Department of Information and Communication Technology
Faculty of Technology
University of Ruhuna

Advanced Database Management Systems
ICT 3263
Group Assignment
System Requirements Specification

Group 2
Submitted to: Mr. P.H.P. Nuwan Laksiri

Submitted by:

1. TG/2019/491 – P.L.N.N. Dilshan
2. TG/2019/513 – E.A.P. Lakshita
3. TG/2019/516 – R.M.U.H.P. Ratnayake
4. TG/2019/525 – J.L. Rasanjana

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1.0. Introduction

1.1. Purpose

The purpose of this document is to present a detailed description about the hostel management system. This document will provide a brief description about the system, the purpose and features, what the system does, the users and technology used to build the system, the constraints under which it must operate and how the system will react to external elements. This document is intended for the stakeholders and developers of the system and will be handed to the lecturer-in-charge for the system's approval.

1.2. Scope of Project

This software system will be a hostel management system for the students who reside in the hotels in the faculty of technology, University of Ruhuna. The system will be designed to report any damages to the property or any missing property in the room the student resides in, including tables, cupboards, clothes rack, etc. These inquiries will be stored in a database with image proof to ensure they are damaged to the point they cannot be used. The inquiries will be reviewed by the sub warden and will check on these damages and will take necessary actions for the damaged or missing property, either repair them or replace them according to the property. If the sub warden did not check the inquiry for 3 days, then the inquiry will be sent to academic warden and if he/she did not check it for 7 days, it will be sent to the dean to take immediate action for the damaged or missing property. The system will maximize the efficiency of this process since the manual way will be slow and difficult to handle by users. It will ensure the damaged or missing property will be repaired or replaced according to the student's need.

This system will communicate with students, sub warden, academic warden and the dean via a web application. The current property of the hostel will be labeled with a QR code to identify the type of the property(Tables, chairs, etc) and the room it was situated. The system will be able to scan the QR code and can take a picture of the damage of the property. The user can state the sincerity of the damage in the inquiry form and the authorities can look up the damages and take immediate actions to fix them. A weekly report will be sent to the academic warden and a monthly report will be sent to the dean about the completed or uncompleted fixes for the property. The system will work on any device since it will be designed to be responsive to every device. The system will be designed with hibernate and there will be a database to store the complaints, property, users and more.

1.3. Glossary

Term	Definition
Database	Collection of all the information monitored by this system.
Dean	The person who verifies the adequacy of instruction, monitors academic integrity, confer degrees, and are responsible for student recruitment, admission, and academic progress.
Hostel Warden	The person responsible for monitoring, counseling, and mentoring students who reside in campus hostels.
Property	Any objects and items in the hostel that belong to the faculty.
QR Code	A type of two-dimensional matrix barcode designed to store data and information.
Senior Student Counselor	The person who works with the students, supporting the emotional and professional growth of students, developing and monitoring counseling support programs, and providing educational and vocational guidance.
Student	The person who attends academic activities in the university and resides in the hostel.
Web application	An application program that is stored on a remote server and delivered over the internet through a browser interface

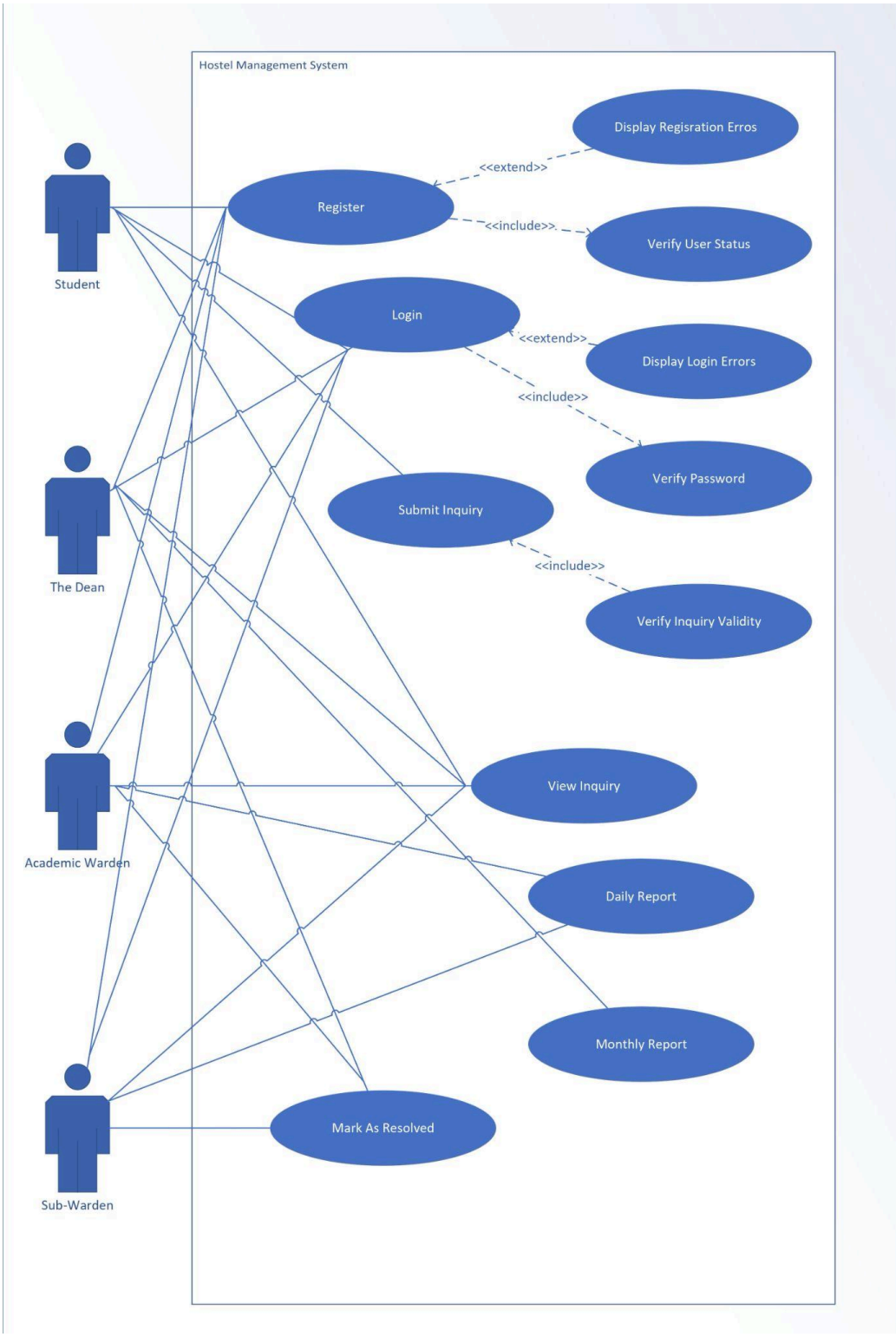
1.4. Overview of Document

The next chapter, the Overall Description section, of this document gives an overview of the functionality of the product. It describes the informal requirements and is used to establish a context for the technical requirements specification in the next chapter.

