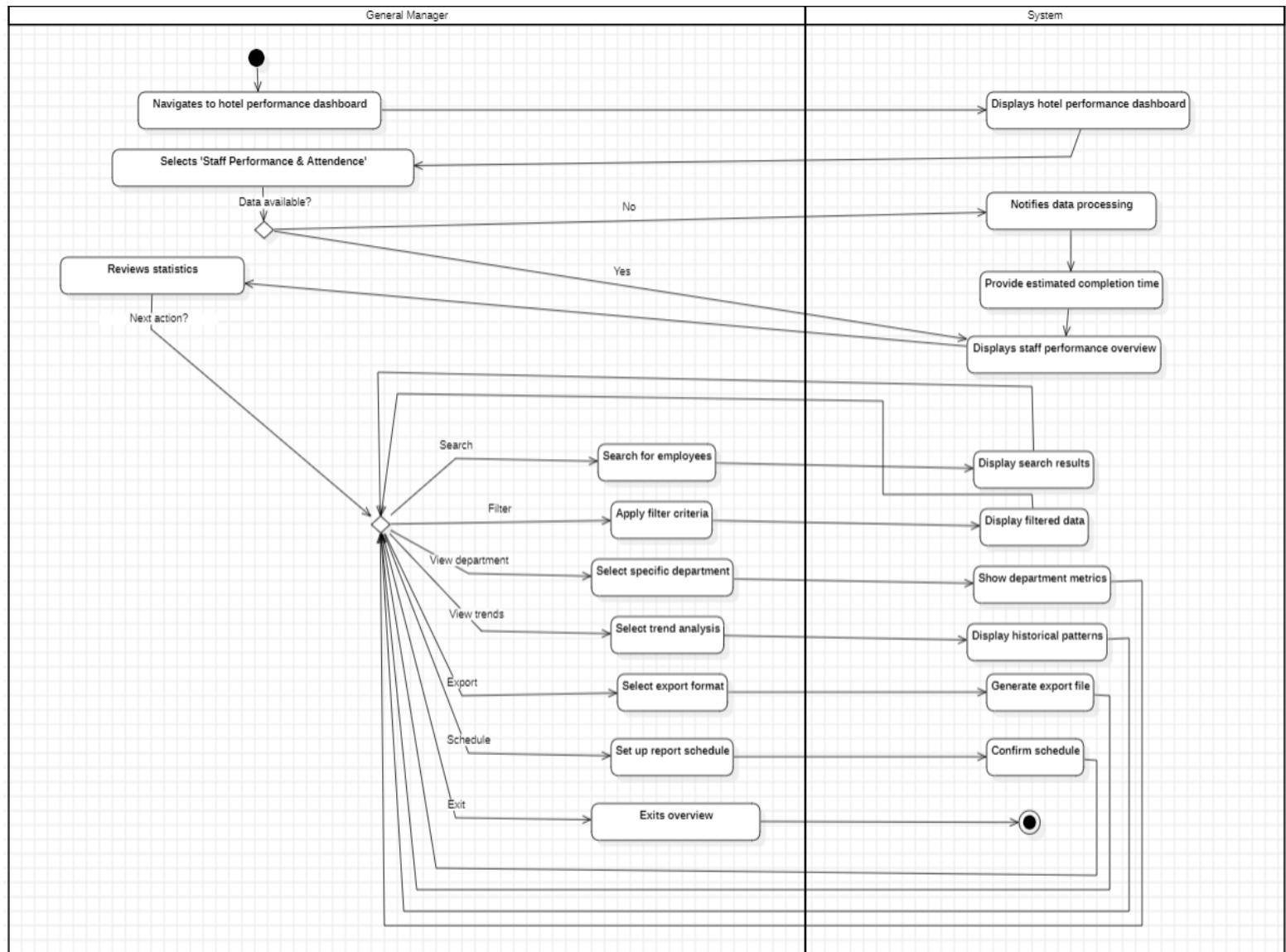
**AC\_DM\_02: View Department Staff Details — (Hazis Voda)**



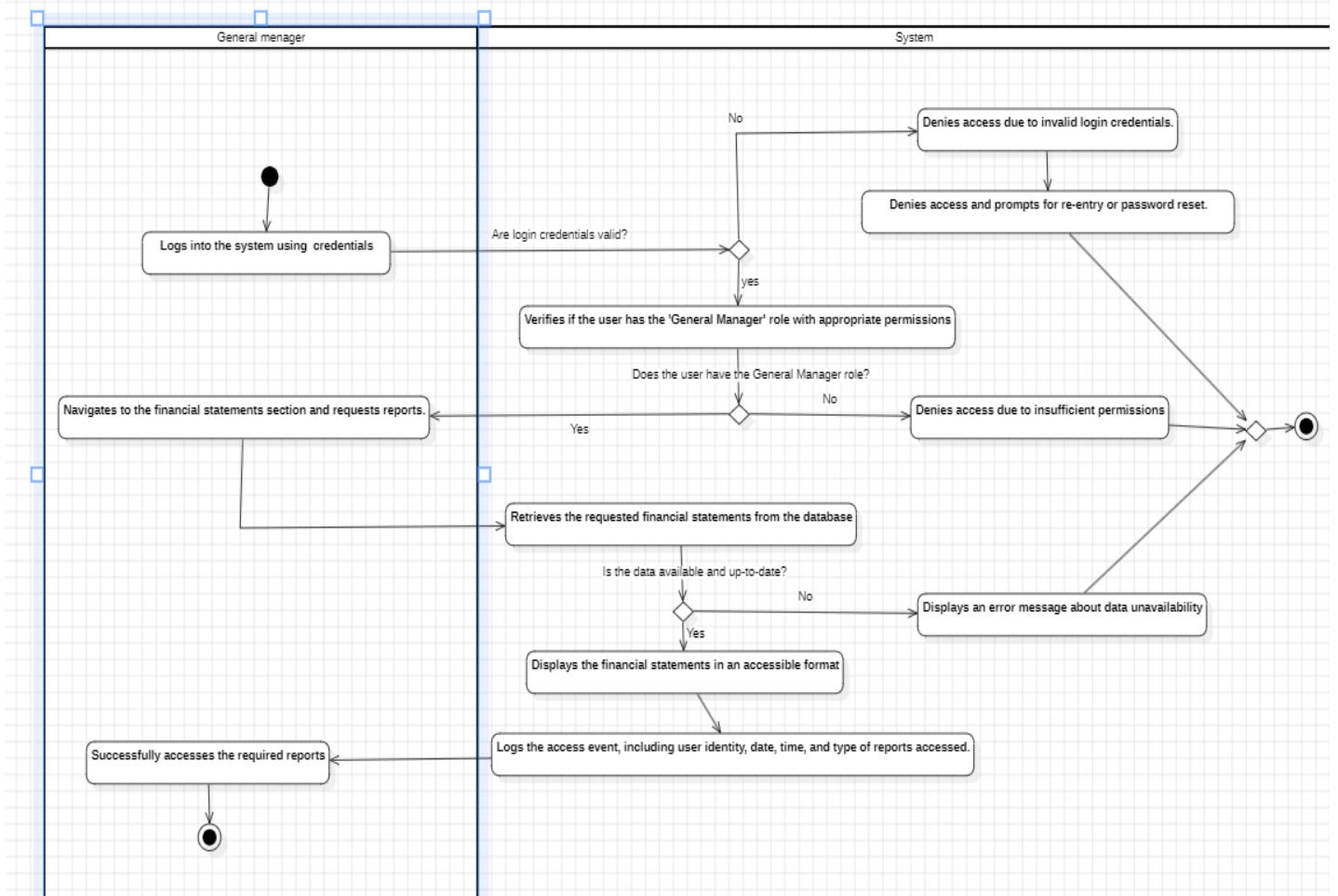
**AC\_GST\_17: Submit Complaints to Relevant Department Manager — (*Orgest Bacova*)**



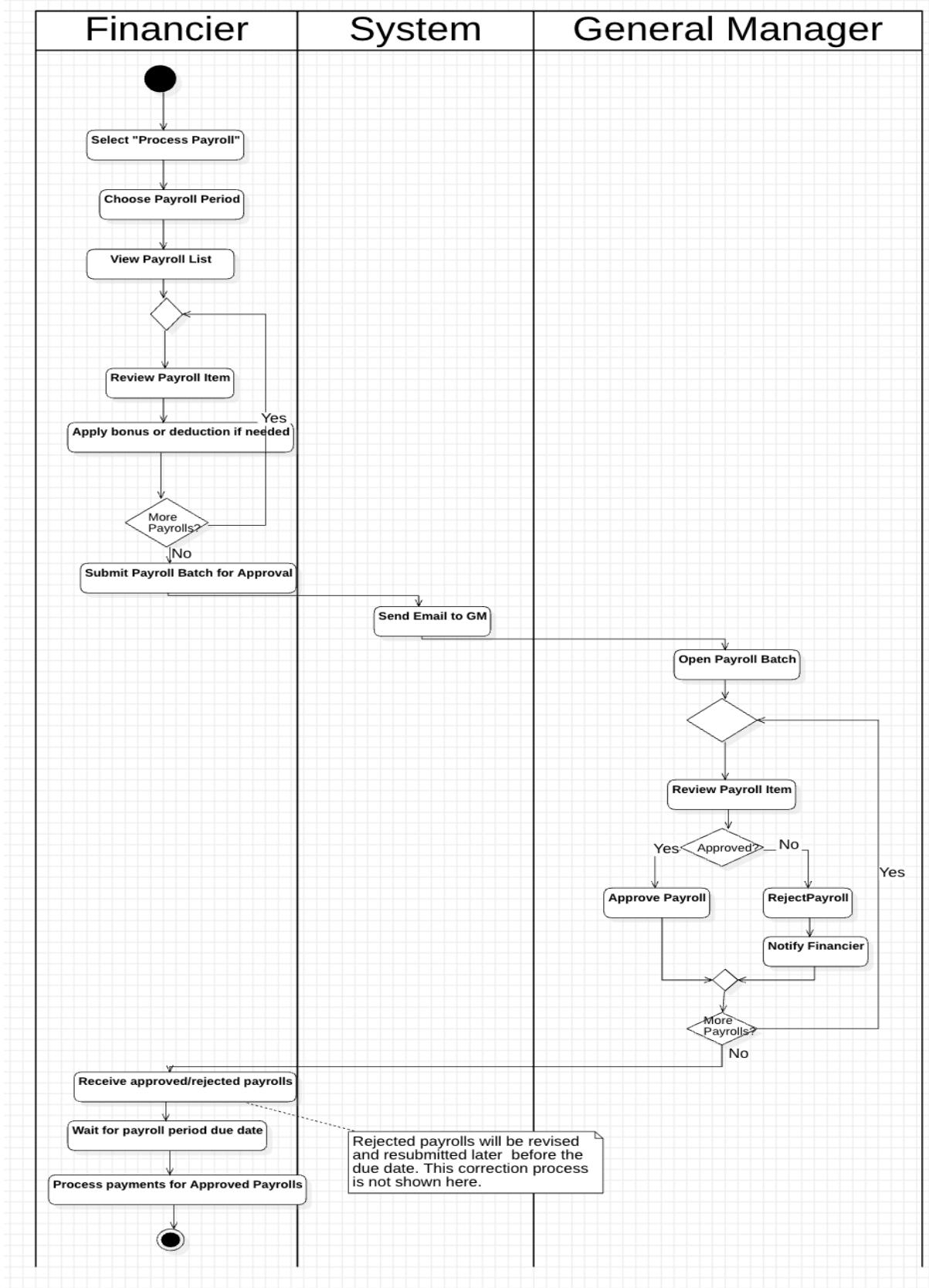
**AC\_GM\_02: View Staff Performance, Attendance (General Manager) — (Hazis Voda)**



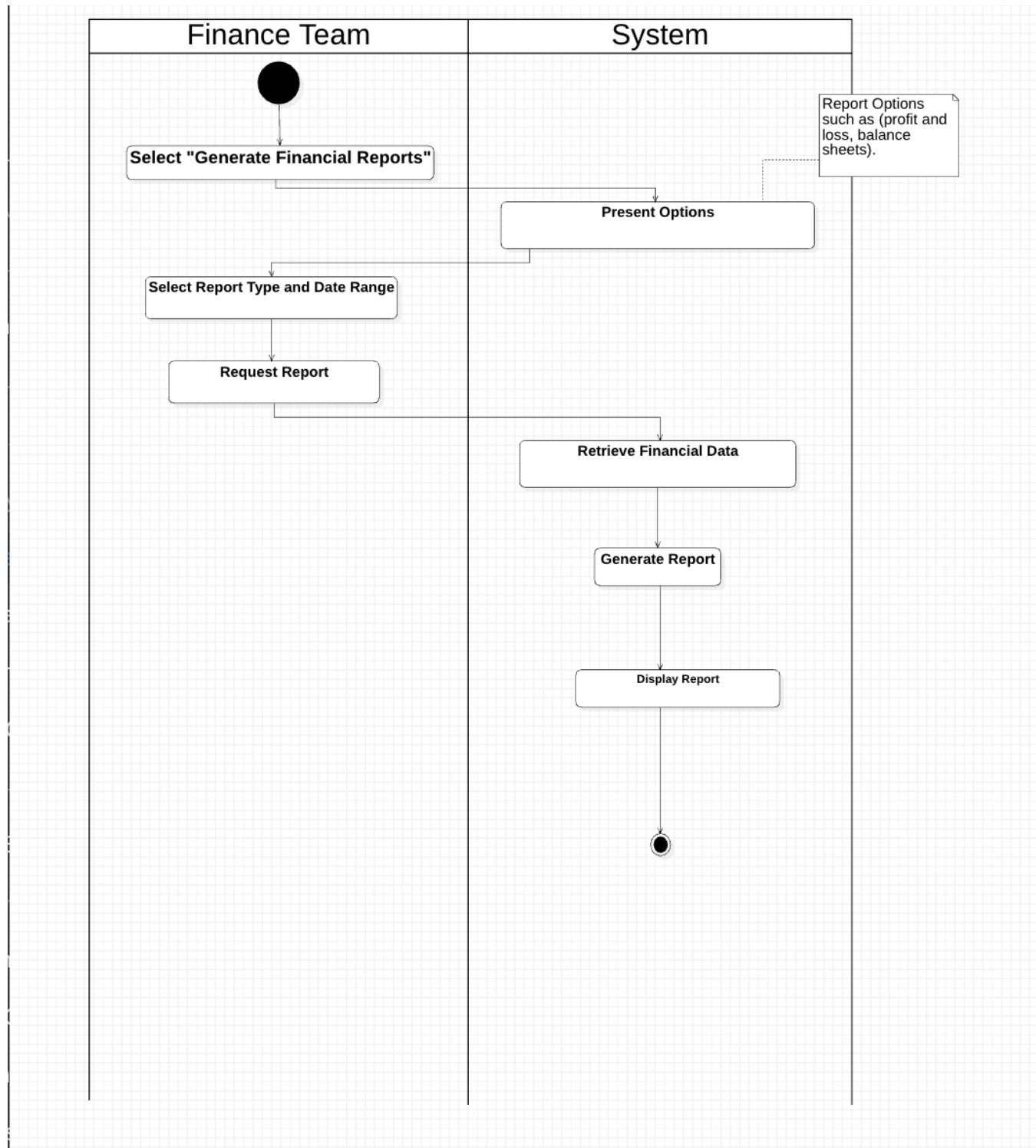
## AC\_GM\_05: Financial Statements Access — (Jurgen Hila)



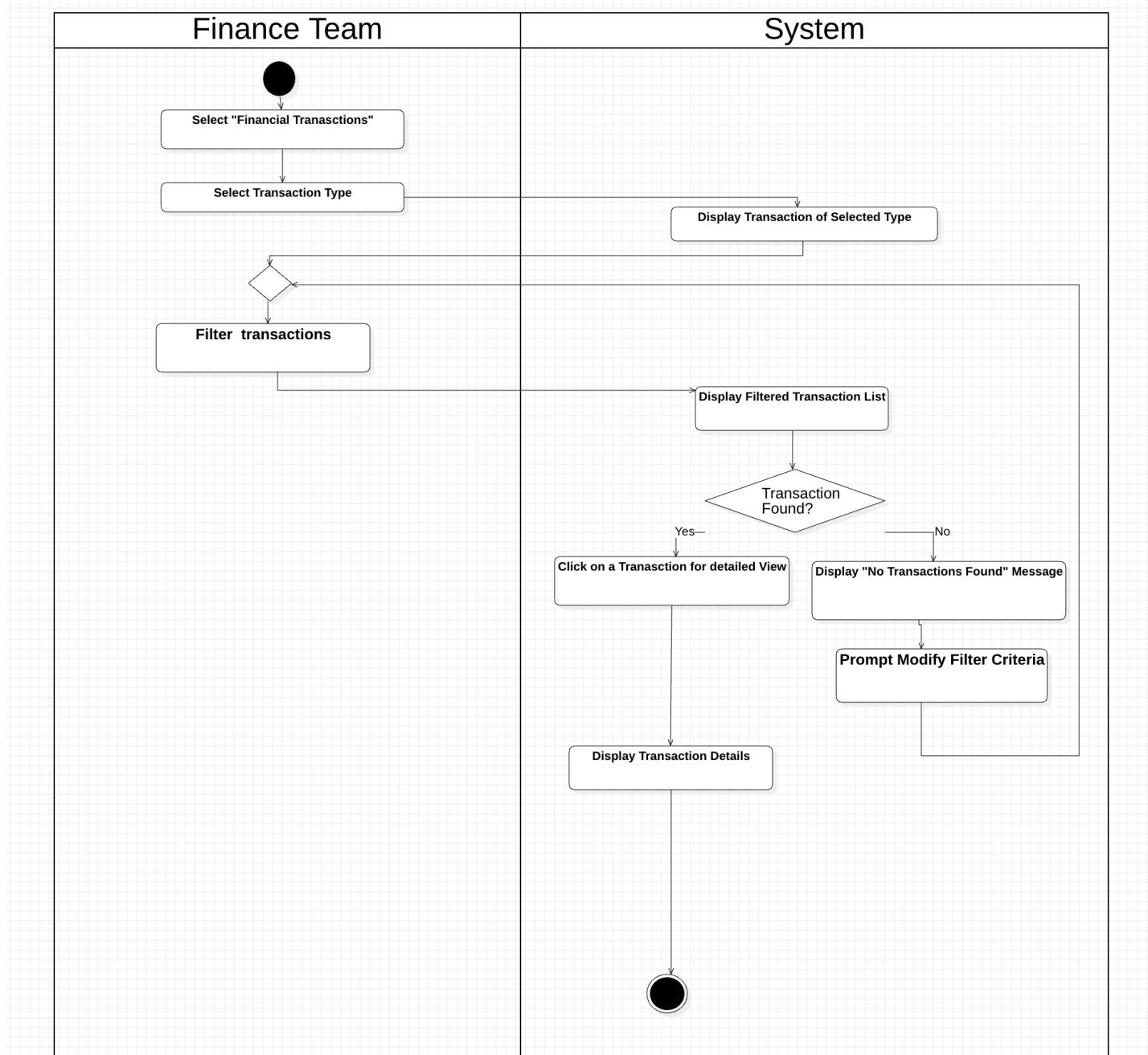
**AC\_FI\_01 Calculate Staff Payroll — (*Endri Baku*)**



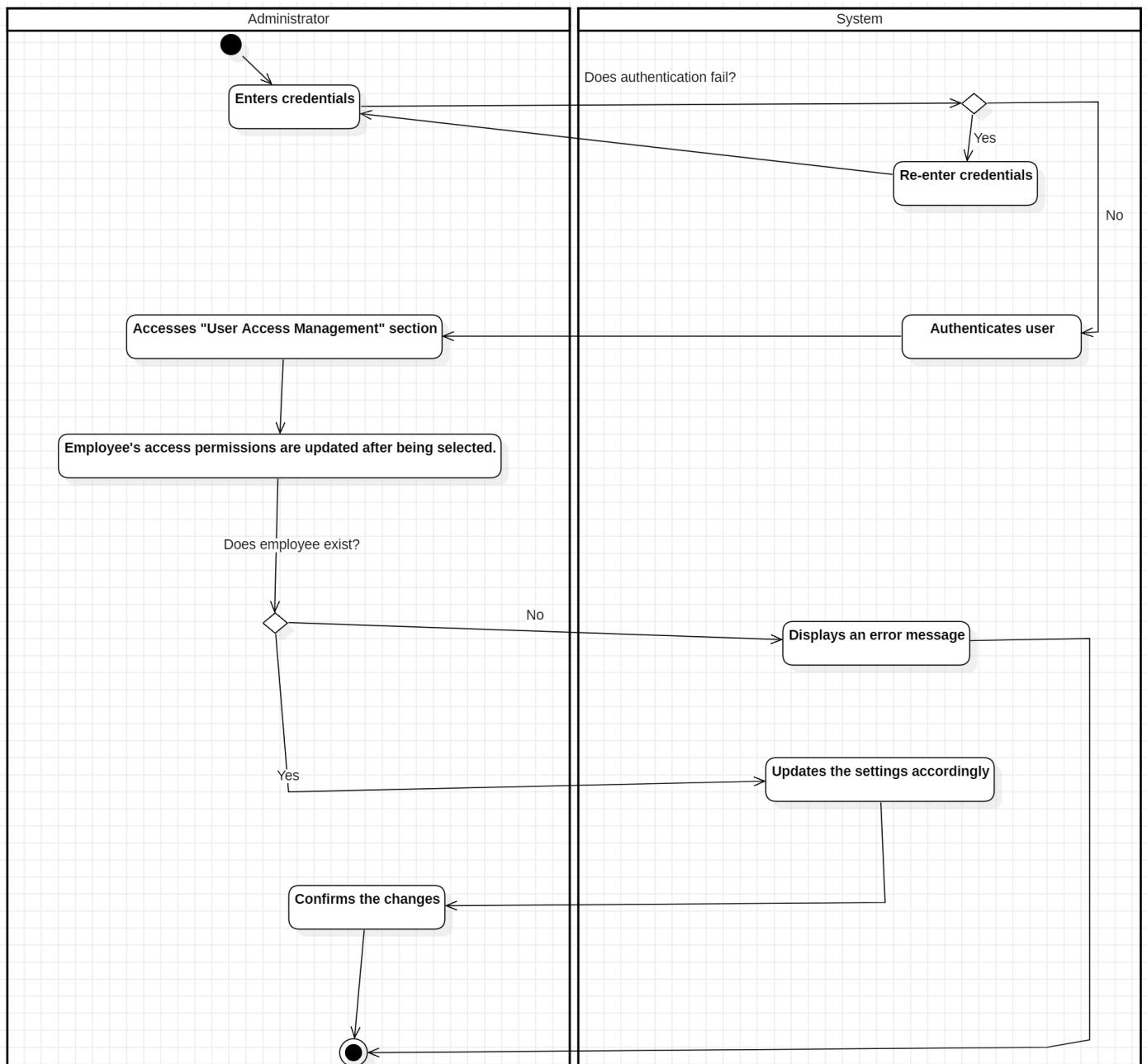
**AC\_FI\_02: Generate Financial Reports — (*Endri Baku*)**



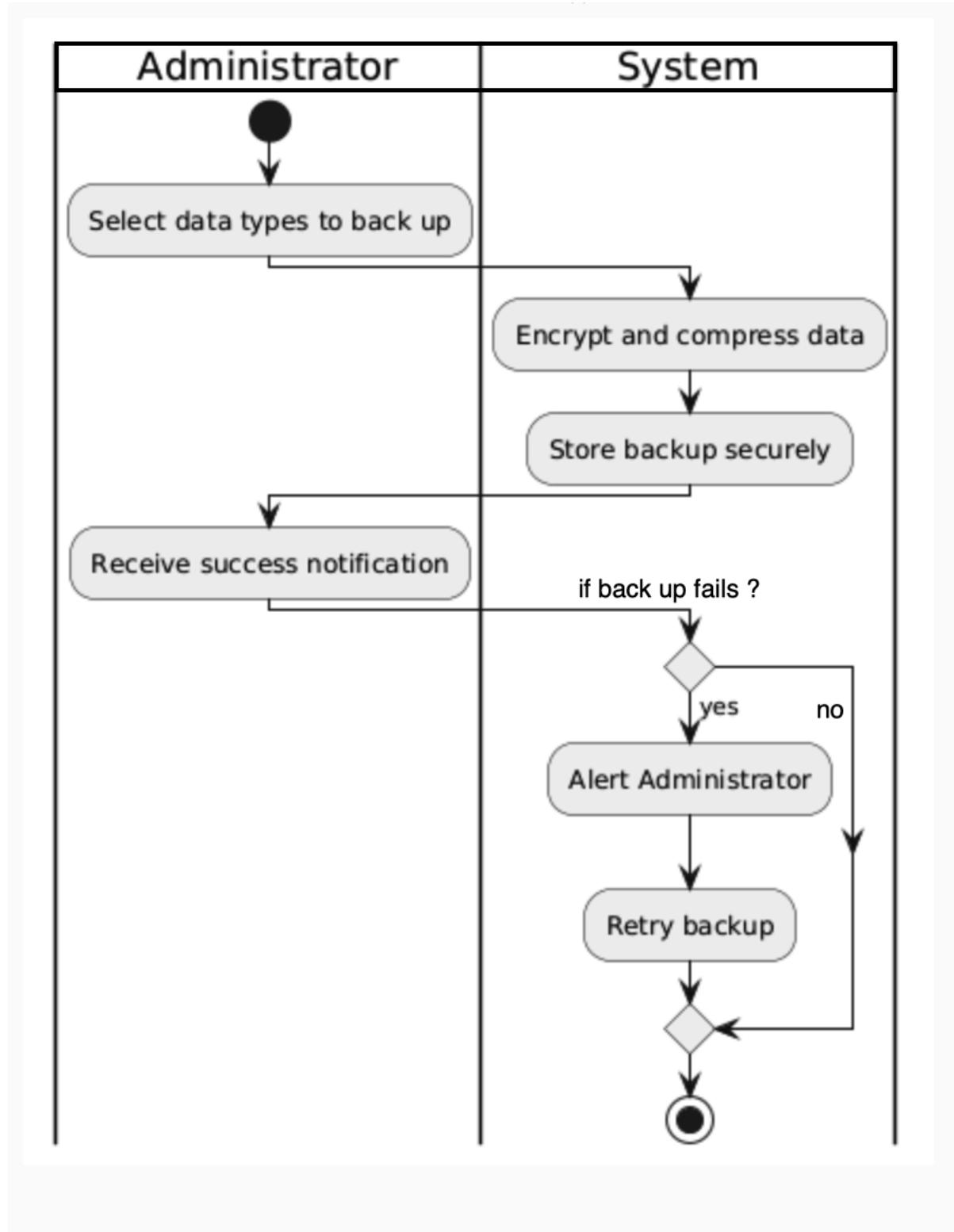
**AC\_FI\_03: Track Financial Transactions — (*Endri Baku*)**



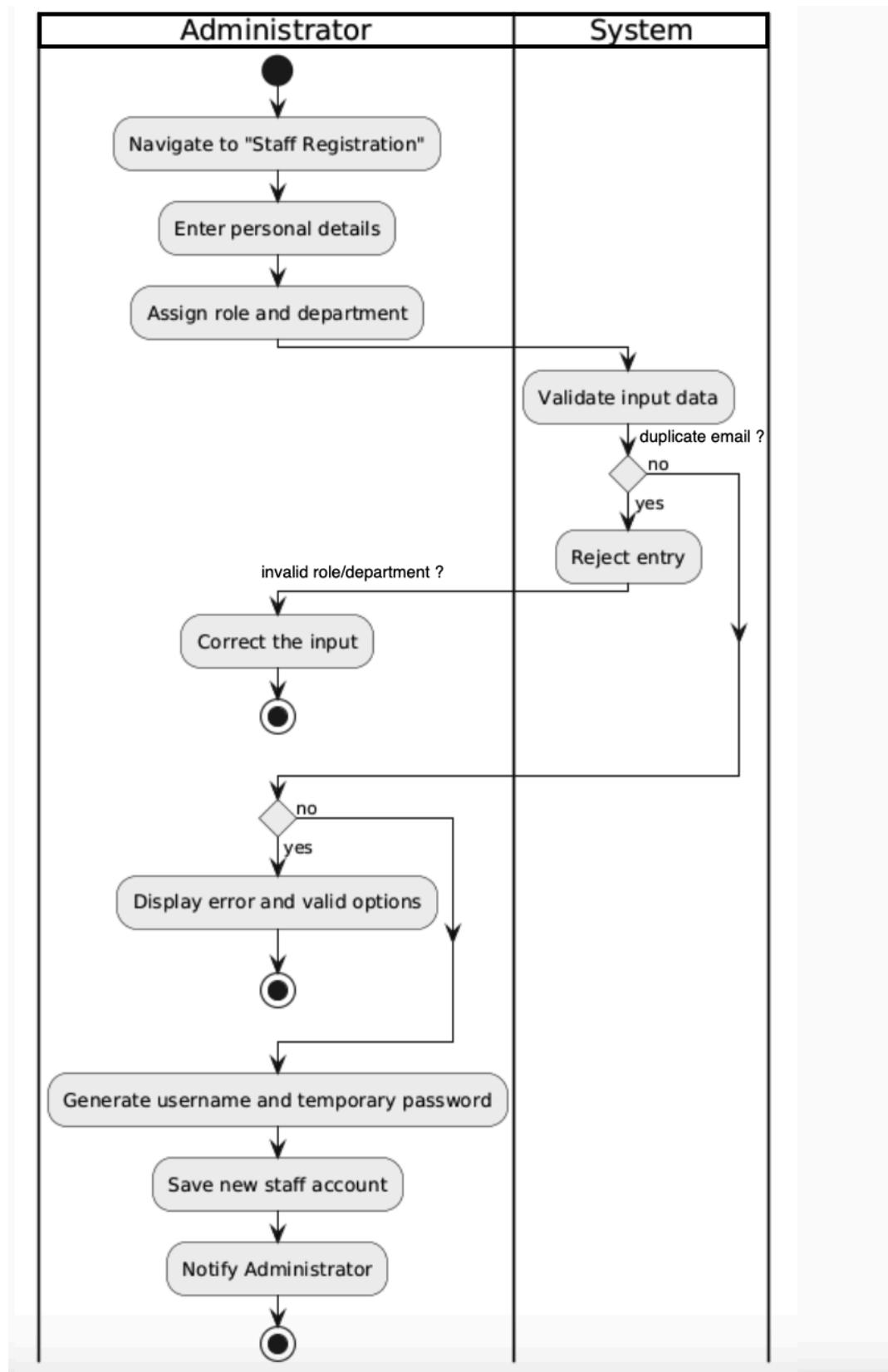
**AC\_ADMIN\_01: Manage User Access — (Daron Delvina)**



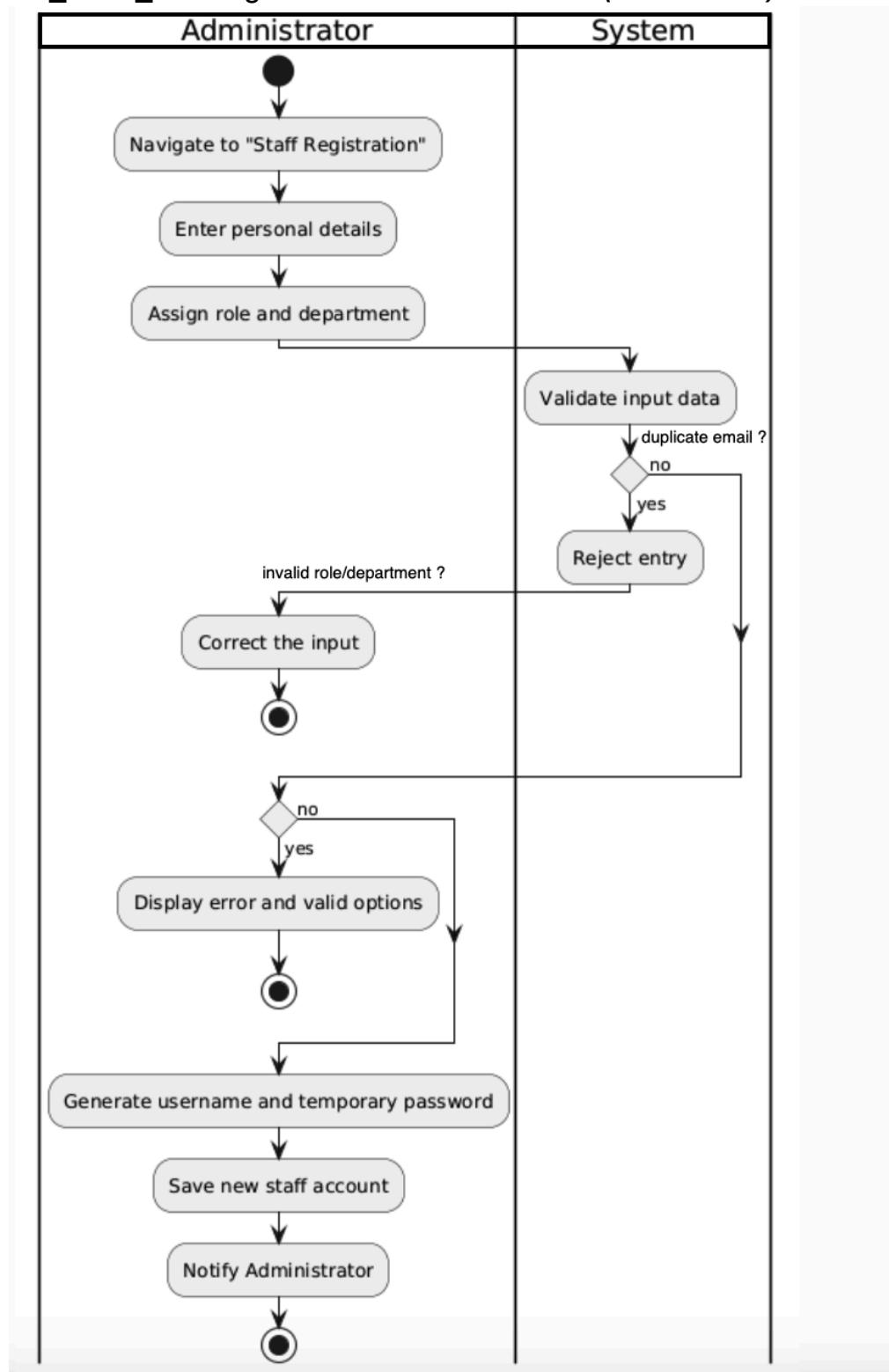
**AC\_ADMIN\_02:** Backup and Restore the System — (*Xhois Cano*)



