SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE UNIVERSITY
DELHI NCR

Laundry Management System

Software Engineering Project
CSD 326

Phase 1 Project Evaluation
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Supervisor:

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Team Members:

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Chapter One

Introduction

The current state of college laundry services often leaves much to be desired, with students facing various inconveniences due to a lack of structure and efficient communication channels. This results in challenges such as an information gap, inefficient communication methods, limited feedback channels, and difficulties in managing lost and found items. To address these issues, there is a pressing need for a comprehensive solution that enhances the overall management of student laundry services.

The proposed system aims to tackle these challenges head-on by offering a robust platform for managing laundry services tailored specifically to the needs of college students. By implementing features such as secure login and user authentication, a student laundry portal, a lost and found page, a complaint box, admin views for laundry management, and efficient communication channels, the system endeavors to streamline and enhance the laundry experience for both students and administrators.

This introduction sets the stage for discussing the goals and objectives of the proposed system, which are centered around addressing the identified challenges and improving the overall efficiency, transparency, and user experience of college laundry services. Through careful design and implementation, the system aims to mitigate existing issues while providing students with a seamless and convenient laundry management solution.

1.1 Problem Statement

The current college laundry service suffers from a lack of structure, leading to a multitude of inconveniences for students. This manifests in several ways:

Information Gap

Students lack a system to track their laundry throughout the process (collection, washing, drying, delivery). This obscurity creates:

Inefficient Communication

Students resort to overloaded hostel WhatsApp groups for updates, leading to confusion and information overload.

Limited Feedback Channels

Students lack a direct way to address laundry-related concerns (complaints, suggestions). This results in delayed problem resolution and unclear processes.

Lost and Found Issues

Missing laundry items are challenging to locate due to the absence of a dedicated portal, causing frustration and wasted time.

Chapter Two

Background Research

Background Research to Optimize Design Decisions

Existing Systems

- Analyzed functionalities (tracking, booking) in university and commercial laundry management systems to identify features adaptable for the college.

Student Needs

Conducted focus groups and student interviews to understand:

- Laundry usage frequency.
- Pain points (delays, lost items, communication issues).
- Desired features (tracking, lost and found portal, mobile app).

UI/UX

Reviewed best practices for user-friendly interfaces in laundry service applications. This included analyzing successful laundry app examples on platforms like ThemeForest to understand common design patterns and functionalities.

Technical Feasibility

Consulted with students with web development experience and sought guidance from professors to know more about open-source platforms and software development options.

Chapter Three

Proposed System

Addressing Identified Challenges

This system offers a comprehensive solution for managing student laundry services by addressing the identified challenges:

3.1 Goals and Objectives

Table 1: Goals and Objectives

Sl. No.	Description
1	Ensure secure access to the system and protect sensitive student information. Implement username and password-based login for students and admin.
2	Monitor the status of laundry bags throughout the process (collected, washed, dried, delivered). Access past laundry transactions for reference. Receive updates on the status of laundry via push notifications or email.
3	Allow students to post lost items with details (description, date, etc.). Provide a transparent system for students to locate their lost items. Implement a simple process for students to claim found items.
4	Provide a direct communication channel for students to address concerns and offer suggestions. Offer an easy-to-use form for submitting complaints or suggestions.
5	Allow administrators to oversee and manage the overall laundry system. Provide an overview of laundry statistics, pending requests, and resolved issues. Enable administrators to monitor and update the status of laundry bags. Access the complaint box to address student concerns. Ability to communicate with separate hostels about their laundry updates.
6	Broadcast critical updates, changes in laundry services, or announcements directly to hostels. Provide the ability to send targeted messages or announcements to specific hostels or all students.

Chapter Four

Project Planning

4.1 Project Setup

Table 2: Project Setup

#	Decision Description
1	Maintain a central repository for project files on Github.
2	To manage the project and track the requirements and user stories on JIRA software
3	A centralised server will be used to host the application on Vercel
4	Use a fast and secure database for storing user data in an encrypted format like Supabase.
5	Develop the application using appropriate web frameworks like Next.Js for web framework and Tailwind as CSS framework.

4.2 Stakeholders and Their Roles

Table 3: Stakeholders

Stakeholder	Role	Description
SNU students	Users	Students of the university who will be utilizing the laundry management system for their laundry needs.
Dr. Suchi Kumari	Mentor	A faculty member or advisor providing guidance and support for the project.
SNU admin	User	Administrators or officials from the university responsible for overseeing and managing the laundry services.
Laundry service provider	User	External entity or organization responsible for providing laundry services to the university.
Kartheek	Team member	Member of the development team responsible for contributing to the implementation of the laundry management system.
Sanjay	Team member	Member of the development team responsible for contributing to the implementation of the laundry management system.
Tanishka	Team member	Member of the development team responsible for contributing to the implementation of the laundry management system.
Ramakrishna	Team member	Member of the development team responsible for contributing to the implementation of the laundry management system.