The third chapter, Requirements Specification section, of this document is written primarily for the developers and describes in technical terms the details of the functionality of the product. Both sections of the document describe the same software product in its entirety, but are intended for different audiences and thus use different language.

2.0. Overall Description

2.1 System Environment



The hostel management system has four active actors and one cooperative system. The Student, the Dean, Academic Warden and Sub-Warden access the system through the Internet and must be registered in order to use the system. During the registration, the system will display any registration errors done by the user and will verify the user's status whether the user is correctly registered to the system. After the registration, the user should login and the system will display any login errors and verify user login. The student can access the system and submit an inquiry via the system and the system will check whether the inquiry submitted is valid or not. If it is invalid, the system will reject the following inquiry and notify the user to submit the inquiry again with correct information.

After submitting the inquiry, the Sub-Warden can login and view the inquiry via the system and he/she can look up the damages and take necessary actions to fix or replace the damages. After that, the Sub-Warden will mark it as a completed inquiry via the system to notify the users that the inquiry is completed. If the Sub-Warden did not view an inquiry in 3 days, itr will be sent to the Academic Wardan to check the inquiry for inspection. If the inquiry was not checked by Academic Wardan for 7 days, it will be sent to the DEan of the faculty to ensure the inquiry process will be executed with no issue. A daily report will be sent by the system to the Sub-Warden and the Academic Wardan about any completed or uncompleted inquiries and a monthly report will be sent to the Dean of the faculty to view all of the inquiries completed in the month.

2.2 Functional Requirements Specification.

2.2.1 General Use Cases

This section outlines the use cases that need to be executed by every active user.

Use Case: **Registration Use Case**

Brief Description
In order to access the system, the user registers to the system and the system checks for any invalid information submitted to the registration form.

Initial Step-by-Step Description

1. The user opens the application and goes to the registration form.
2. The user enters necessary information to the registration form.
3. The system checks for any unnecessary or empty information via verification and ensures users to type valid and correct information to the registration form.
4. The system records every data to the database to verify with the login process.

5. The system gives a notification to the user that the registration process is complete.

Use Case: **Login Use Case**

Brief Description
The users will login to the system to access the system.

Initial Step-by-Step Description

1. The user opens the application and goes to the login form.
2. The user types the necessary credentials to the login form.
3. The system checks for the verification and if the user entered the incorrect credentials, the system will inform the user to enter the correct credentials.
4. After entering the correct credentials and user clicking on the login button, the system checks for credentials and gives access to the system.

2.2.2 Student Use Case

This section outlines the use cases that need to be executed by the Student.

Use Case: **Submit Use Case**

Brief Description
The student opens an inquiry and shows the damages for the property and submit it for replacement or repair.

Initial Step-by-Step Description

1. The Student logins to the system and goes to the inquiry form.
2. The Student enters the relevant data to the inquiry form and shows the damages via a photograph. The Student will upload the photograph and scan the relevant QR code for the property to identify the property.
3. After entering correct and relevant data to the inquiry form, the Student clicks the submit button.
4. The system checks the validity of the inquiry information and if it is incomplete, the form will not submit and tells the user to check if there is anything missing in the form.
5. If the Student submits correct information, the system will add the details of the inquiry to the database and it will be shown to the Sub-Wardan when he/she logs into the system.

2.2.3 Sub-Warden Use Case

This section outlines the use cases that need to be executed by the Sub-Warden.

Use Case: View Inquiry **Use Case**

Brief Description
The Sub-Warden views the inquiries and takes necessary actions.

Initial Step-by-Step Description

1. The Sub-Warden logins to the system and goes to the View Inquiries section.
2. The Sub-Warden checks every inquiry and takes necessary actions to fix/repair/replace the property that is shown in the inquiry.
3. After fixing the relevant damages, the Sub-Warden will mark the inquiry as “Resolved” via the system.

2.2.4 Academic Wardan Use Case

This section outlines the use cases that need to be executed by the Academic Wardan.

Use Case: View Inquiry **Use Case**

Brief Description
The Academic Wardan views the inquiries and takes necessary actions.

Initial Step-by-Step Description
Before this user case can be initiated, the system will wait until Sub-Warden does not view an inquiry for 3 days.

1. The Academic Wardan logins to the system and goes to the View Inquiries section.
2. The Academic Wardan checks every inquiry and takes necessary actions to fix/repair/replace the property that is shown in the inquiry.
3. After fixing the relevant damages, the Academic Warden will mark the inquiry as “Resolved” via the system.

2.2.5 Dean Use Case

This section outlines the use cases that need to be executed by the Dean.

Use Case: View Inquiry **Use Case**

Brief Description
The Dean views the inquiries and takes necessary actions.

Initial Step-by-Step Description
Before this user case can be initiated, the system will wait until Academic Warden or Sub-Warden does not view an inquiry for 7 days.

1. The Dean logins to the system and goes to the View Inquiries section.
2. The Dean checks every inquiry and takes necessary actions to fix/repair/replace the property that is shown in the inquiry.
3. After fixing the relevant damages, the Dean will mark the inquiry as “Resolved” via the system.

2.2.6 System Use Case

This section outlines the use cases that need to be executed by the system.

Use Case: Issue Daily/Monthly Reports Use Case

Brief Description
The system will issue daily and monthly reports to Sub-Warden, Academic Warden and the Dean.

Initial Step-by-Step Description

1. The system issues a report to the Sub-Warden and the Academic Wardan daily about the inquiries that are resolved and unresolved.
2. The system issues a report to the Dean monthly about the inquiries that are resolved and unresolved.

2.3 User Characteristics

The Student should be computer and internet literate and should be able to login to the system and fill the inquiry form without any issues. The Student should be able to navigate the system and take necessary pictures of the damages and scan the QR code to submit an inquiry.

The Sub-Warden and the Academic Warden should be computer and internet literate and should be able to navigate the system and view the inquiries and check them to take necessary actions for the damages. Also the Sub-Warden should be able to scan the QR code and ad properties to the system. The Academic Warden will inform the Sub-Wardan to take necessary actions if any inquiries are being ignored by the Sub-Warden.