**AC\_ADM\_03: Maintain Audit Logs — (Jurgen Hila)**

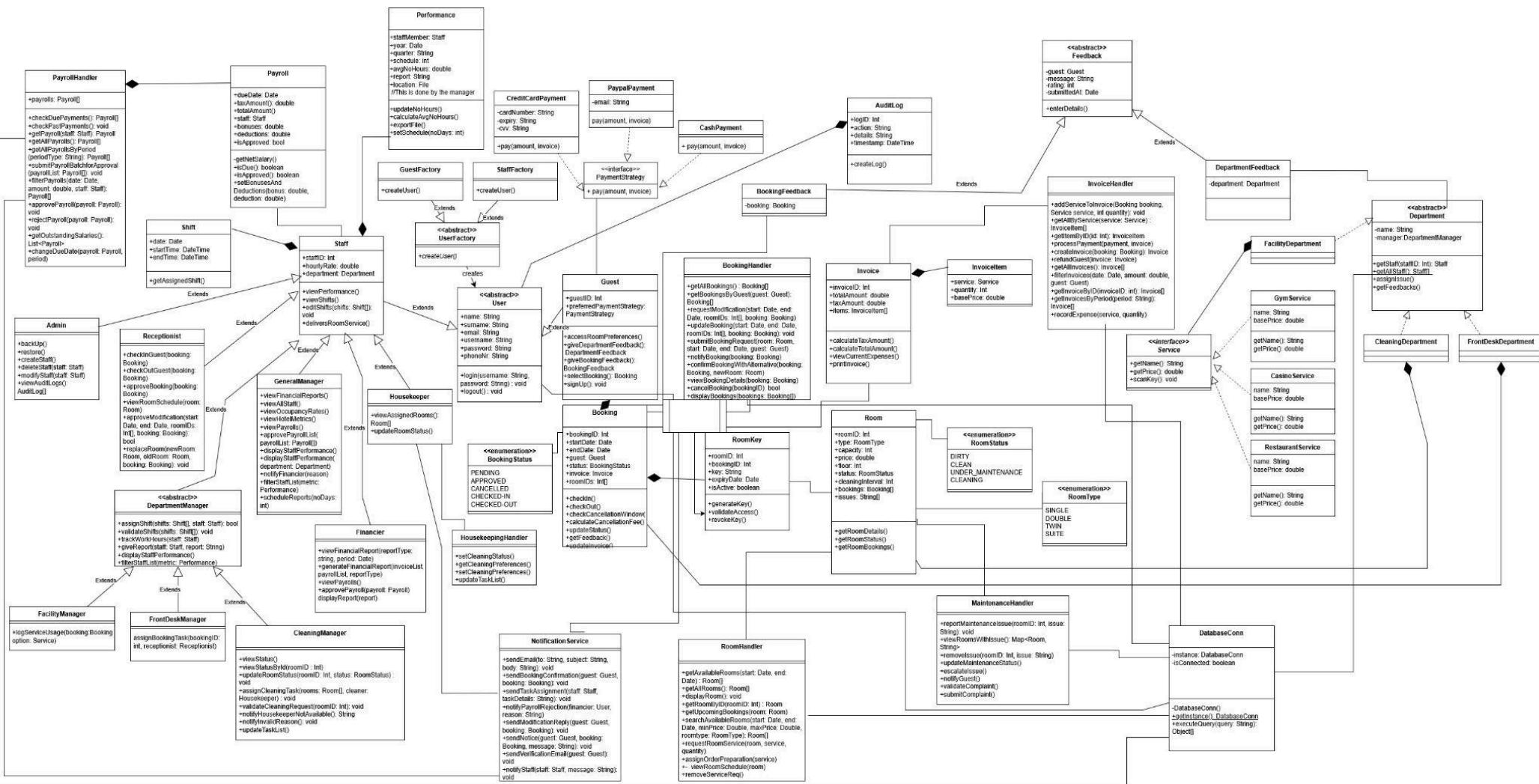


**AC\_ADMIN\_04: Register Staff Members — (Xhois Cano)**



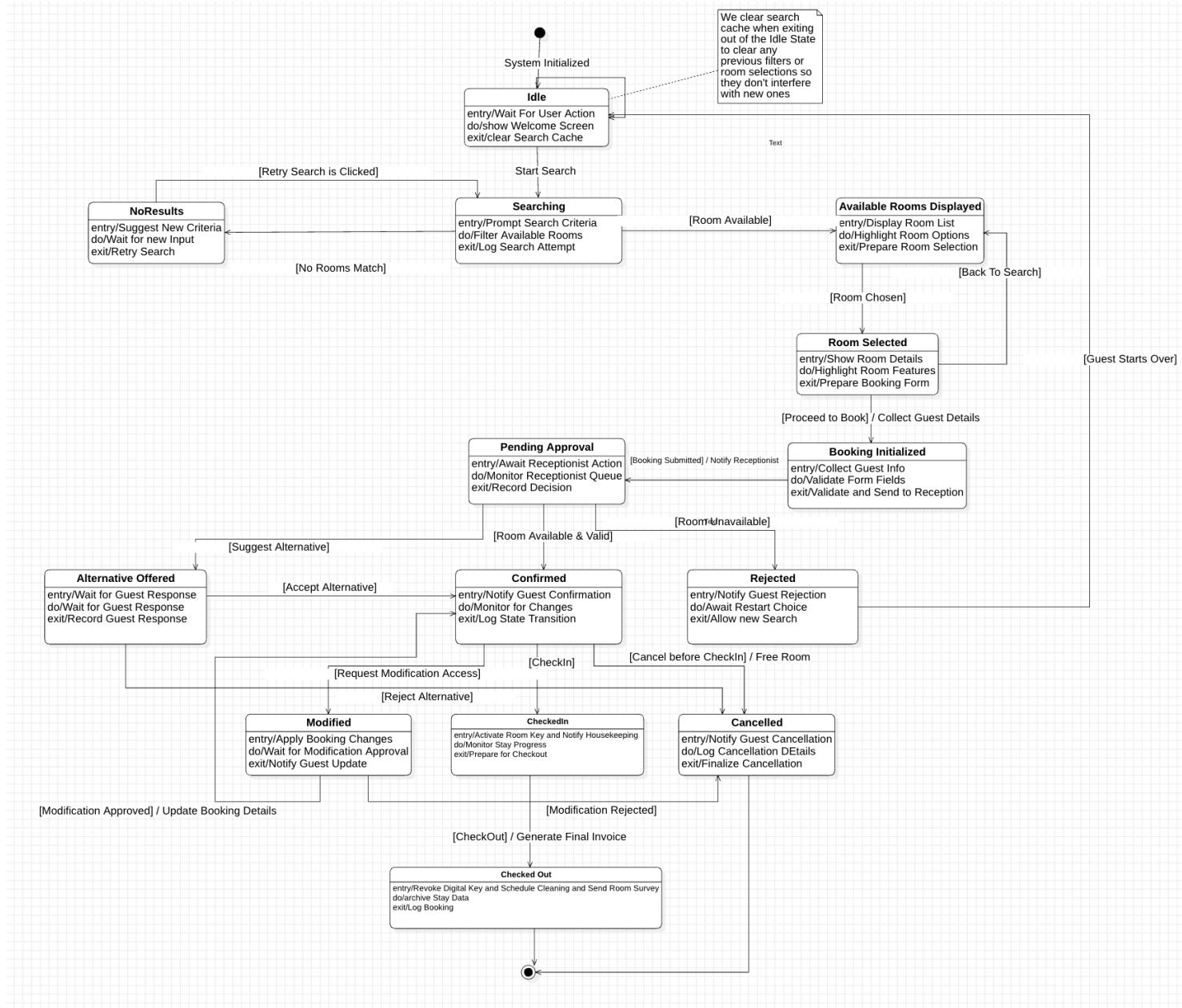
## **Class Diagram (next page)**

# Hotel Management System [HMS] Requirements Specification

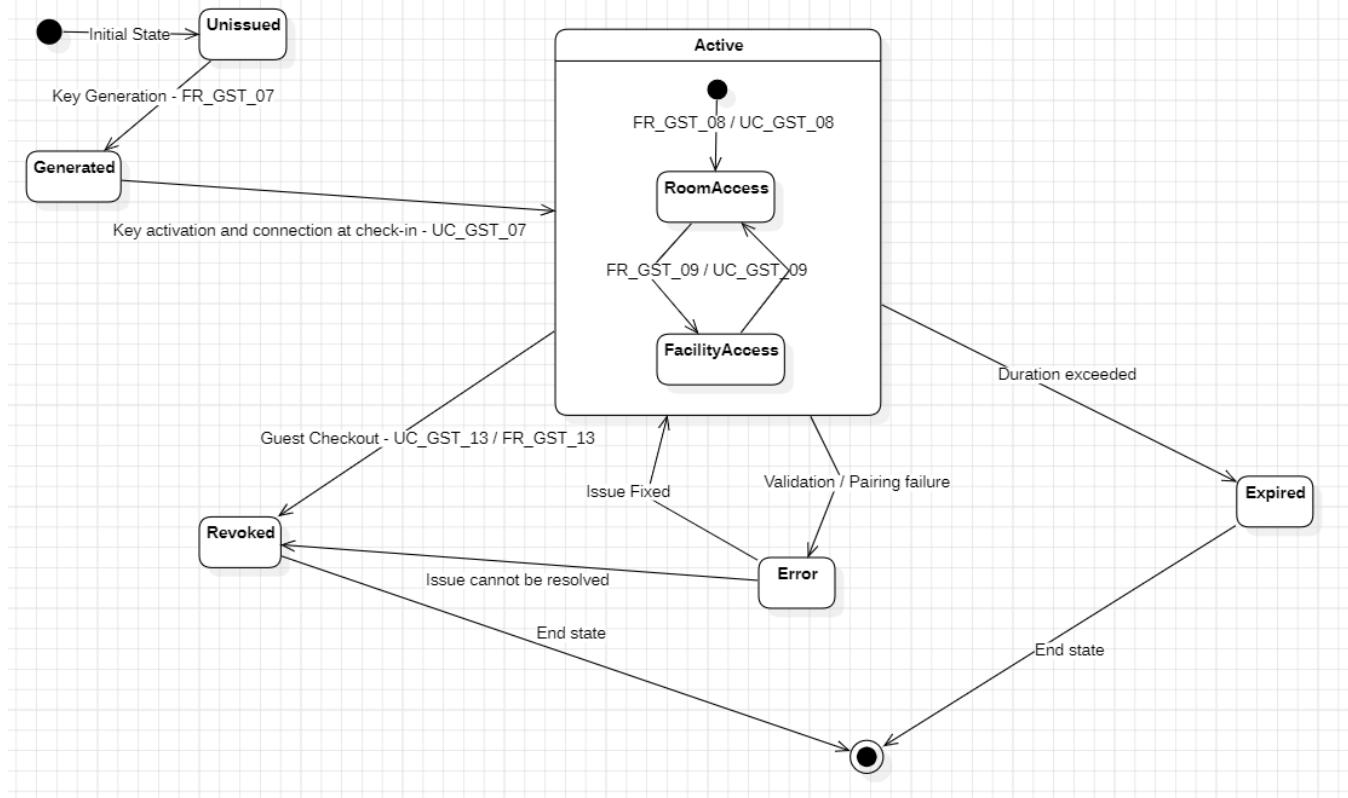


# State Diagram

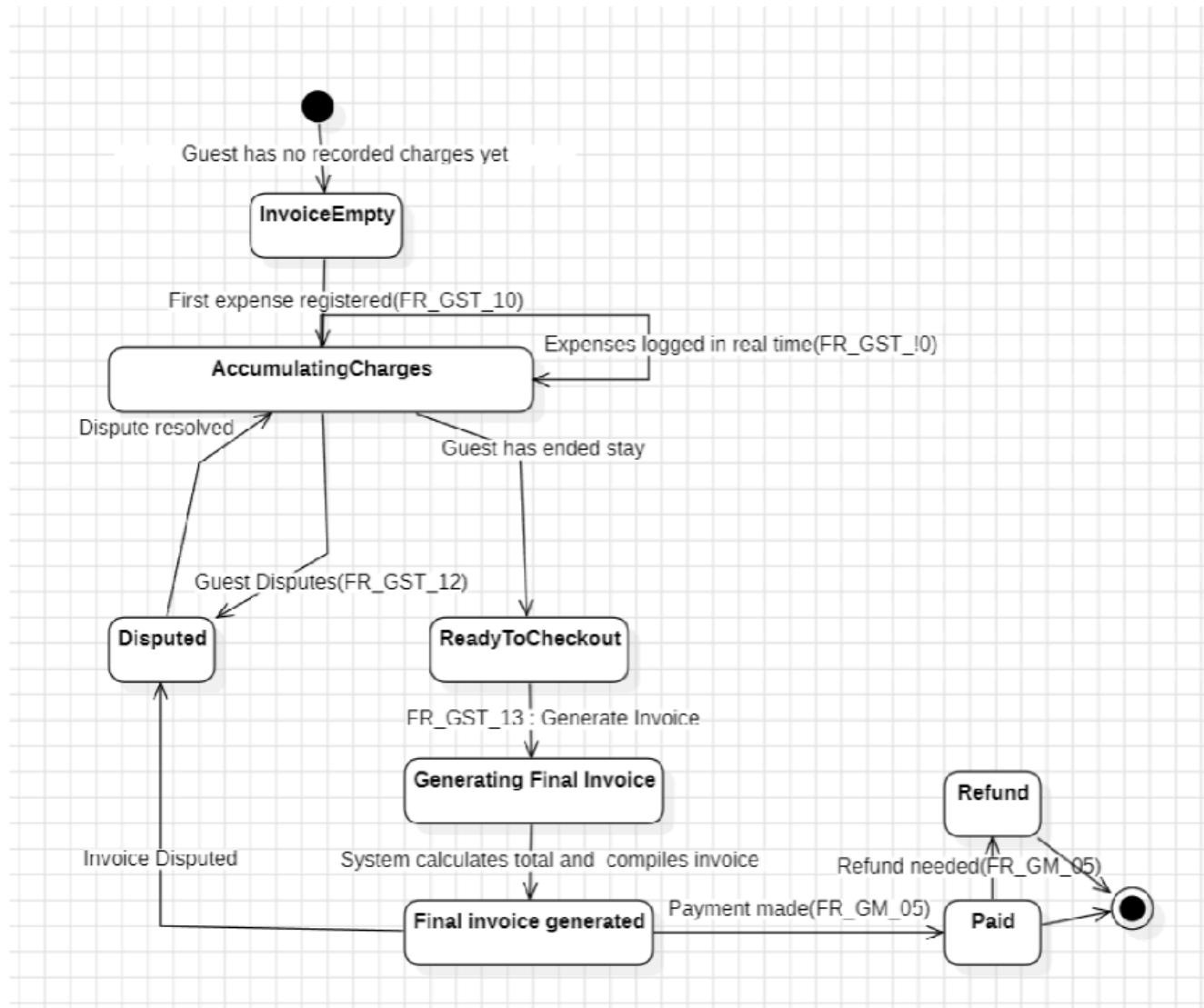
## State Diagram 01 - Room Booking Lifecycle — (Endri Baku)



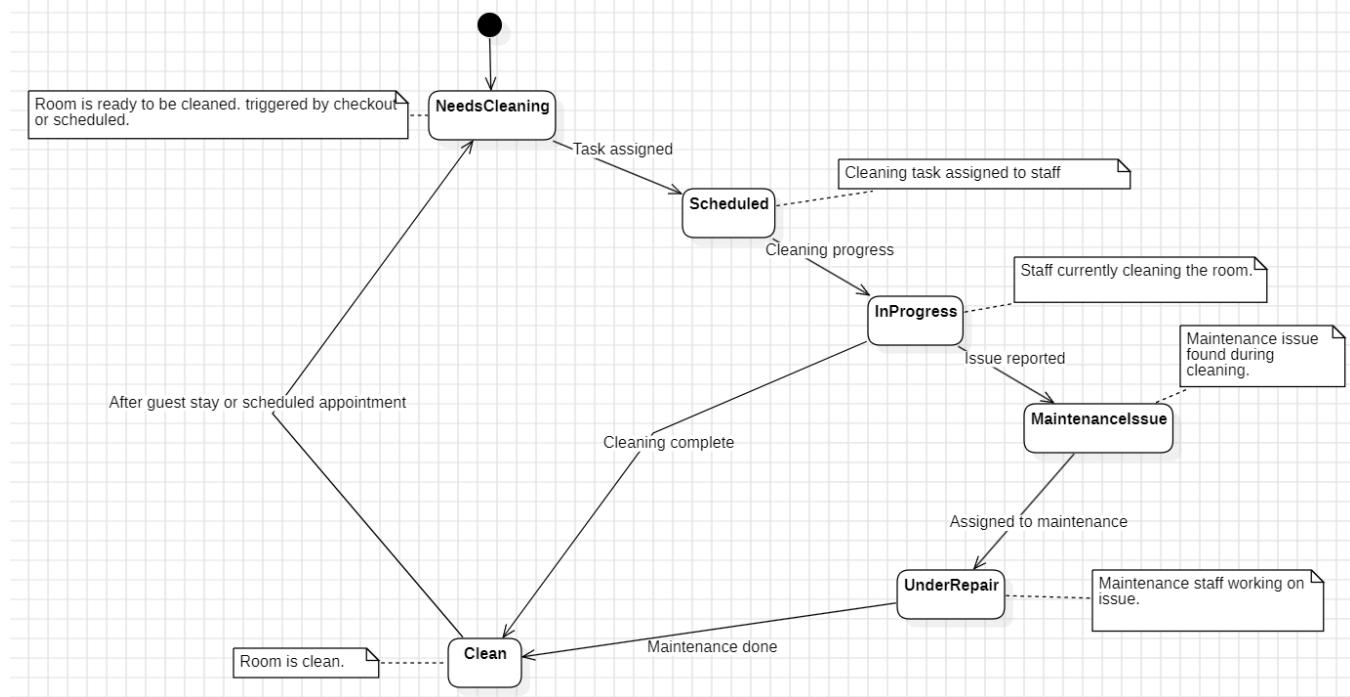
## State Diagram 02 - Digital Key & Guest Access — (*Hazis Voda*)



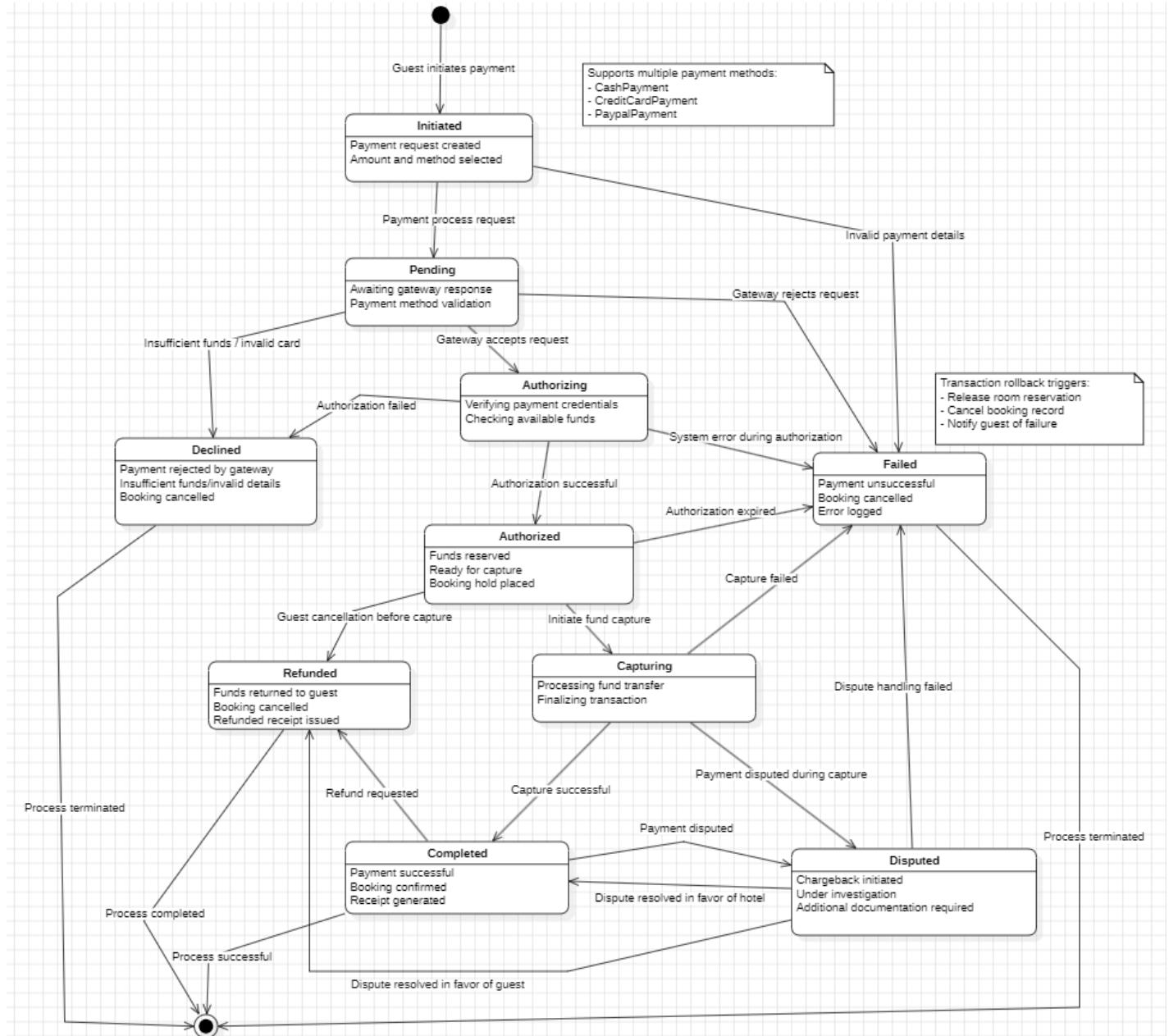
### **State Diagram 03 - Billing & Expense Tracking — (Jurgen Hila)**



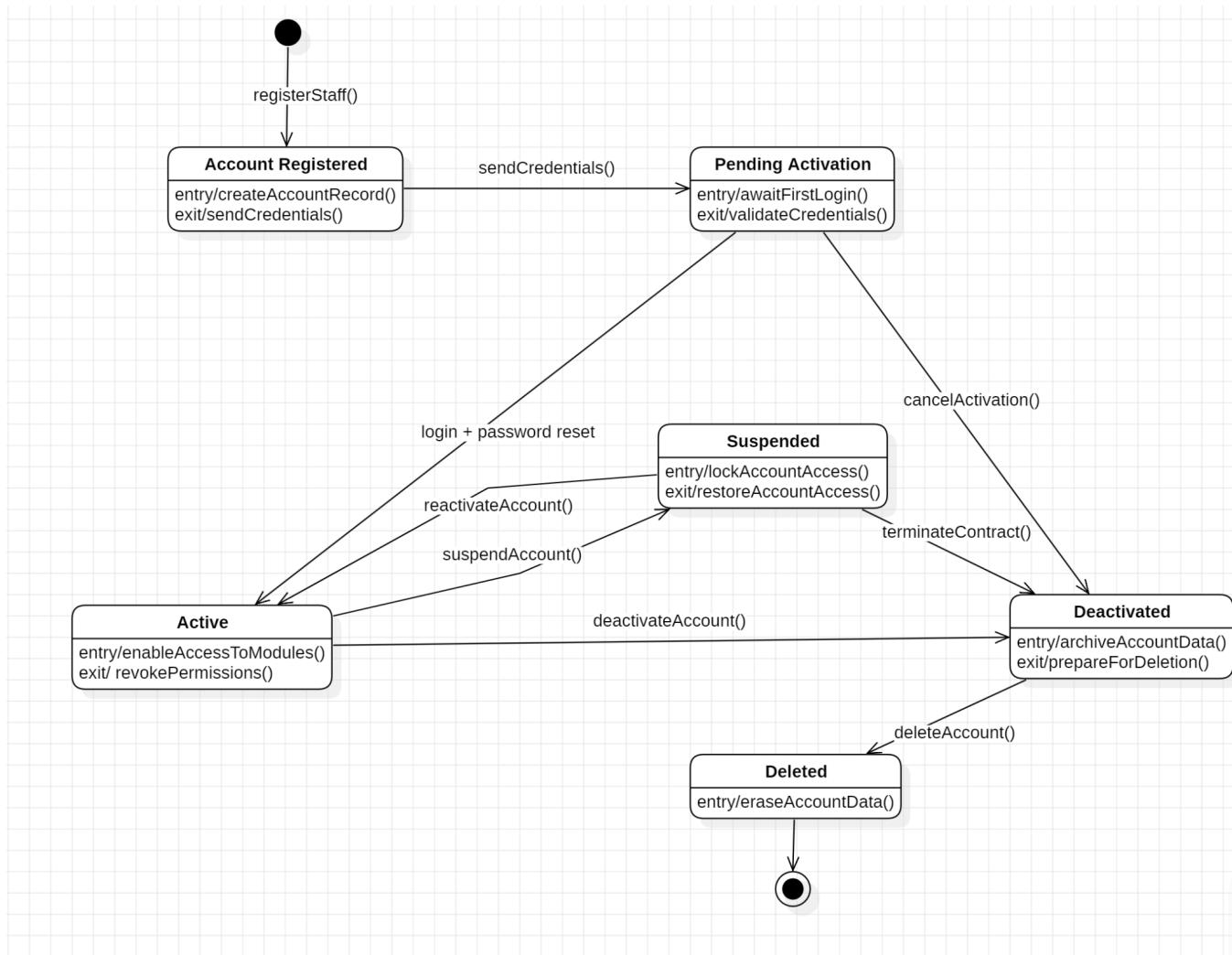
## **State Diagram 04 - Room Cleaning State — (Orgest Bacova)**



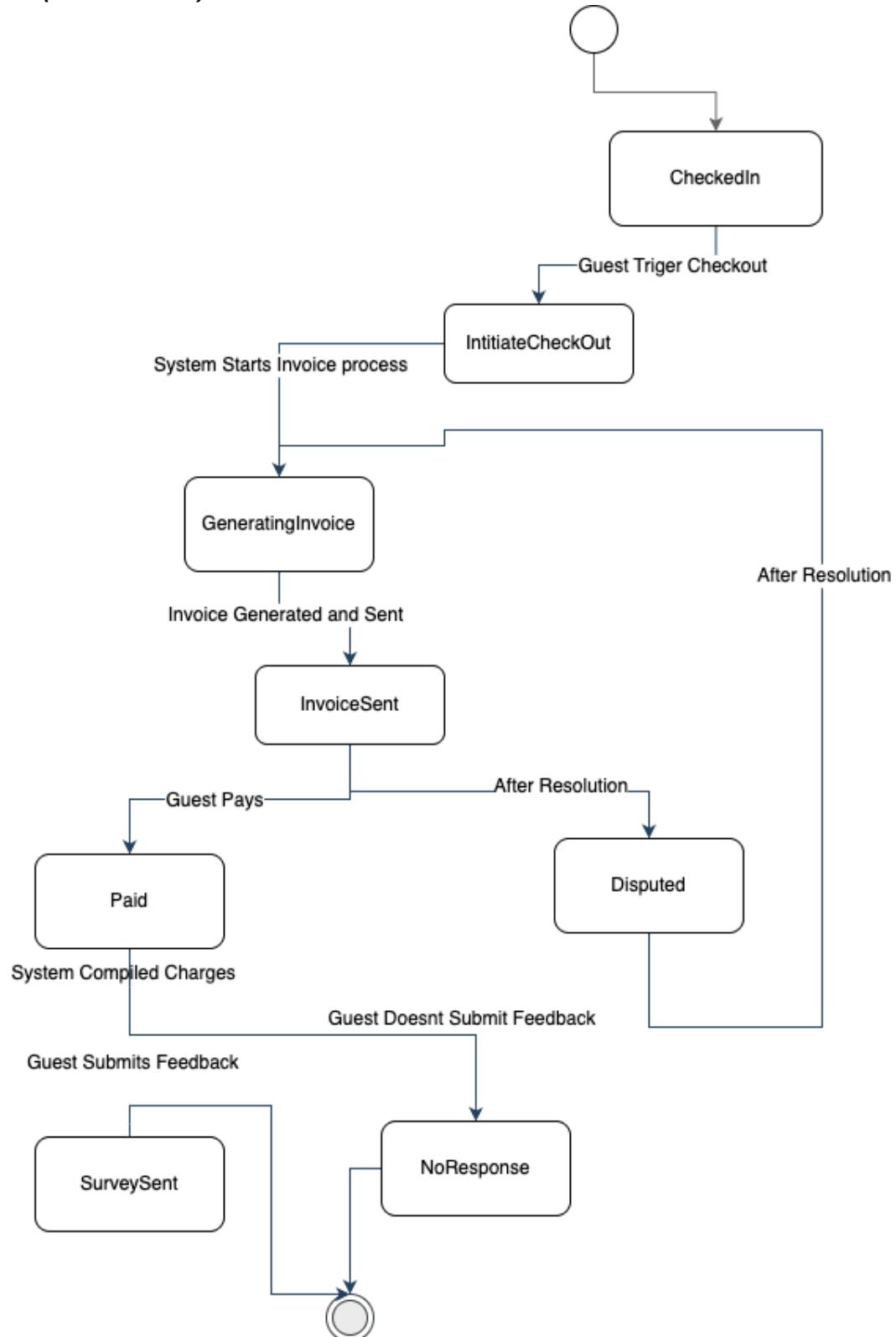
## State Diagram 05 - Payment processing state diagram — (Orgest Bacova)



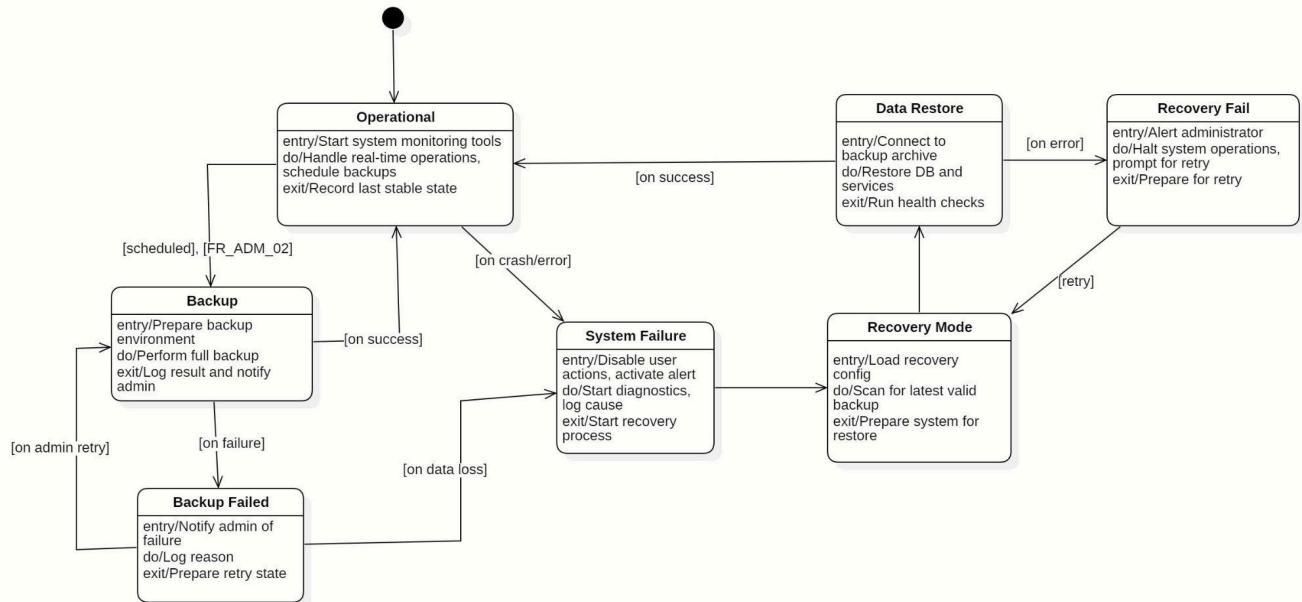
## State Diagram 06 - Staff Account Lifecycle — (Daron Delvina)



**State Diagram 07 - Checkout & Feedback Collection  
— (Xhois Cano)**

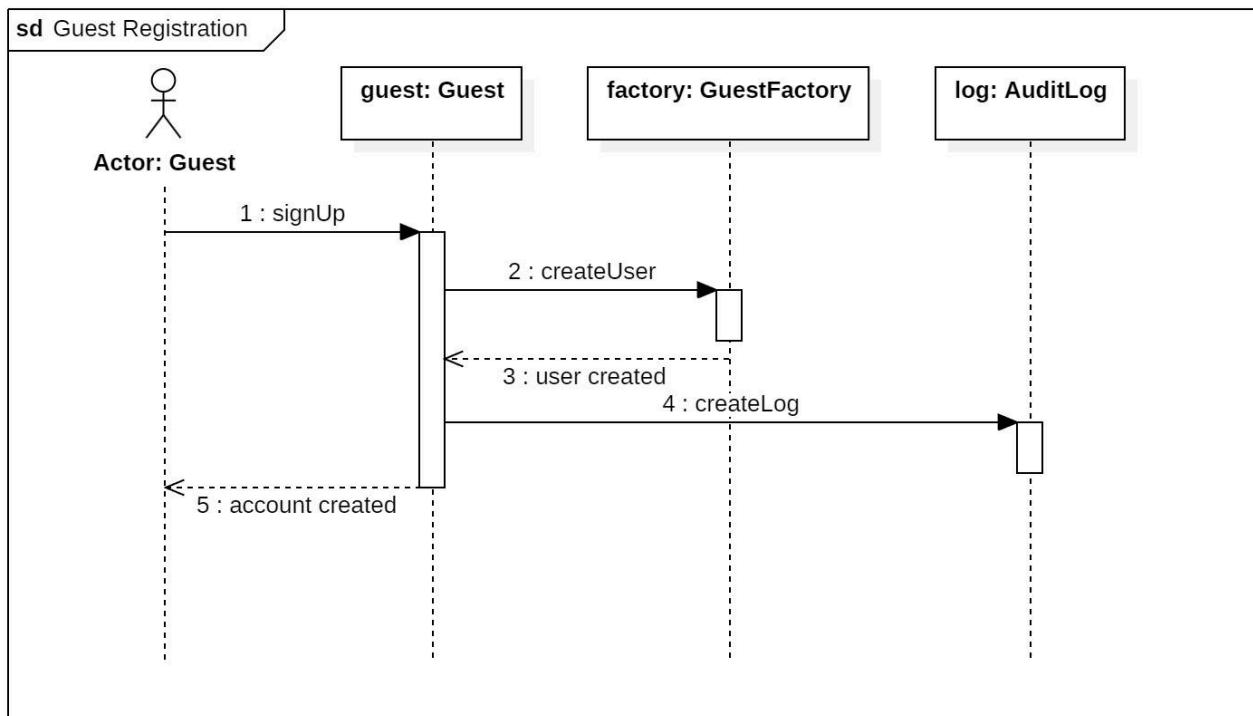


**State Diagram 08 - System Backup and Restore — (Sidrit Zela)**

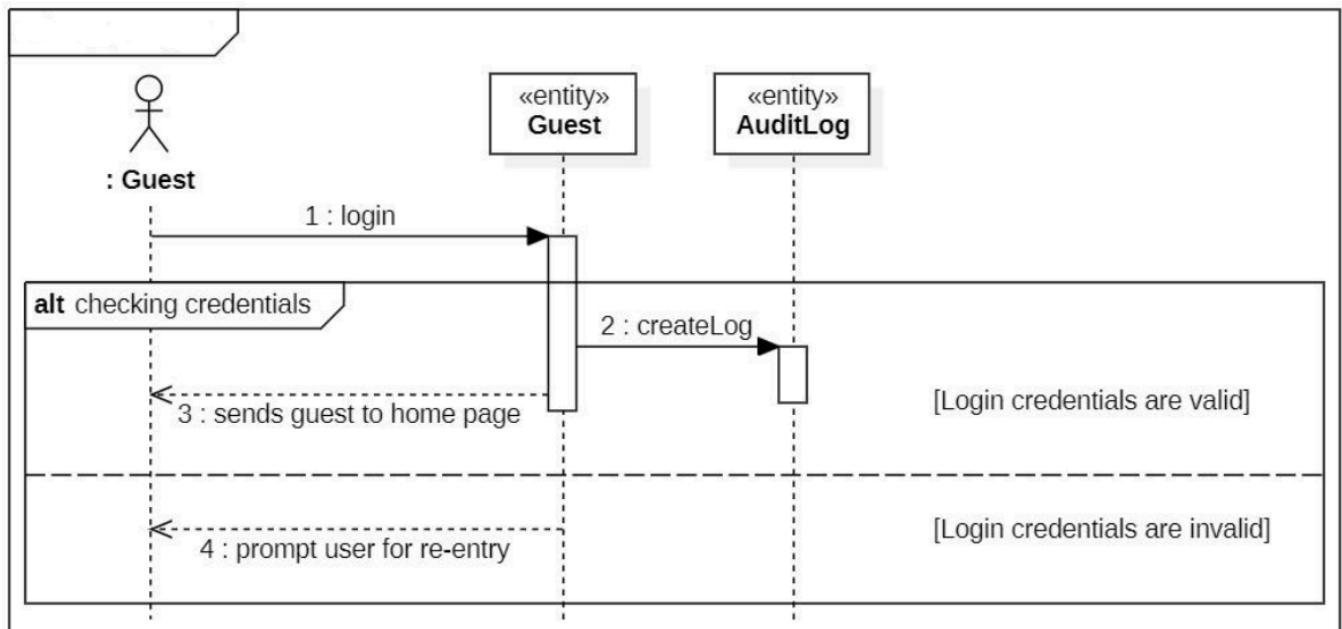


# Sequence Diagram

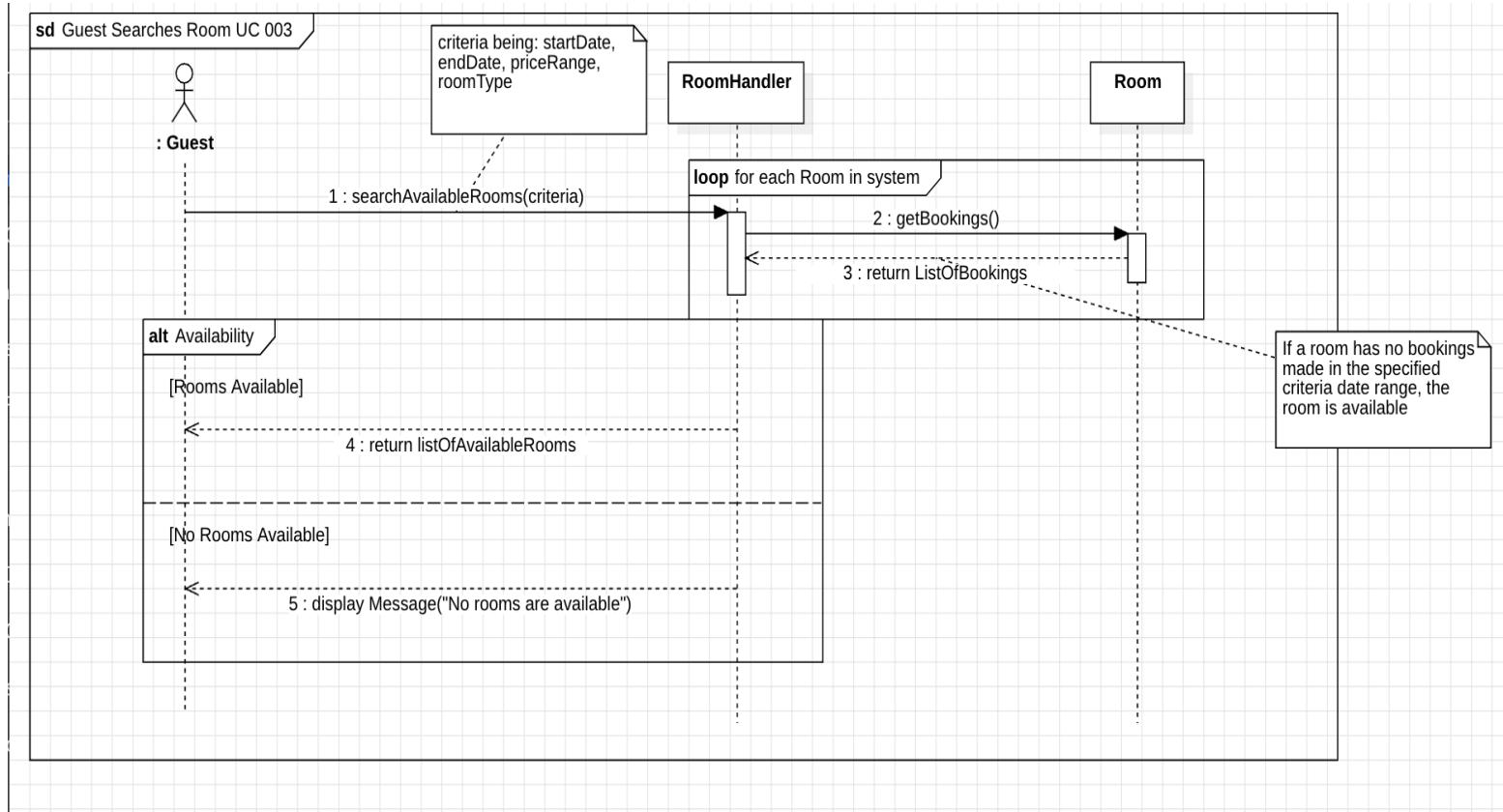
**SC\_GST\_01:** Guest Registration — (*Sidrit Zela*)