4.3 Resource Descriptions

Table 4: Project Resources

Resource	Resource Description	Quantity
Cloud Server	A cloud-based server on which the computation will take place.	1
Project Management	Advanced project management tool often used for software development projects, but customizable for various project types. It can track tasks, issues, and bugs - JIRA.	1
Capstone Team	Our team of students who will be the primary developers of the project.	4
Dr. Suchi Kumari	Our mentor who will guide us regarding the technical aspects of the project.	1
Version Control	A distributed version control system widely used for tracking changes in source code during software development - GIT.	1
Database Server	Open-source relational database management system (RDBMS) suitable for storing user information, laundry schedules, and maintenance logs.	1
Workstations	Workstations for the developers in which they will be developing the product - VSCODE.	1

4.4 Assumptions

Table 5: Assumptions

#	Assumption
A1	The team members will be able to communicate anytime during the week.
A2	Scope of the project will remain constant throughout.
A3	Project costs will stay the same as initially budgeted costs.
A4	It is assumed that the college administration has allocated sufficient database details of the enrolled students in the university for implementing the laundry solution project.
A5	It is assumed that the development team will adopt an iterative and AGILE approach to software development, continuously gathering feedback from users and stakeholders to identify areas for improvement and prioritize feature enhancements accordingly.
A6	Team members will be able to familiarize themselves with the Next.Js, Supabase, JIRA and Github.

Chapter Five

System Analysis and Design

5.1 Overall Description

The proposed student laundry management system aims to streamline and enhance the laundry experience for students residing in university hostels or dormitories by offering a comprehensive digital solution. Through secure login and user authentication, students and administrators gain access to features designed to optimize the laundry process, enhance transparency, and facilitate communication. The system ensures data security and confidentiality through a username and password-based login mechanism, preventing unauthorized access and safeguarding sensitive student information. A dedicated student laundry portal allows students to monitor the status of their laundry bags from collection to delivery, access past transactions, and receive timely updates via push notifications or email. Additionally, a Lost & Found page enables students to post details of lost items, facilitating a transparent process for reclaiming belongings and enhancing accountability. A built-in complaint box provides a direct communication channel for students to voice concerns and suggestions, enabling administrators to address issues promptly and improve service quality based on feedback. Administrators have access to a comprehensive dashboard to oversee and manage the entire laundry system, including monitoring statistics, resolving issues, and updating bag statuses. The system also facilitates seamless communication between administrators and hostel staff or residents, allowing for the broadcast of critical updates or announcements directly to specific hostels or all students, thereby enhancing overall efficiency and effectiveness. Overall, the system's design prioritizes user convenience, transparency, and communication, aiming to optimize the student laundry experience and improve service quality within university hostel environments.

5.2 Users and Roles

Table 6: Roles and Responsibilities

User	Description
Front-end Developer	Responsible for designing and developing the user interface of the student laundry portal, ensuring an intuitive and user-friendly experience for students and administrators.
Back-end Developer	Tasked with building the backend infrastructure of the system, including server-side logic, database management, and API development to support the functionality of the laundry management system.
Database Administrator	Manages the database infrastructure, including database design, optimization, and maintenance, to ensure efficient storage and retrieval of student and laundry-related data.
Cloud Architect	Designs and manages the cloud infrastructure where the system is hosted, ensuring scalability, availability, and reliability using cloud services such as AWS, Azure, or Google Cloud Platform.
Project Manager	Oversees the planning, execution, and monitoring of the system development project, coordinating tasks, managing resources, and ensuring adherence to project timelines and objectives.
System Architect	Designs the overall architecture of the system, including the integration of various components such as frontend, backend, database, and communication channels, to ensure scalability, reliability, and security.

5.3 User Stories (Requirements)

Table 7: User Stories Requirement

ID	Feature Name	Story Points
010	Request laundry services	12
020	Track status of laundry	6
030	Provide an API to enable real-time tracking of laundry status	4
040	Provide an API to handle authentication of laundromats	8
050	Provide an API to handle authentication of students	8
060	Receive notification when laundry is ready for pick up	5
070	View history of the laundry	6
080	View all pending laundry requests	15
090	Update status of laundry requests	8
100	Communication with students	10
110	Report lost and found clothes	18

5.4 User Stories

SPRINT 1

Estimated User Story Points: 22

Actual Completed User Story Points: 22

Table 8: Sprint 1

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
010	***As a student**, I want to be able to request laundry service **so that** I can submit a request through the system.*	C	12	12	100%

ID	Acceptance Criteria	Verification
011	The student should be able to input necessary details such as pickup time, num of clothes & special instructions.	Create test cases to verify that all mandatory fields in the student laundry portal are validated properly.
012	Upon submission, the system should confirm the successful submission of the request and provide a reference or confirmation number.	Create a case to verify that upon successful submission of a laundry request, a confirmation message is displayed.
013	The submitted request should be stored in the system for further processing	Create test cases to verify that submitted laundry requests are stored correctly in the database.