The Dean should be computer and internet literate and should be able to navigate the system and view the inquiries and check them to take necessary actions for the damages. The Dean should inform the Sub-Warden and the Academic Wardan to take necessary actions if any inquiries are being ignored.

2.4 Non-Functional Requirements

The application or the system should have a good user interface for users to navigate easily. The system will be on a server with high speed internet speed. It should be suitable for mobile since the users can use the system anywhere they go. The speed of the user navigation will depend on the connection in the area and the device they have. The database should be made with advanced database management techniques and it should have triggers, views, stored procedures etc.

3.0. Requirements Specification

3.1 External Interface Requirements.

User Interfaces

Student Interface - The system should provide a user-friendly web or mobile interface for students to report damaged items using QR codes.

Sub Warden Interface - Sub Wardens should have access to a dedicated interface for receiving notifications, investigating damaged items, and viewing daily damage reports.

Academic Warden Interface - Academic Wardens should have a separate interface for reviewing and approving/rejecting damage reports.

QR Code Scanner

The system should be able to interface with a QR code scanning component to process codes scanned by students and sub-warden accurately.

Integration with the Database

The system should be able to retrieve and update information about the relevant system facilities and locations from the database.

Data Storage and Backup

The system should interact with a database management system for storing damage reports and related data securely.

Authentication and Authorization

The system should interface with an authentication system to verify the identity of users (students, Sub Warden, Academic Warden, The dean) and grant appropriate permissions based on roles and access levels.

3.2 Functional Requirements

3.2.1 Student Registration Use Case

Use Case	Registration
Actor	Student
Description	Students register for system access and validation.
Precondition	Student not registered.
Postcondition	Students successfully registered.

Flow of Activities	1. User opens the application and accesses the registration form. 2. User provides necessary information. 3. System verifies information and records it in the database. 4. System notifies users of successful registration.

3.2.2 Student Login Use Case

Use Case	Login
Actor	Student
Description	Students log in to access the system.
Precondition	Student registered
Postcondition	Student successfully logged in.
Flow of Activities	1. The student opens the application and accesses the login form. 2. Students enter login credentials. 3. Student verifies credentials. 4. If incorrect, the system informs the user to enter correct credentials. 5. Upon successful login, the system grants access.

3.2.3 Sub-Warden Registration Use Case

Use Case	Registration

Actor	Sub-warden
Description	Sub-warden registers for system access and validation.
Precondition	Sub-warden not registered.
Postcondition	Sub-warden successfully registered.
Flow of Activities	1. Sub-warden opens the application and accesses the registration form. 2. Provides necessary information. 3. System verifies information and records it in the database. 4. System notifies users of successful registration.

3.2.1 Sub-Warden Login Use Case

Use Case	Login
Actor	Sub-warden
Description	Sub-warden log in to access the system.
Precondition	Sub-warden registered
Postcondition	Sub-warden successfully logged in.
Flow of Activities	1. Sub-warden opens the application and accesses the login form. 2. Sub-warden enters login credentials. 3. Sub-warden verifies credentials. 4. If incorrect, the system informs the user to enter correct credentials. 5. Upon successful login, the system grants access.

3.2.4 Student Submit Inquiry Use Case

Use Case	Submit Inquiry
Actor	Student
Description	submit property inquiry with damages.
Precondition	Student logged in
Postcondition	Inquiry submitted and shown to Sub-Warden.
Flow of Activities	1. Student logs in and accesses the inquiry form. 2. Student enters inquiry details and scans the qr code of relevant damaged items. 3. System validates inquiry data. 4. If incomplete, the system prompts the user to provide missing information. 5. Upon successful submission, inquiry details are added to the database.

3.2.5 Sub-Warden Submit Inquiry Use Case

Use Case	Submit Inquiry
Actor	Sub-warden
Description	submit property inquiry with damages.
Precondition	User logged in
Postcondition	Inquiry submitted

Flow of Activities	1. User logs in and accesses the inquiry form. 2. User enters inquiry details and scans the qr code of relevant damaged items. 3. System validates inquiry data. 4. If incomplete, the system prompts the user to provide missing information. 5. Upon successful submission, inquiry details are added to the database.

3.2.6 Student View submitted Inquiry Use Case

Use Case	View submitted Inquiry
Actor	Student
Description	students view the details of an inquiry they have submitted through the system.
Precondition	Student is logged in and has previously submitted an inquiry.
Postcondition	Students can view the details of the submitted inquiry.
Flow of Activities	1. Students navigate to the "My Inquiries" or "Inquiry History" section. 2. The system displays a list of inquiries submitted by the student. 3. Student selects a specific inquiry from the list to view details. 4. System presents the detailed information of the selected inquiry.

3.2.7 Sub-warden View submitted Inquiry Use Case

Use Case	View Inquiry
Actor	Sub-warden
Description	Sub-Warden views and takes actions on inquiries.
Precondition	Sub-Warden logged in.
Postcondition	Inquiry marked as "Resolved" after action.
Flow of Activities	1. Sub-Warden logs in and accesses the "View Inquiries" section. 2. Sub-Warden reviews inquiries and addresses property issues. 3. After fixing damages, Sub-Warden marks the inquiry as "Resolved" via the system.

3.2.8 Academic Warden View Inquiry Use Case

Use Case	View Inquiry
Actor	Academic warden
Description	Academic-Warden views and takes actions on inquiries.
Precondition	Academic-Warden logged in.
Postcondition	Inquiry marked as "Resolved" after action.

Flow of Activities	1. Academic-Warden logs in and accesses the "View Inquiries" section. 2. Academic-Warden reviews inquiries and addresses property issues. 3. After fixing damages, Academic-Warden marks the inquiry as "Resolved" via the system.

3.2.9 Generate and Issue Daily Report Use Case

Use Case	Generate and Issue Daily Report
Actor	System
Description	The system generates and issues daily reports to the Sub-Warden and Academic Warden regarding resolved and unresolved inquiries.
Precondition	The system has access to the necessary data regarding inquiries and their status.
Postcondition	Daily reports are generated and delivered to the Sub-Warden and Academic Warden.
Flow of Activities	1. The system retrieves data on inquiries and their status from the database. 2. For each inquiry, the system compiles a daily report. 3. The system sends the daily report to the Sub-Warden. 4. The system sends the same daily report to the Academic Warden. 5. The Sub-Warden and Academic Warden receive and review the daily reports to stay updated on the status of inquiries.