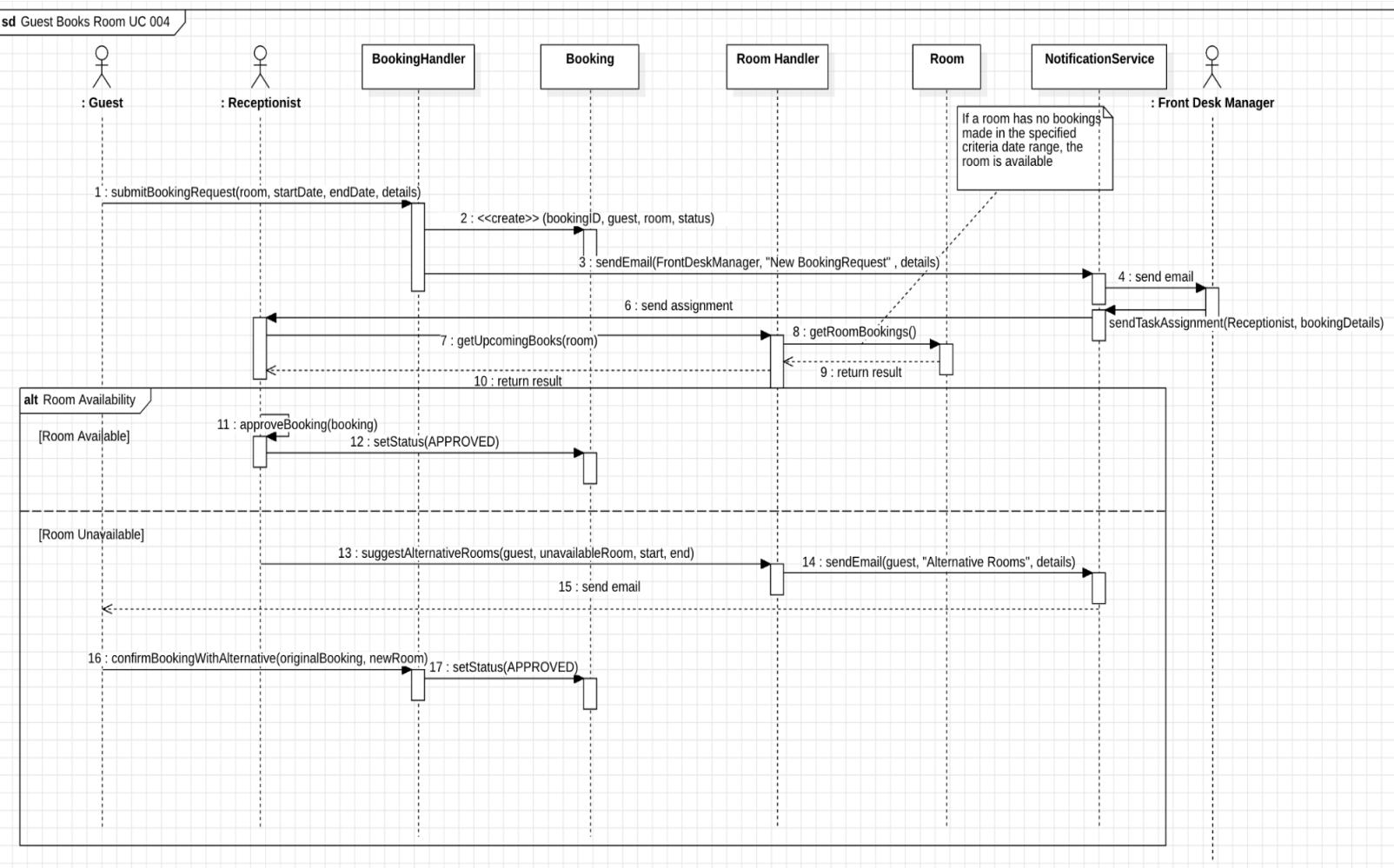
**SC\_GST\_02:** Guest Login — (*Hazis Voda*)



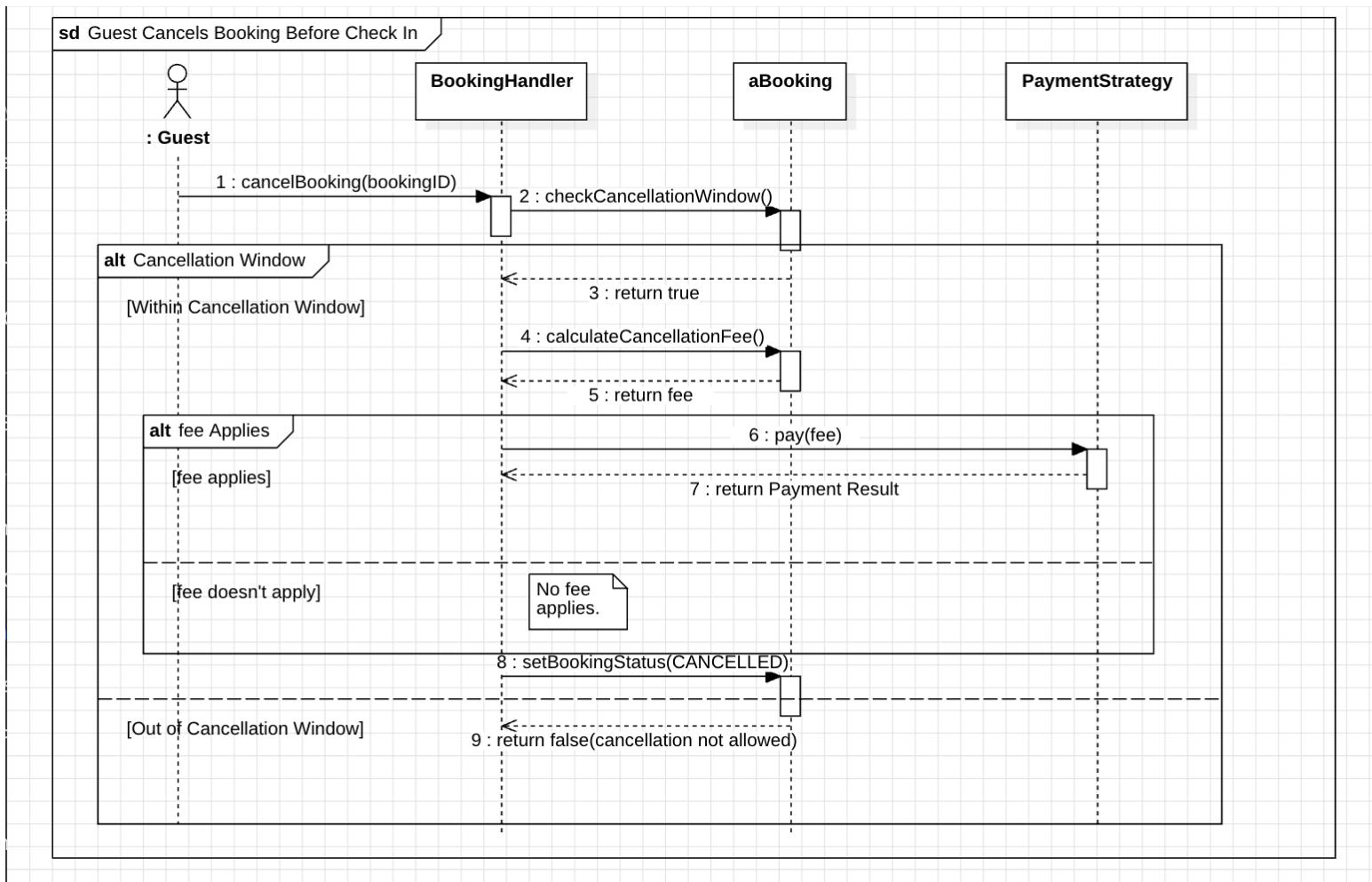
### SC\_GST\_03: Search for Available Rooms — (Endri Baku)



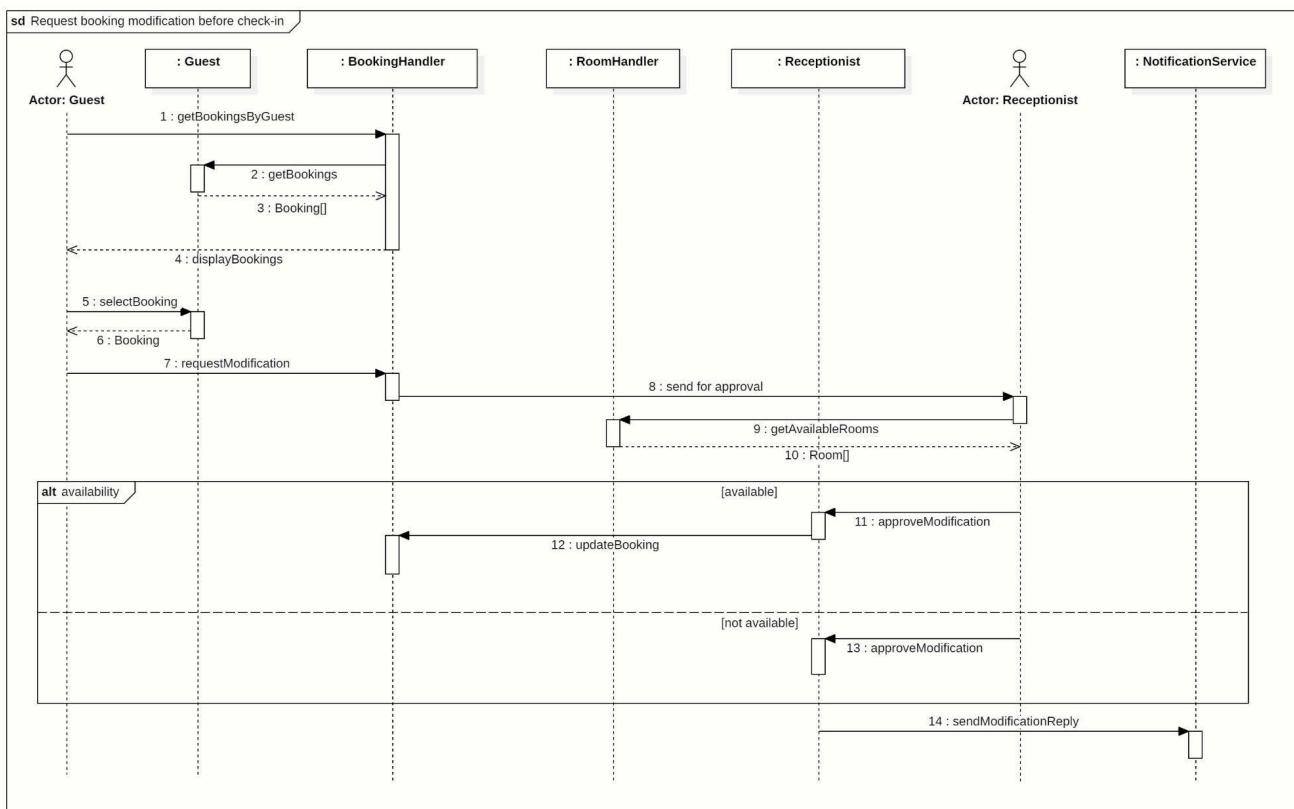
## SC\_GST\_04: Guest Books Room — (*Endri Baku*)



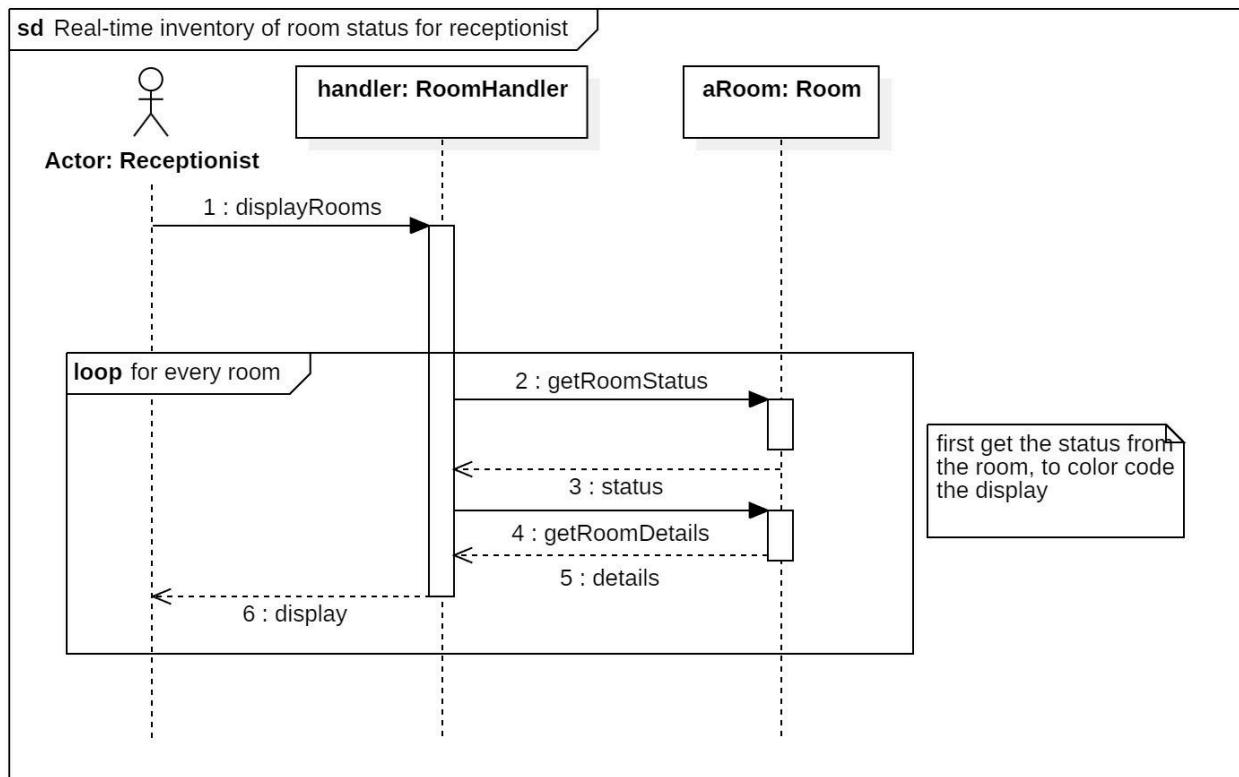
## **SC\_GST\_05: Cancel Booking — (*Endri Baku*)**



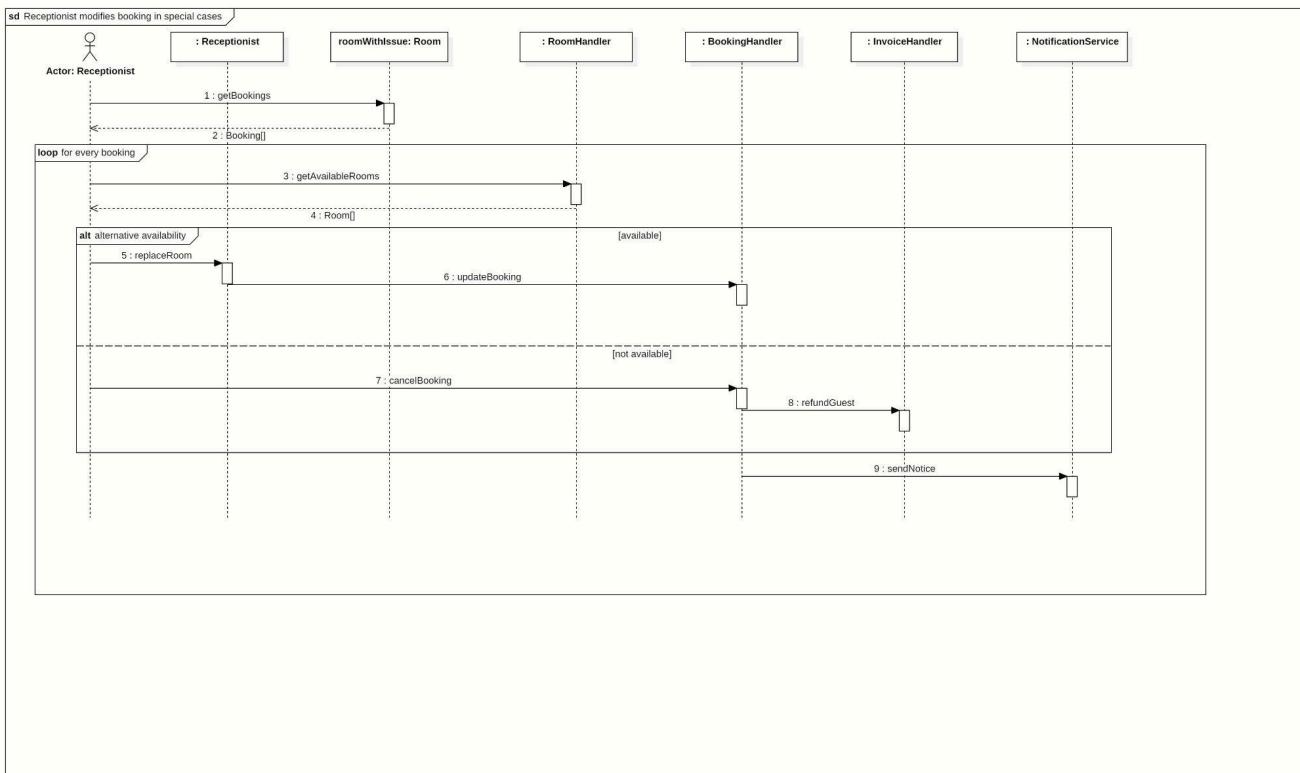
## SC\_GST\_06: Guest Requests Booking Modification — (Sidrit Zela)



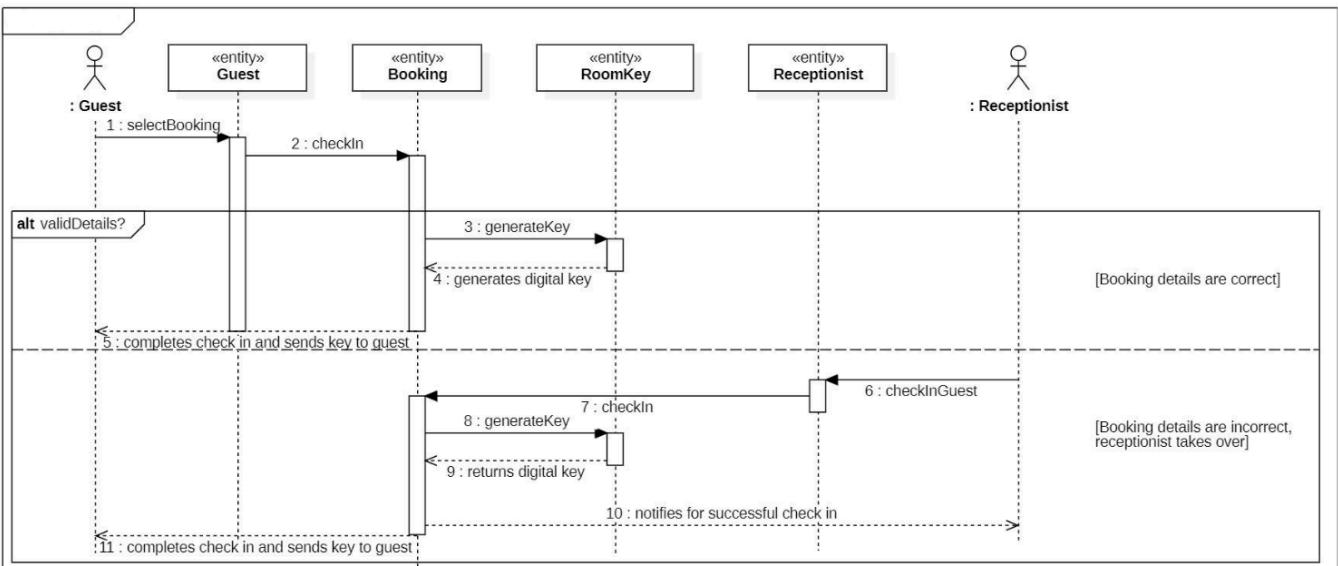
## SC\_REC\_01: Receptionist Real-Time Room Inventory Status — (Sidrit Zela)



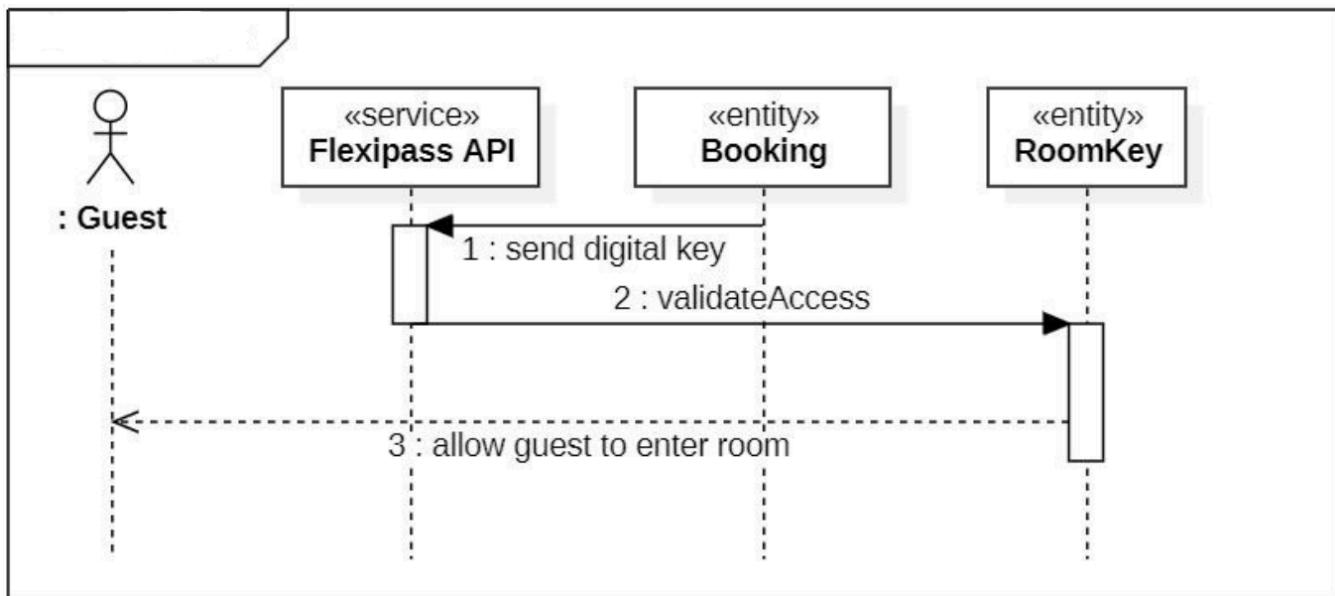
## SC\_REC\_02: Receptionist Modifies Booking — (Sidrit Zela)



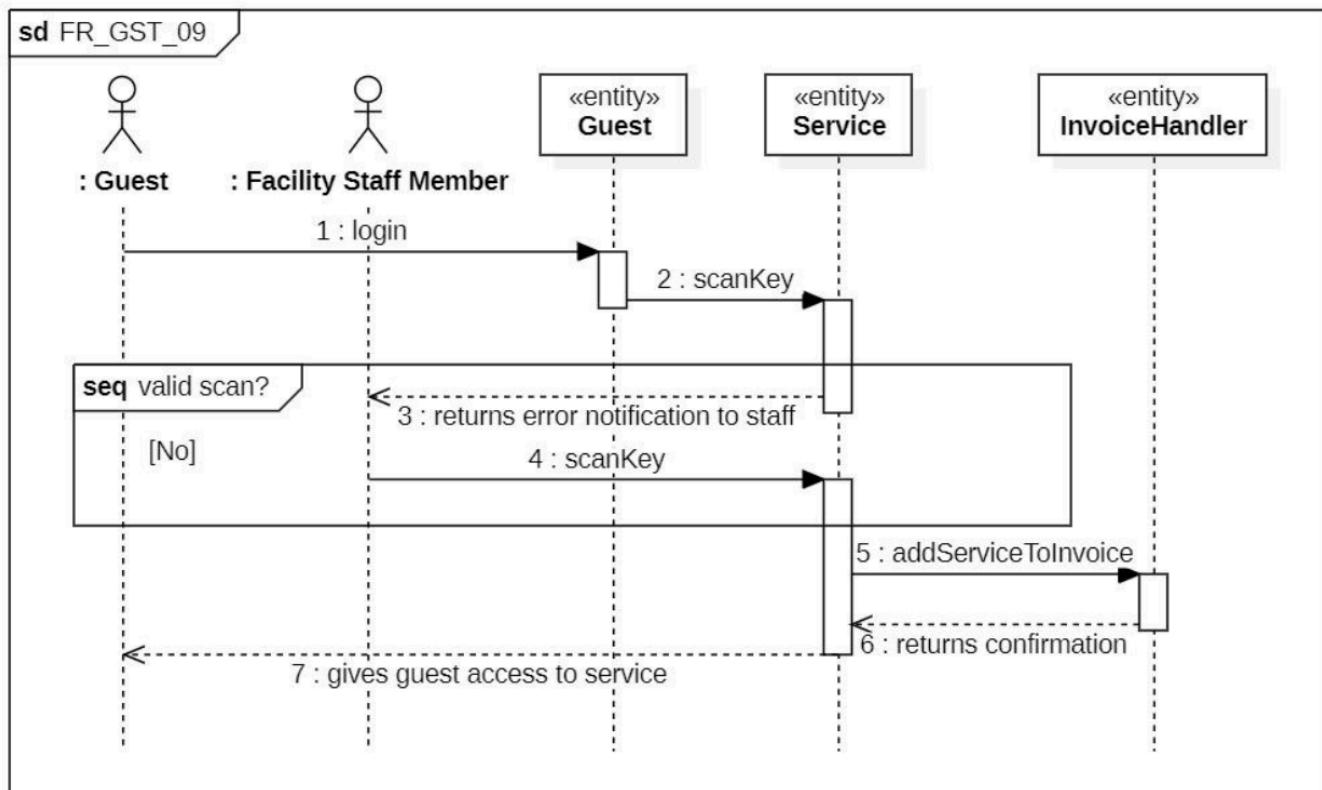
## SC\_GST\_07: Guest Check-In — (Hazis Voda)



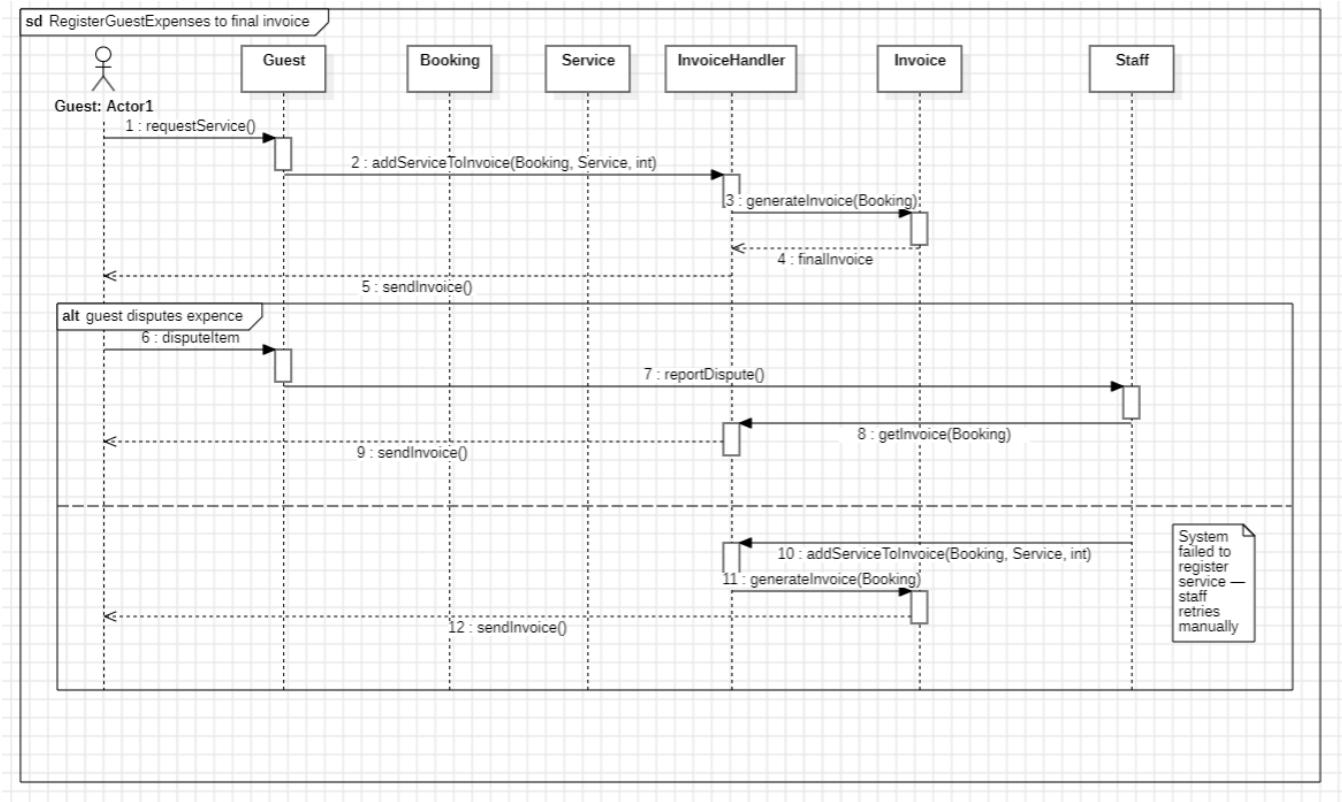
**SC\_GST\_08: Connect Digital Key To Room — (Hazis Voda)**



**SC\_GST\_09: Access Facilities and Services — (Hazis Voda)**

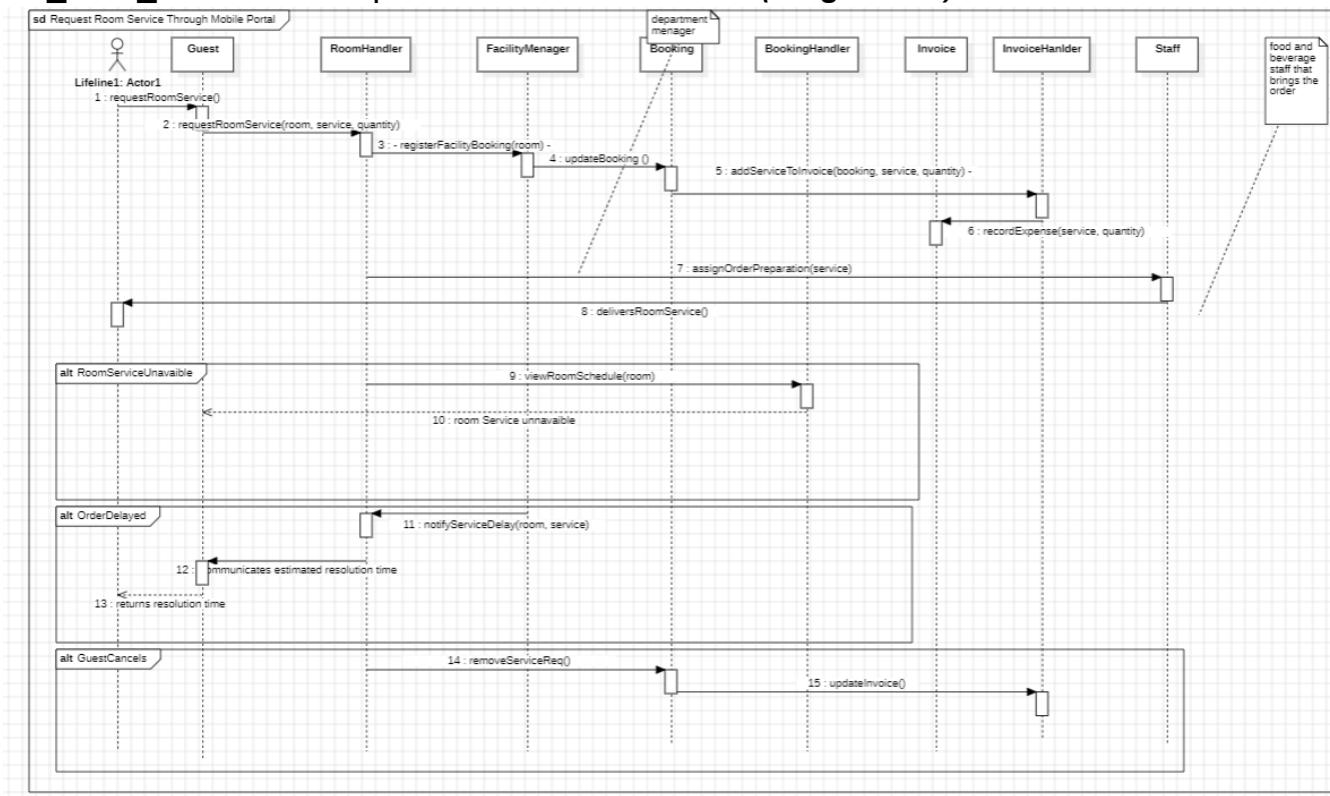


## SC\_GST\_10: Register Guest Expenses — (Jurgen Hila)

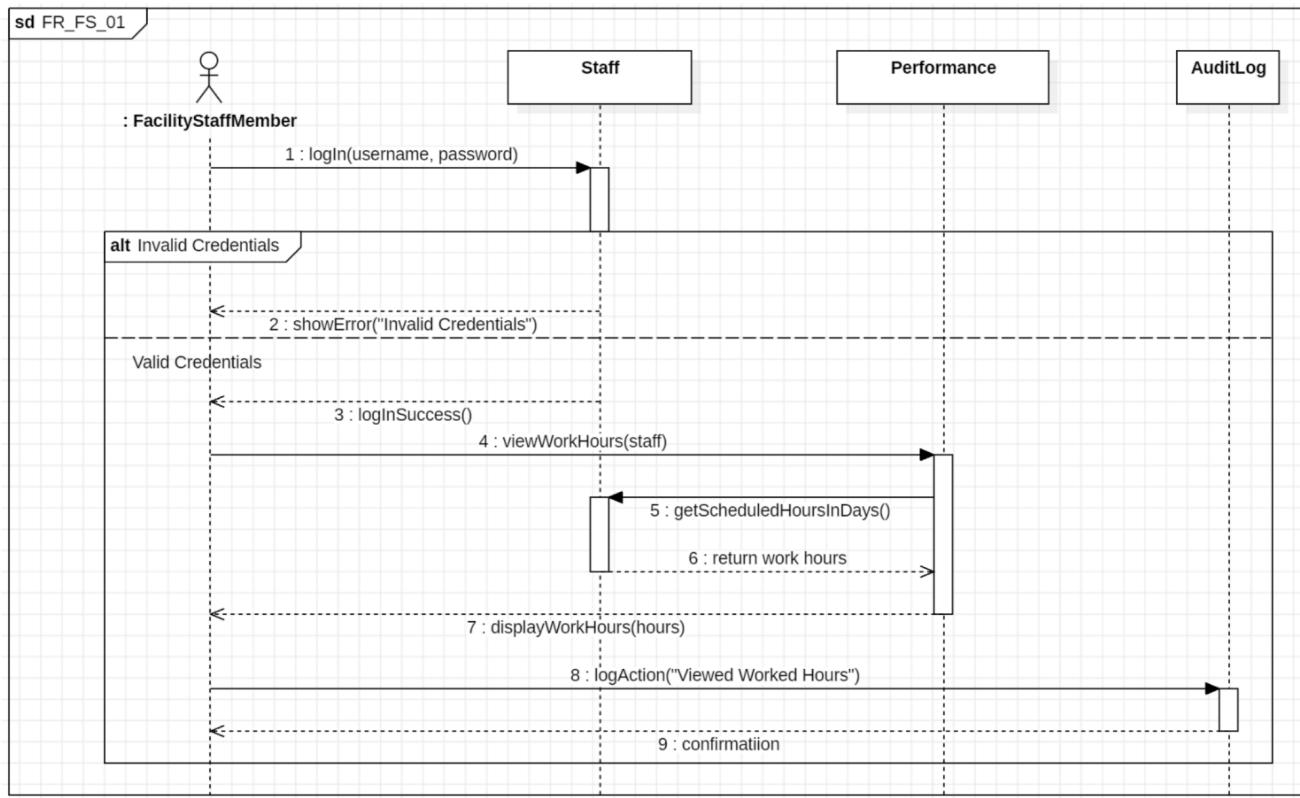


## Hotel Management System [HMS] Requirements Specification

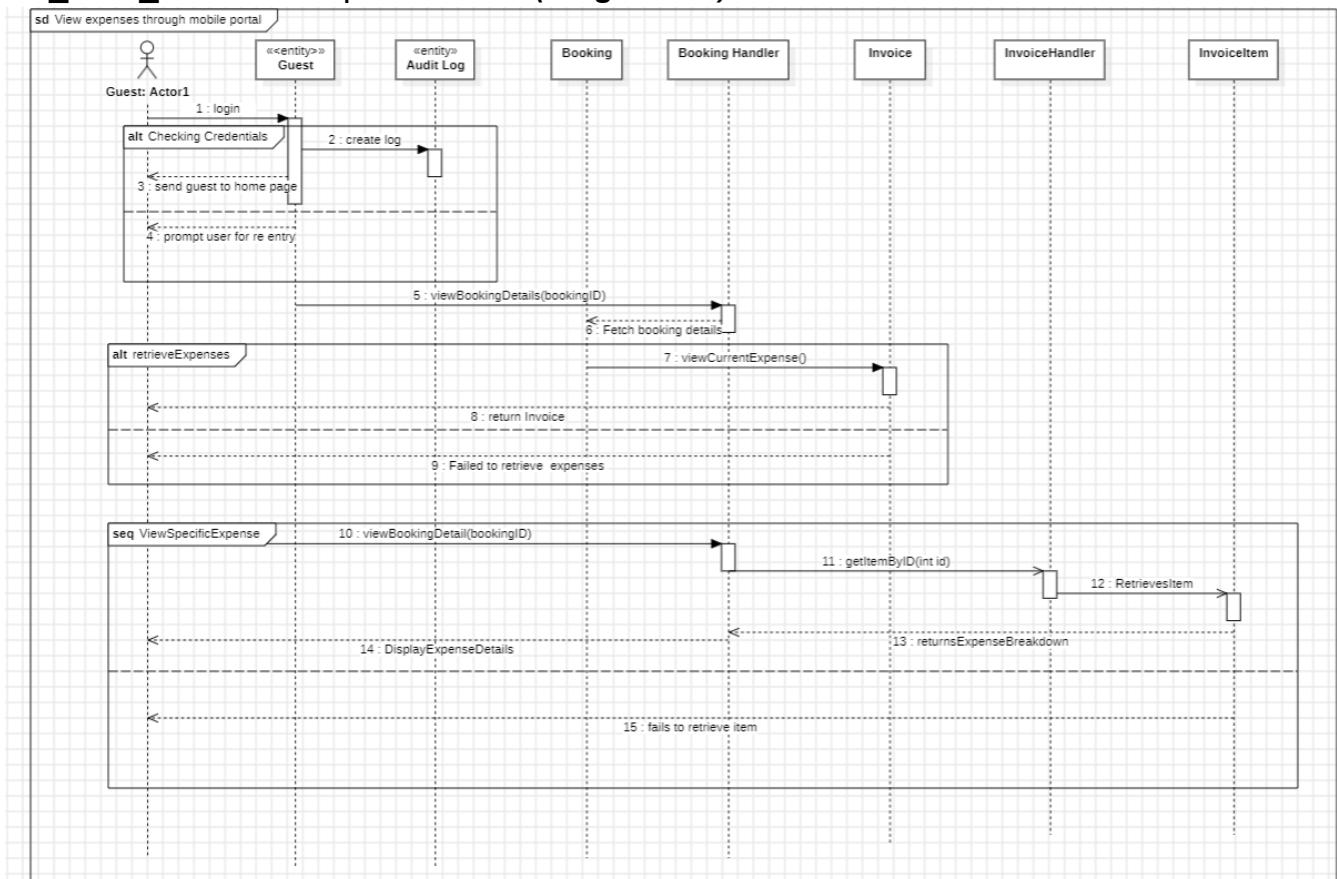
### SC\_GST\_11: Guest Requests Room Service — (Jurgen Hila)