ID	Tasks	Resource
001	Design and develop the laundry student portal.	Tanishka
002	Develop backend logic to handle and store laundry submission.	Kartheek
003	Generate and display confirmation messages upon successful request submission	Sanjay

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
020	***As a student**, I want to track the status of my laundry request **so that** I know if it is received, processing, or completed.*	C	6	6	100%

ID	Acceptance Criteria	Verification
021	The status of each laundry request should be clearly displayed along with relevant details such as pickup/delivery times.	Create test cases to verify that the status of each laundry request is accurately displayed on the student interface.
022	The student should be able to refresh the status page to see the latest updates.	Create test cases to verify that the status page can be refreshed to show the latest updates in real-time.

ID	Tasks	Resource
001	Design and develop the status tracking feature in the student portal.	Tanishka
002	Implement backend logic to retrieve and update the status of laundry requests.	Kartheek

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
030	***As an API**, I want to provide endpoints for retrieving the status of laundry requests **so that** students can track the progress of their requests in real-time.*	C	4	4	100%

ID	Acceptance Criteria	Verification
031	The API should provide endpoints for retrieving the status of laundry requests based on student authentication.	Create test cases to verify that the API provides endpoints for retrieving the status of laundry requests.
032	Endpoints should return the current status of each laundry request along with relevant details such as pickup/delivery times and special instructions.	Create test cases to verify that the endpoints return the current status of each laundry request accurately along with relevant details.
033	Authentication mechanisms should ensure that only authorized students can access the endpoints for tracking their requests.	Create test cases to verify that authentication mechanisms ensure only authorized students can access the endpoints for tracking their requests.

ID	Tasks	Resource
001	Develop API endpoints for retrieving laundry status.	Ramakrishna
002	Implement authentication mechanisms for the endpoints.	Ramakrishna
003	Test authentication mechanisms to ensure proper authorization.	Sanjay

SPRINT 2

Estimated User Story Points: 16

Actual Completed User Story Points: 16

Table 9: Sprint 2

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
040	***As an API**, I want to handle authentication **so that only authorized staff** can access endpoints related to processing laundry.*	C	8	8	100%

ID	Acceptance Criteria	Verification
041	The API should implement authentication and authorization mechanisms to validate laundromat staff credentials.	Create test cases to verify that the API implements authentication mechanisms to validate staff credentials.
042	Endpoints related to processing laundry requests should be protected and accessible only to authorized laundromat staff.	Create test cases to verify that endpoints related to processing laundry requests are accessible only to authorized staff.
043	Access to protected endpoints should be validated using authentication tokens or other secure mechanisms.	Create test cases to verify that access to protected endpoints is validated using authentication tokens or other secure mechanisms.

ID	Tasks	Resource
001	Implement authentication and authorization using APIs.	Sanjay
002	Protect endpoints related to processing laundry requests and configure access control.	Sanjay
003	Test authentication and authorization mechanisms to ensure proper functionality.	Ramakrishna

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
050	***As an API**, I want to provide endpoints for student registration and authentication **so that students** can securely access the laundry management system.*	C	8	8	100%

ID	Acceptance Criteria	Verification
051	The API should provide endpoints for student registration, allowing them to create new accounts with necessary details.	Create test cases to verify that the API provides endpoints for student registration.
052	Endpoints should support authentication mechanisms for securely verifying student credentials during login.	Create test cases to verify that endpoints support authentication mechanisms for securely verifying student credentials during login.
053	Upon successful authentication, the API should generate and return an authentication token for accessing protected endpoints.	Create test cases to verify that the API generates and returns authentication tokens upon successful authentication.

ID	Tasks	Resource
001	Develop API endpoints for student registration.	Sanjay
002	Implement authentication mechanisms for the endpoints.	Sanjay
003	Test authentication mechanisms to ensure proper verification of student credentials.	Ramakrishna

SPRINT 3

Estimated User Story Points: 11

Actual Completed User Story Points: 11

Table 10: Sprint 3

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
060	***As a student**, I want to be notified by email when my laundry bag is ready for pickup **so that** I can be prepared to recieve it..*	C	5	5	100%

ID	Acceptance Criteria	Verification
061	The system should send a notification to the student's registered email address when their laundry bag is ready for pickup.	Create test cases to verify that the system sends an email notification to the student upon their laundry bag being ready for pickup.
062	The notification should include relevant details such as the pickup location and any special instructions provided by the student.	Create a case to verify that the email notification includes all necessary details such as pickup time and special instructions.