3.2.10 Sub Warden View Daily Report Use Case

Use Case	View Daily Report by Sub warden
Actor	Sub-warden
Description	Sub-Warden views the daily report summarizing activities and incidents within the hostel.
Precondition	Sub-Warden is logged in and has access to the daily reports section.
Postcondition	Sub-Warden can access and review the daily report for the hostel's activities and incidents.
Flow of Activities	1. Sub-Warden navigates to the "Daily Report". 2. Sub-Warden selects the daily report. 3. System presents the detailed content of the selected daily report. 4. Sub-Warden reviews the contents of the selected daily report, including any incidents, damages, or issues reported. 5. Sub-Warden may take necessary actions based on the information in the report and contacting relevant parties. 6. Sub-Warden has the option to print or download the report for further analysis or reporting.

3.2.11 Academic Warden View Daily Report Use Case

Use Case	View Daily Reports by Academic warden

Actor	Academic warden
Description	Academic-Warden views daily reports summarizing activities and incidents within the hostel.
Precondition	Academic-Warden is logged in and has access to the daily reports section.
Postcondition	Academic-Warden can access and review daily reports for the hostel's activities and incidents.
Flow of Activities	1. Academic-Warden navigates to the "Daily Reports". 2. Academic-Warden selects the daily report. 3. System presents the detailed content of the selected daily report. 4. Academic-Warden reviews the contents of the selected daily report, including any incidents, damages, or issues reported. 5. Academic-Warden may take necessary actions based on the information in the report, such as initiating investigations, addressing issues, or contacting relevant parties. 6. Academic-Warden has the option to print or download the report for further analysis or reporting.

3.2.12 Generate and Issue Monthly Report Use Case

Use Case	Generate and Issue Monthly Report
Actor	System
Description	The system generates and issues monthly reports to the Dean regarding resolved and unresolved inquiries.

Precondition	The system has access to the necessary data regarding inquiries and their status.
Postcondition	Monthly report is generated and delivered to the Dean.
Flow of Activities	1. The system retrieves data on inquiries and their status from the database for the entire month. 2. The system generates a monthly report. 3. The system sends the monthly report to the Dean. 4. The Dean receives and reviews the monthly report to assess the overall status of inquiries and to make informed decisions or take necessary actions.

3.2.13 Dean View Monthly Report Use Case

Use Case	View monthly report
Actor	The Dean
Description	Dean views the monthly report summarizing activities, incidents, and performance within the hostel for a specific month.
Precondition	Dean is logged in and has access to the monthly reports section.
Postcondition	Dean can access and review the monthly report for the hostel's activities, incidents, and performance for a specific month.

Flow of Activities	1. Dean navigates to the Monthly Reports. 2. The system displays a list of available monthly reports. 3. Dean selects the latest report or a specific monthly report by choosing the desired month and year from the list. 4. Dean reviews the contents of the monthly report. 5. Dean may also choose to generate and save a PDF or printed version of the report.

3.3 Detailed Non-Functional Requirements.

Performance Requirements

Response Time - The system shall generate and send notifications to the Sub Warden within a few seconds from the time the student scans the QR code.

Report Generation Time - The system shall generate damage reports for Sub Wardens and Academic Wardens within a few seconds.

Security

Authentication - Users must authenticate themselves before accessing the system to prevent unauthorized access.

Access Control - Role-based access control should be implemented to ensure that only authorized personnel can approve or reject damage reports.

Reliability

The system must be highly reliable, ensuring uninterrupted operation with minimal downtime

Data Storage and Retention

The system shall store damage reports and associated data for a relevant timeframe to maintain a historical record of incidents.

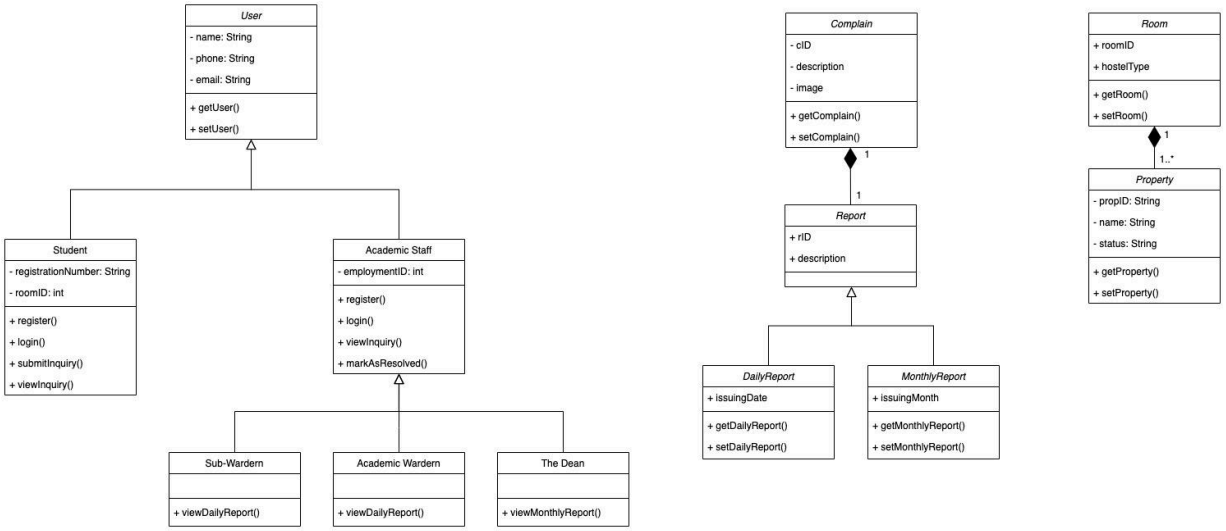
Compatibility

The system shall be compatible with a range of modern web browsers and mobile devices to accommodate users with varying technology preferences.