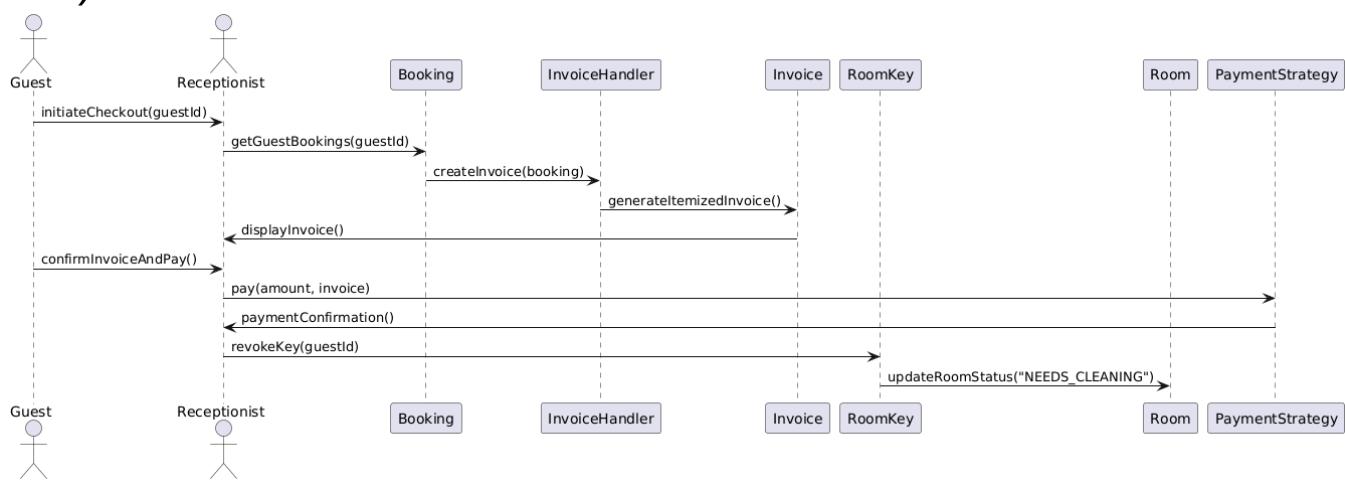
## **SC\_FS\_01: Facility Staff Views Work Hours — (Daron Delvina)**



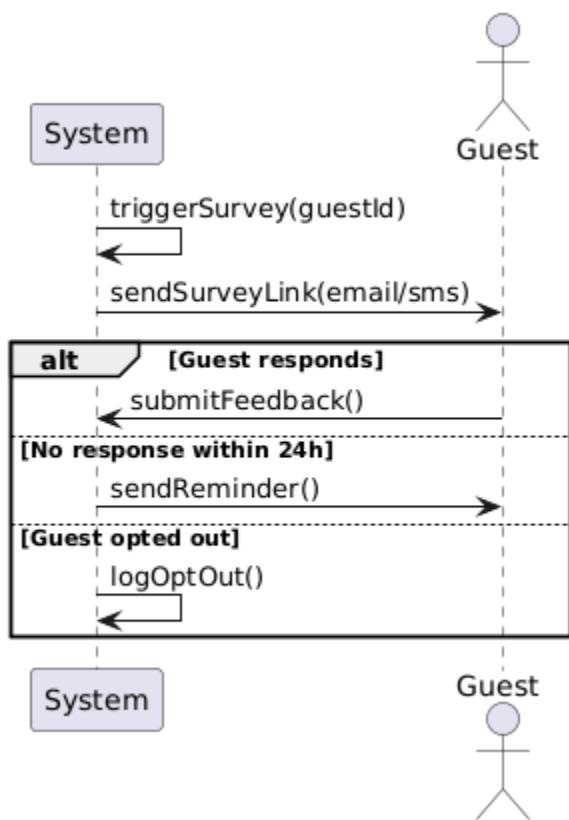
## SC\_GST\_12: View Expenses — (Jurgen Hila)



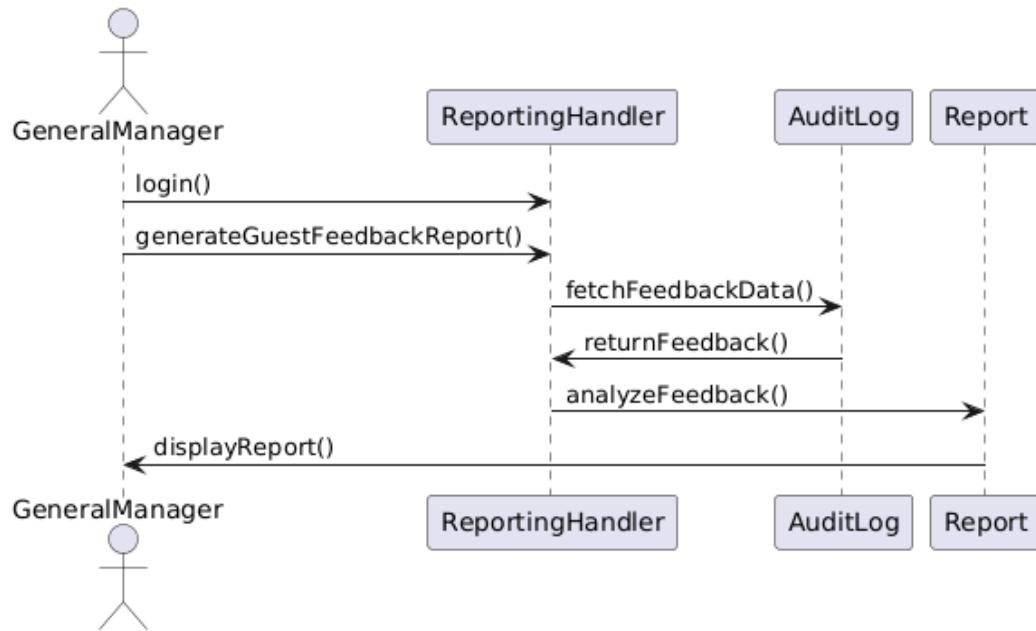
## SC\_GST\_13: Check-Out: Generate Itemized Invoice, Revoke Digital Key — (Xhois Cano)



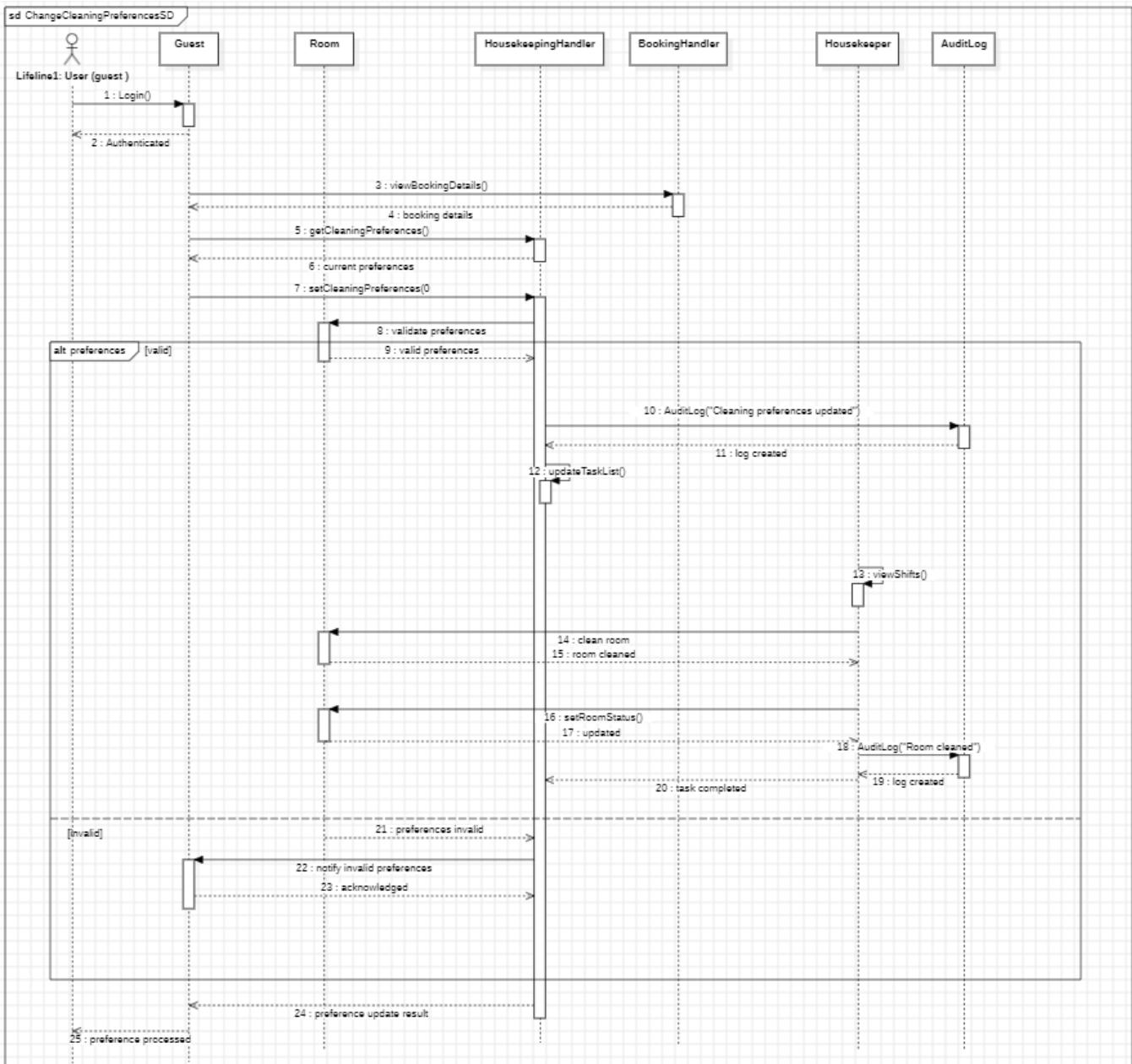
**SC\_GST\_14: Send Post Check-out Survey — (Xhois Cano)**



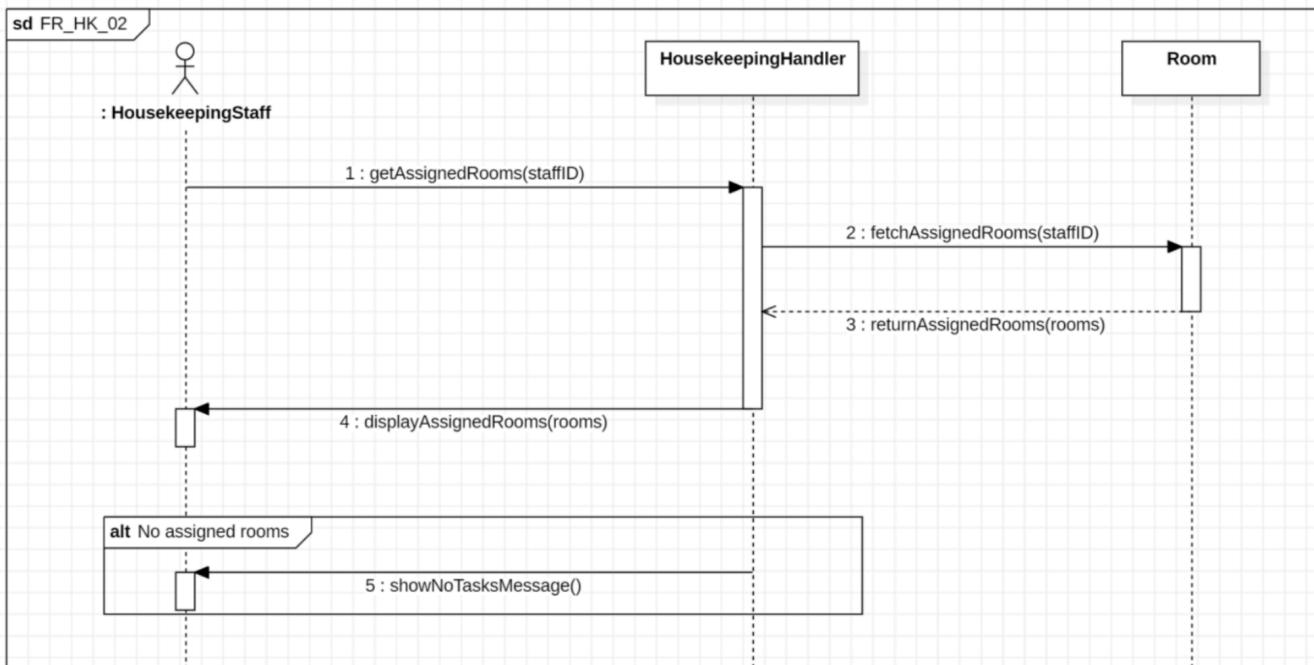
**SC\_GM\_01:** Generate Survey Post-Checkout Reports — (*Xhois Cano*)



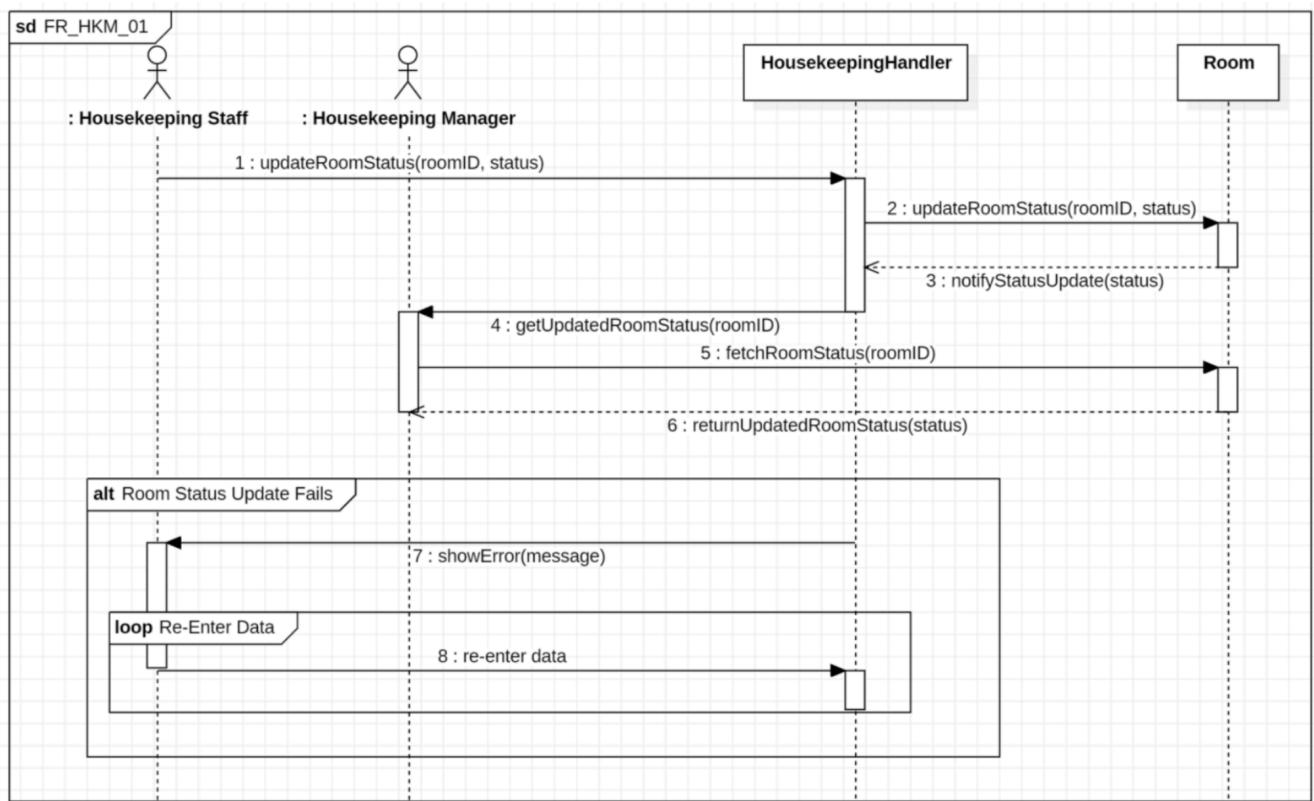
## SC\_GST\_15: Track Cleaning Schedule Based on Guest Preferences — (Orgest Bacova)



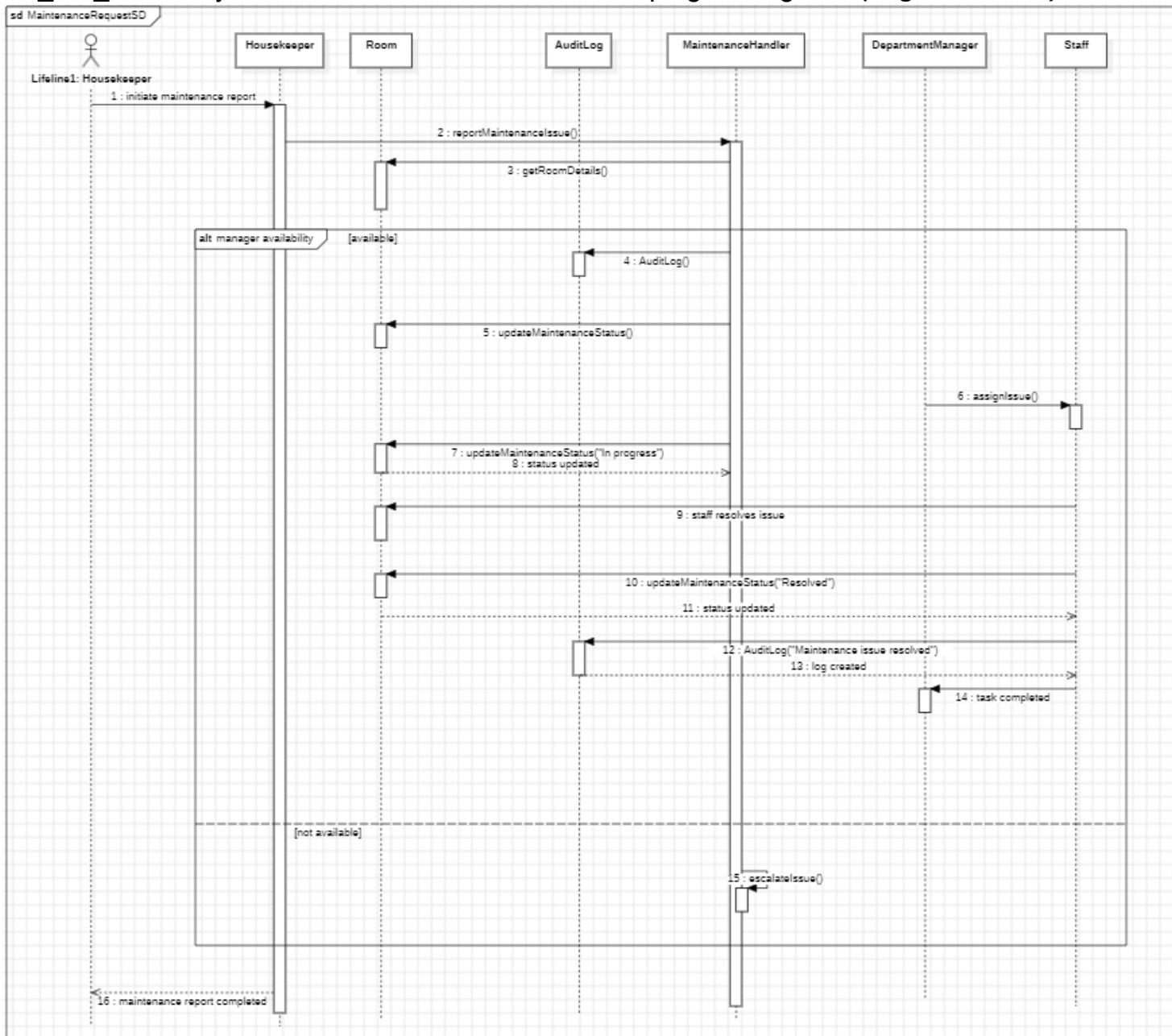
**SC\_HK\_02: View Assigned Rooms for Cleaning — (Daron Delvina)**



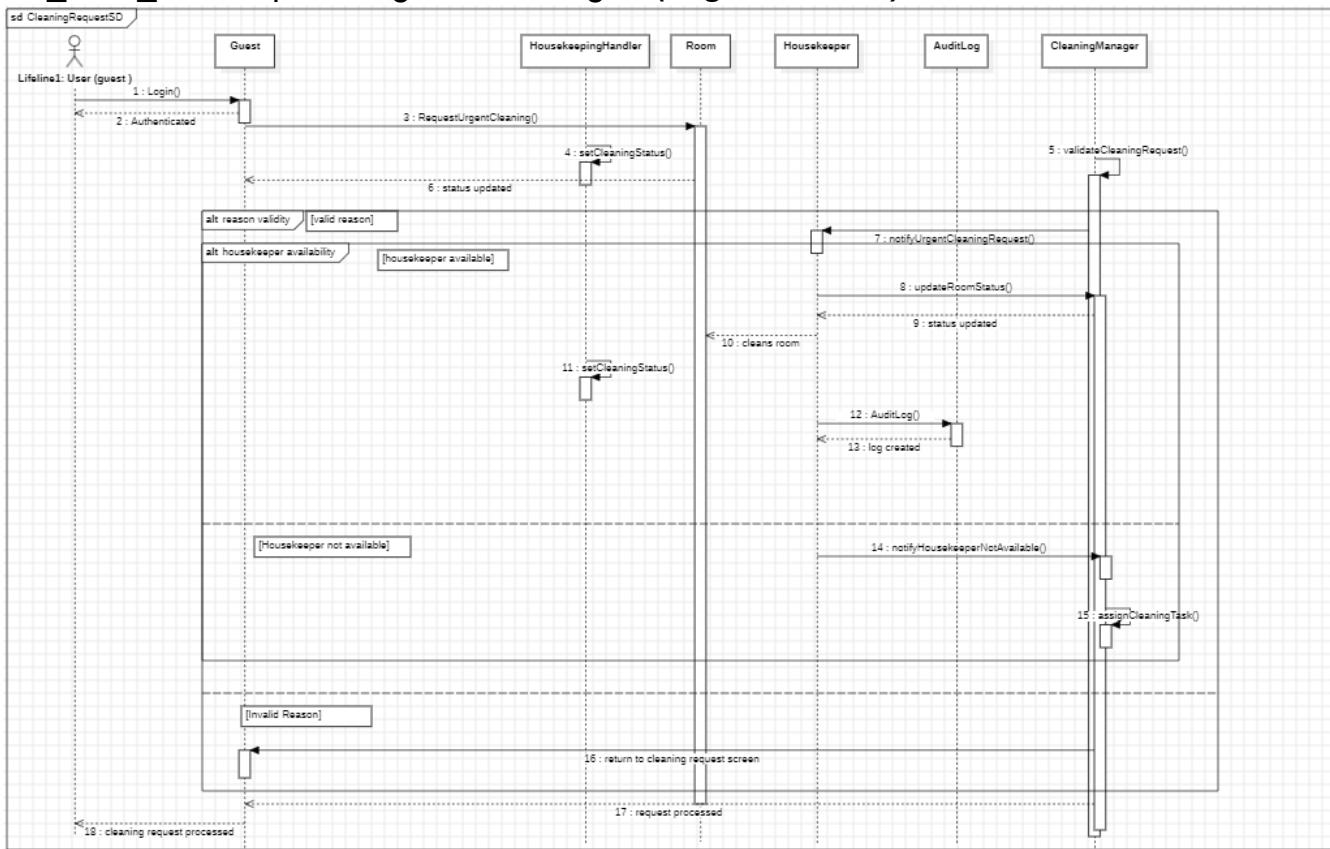
**SC\_HKM\_01: Real-Time View of Room Cleaning Statuses — (Daron Delvina)**



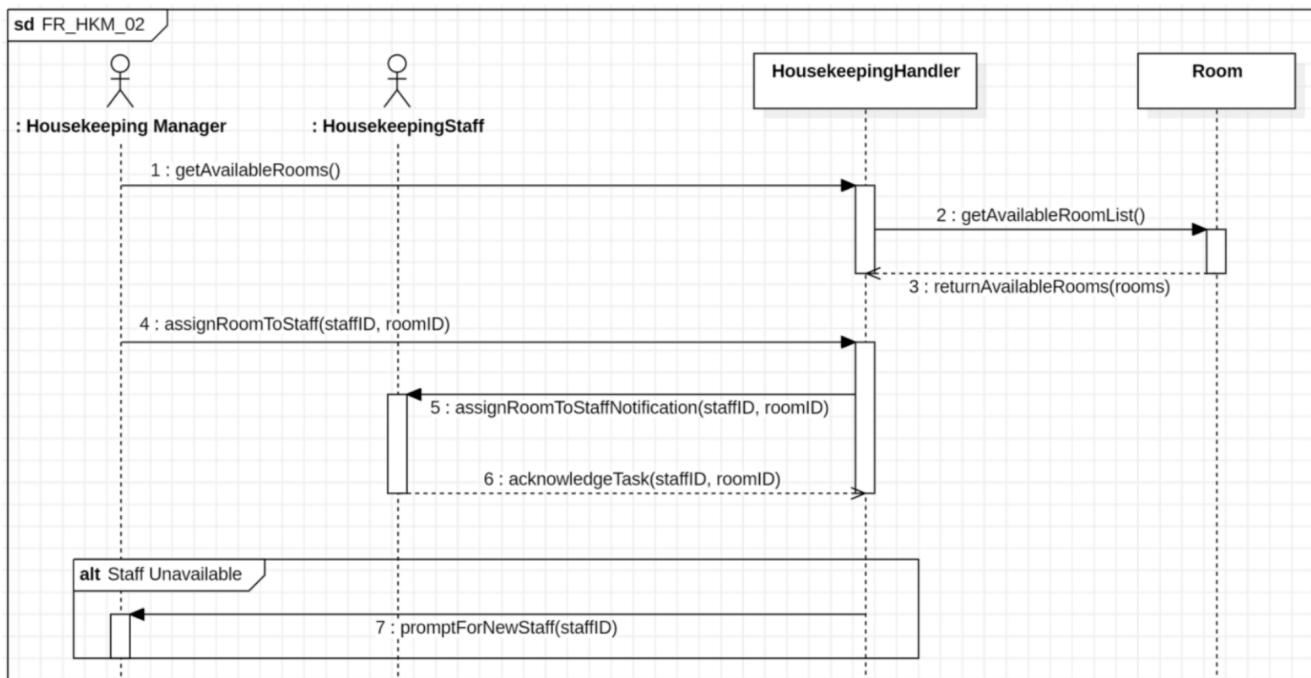
## SC\_HK\_02: Notify Maintenance Issues to Housekeeping Manager — (Orgest Bacova)



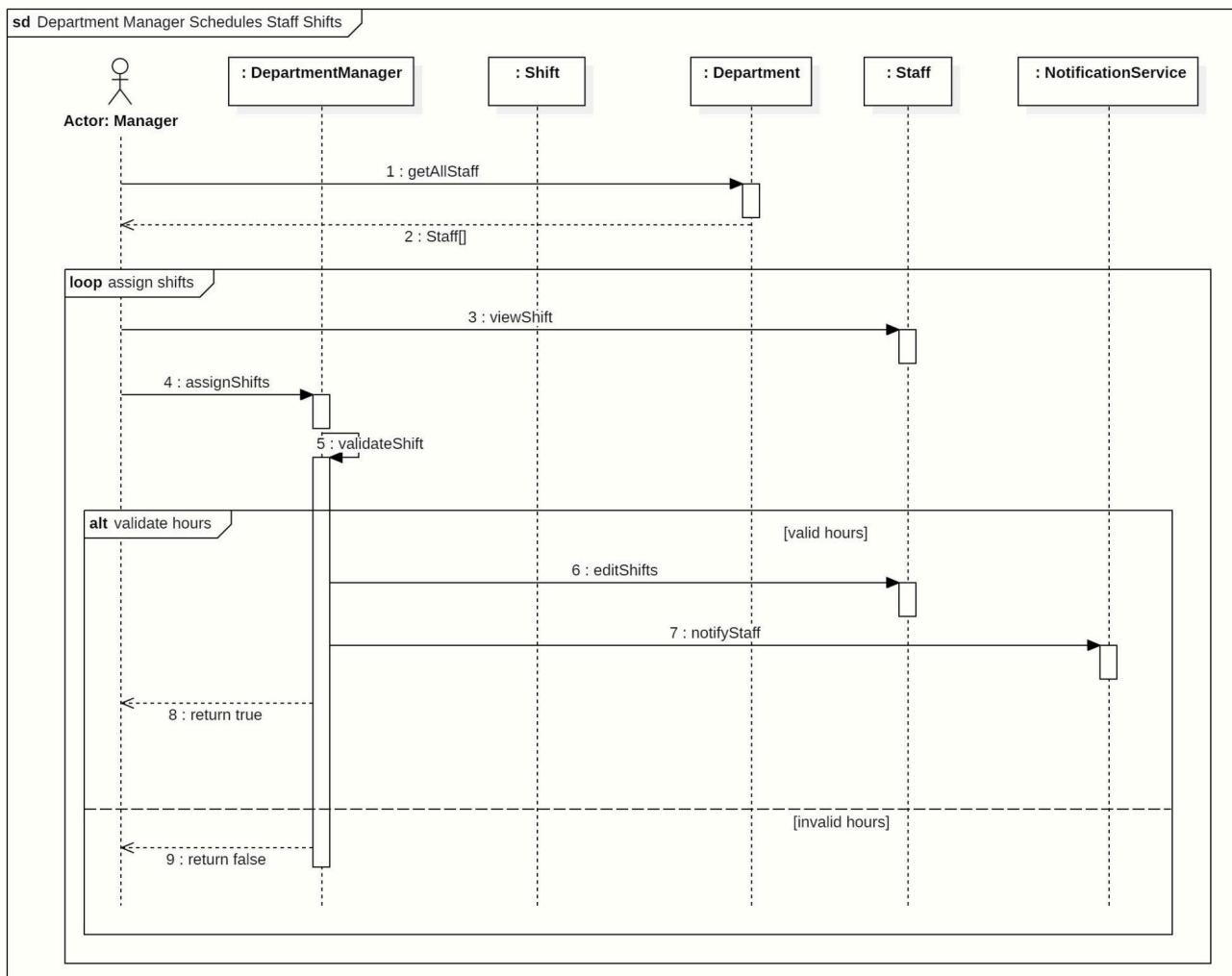
## SC\_GST\_16: Request Urgent Cleaning — (*Orgest Bacova*)



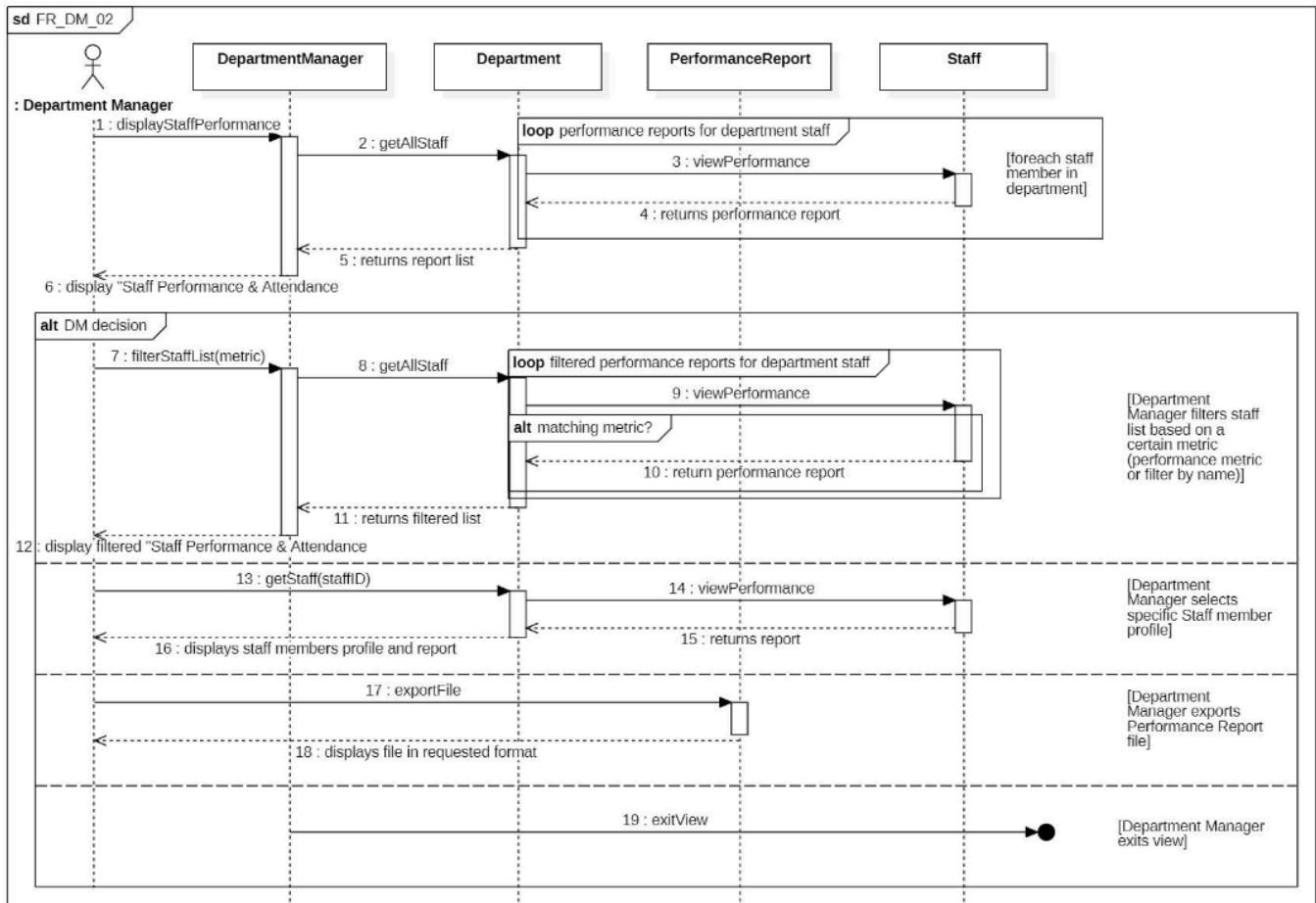
## **SC\_HKM\_02: Assign Cleaning Tasks — (Daron Delvina)**



## SC\_DM\_01: Schedule Shifts — (Sidrit Zela)

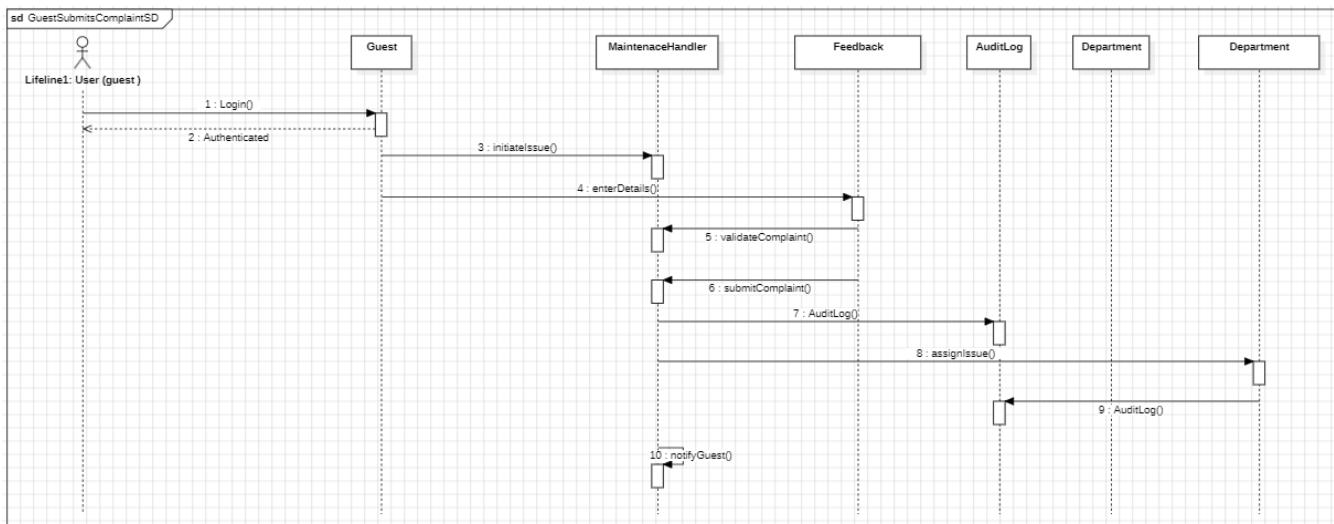


## SC\_DM\_02: View Department Staff Details — (Hazis Voda)

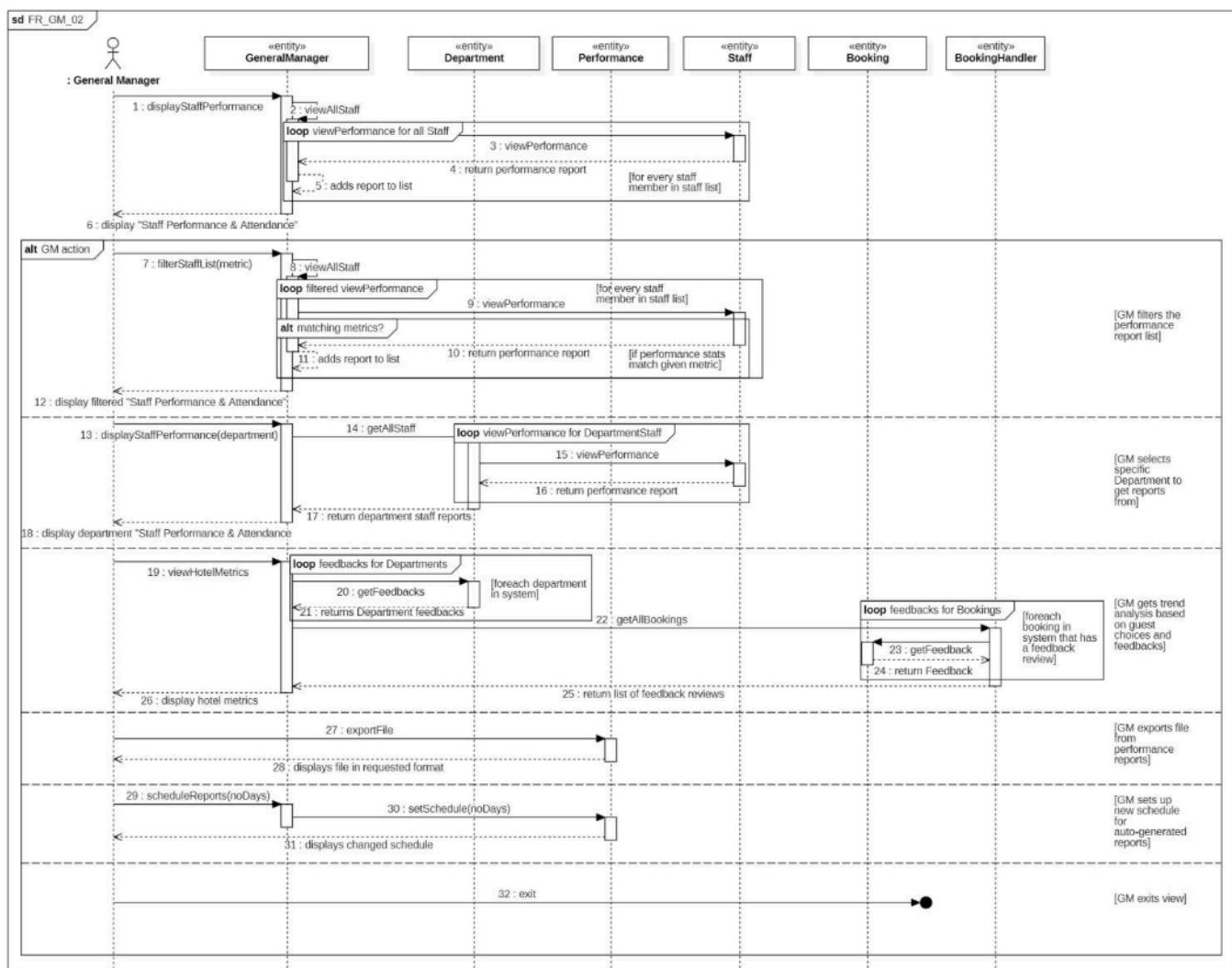


## Hotel Management System [HMS] Requirements Specification

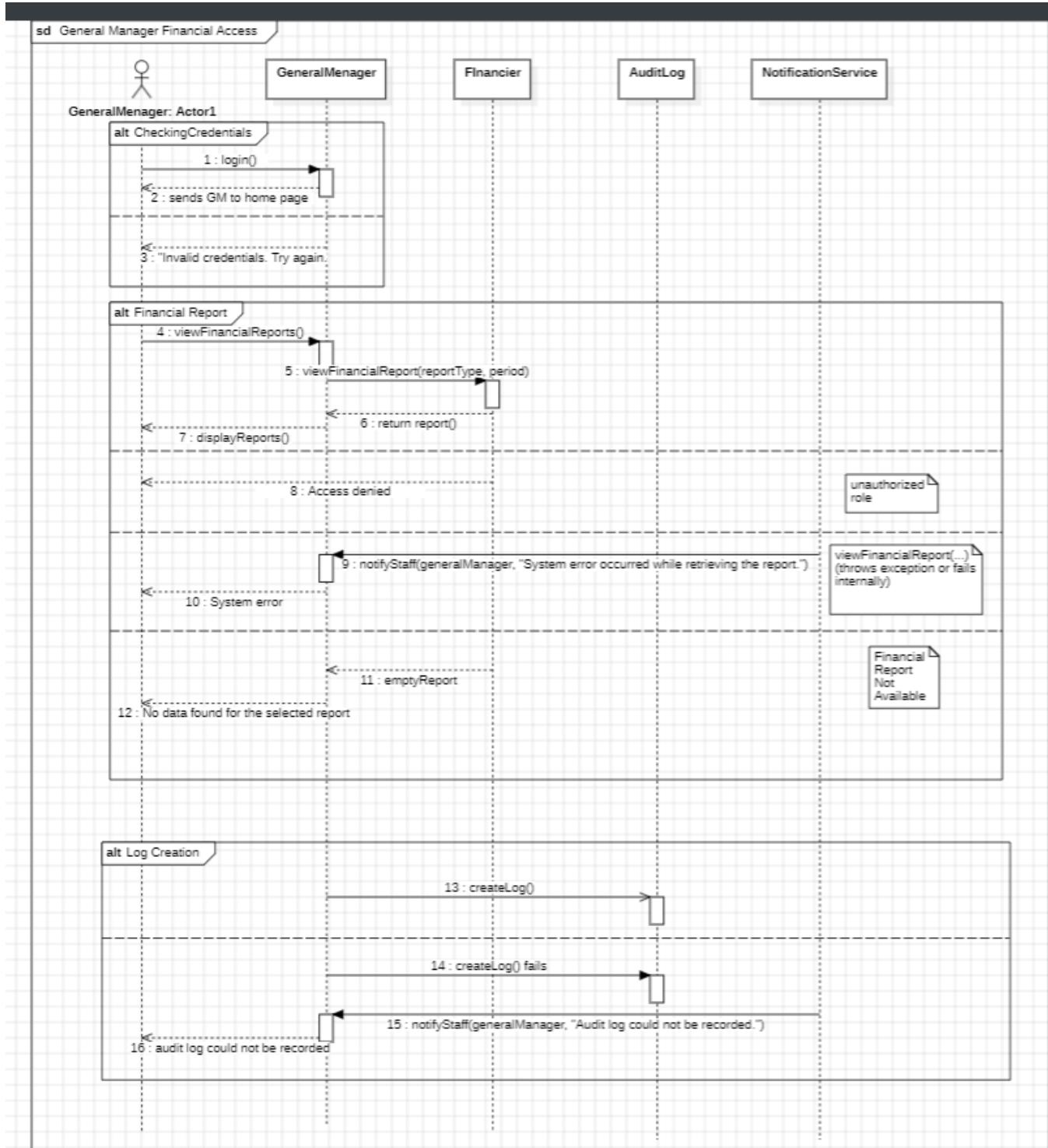
### SC\_GST\_17: Submit Complaints to Relevant Department Manager — (Orgest Bacova)



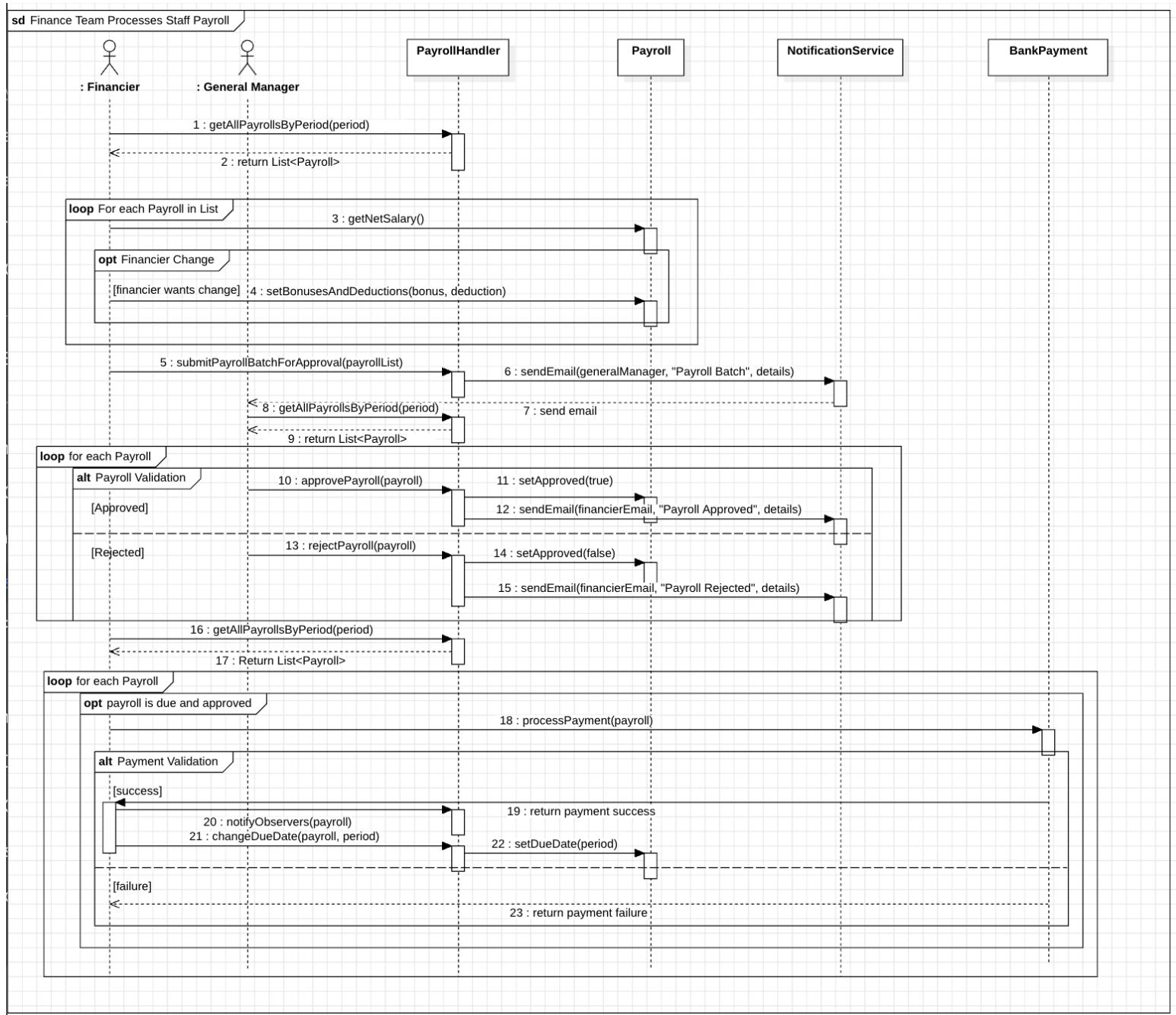
### SC\_GM\_02: View Staff Performance, Attendance (General Manager) — (Hazis Voda)



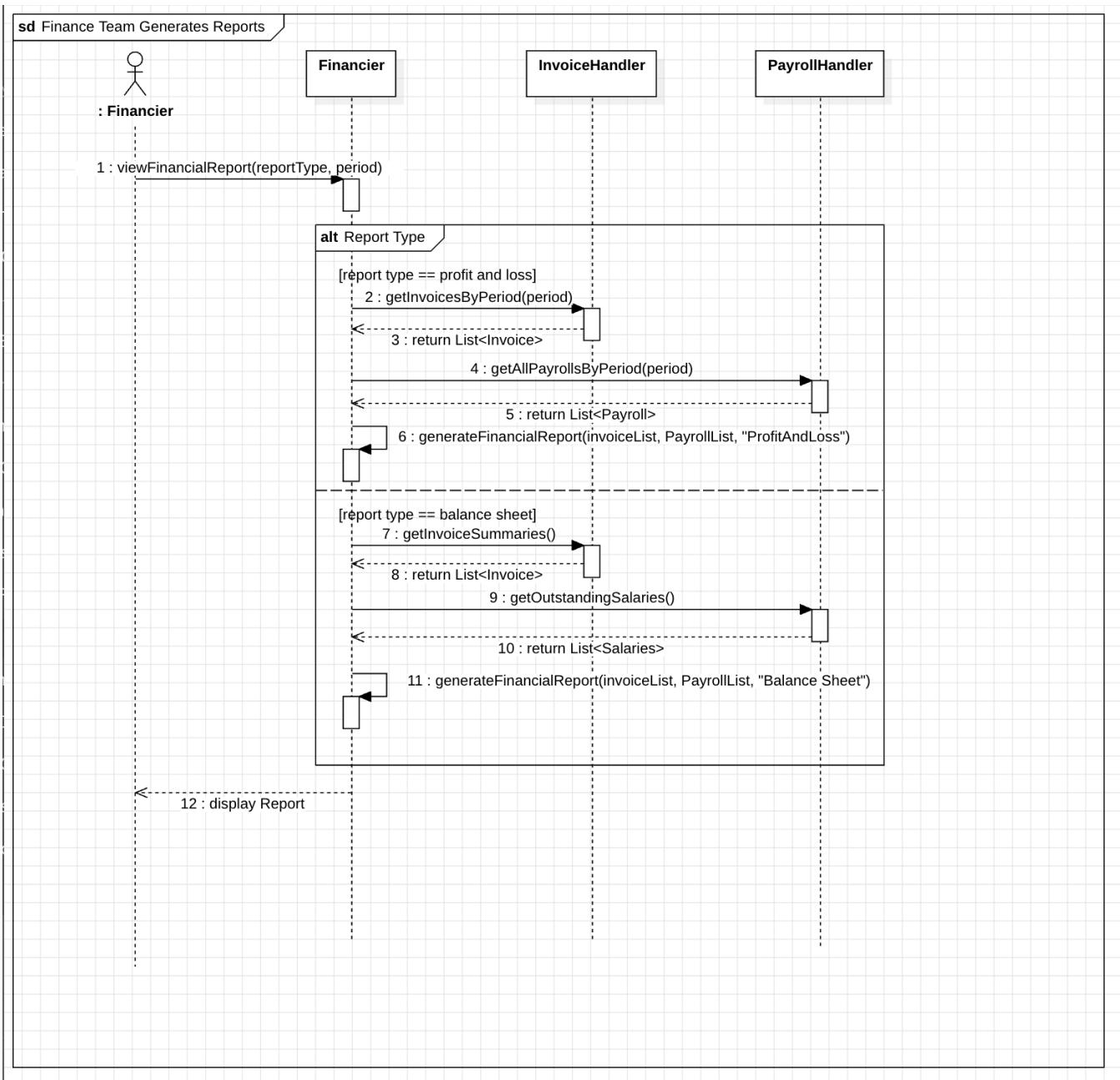
## SC\_GM\_05: Financial Statements Access — (Jurgen Hila)



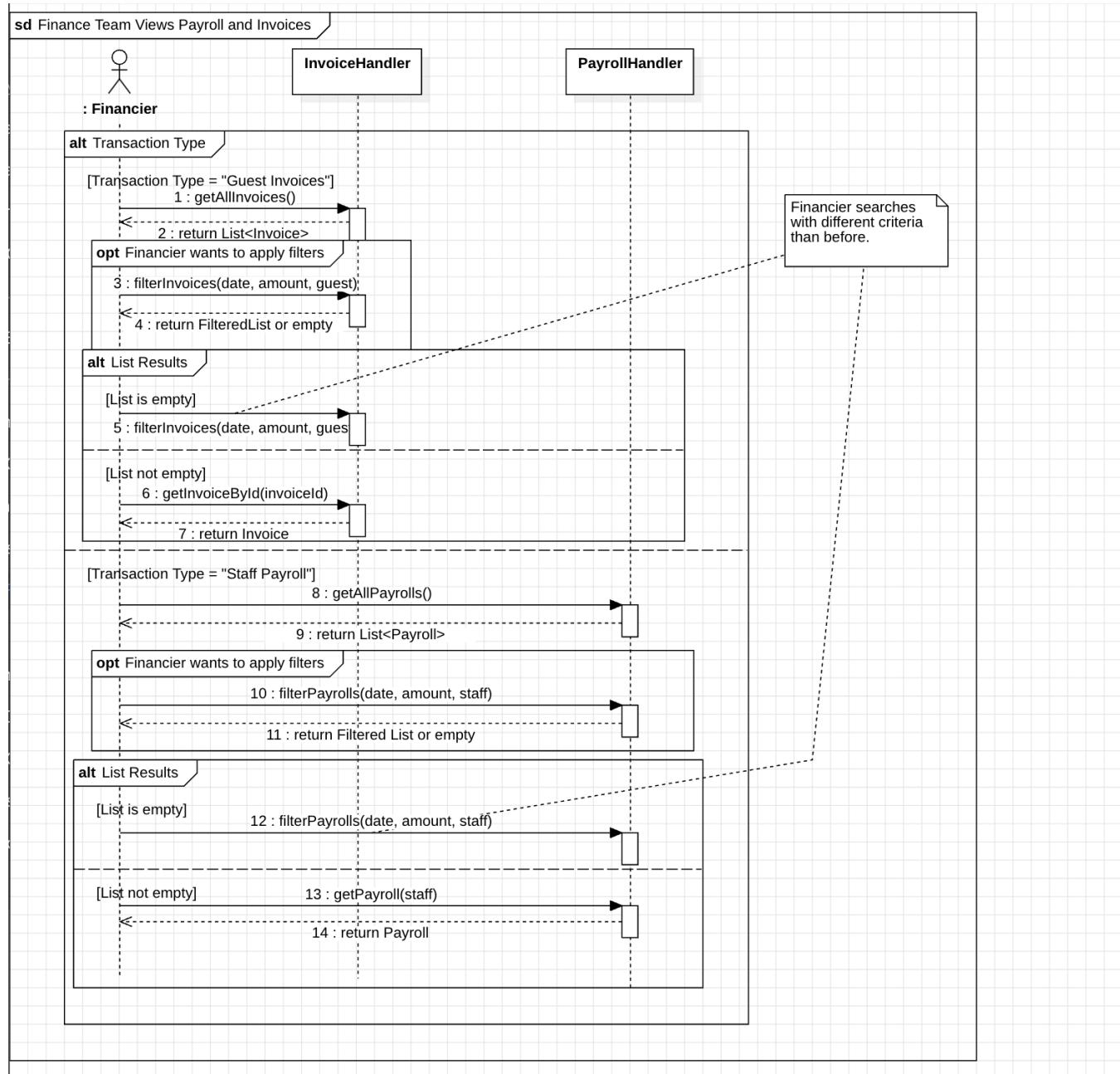
## SC\_FI\_01 Calculate Staff Payroll — (*Endri Baku*)



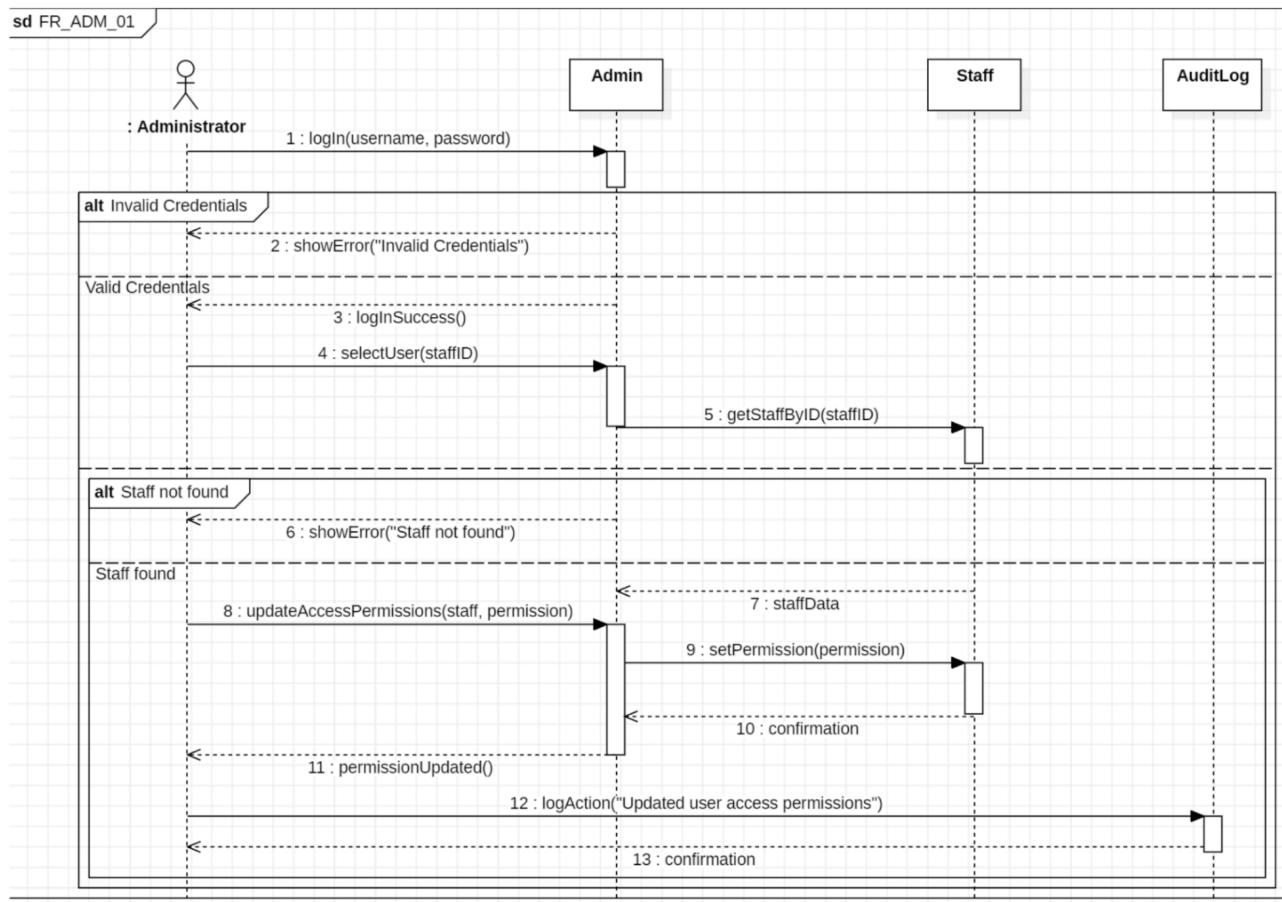
## SC\_FI\_02: Generate Financial Reports — (*Endri Baku*)



## SC\_FI\_03: Track Financial Transactions — (*Endri Baku*)

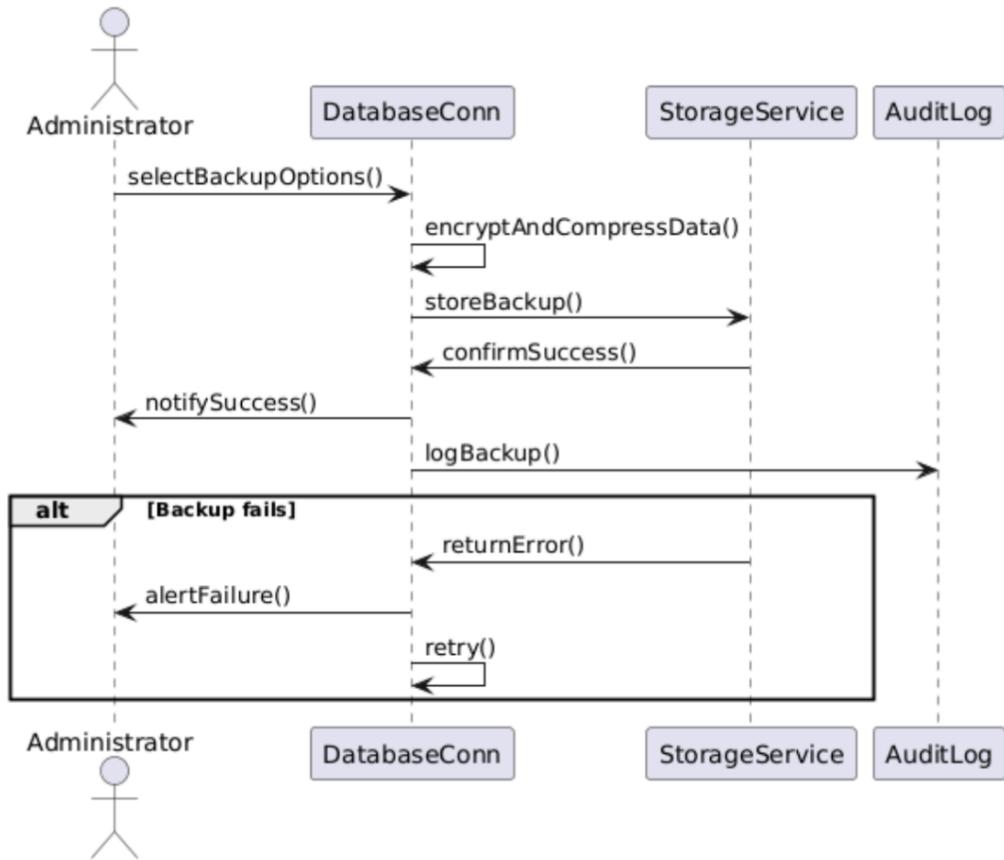


**SC\_ADMIN\_01: Manage User Access — (Daron Delvina)**

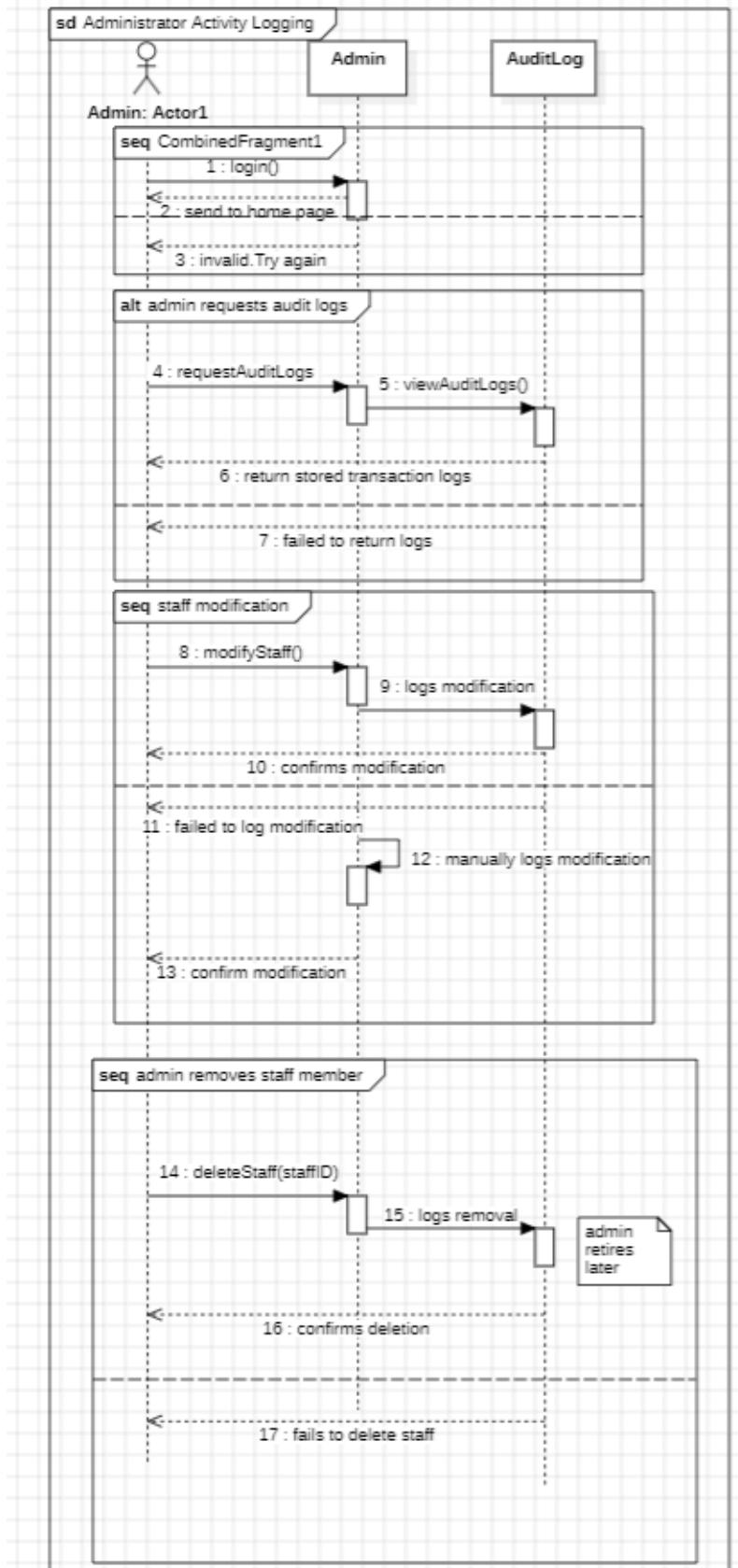


**SC ADM\_02:** Backup and Restore the System — (*Xhois Cano*)

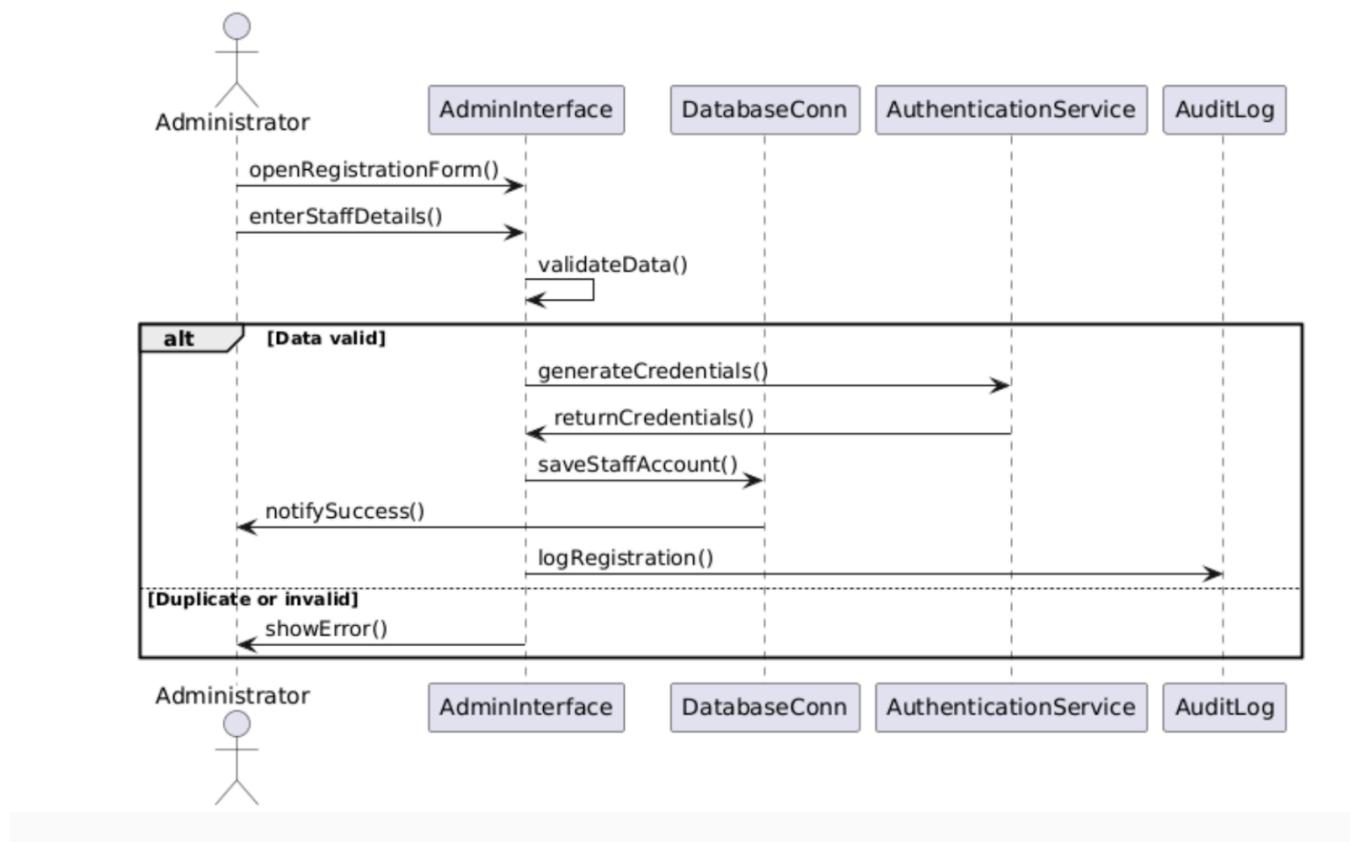
FR ADM\_02: System Backup and Restore



## SC\_ADMIN\_03: Maintain Audit Logs — (Jurgen Hila)

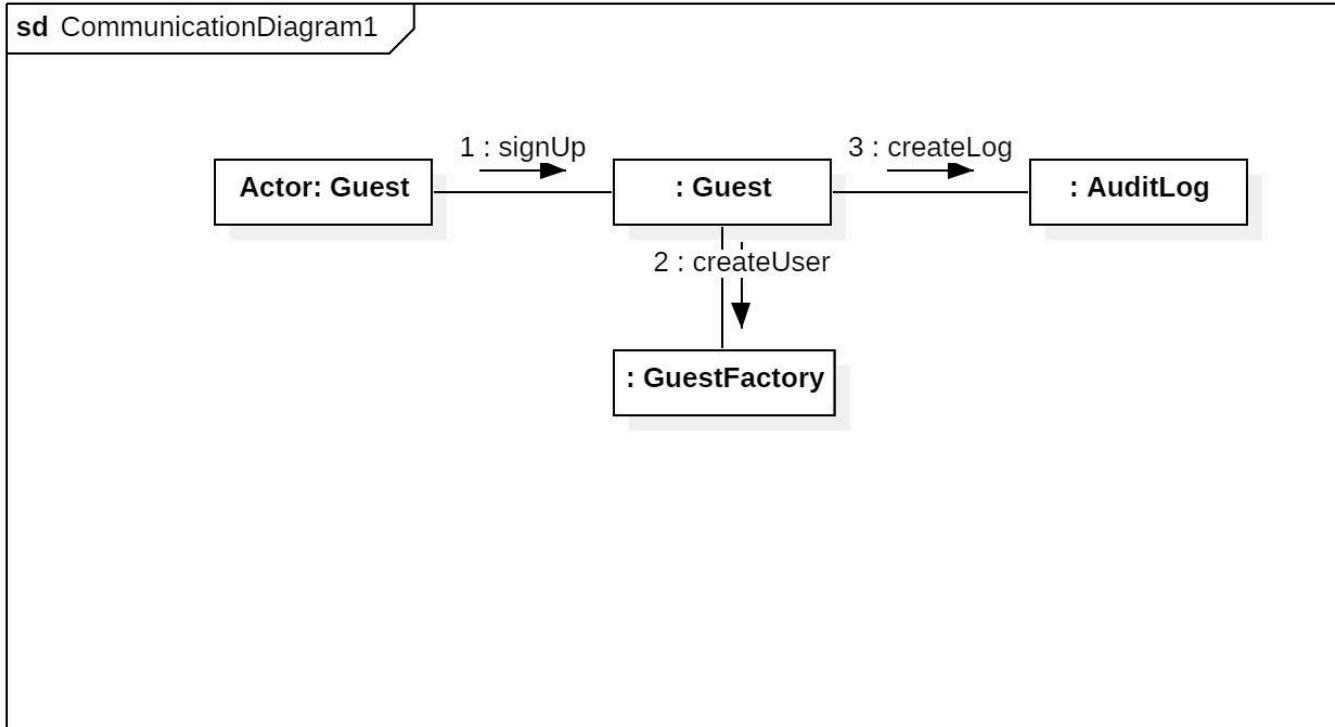


**SC\_ADMIN\_04: Register Staff Members — (Xhois Cano)**



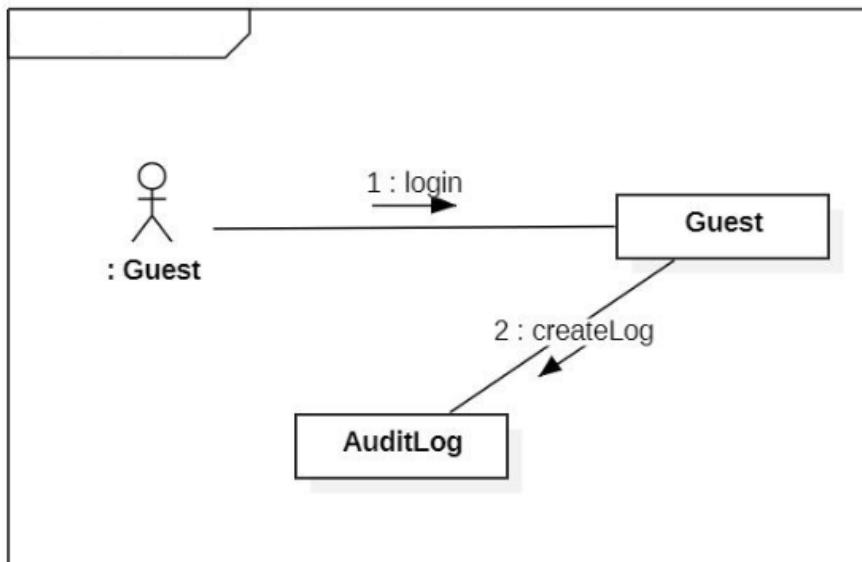
# Communication Diagram

**CC\_\_GST\_01:** Guest Registration — (**Sidrit Zela**)

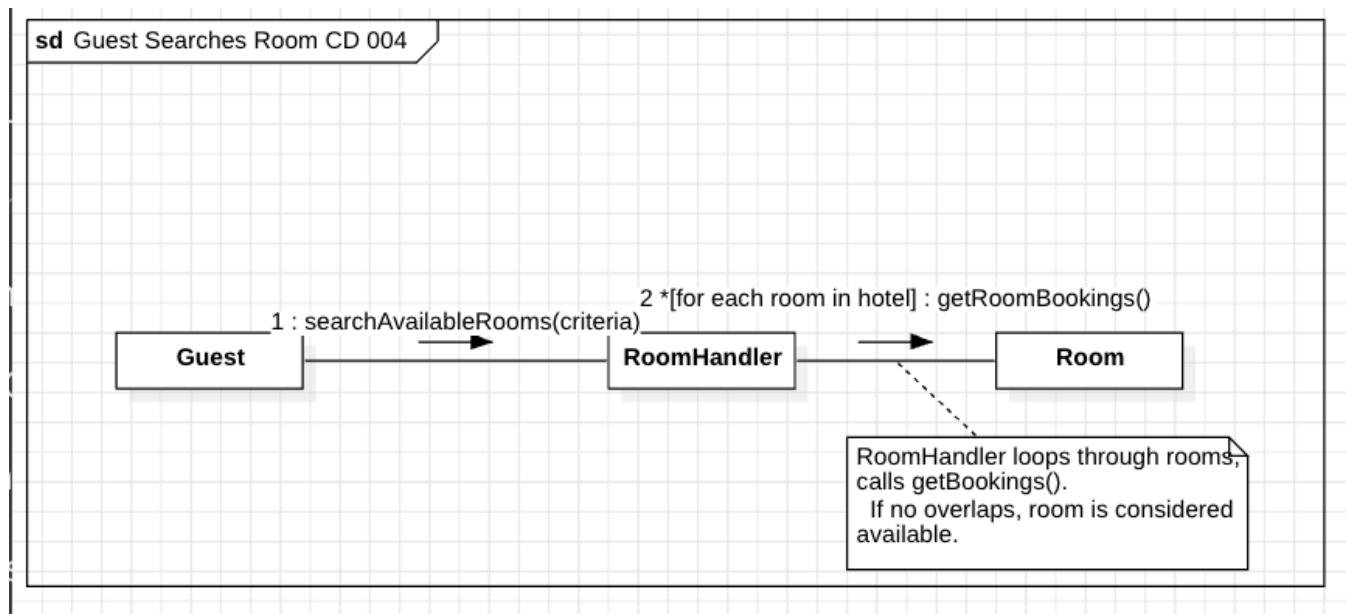


### CC\_GST\_02: Guest Login — (*Hazis Voda*)

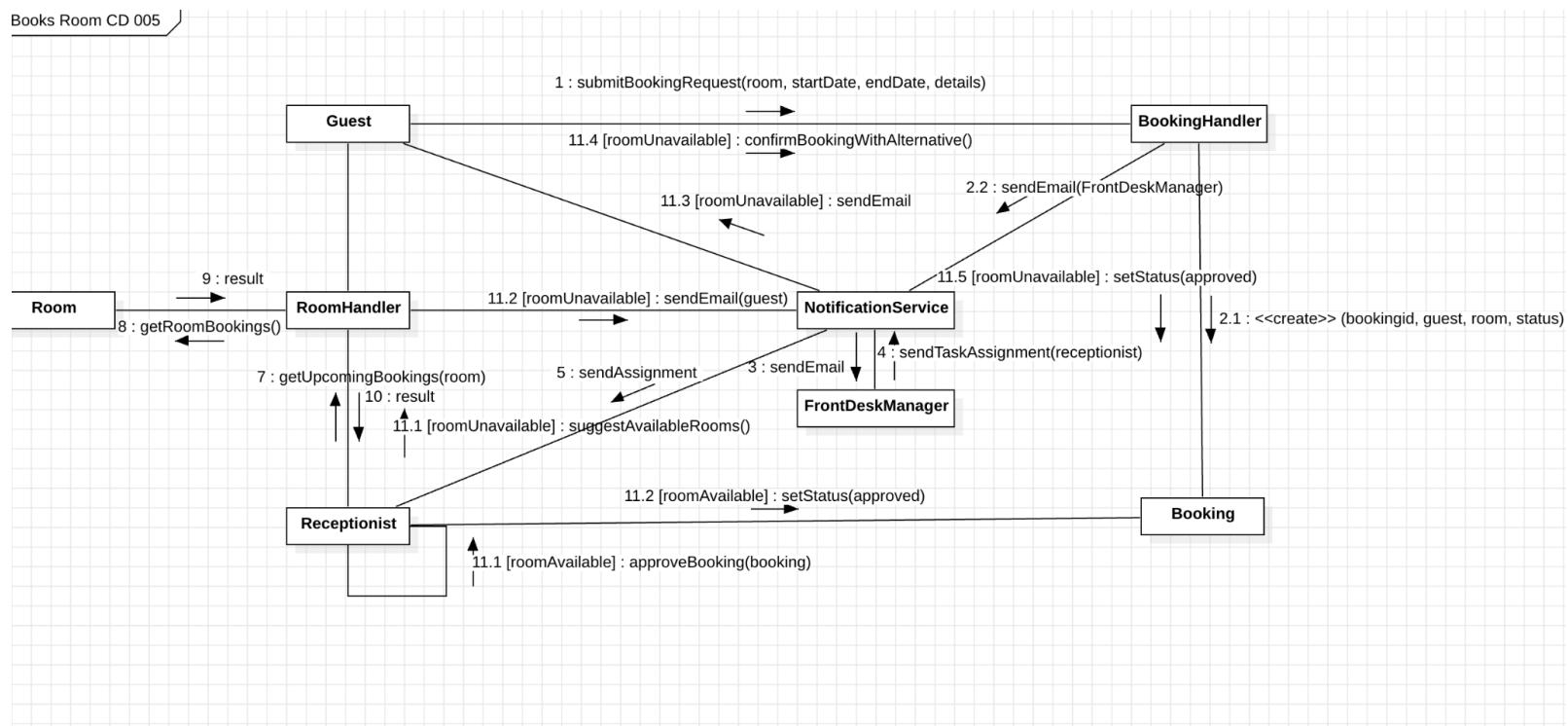
Guest logs in to portal and login is registered into audit log.