Backup and Recovery

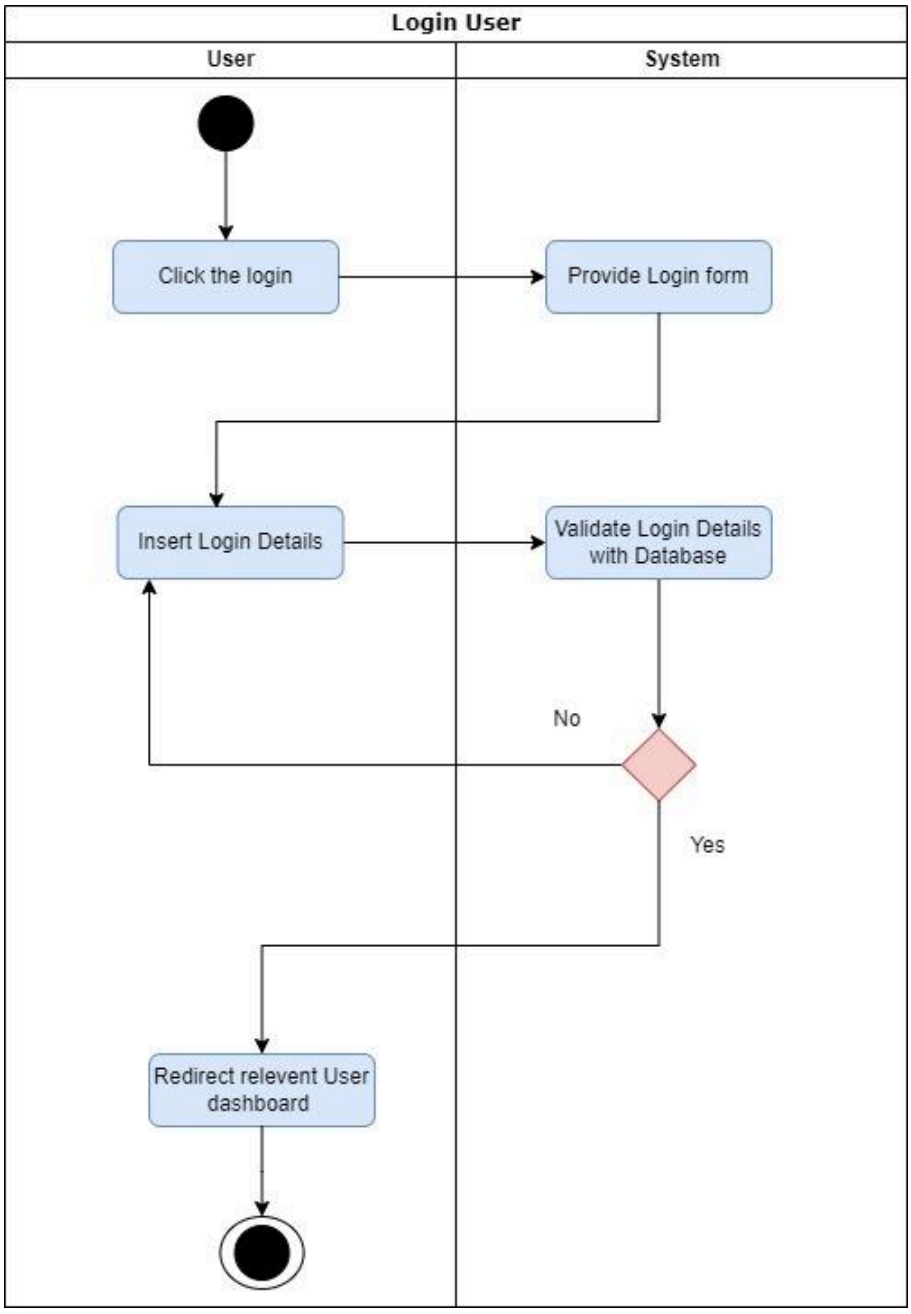
Regular automated backups of system data shall be performed, and a disaster recovery plan should be in place to minimize data loss in case of system failures.