### CC\_GST\_03: Search for Available Rooms — (*Endri Baku*)

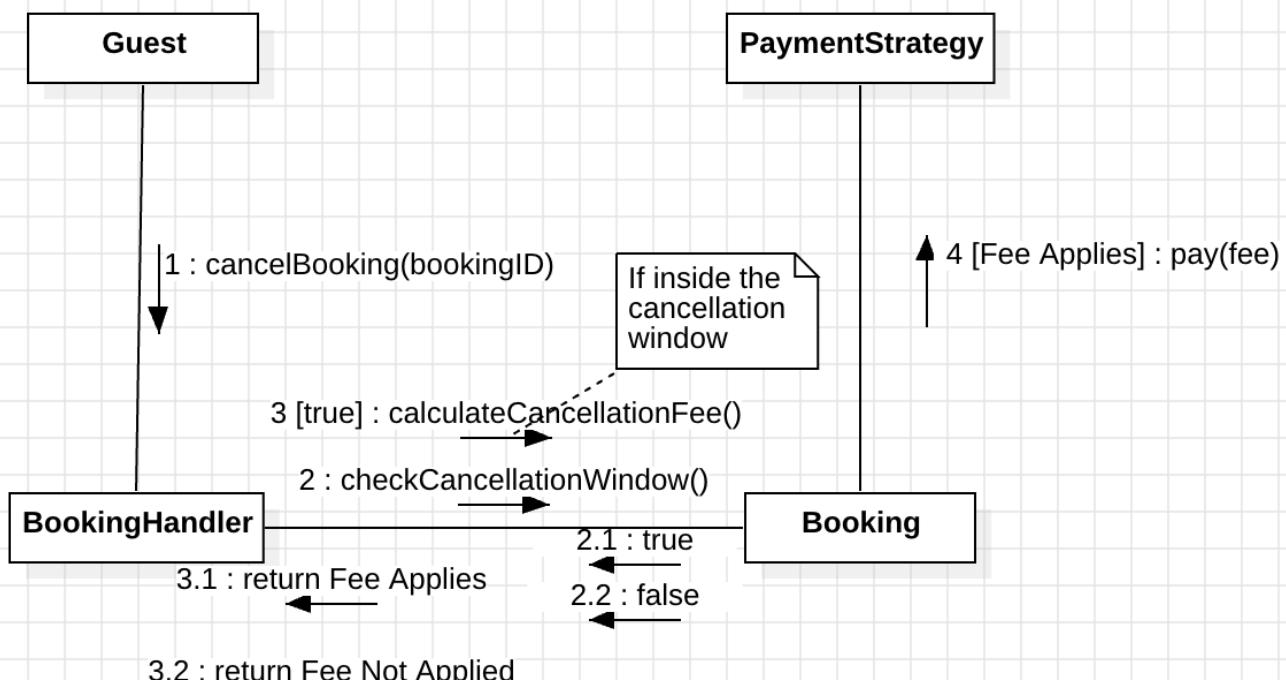


**CC\_GST\_04: Guest Books Room — (*Endri Baku*)**

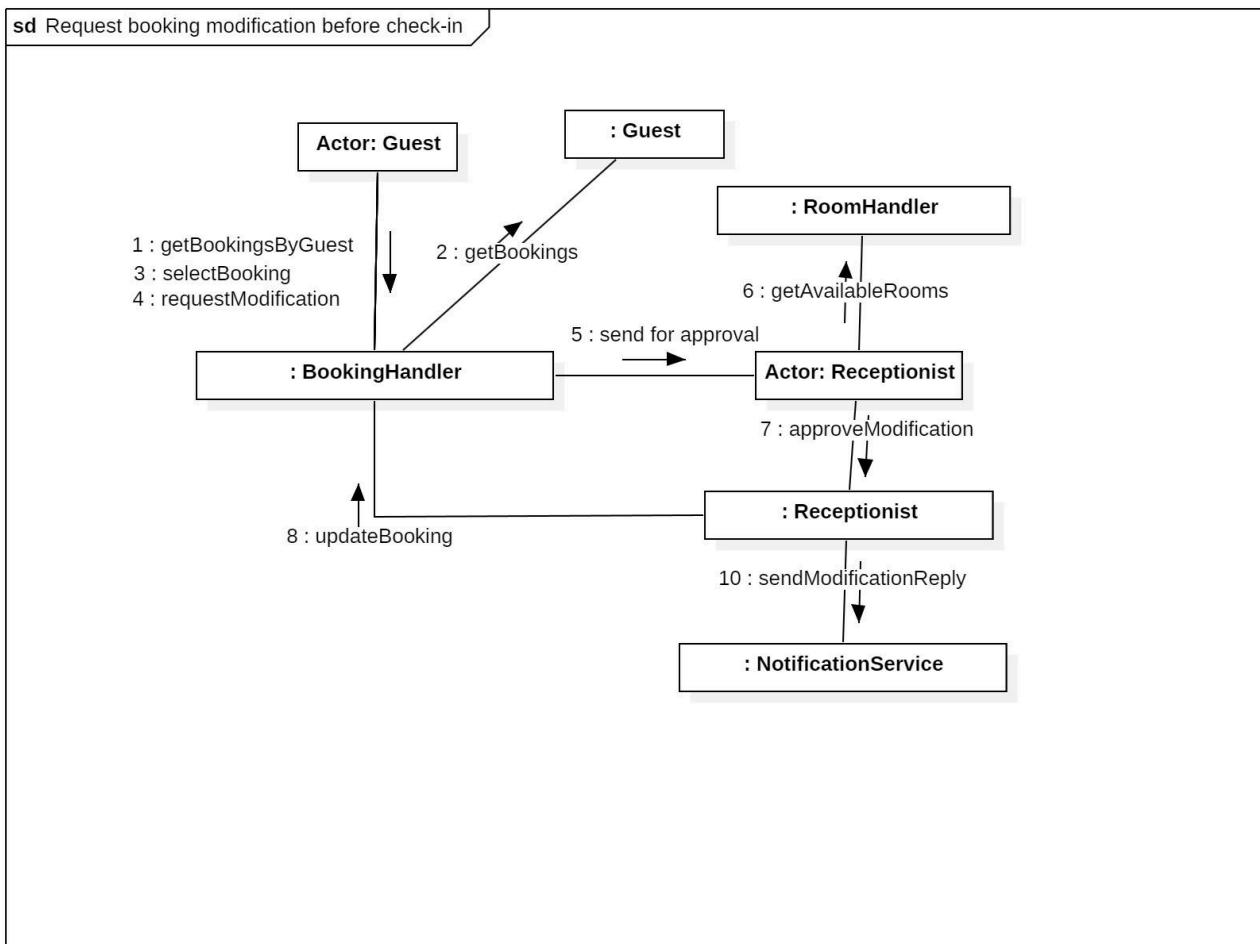


**CC\_GST\_05: Cancel Booking — (*Endri Baku*)**

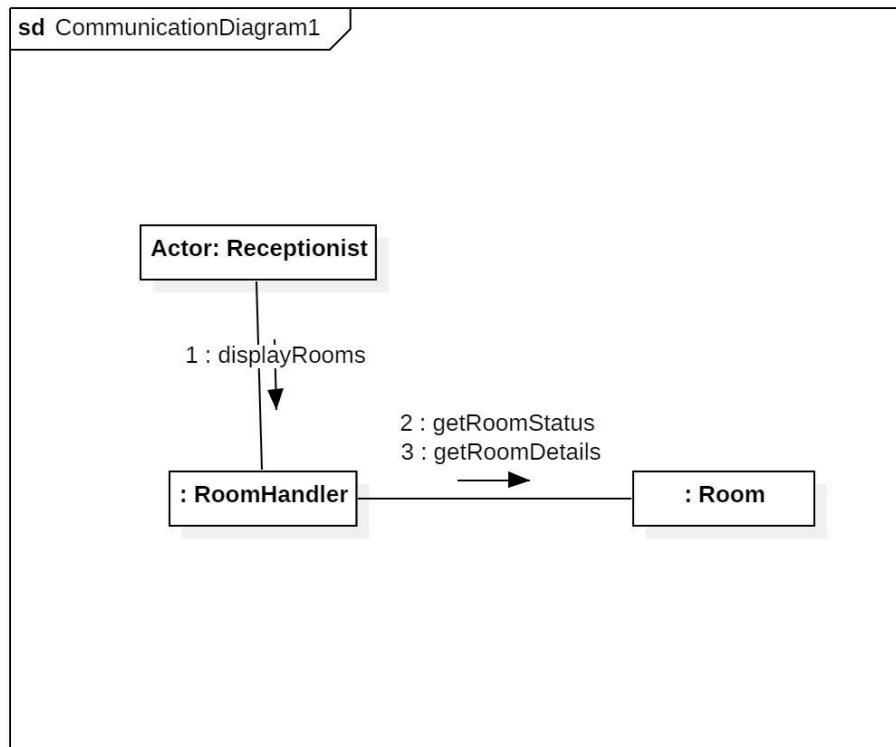
**sd Guest Cancels Room CD 006**



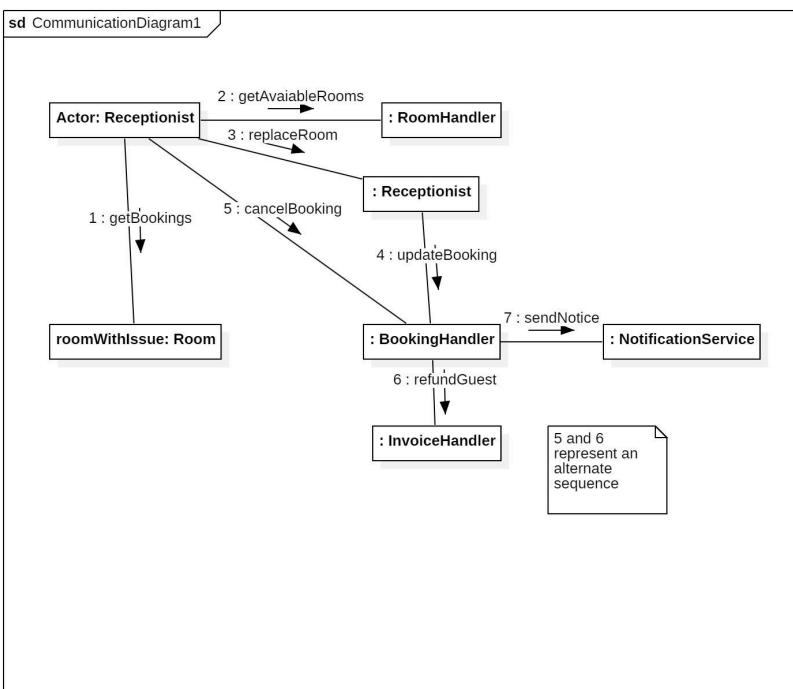
**CC\_GST\_06: Guest Requests Booking Modification — (*Sidrit Zela*)**



**CC\_REC\_01: Receptionist Real-Time Room Inventory Status — (*Sidrit Zela*)**

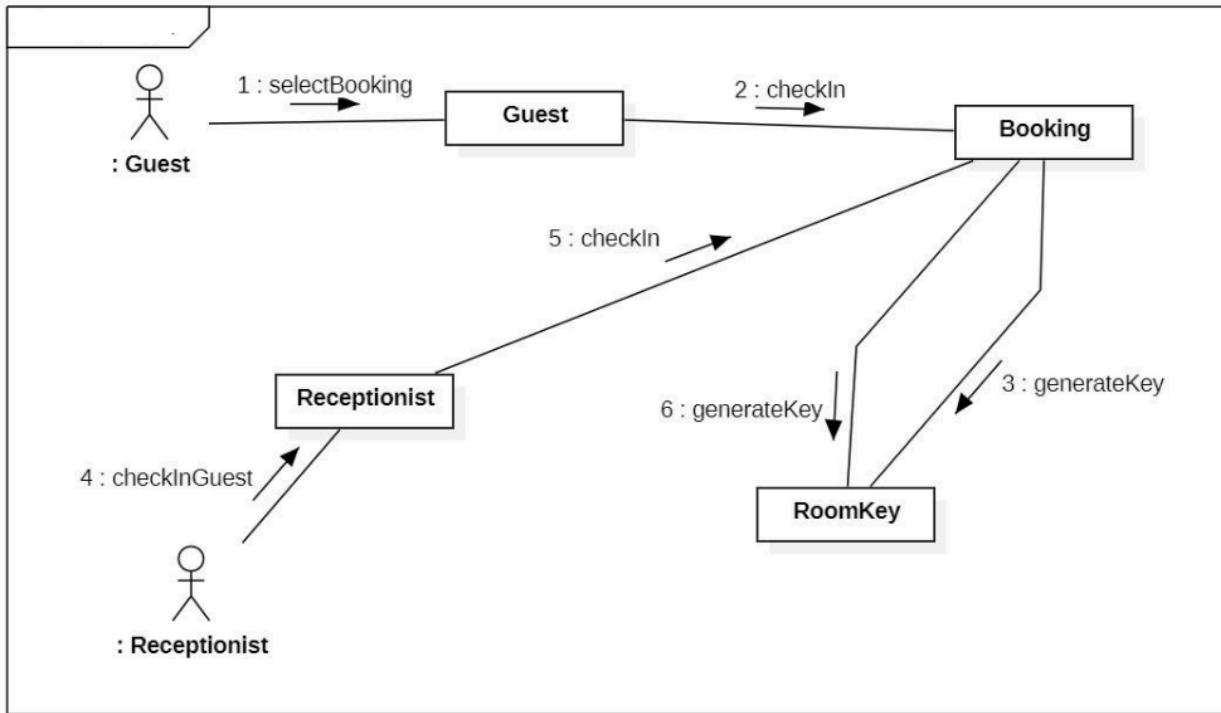


**CC\_REC\_02: Receptionist Modifies Booking — (*Sidrit Zela*)**



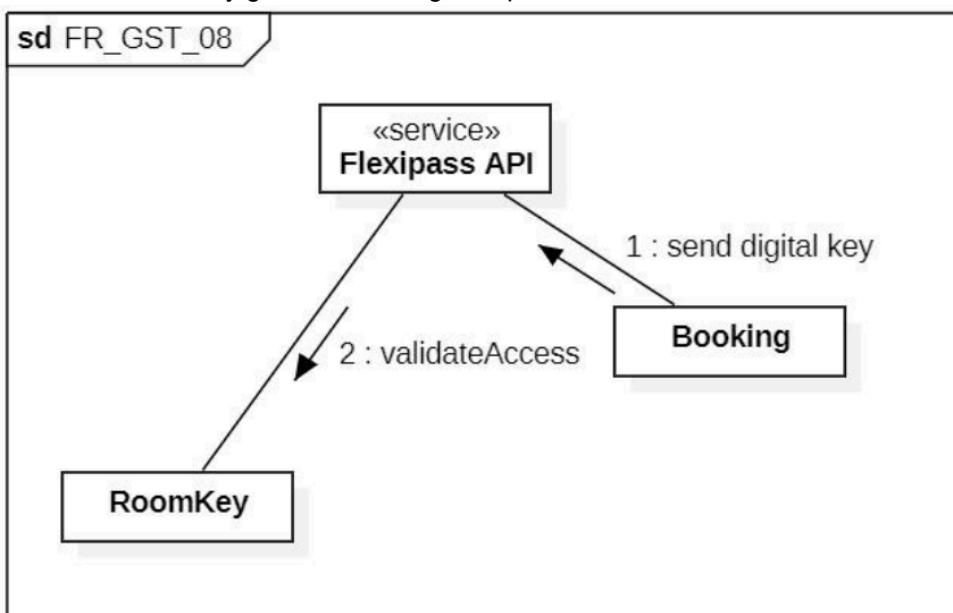
### **CC\_GST\_07: Guest Check-In — (*Hazis Voda*)**

Process of Guest Check-in and room key generation.



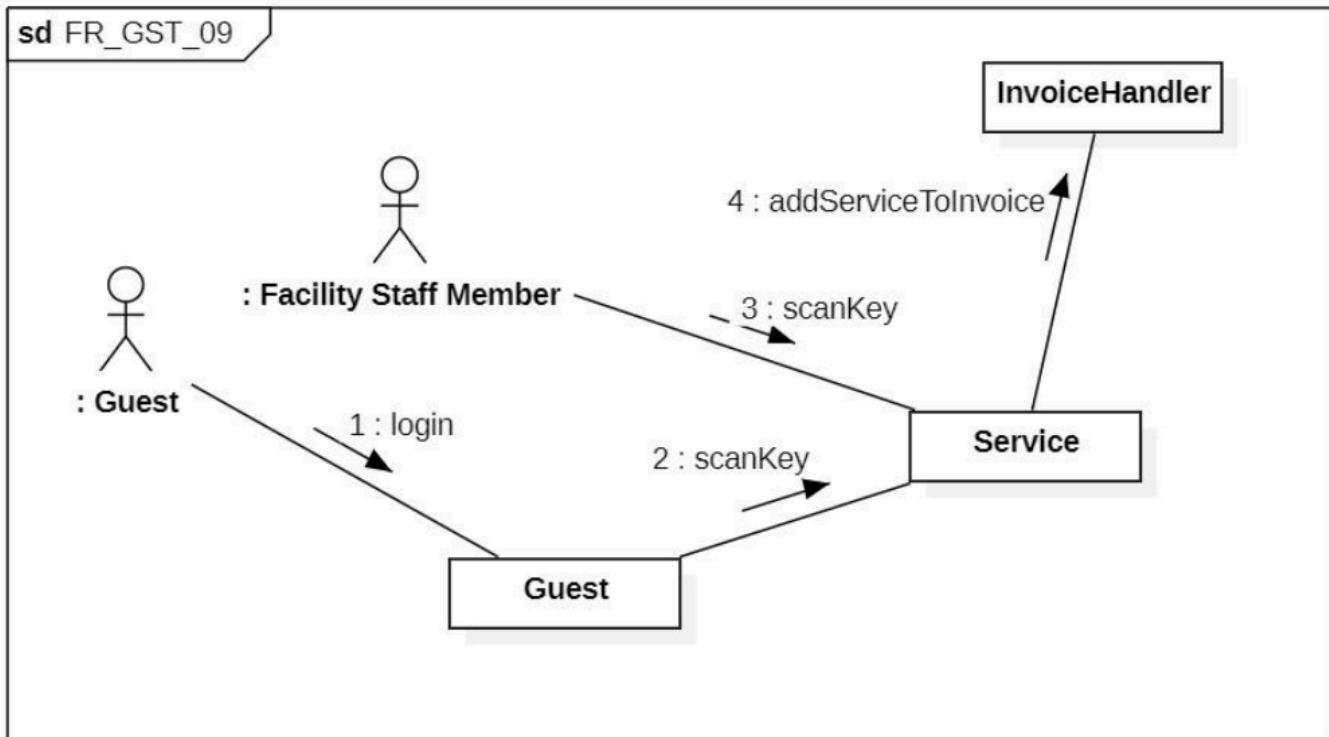
### **CC\_GST\_08: Connect Digital Key To Room — (*Hazis Voda*)**

Process of room key generation using Flexipass.

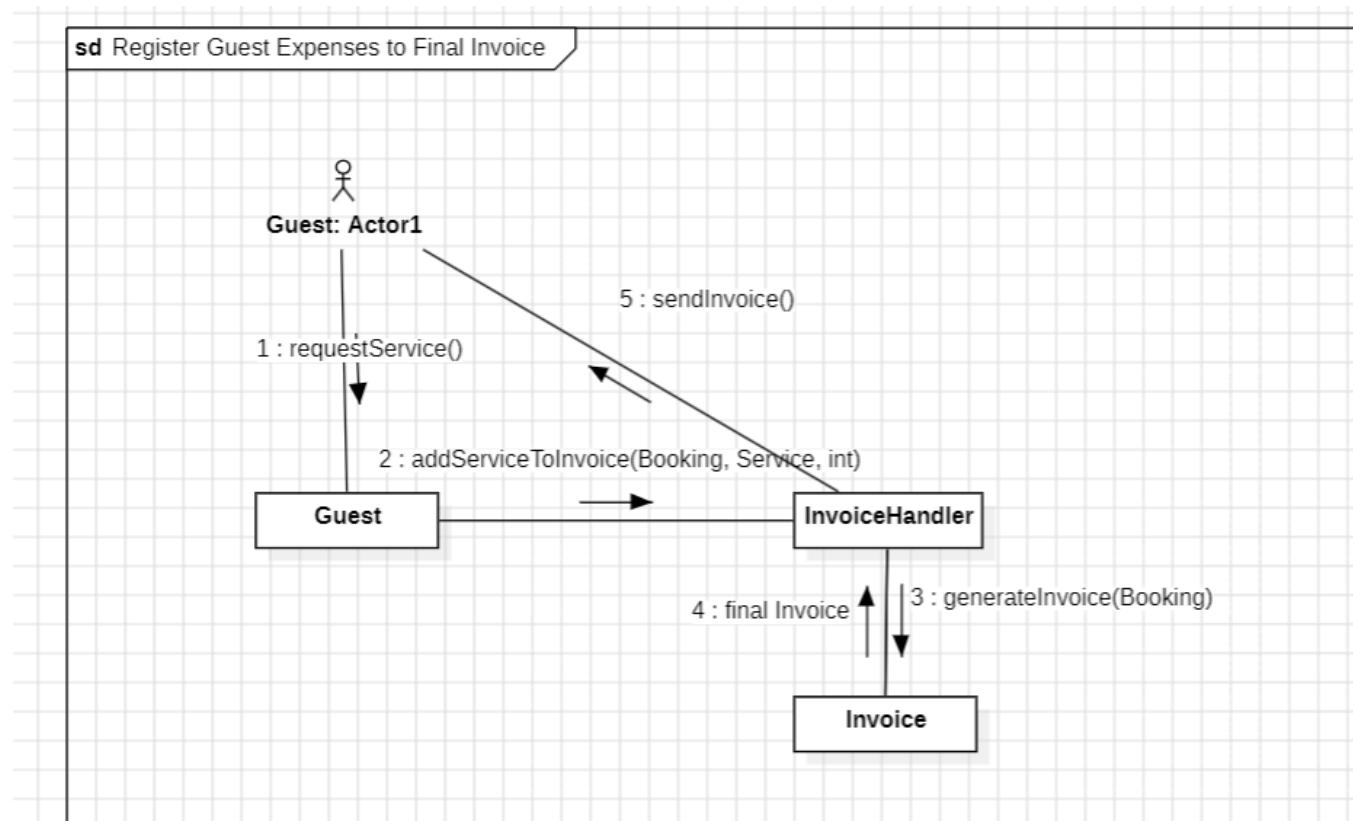


### **CC\_GST\_09: Access Facilities and Services — (*Hazis Voda*)**

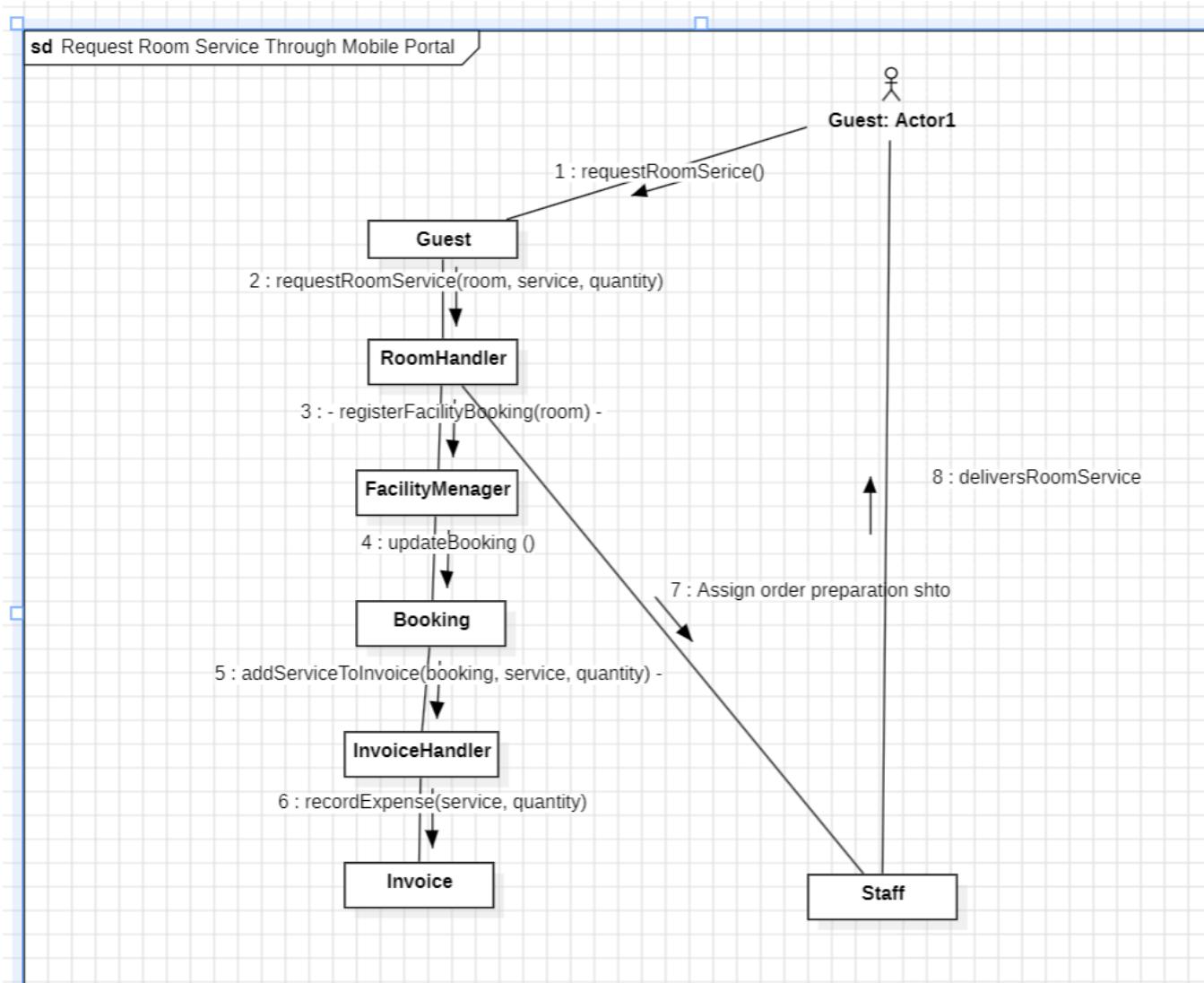
Guest accesses facilities and services by scanning room key.



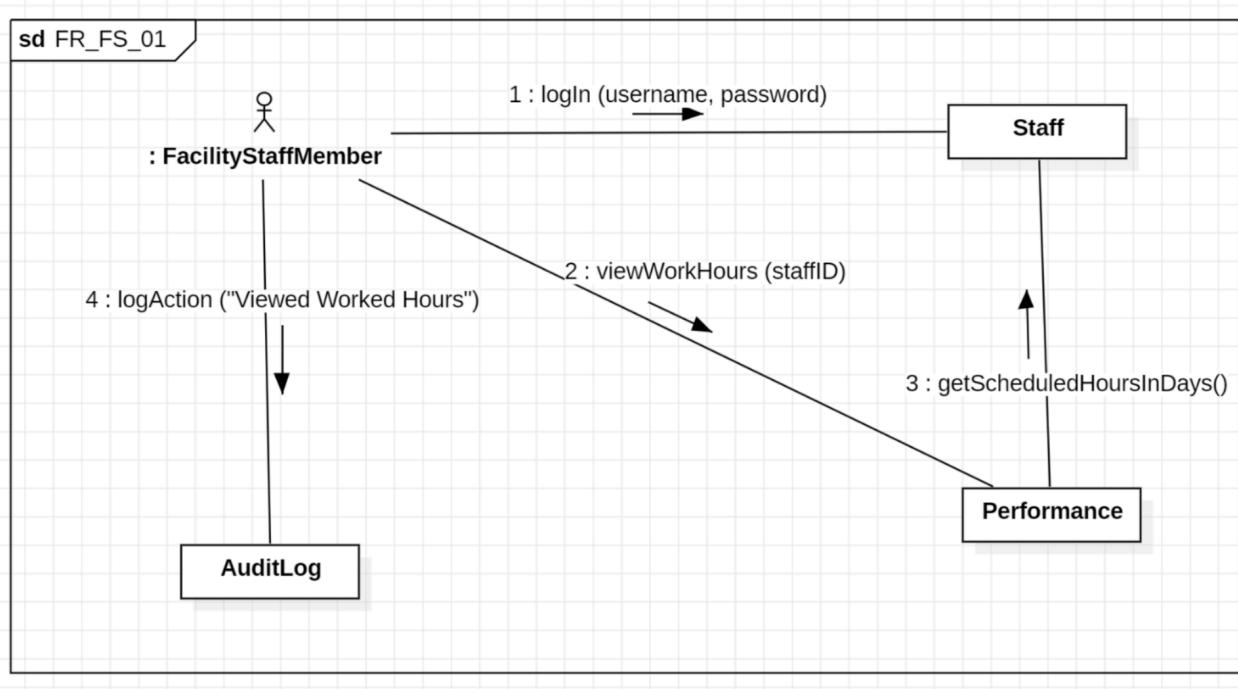
### **CC\_GST\_10: Register Guest Expenses — (*Jurgen Hila*)**



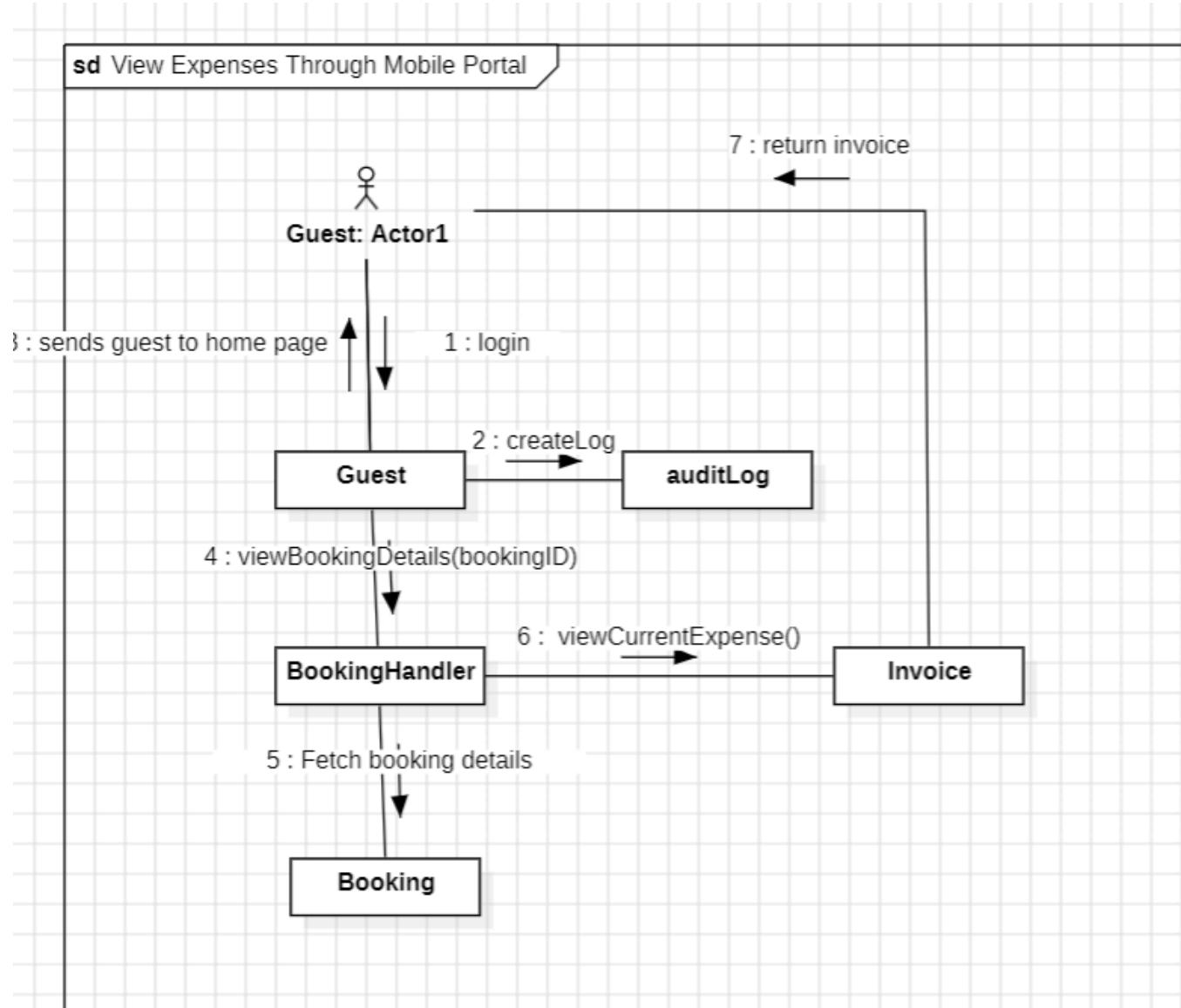
## CC\_GST\_11: Guest Requests Room Service — (Jurgen Hila)



**CC\_FS\_01: Facility Staff Views Work Hours — (*Daron Delvina*)**

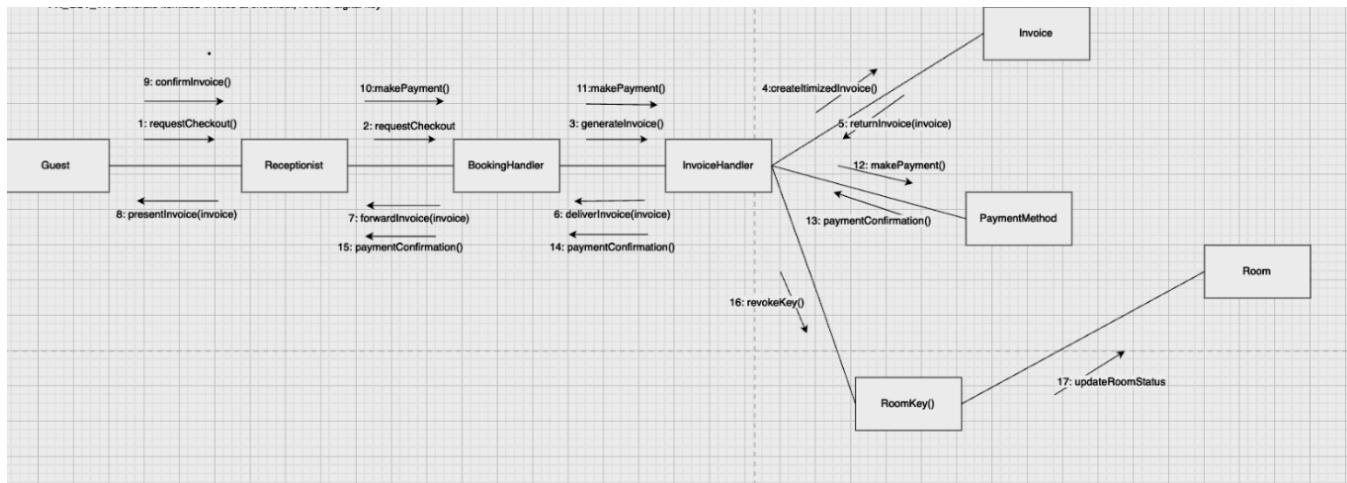


## CC\_GST\_12: View Expenses — (*Jurgen Hila*)

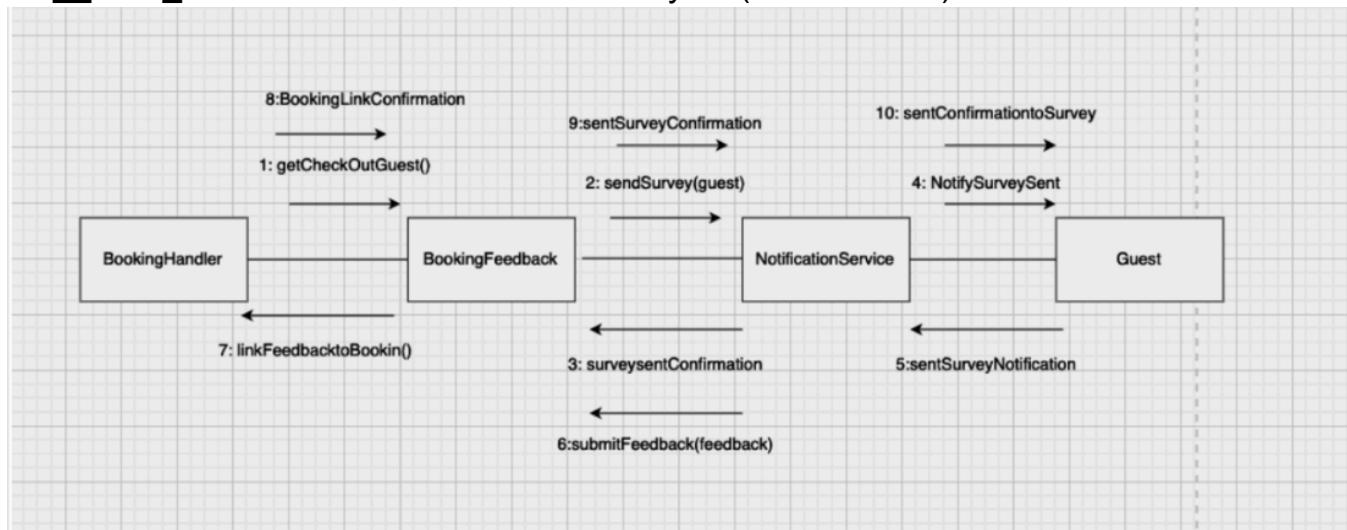


## Hotel Management System [HMS] Requirements Specification

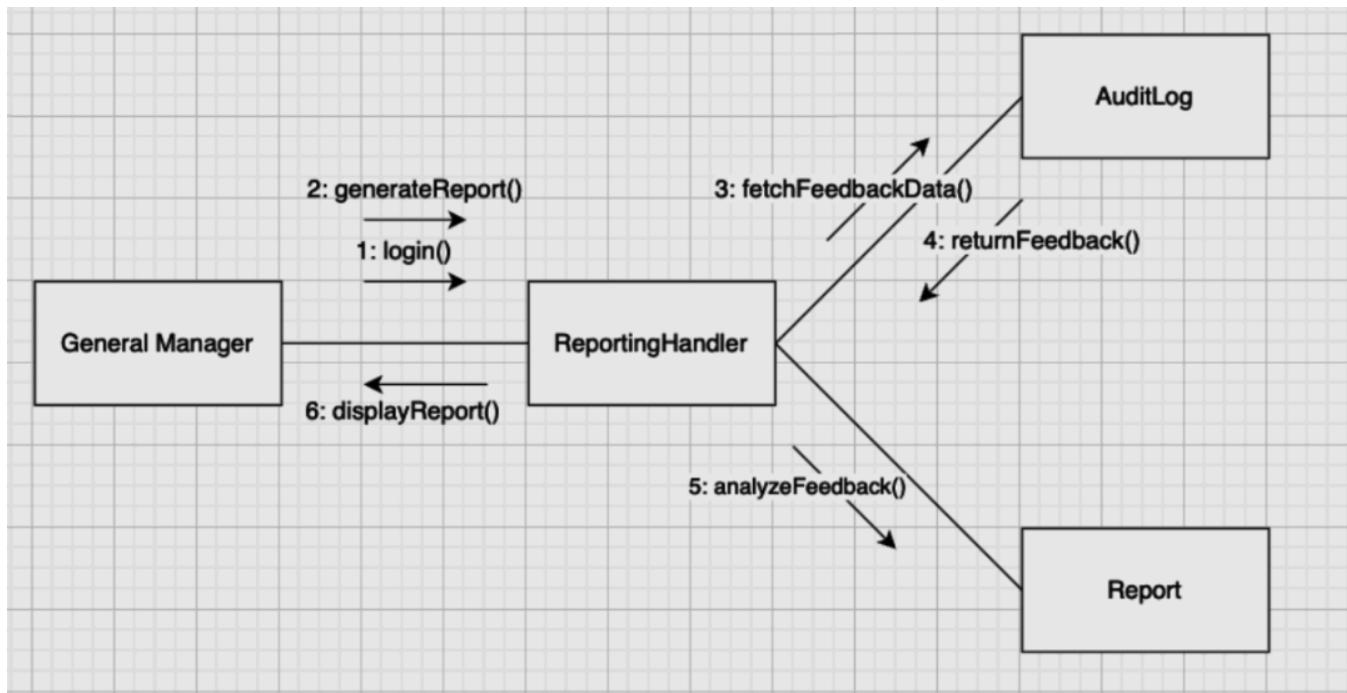
### CC\_GST\_13: Check-Out: Generate Itemized Invoice, Revoke Digital Key — (Xhois Cano)



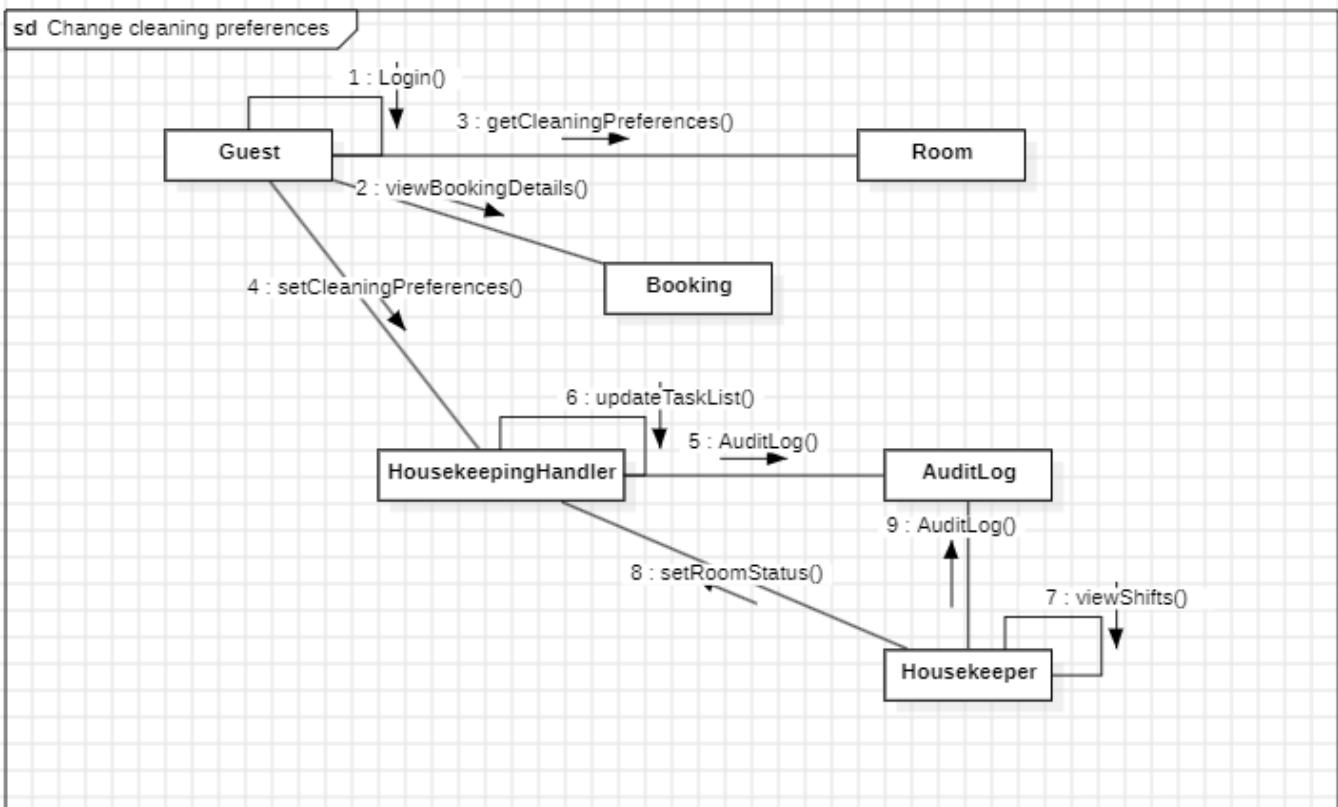
### CC\_GST\_14: Send Post Check-out Survey — (Xhois Cano)



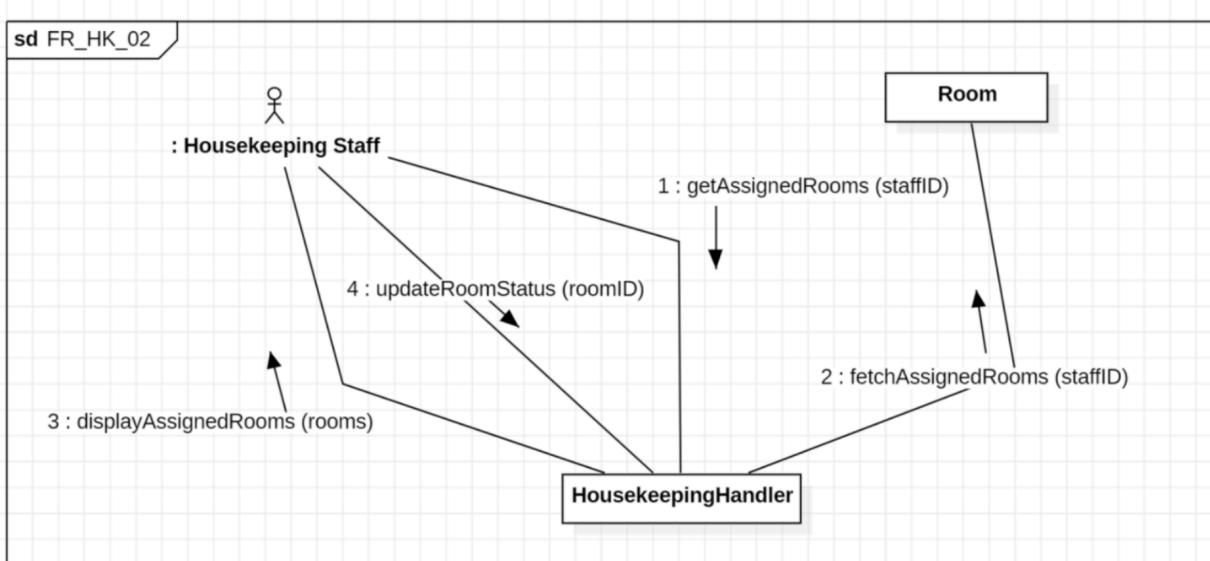
**CC\_GM\_01:** Generate Survey Post-Checkout Reports — (*Xhois Cano*)



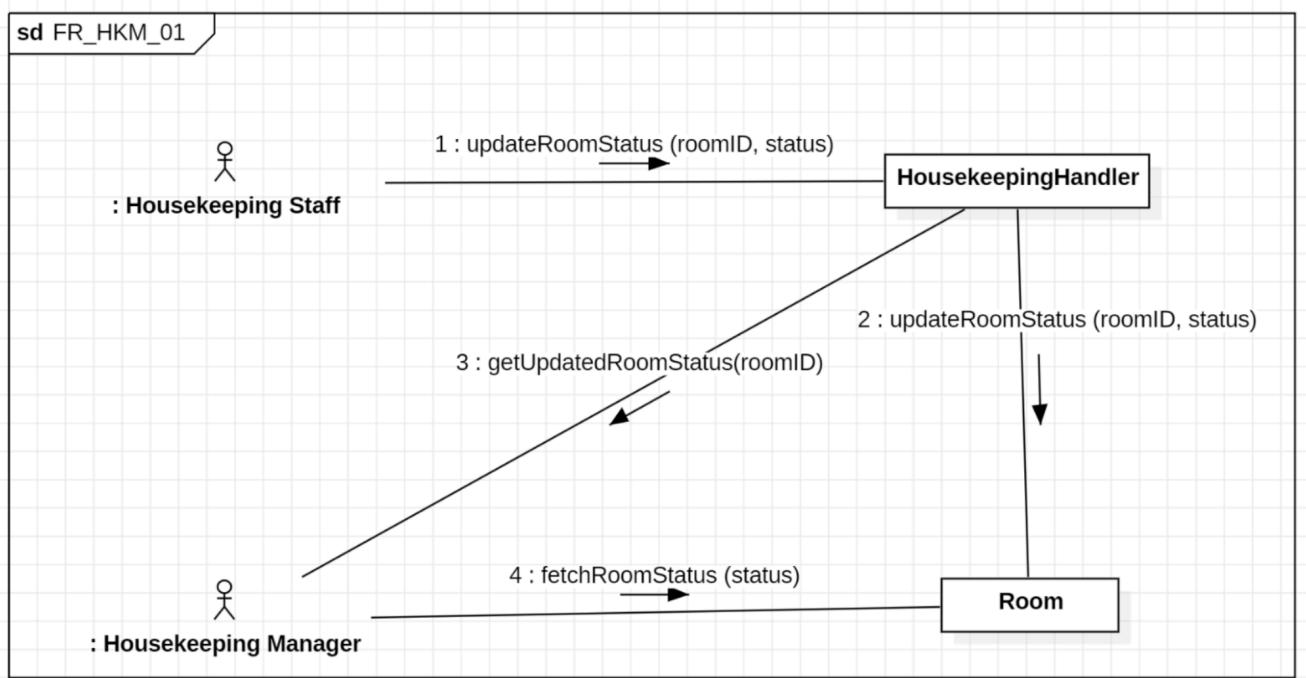
**CC\_\_GST\_15: Track Cleaning Schedule Based on Guest Preferences — (Orgest Bacova)**



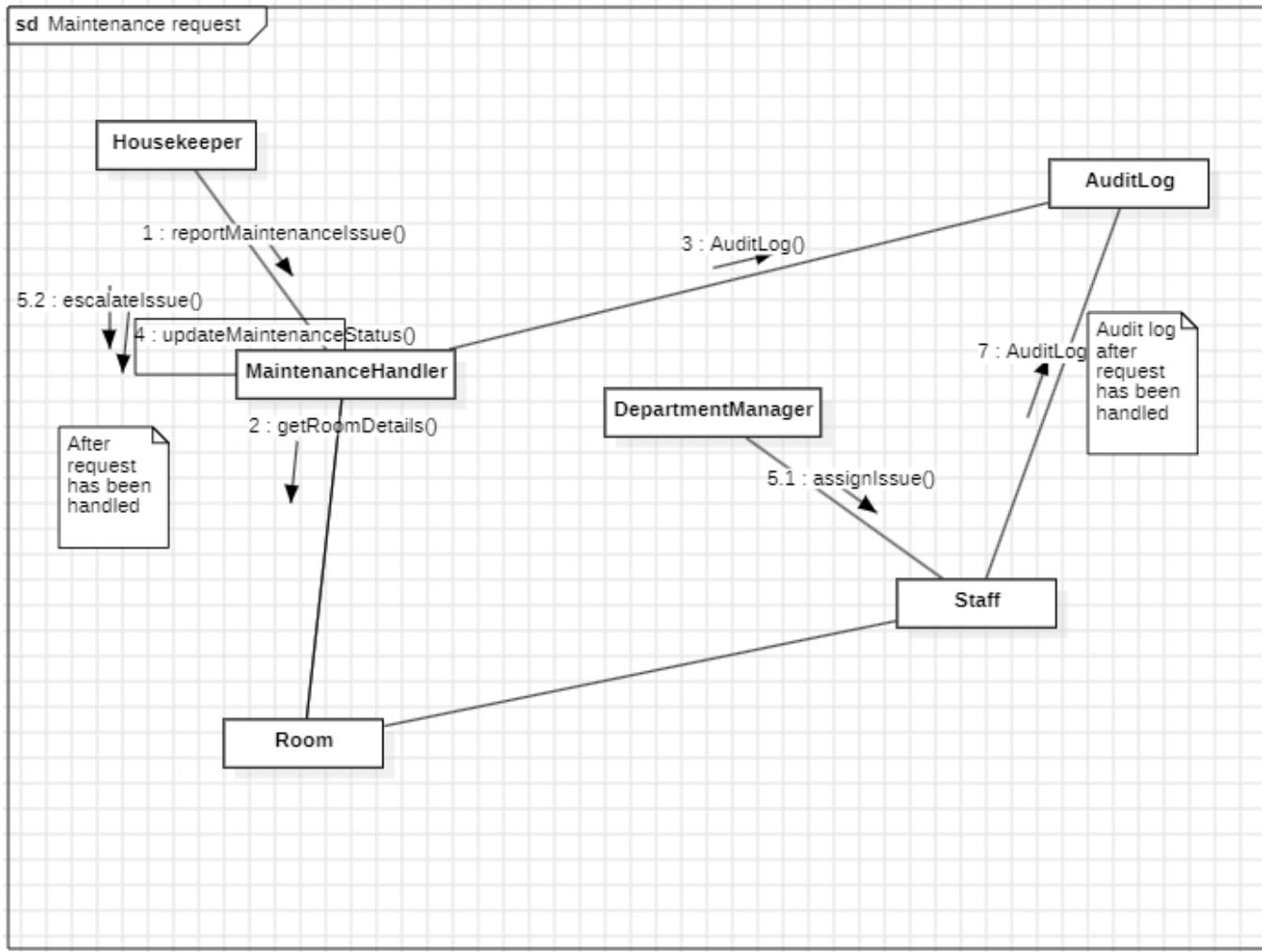
**CC\_\_HK\_02: View Assigned Rooms for Cleaning — (Daron Delvina)**



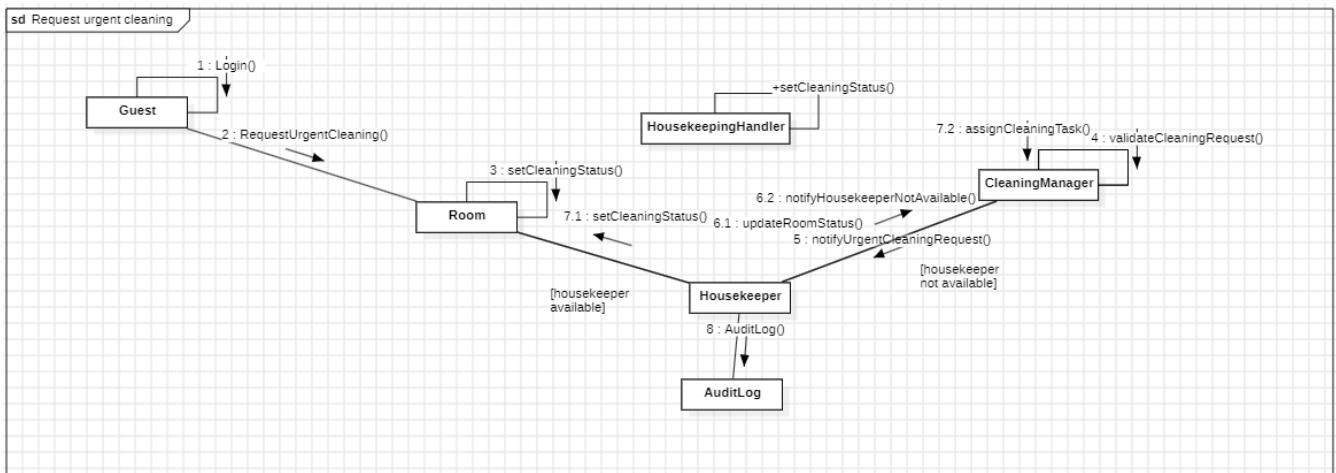
**CC\_HKM\_01:** Real-Time View of Room Cleaning Statuses — (*Daron Delvina*)



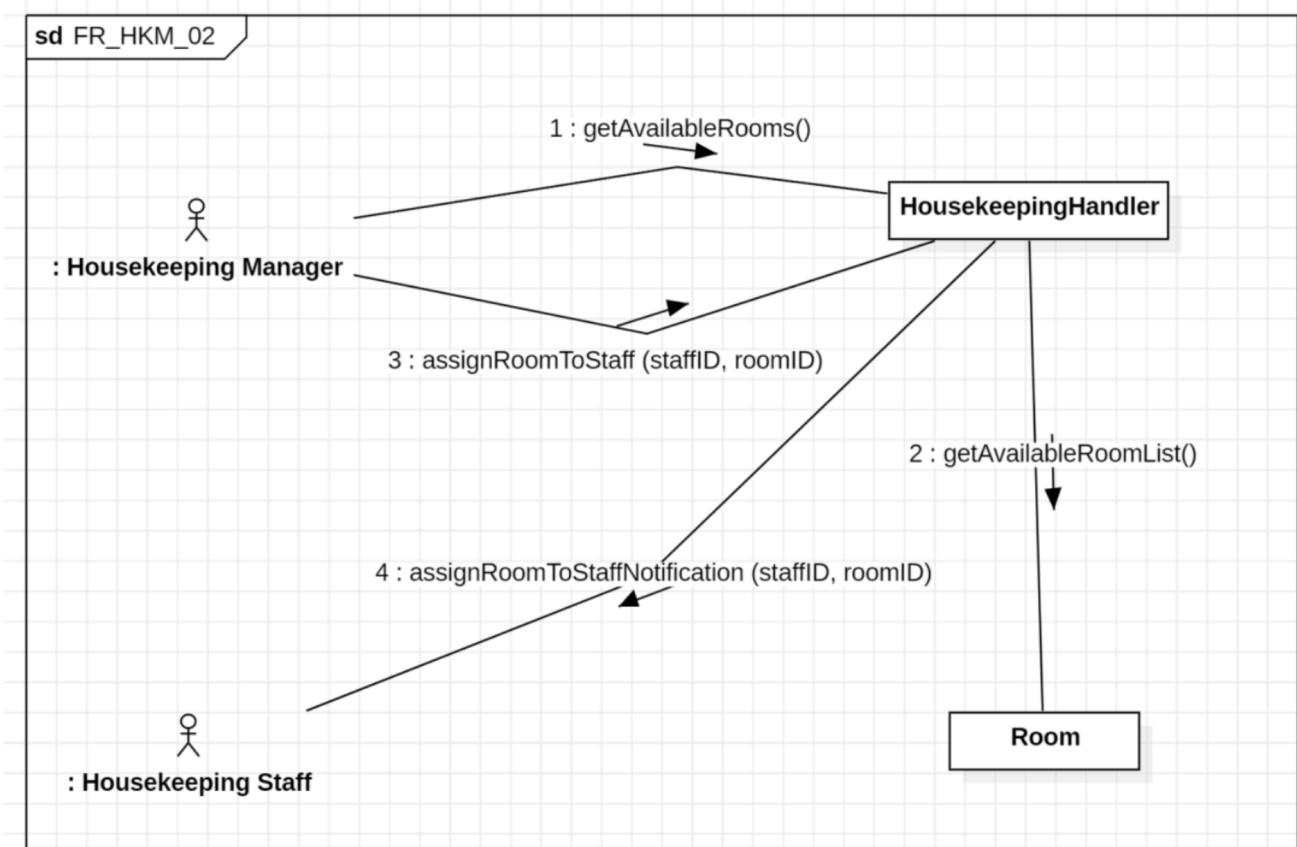
**CC\_HK\_02:** Notify Maintenance Issues to Housekeeping Manager — (*Orgest Bacova*)



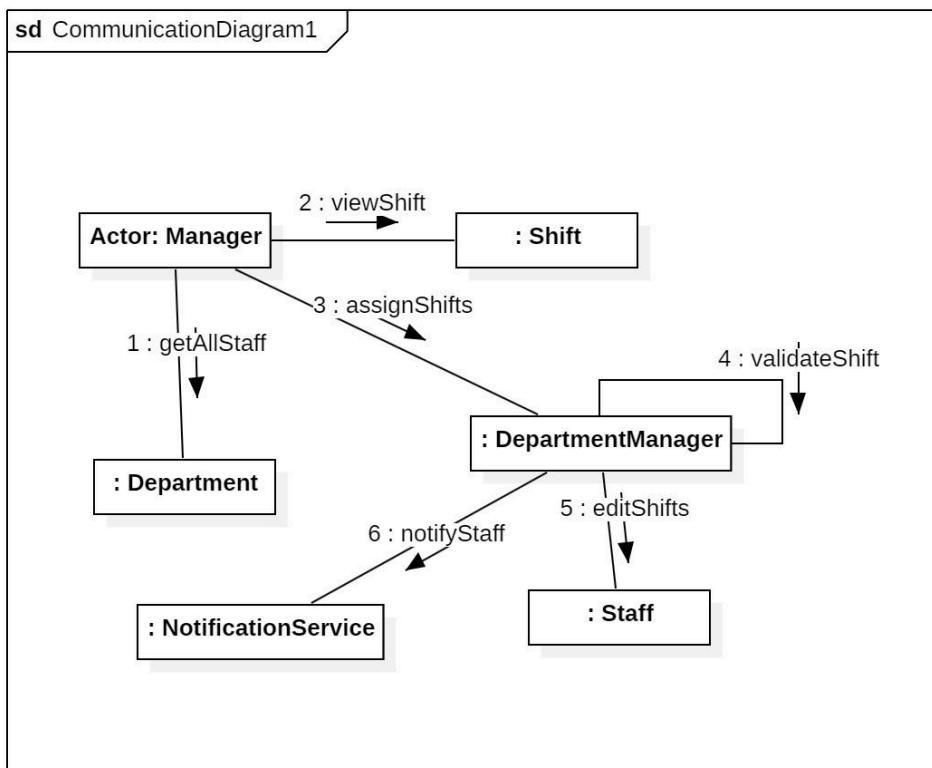
## CC\_\_GST\_16: Request Urgent Cleaning — (*Orgest Bacova*)



## CC\_\_HKM\_02: Assign Cleaning Tasks — (*Daron Delvina*)

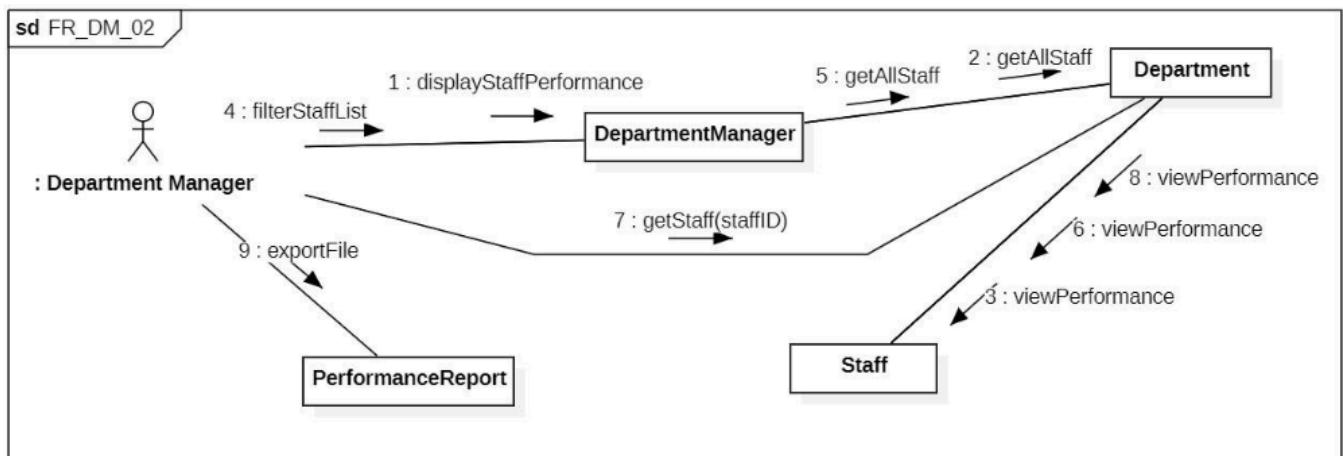


## CC\_DM\_01: Schedule Shifts — (*Sidrit Zela*)

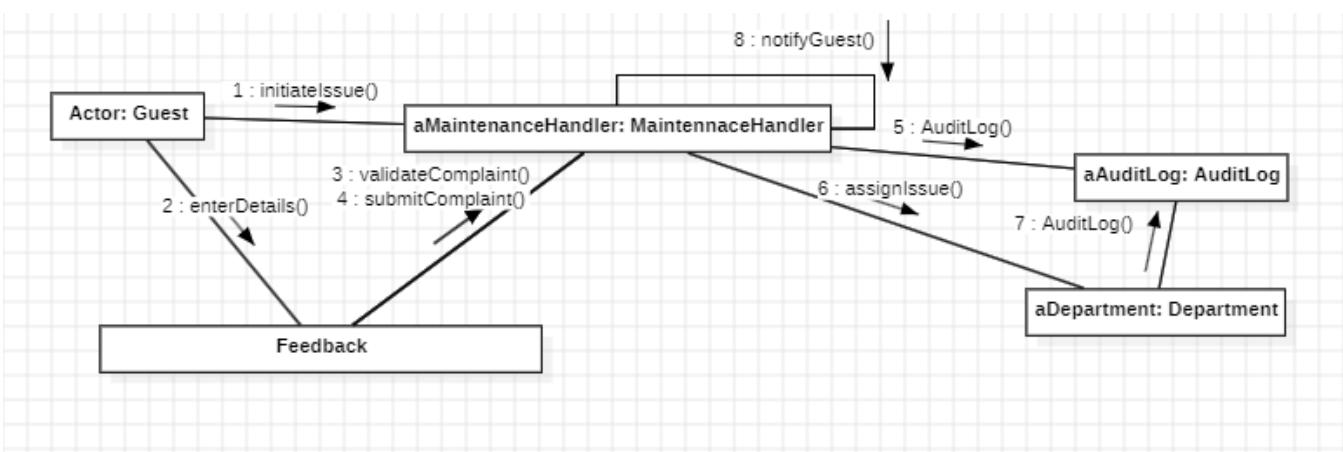


## CC\_DM\_02: View Department Staff Details — (*Hazis Voda*)

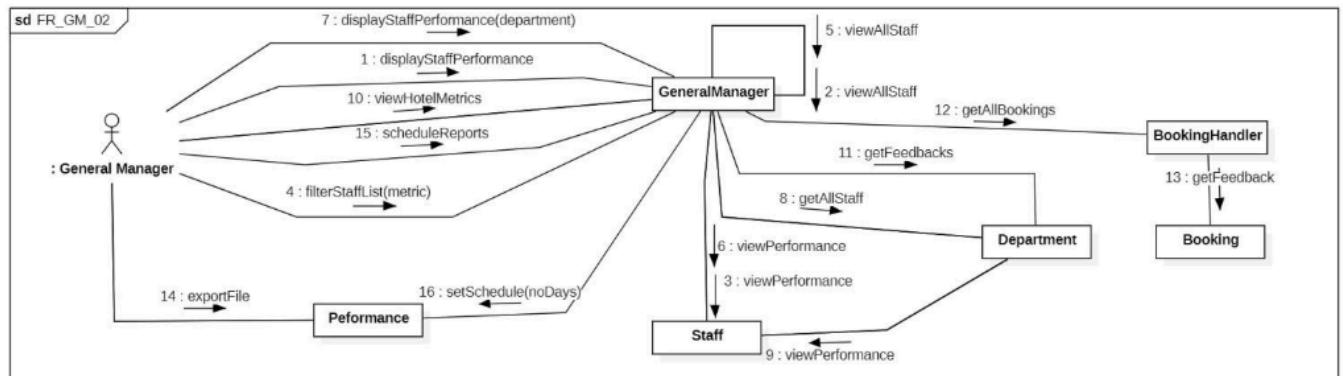
Department Manager reviewing hotel statistics and staff performance.



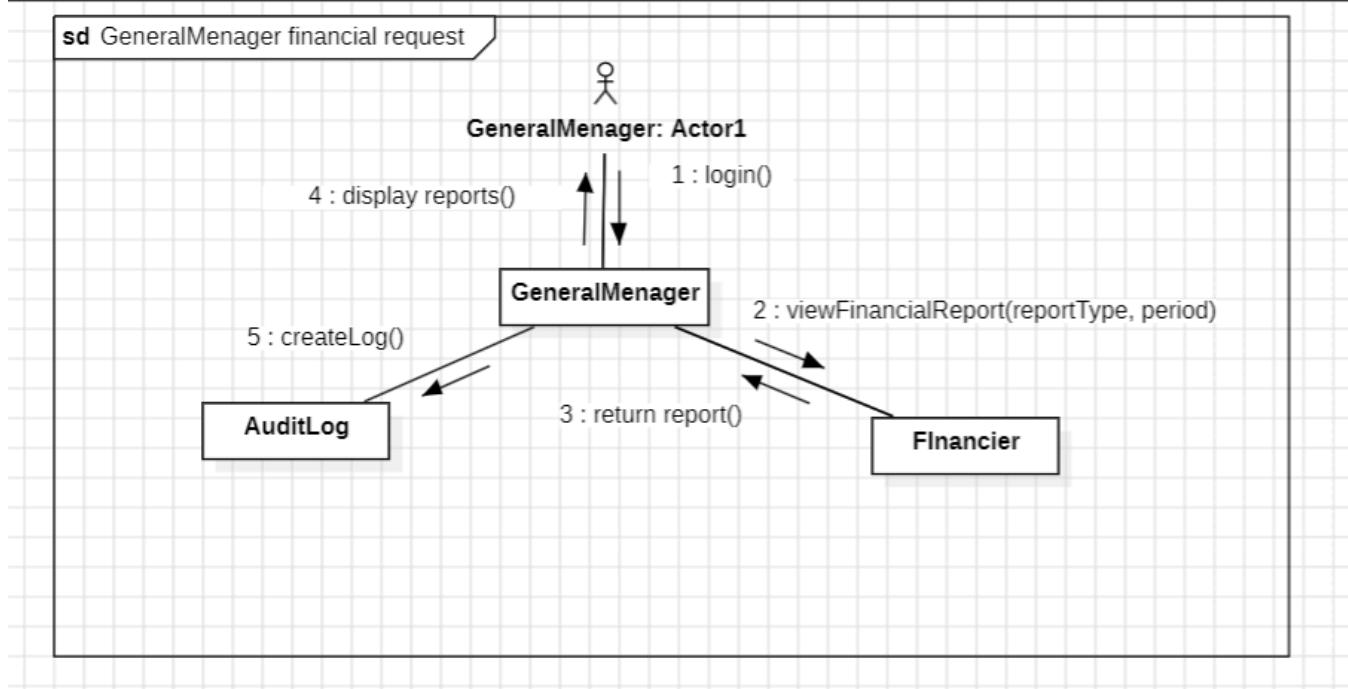
## CC\_GST\_17: Submit Complaints to Relevant Department Manager — (*Orgest Bacova*)



## CC\_GM\_02: View Staff Performance, Attendance (General Manager) — (*Hazis Voda*)

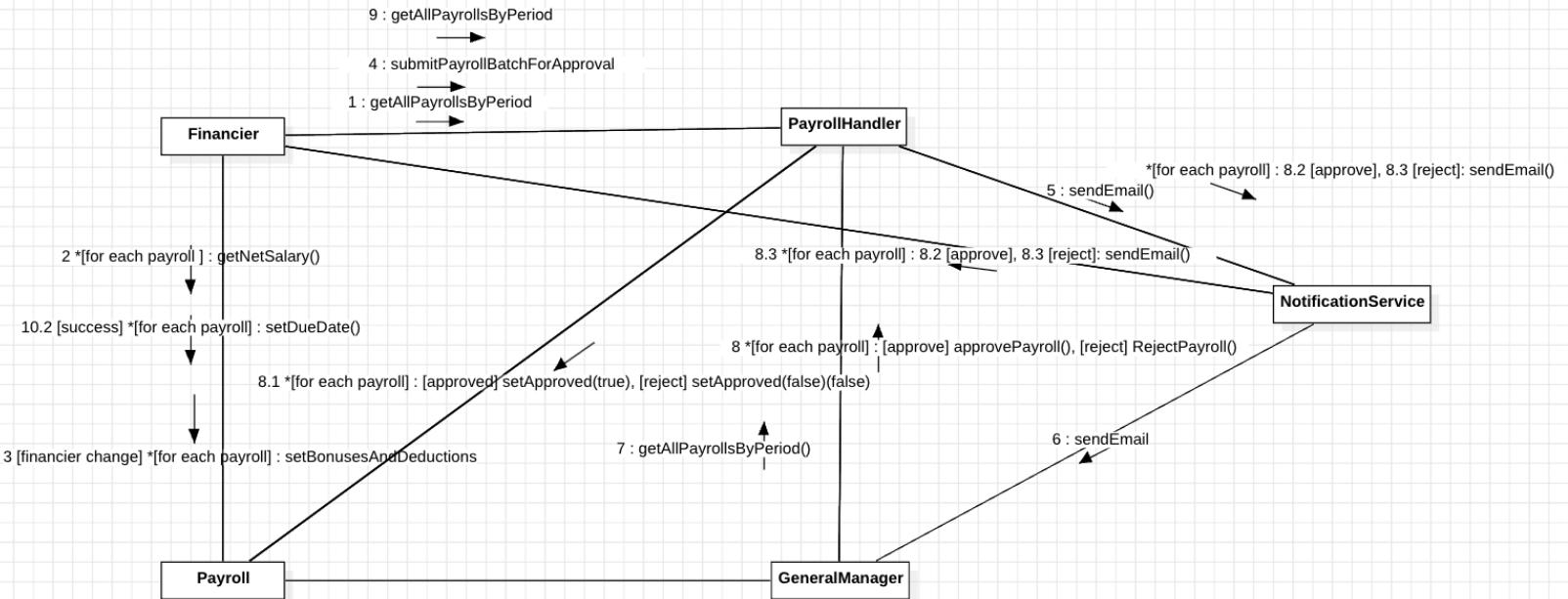


## CC\_GM\_05: Financial Statements Access — (*Jurgen Hila*)

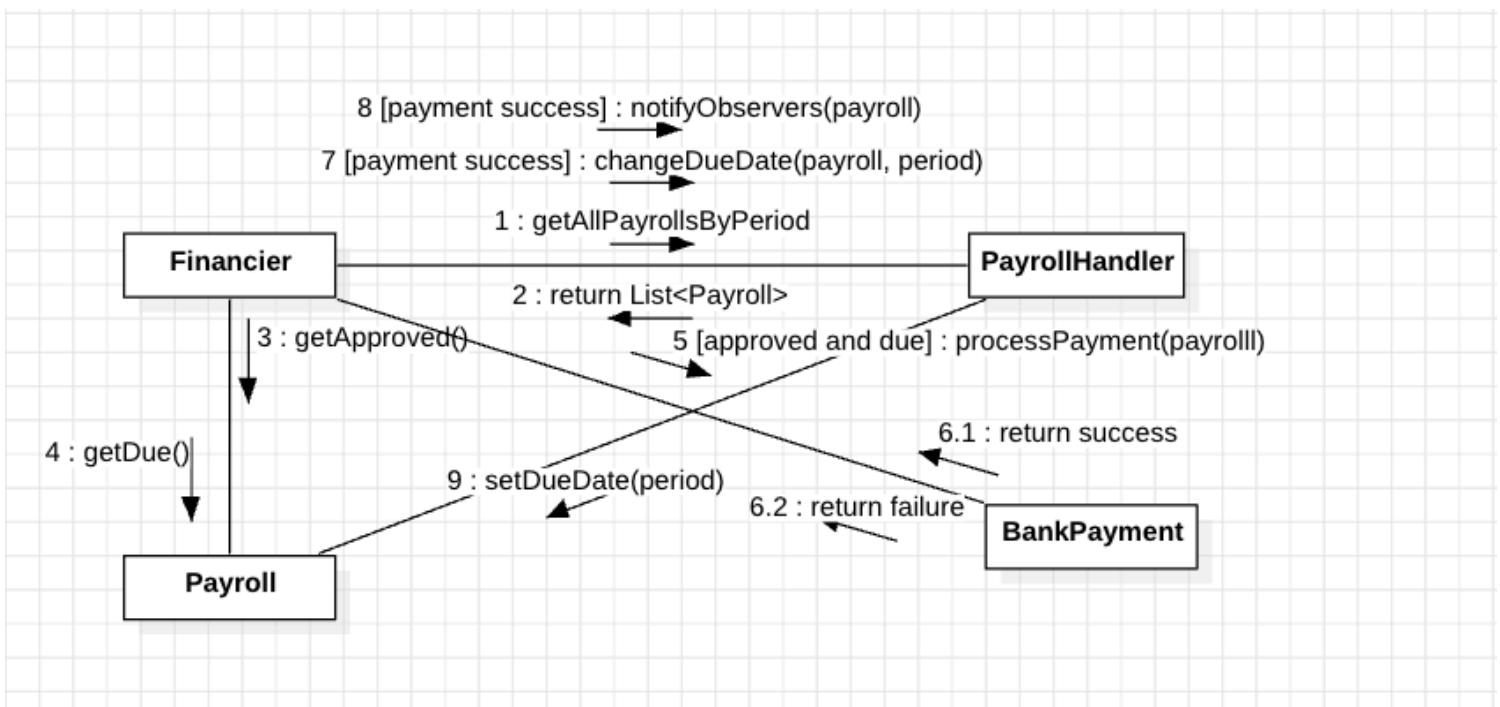


## CC\_FI\_01: Calculate Staff Payroll — (*Endri Baku*)

Financier and General Manager set up payrolls (Approvals and Submissions)