3.4 Class Diagram

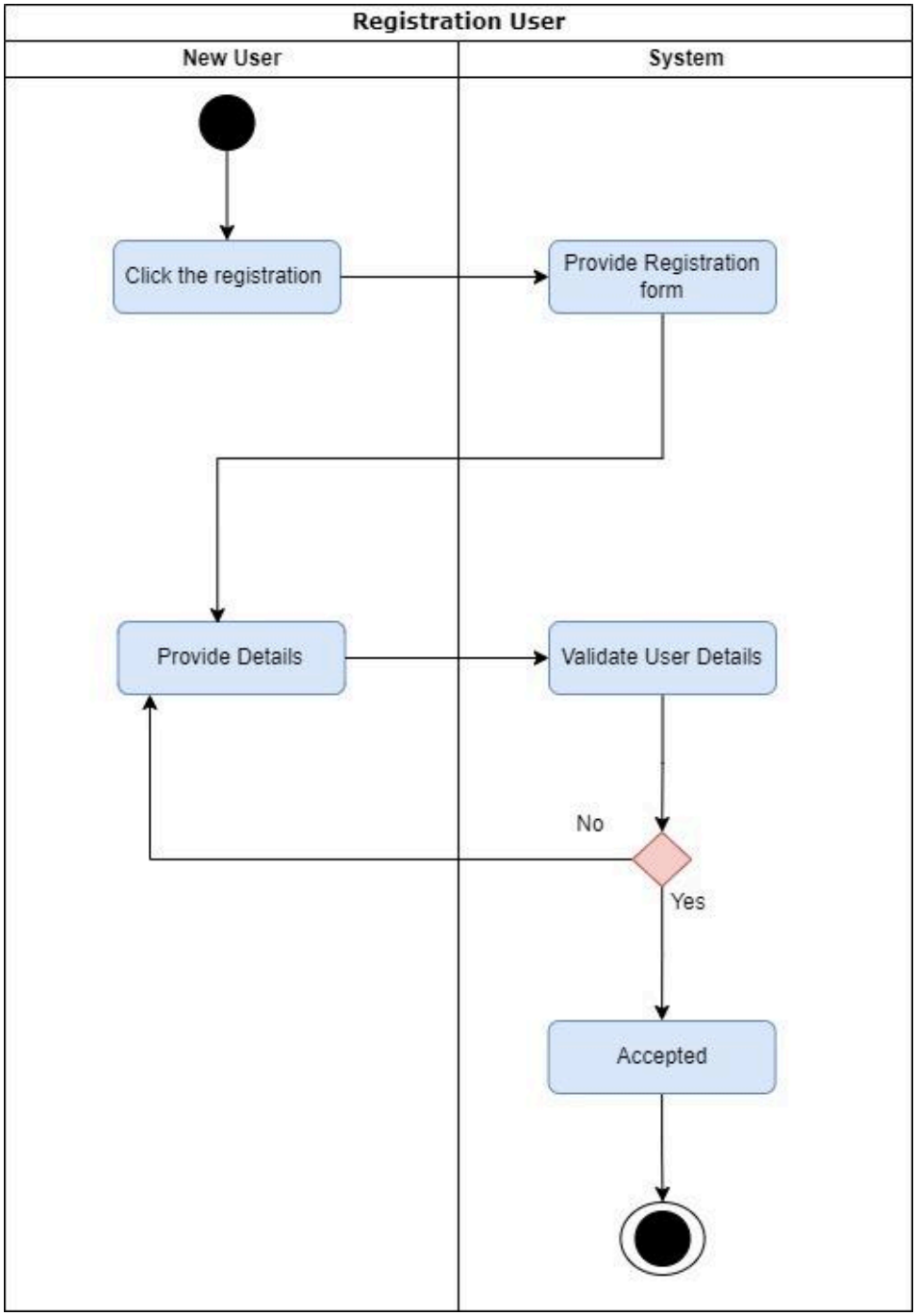


3.5 Dynamic Aspects of the System

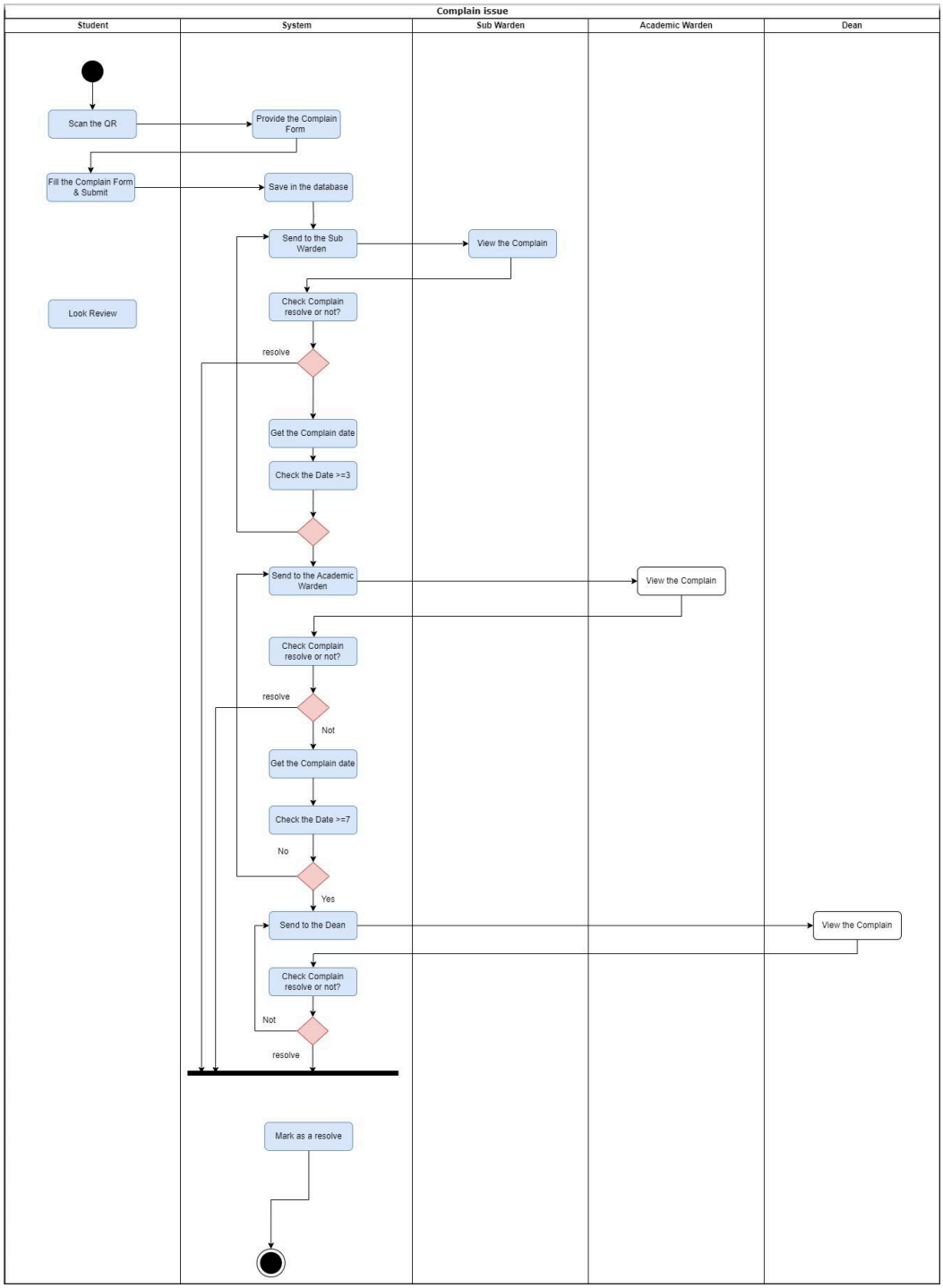
Login User Activity



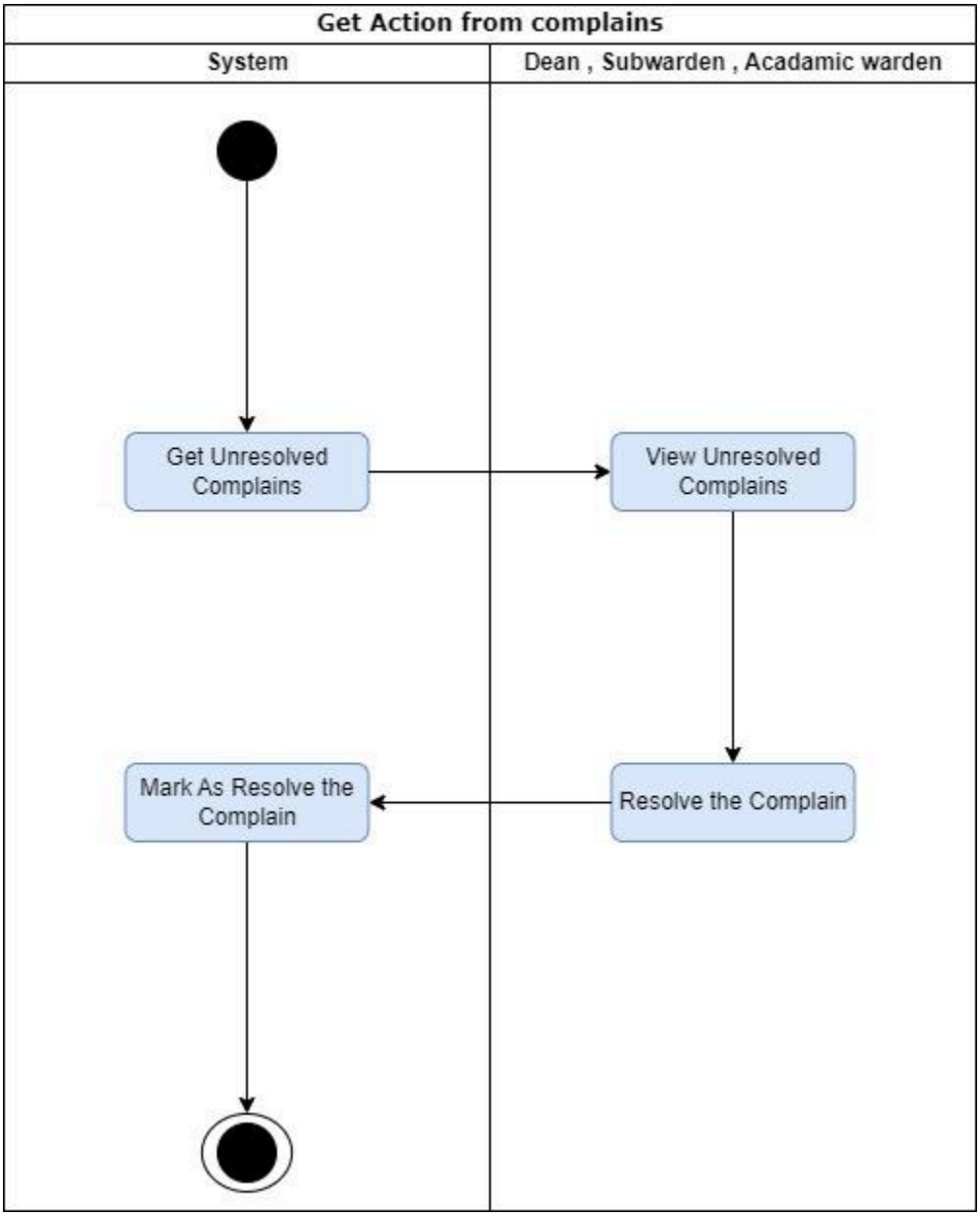
Register User Activity



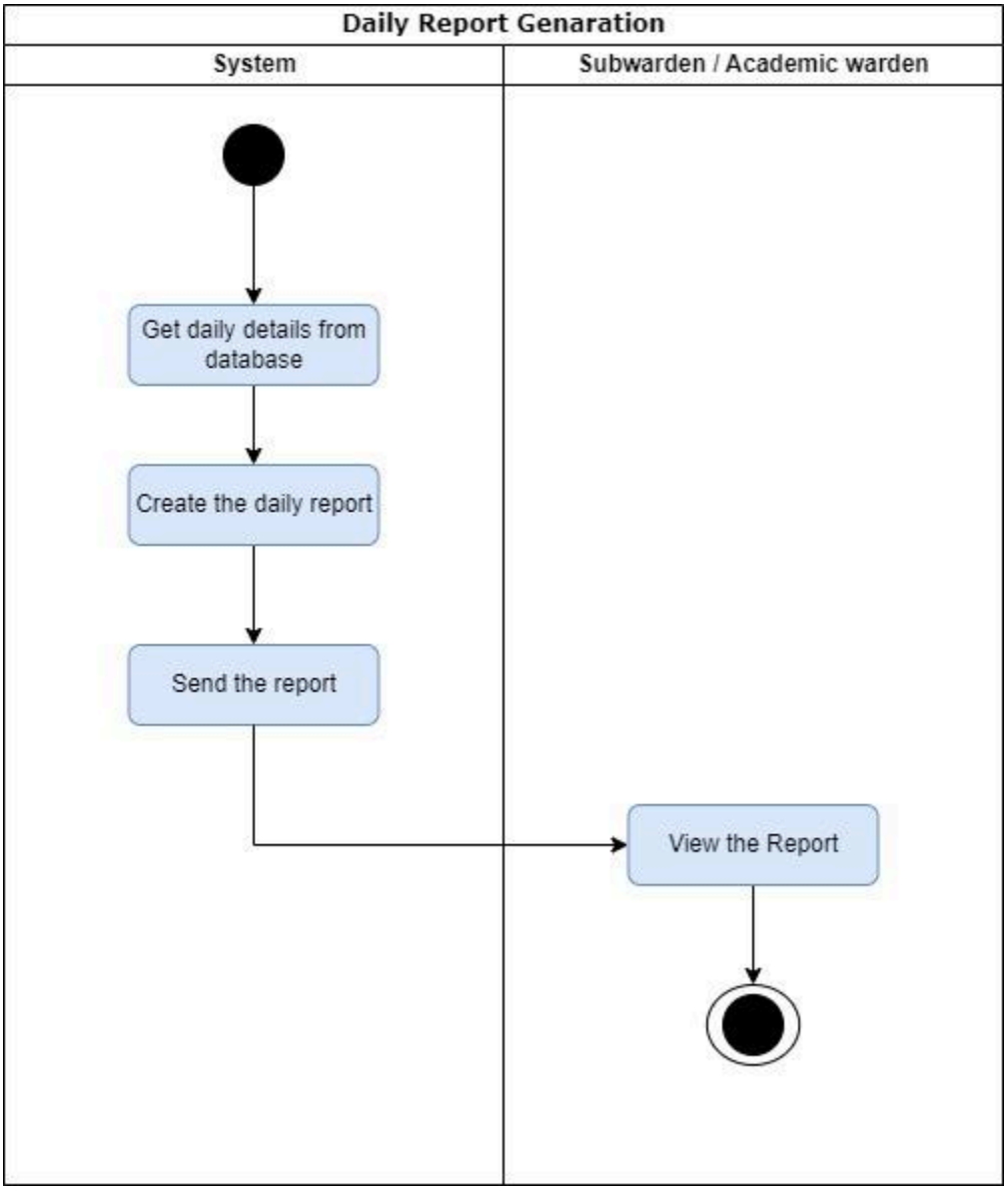
Complaint Activity