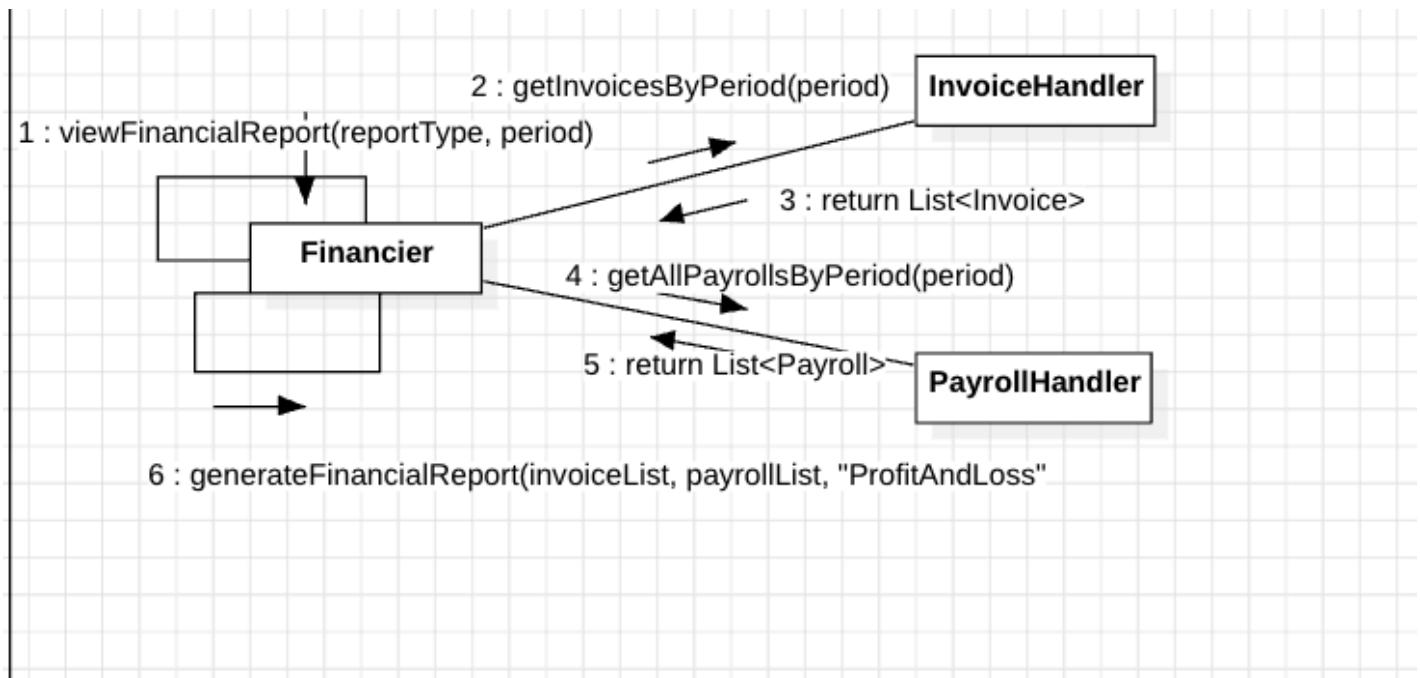


Financier Initializes payment when in Due Period



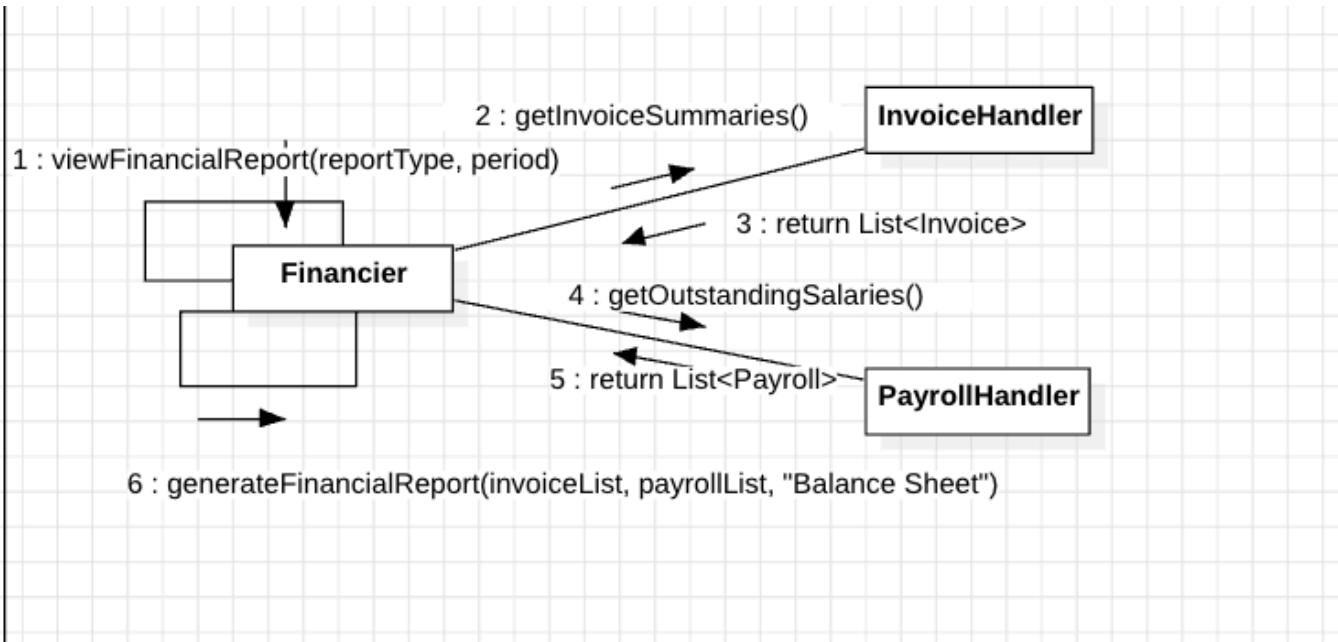
## CC\_\_FI\_02: Generate Financial Reports — (*Endri Baku*)

Profit and Loss Report



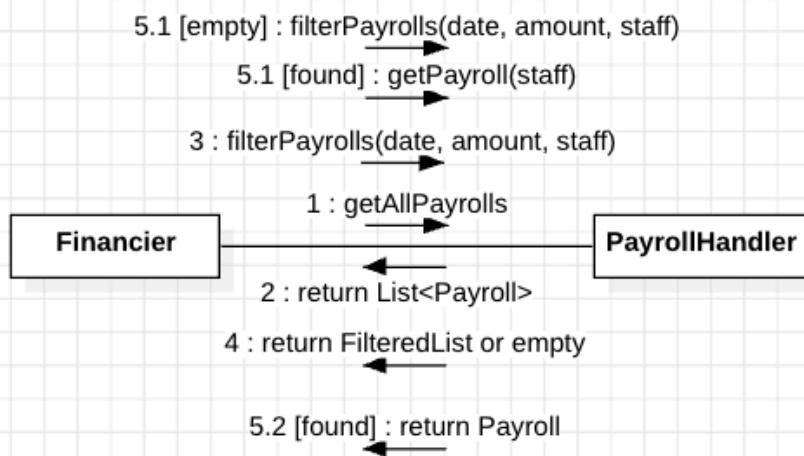
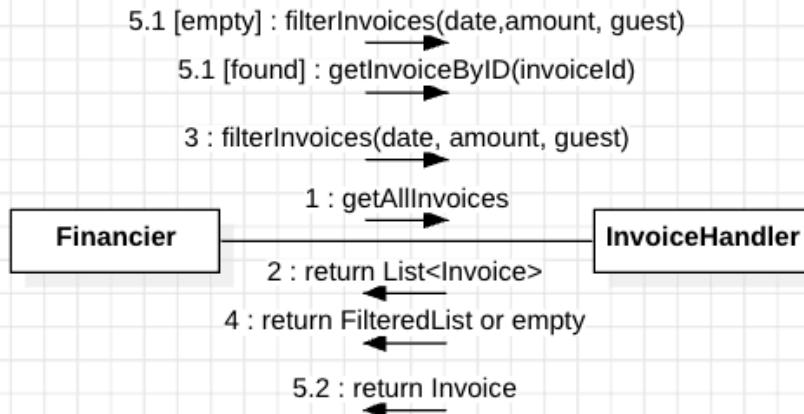
Balance Sheet

## *Hotel Management System [HMS] Requirements Specification*

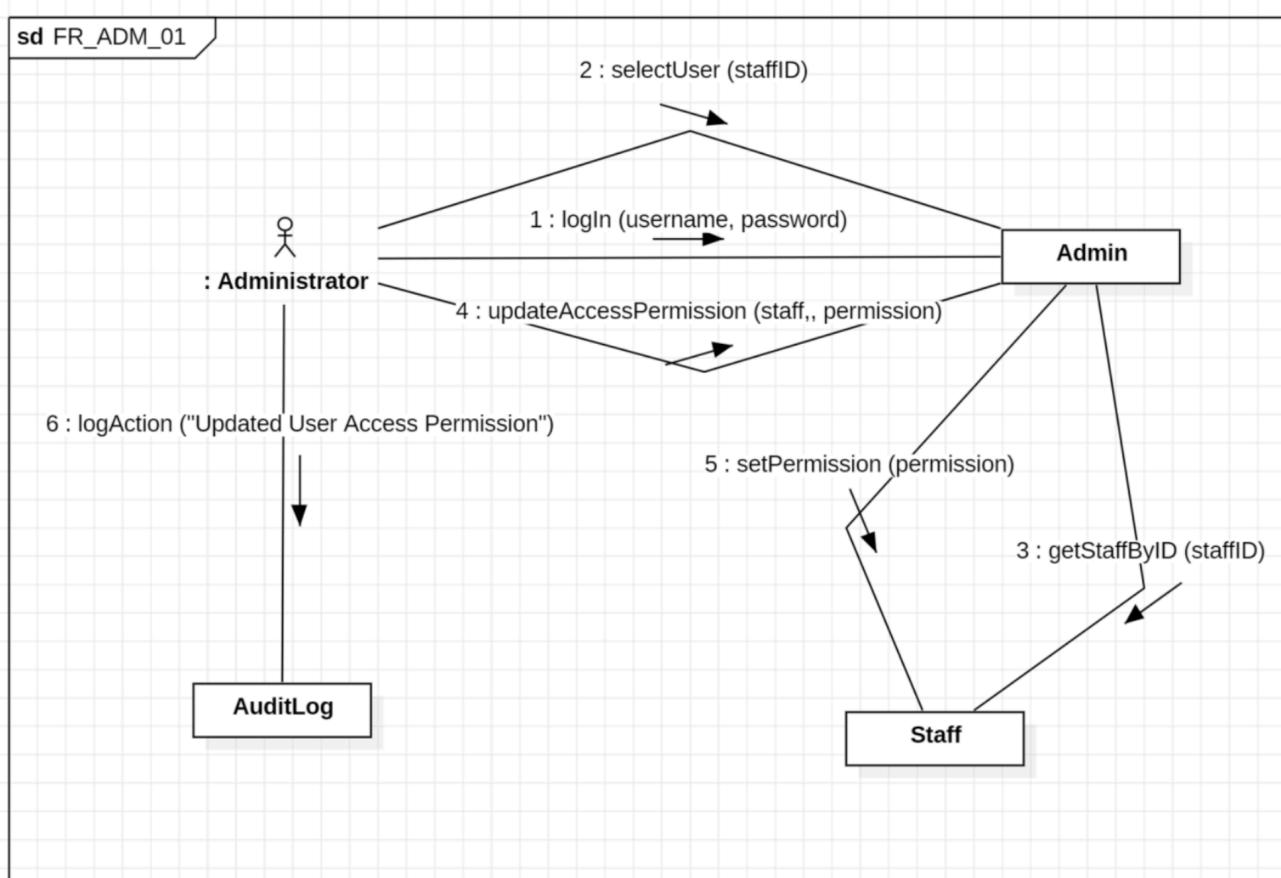


## CC\_FI\_03: Track Financial Transactions — (*Endri Baku*)

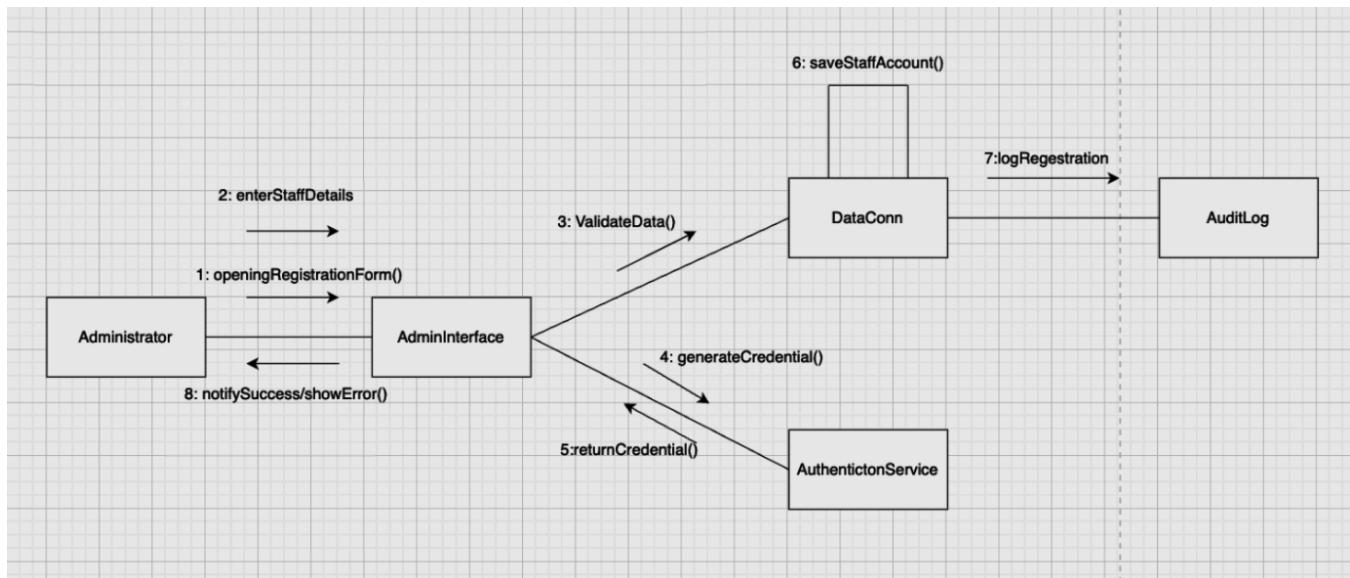
Tracking Invoices or Payrolls



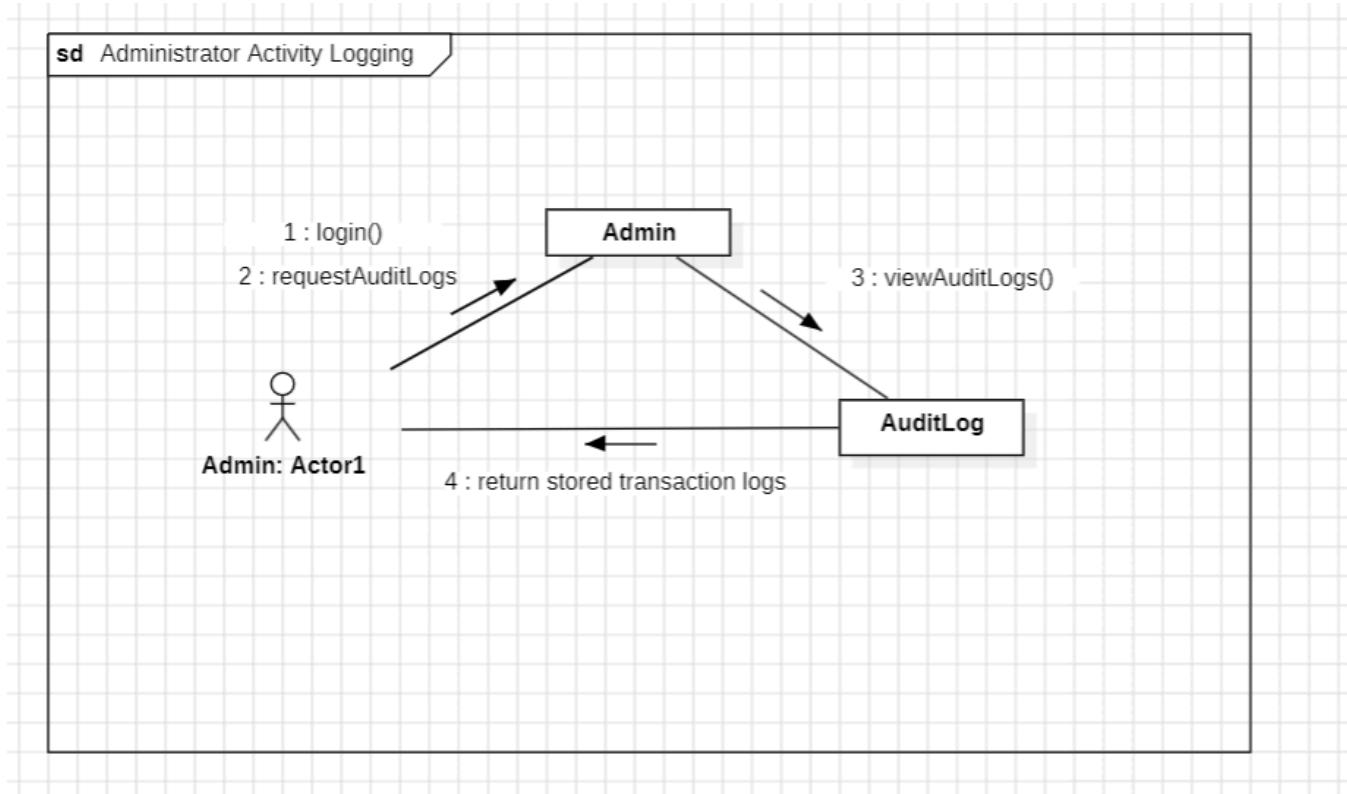
**CC\_\_ADM\_01: Manage User Access — (*Daron Delvina*)**



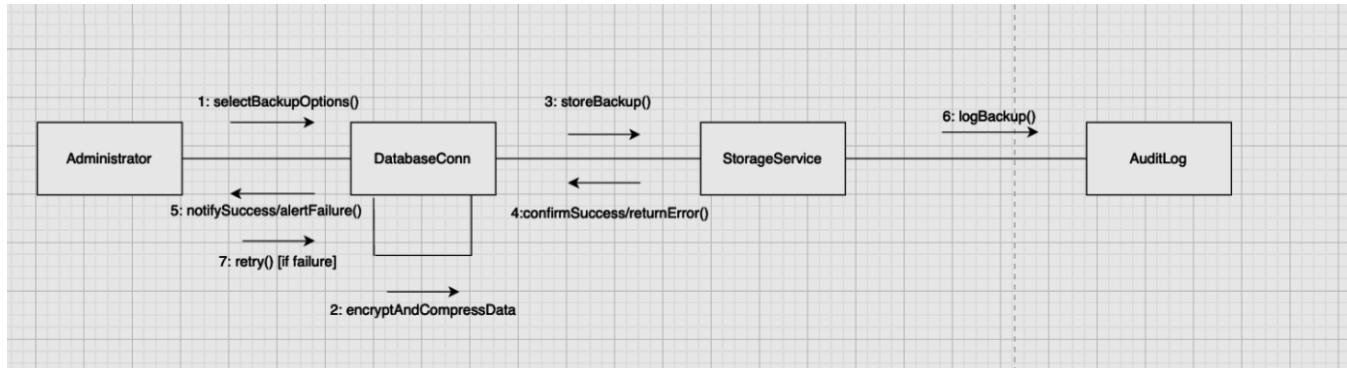
**CC\_\_ADM\_02: Backup and Restore the System — (*Xhois Cano*)**



### CC\_\_ADM\_03: Maintain Audit Logs — (*Jurgen Hila*)

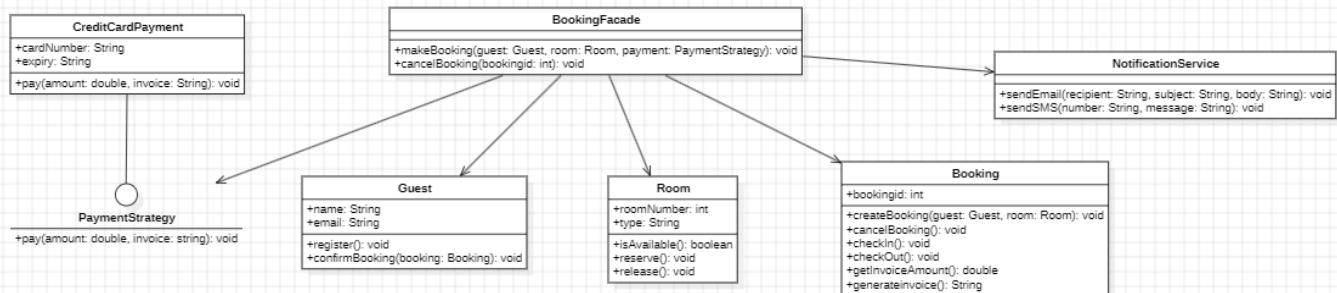


### CC\_\_ADM\_04: Register Staff Members — (*Xhois Cano*)



## 6. Design Patterns

### Façade design pattern of the Booking process (Daron Delvina, Orgest Baçova):



**Justification:** We have chosen to use this pattern for a couple of reasons. Although the original layout of the classes in the original class diagram are correct, the usage of the façade pattern offers a few more advantages.

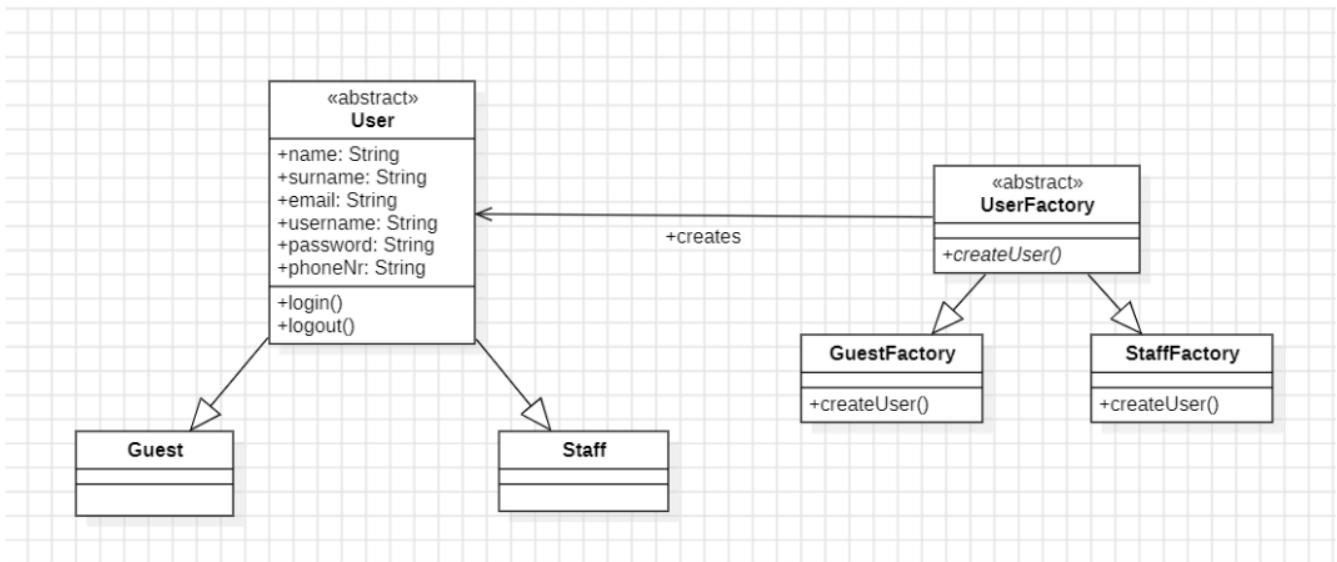
Operations like creating a new booking or cancelling an existing one would require deep understanding of multiple classes and the relationships between them making the code prone to errors and difficult to maintain.

This pattern can encapsulate interactions between the Guest, Room, Booking and payment classes. In doing so, the complexity of the operations is reduced.

System-wide changes are made more manageable. For example, if we want to add a new workflow, we would only need to make changes to the façade implementation.

Also, in the original class diagram, a complete booking process would require direct interaction with more classes, meanwhile the façade pattern reduces it to a single method call.

### Factory Pattern of the User registration process (Hazis Voda, Jurgen Hila):



The factory design pattern is used to provide an interface for creating objects in a superclass, allowing subclasses to alter the type of objects that will be created. This allows us to create users for guests and staff using a different factory class.

## **Strategy Pattern of the Guest Payment Process (Endri Baku, Sidrit Isufi):**

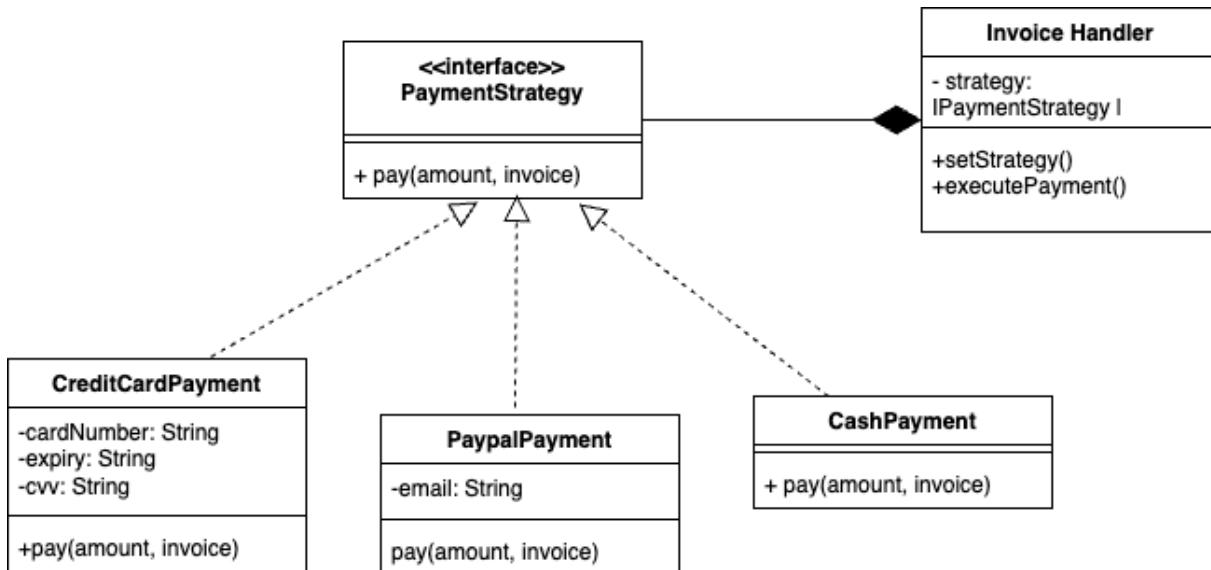
**Intent of the Pattern:** The Strategy Pattern is used to define a family of algorithms, encapsulate each one, and make them interchangeable. This pattern allows the behavior of an object to be selected at runtime.

**Context in the Hotel Management System:** In our Hotel Management System, the Strategy Pattern is implemented for the payment processing mechanism. This allows us to dynamically choose between multiple payment methods when processing transactions such as guest invoices.

### **Participants and Structure:**

- **IPaymentStrategy (Interface):** Declares the pay() method that each payment strategy implements.
- **Concrete Strategies:**
  - BankTransferPayment
  - CashPayment
  - CardPayment
  - (Optionally) CryptoPayment (would be easy to add)
- **Context Class:**
  - PayrollHandler or InvoiceHandler which maintains a reference to an IPaymentStrategy and uses it to execute payment.

## Hotel Management System [HMS] Requirements Specification



### Justification:

- **Flexibility:** Easily switch between different payment methods without changing the handler logic.
- **Maintainability:** Payment logic is isolated within separate strategy classes.
- **Extensibility:** New payment methods can be added without modifying existing code.
- **Cleaner Code:** Avoids complex conditionals or switch statements for handling different payment types.

**Conclusion:** The Strategy Pattern is an excellent fit for our Hotel Management System's payment module, as it cleanly supports multiple dynamic behaviors (payment methods) and ensures that our codebase remains modular and scalable.

## Proxy Pattern of the Guest Room Unlocking Process (Endri Baku):

### Intent

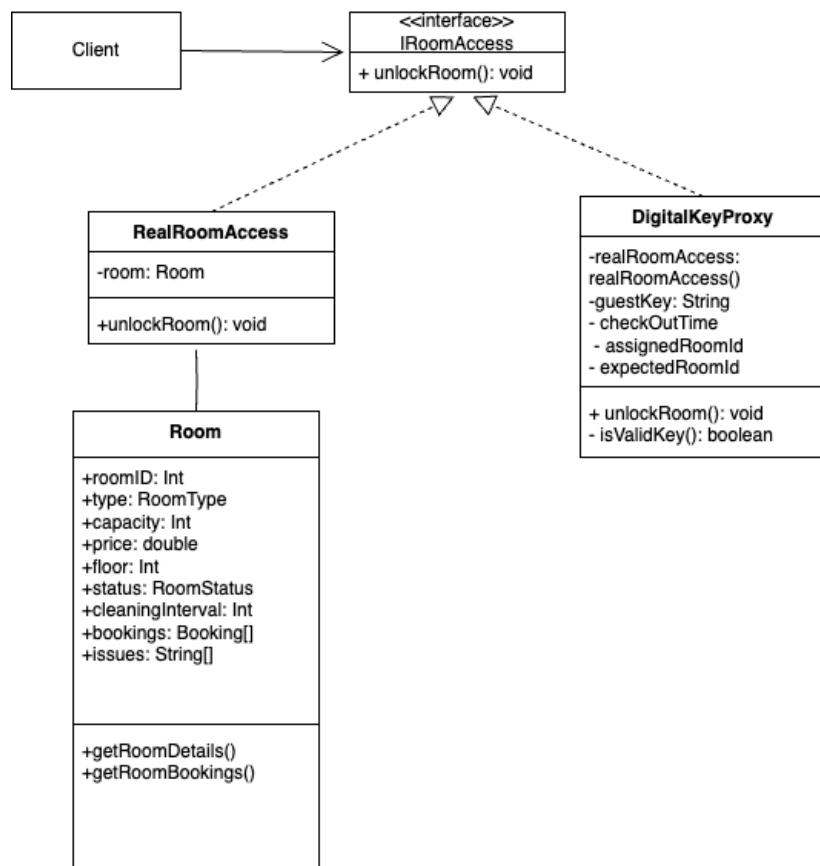
Lets you provide a substitute or placeholder for another object. A proxy controls access to the original object, allowing you to perform something either before or after the request gets through the original object.

### Motivation

In our Hotel Management System (HMS), unlocking a guest's room is a **sensitive operation** that must only be performed under strict conditions:

- The digital key must be valid.
- The guest must have checked in.
- The stay period must be active.

We use a **proxy object** to **validate these rules before allowing access** to the actual unlocking logic (RealRoomAccess), even though the implementation is entirely internal (no UI, no third-party SDK like Flexipass).



## Justification

We need to control access to sensitive resources (guest rooms) **without exposing internal logic** directly. A digital key must pass validation rules before room access is granted.

- **DigitalKeyProxy** acts as a secure gatekeeper.
- **RealRoomAccess** contains the core unlocking behavior.
- The proxy pattern allows us to **separate concerns**, keeping validation logic out of the real business object.

This pattern aligns well with the **security constraints** and **audit requirements** described in the requirements doc (e.g., page 10–11).

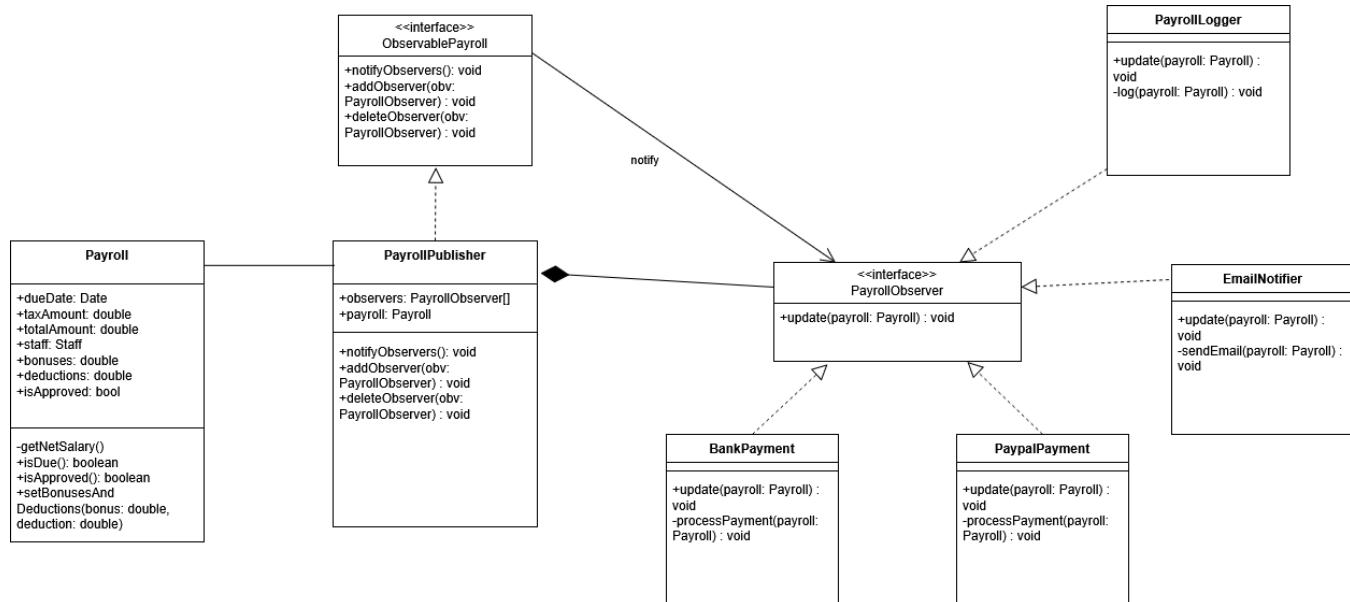
## Advantages

- **Access Control:** Prevents unauthorized access to sensitive operations like room unlocking.
- **Security Layer:** Adds pre-validation checks without modifying the core logic in RealRoomAccess.
- **Logging and Auditing:** Enables logging of all access attempts, which supports compliance and monitoring.
- **Separation of Concerns:** Clearly separates validation logic from room access implementation.
- **Open for Extension:** Additional behaviors (e.g., rate limiting, expiration checks) can be added without altering existing code.

## Drawbacks

- **Additional Indirection:** Introduces an extra layer of method calls, which can slightly increase complexity.
- **Maintenance Overhead:** Using many proxies across the system may impact readability and require careful organization.

## Observer Pattern of the Payroll Management Process (Sidrit Zela, Xhois Cano):



### Context in the Hotel Management System:

We decided to implement the Observer Pattern in our system for the staff payroll management process, since for each payroll, there are a number of steps that have to be done by the system: the payment itself, notifying the staff member, creating a log, etc. The observer Pattern allows all of these actions to be performed automatically when the payroll is due.

### Justification:

- In our implementation, the class Payroll Publisher is the concrete observable class, which notifies all the payment observers once the payroll is due.
- We can very easily add or remove observers without having to change the structure of the Payroll class making the system more flexible.
- Each observer operates independently of the others. Because of this, failures in one observer do not interfere with the operations of the other observers.