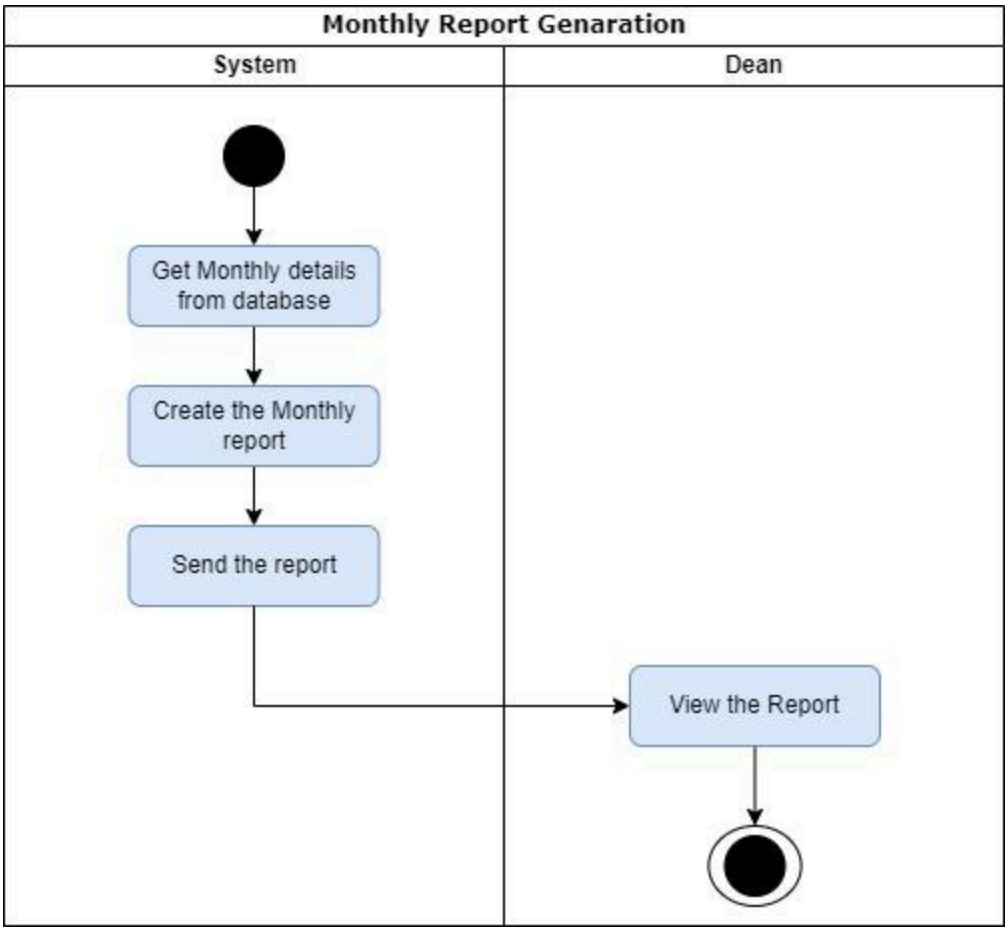
Resolve Activity



Daily Report Activity

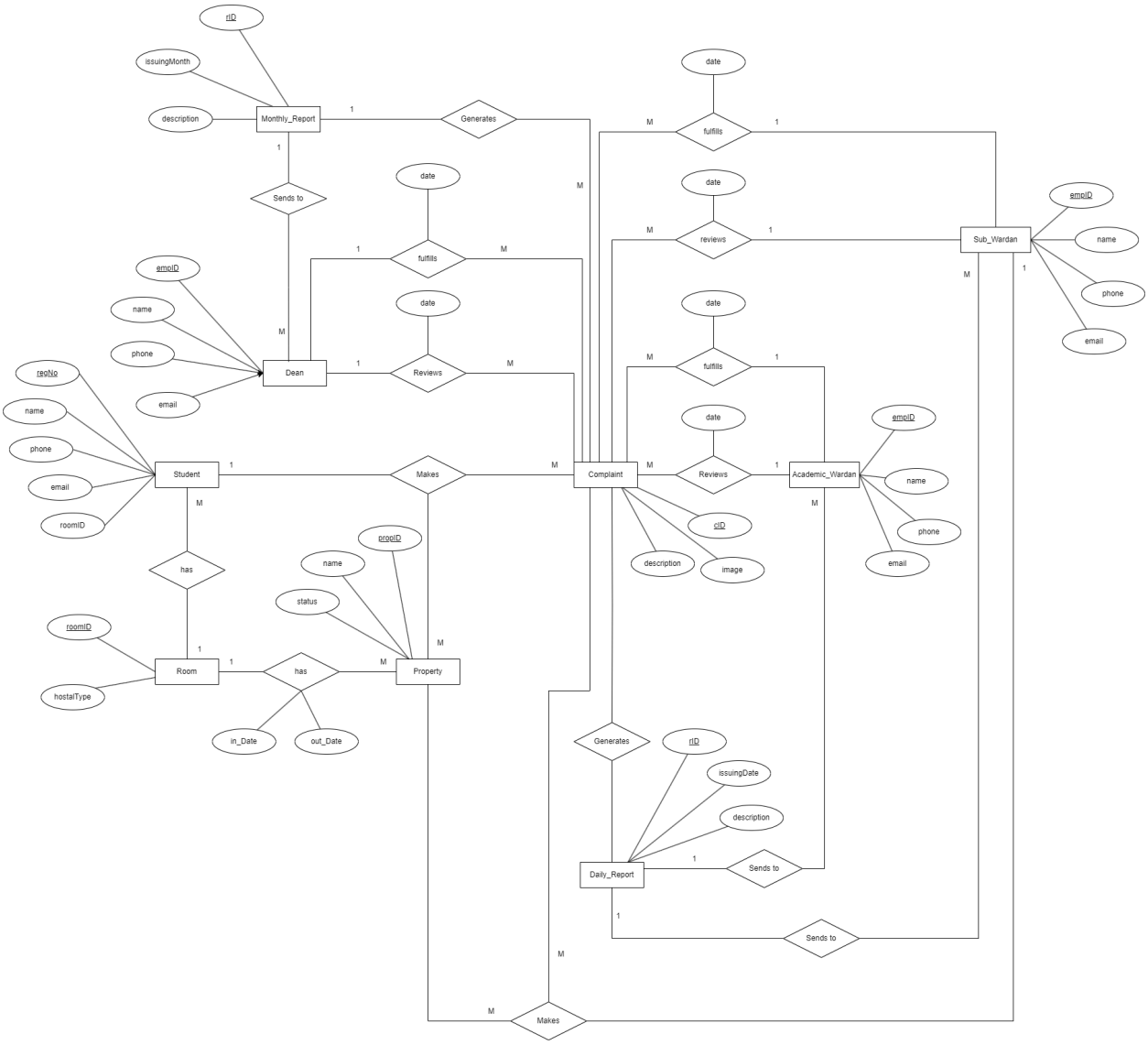


Monthly Report Activity



3.5 Logical Structure of the Data

ER Diagram



3.3.2 Security

The system will be running on a secured server with restrictions to some users who use the system. Only authorized personnel will be able to access the system. There will be no restrictions to read access. The forms will be validated and any sensitive data will be sent via secured connection. The system will be restricted to any personnel who are not involved with the university.