ID	Tasks	Resource
001	Implement email notification feature in the backend logic.	Ramakrishna
002	Design email template for notifications with all relevant details.	Sanjay

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
070	***As a student**, I want to view the history of my laundry **so that** I can keep track of my previously given laundry.*	C	6	6	100%

ID	Acceptance Criteria	Verification
071	The system should provide a dedicated section or page for students to view their laundry history.	Create test cases to verify that there is a dedicated section/page for viewing laundry history on the student interface.
072	The laundry history should include details such as previous requests, status, pickup/delivery times, and any special instructions provided.	Create test cases to verify that all previous laundry requests are displayed along with relevant details in the history section.
073	The history should be sortable and filterable based on various criteria (e.g., date, status).	Create test cases to verify that sorting and filtering options work correctly based on different criteria such as date and status.

ID	Tasks	Resource
001	Develop the user interface for the laundry history section/page.	Tanishka
002	Implement backend logic to retrieve and display the laundry history data.	Kartheek
003	Implement sorting and filtering functionality for the laundry history.	Tanishka

SPRINT 4

Estimated User Story Points: 15

Actual Completed User Story Points: 15

Table 11: Sprint 4

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
080	***As a laundromat**, I want to view all pending laundry requests **so that** I can assign them to available machines for processing.*	C	15	15	100%

ID	Acceptance Criteria	Verification
081	The system should provide a dashboard or interface where staff can view all pending laundry requests.	Create test cases to verify that the system provides a dashboard or interface for viewing pending laundry requests.
082	Laundromat should be able to filter and sort the pending requests based on various criteria (e.g., pickup time, status).	Create test cases to verify that laundromat can filter and sort pending requests based on diff criteria accurately.
083	Staff should have the option to assign pending requests to available machines for processing.	Create test cases to verify that staff can assign pending requests to available machines correctly.

ID	Tasks	Resource
001	Develop the dashboard or interface for laundromat staff members to view pending laundry requests.	Tanishka
002	Implement sorting and filtering functionality for pending laundry requests.	Kartheek
003	Implement functionality to assign pending requests to available machines.	Kartheek

SPRINT 5

Estimated User Story Points: 18

Actual Completed User Story Points: 18

Table 12: Sprint 5

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
090	***As a laundromat**, I want to update the status of each laundry request **so that** I can mark it as received, processing or completed in the system.*	C	8	8	100%

ID	Acceptance Criteria	Verification
091	The system should provide options for laundromat staff members to update the status of each laundry request.	Create test cases to verify that laundromat staff members have options to update the status of each laundry request.
092	Staff members should be able to change the status to various predefined values (e.g., received, processing, completed).	Create test cases to verify that staff members can change the status to different predefined values accurately.
093	Status updates should be reflected in real-time and visible to students when they track their laundry requests.	Create test cases to verify that status updates are reflected in real-time and visible to students when they track their laundry.

ID	Tasks	Resource
001	Develop the user interface or functionality for staff members to update the status of laundry requests.	Tanishka
002	Implement functionality to allow staff members to change the status of laundry requests.	Kartheek
003	Verify that status updates are reflected in real-time for students.	Ramakrishna

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
100	***As a laundromat*** *staff member, I want to communicate with students* ***so that*** *any issues or concerns with their laundry requests can be addressed.*	C	10	10	100%

ID	Acceptance Criteria	Verification
101	The system should provide a messaging or communication feature for laundromat staff members to contact students regarding any issues or concerns with their laundry requests.	Create test cases to verify that the messaging or communication feature is accessible for staff members.
102	Staff members should be able to send messages to specific students or all students with pending laundry requests.	Create test cases to verify that staff members can send messages to specific students or all students with pending laundry requests.
103	Students should receive notifications/alerts when they receive a message from laundromat staff members.	Create test cases to verify that students receive notifications/alerts for new messages from staff members.
104	Students should be able to view and respond to messages through the system.	Create test cases to verify that students can view and respond to messages effectively through the system.

ID	Tasks	Resource
001	Implement a messaging or communication feature for staff members to contact students.	Sanjay
002	Develop functionality to send messages to specific students or all students with pending laundry requests.	Kartheek
003	Verify that students receive notifications/alerts when they receive messages from staff members.	Ramakrishna
004	Implement functionality for students to view and respond to messages through the system.	Tanishka

SPRINT 6

Estimated User Story Points: 18

Actual Completed User Story Points: 18

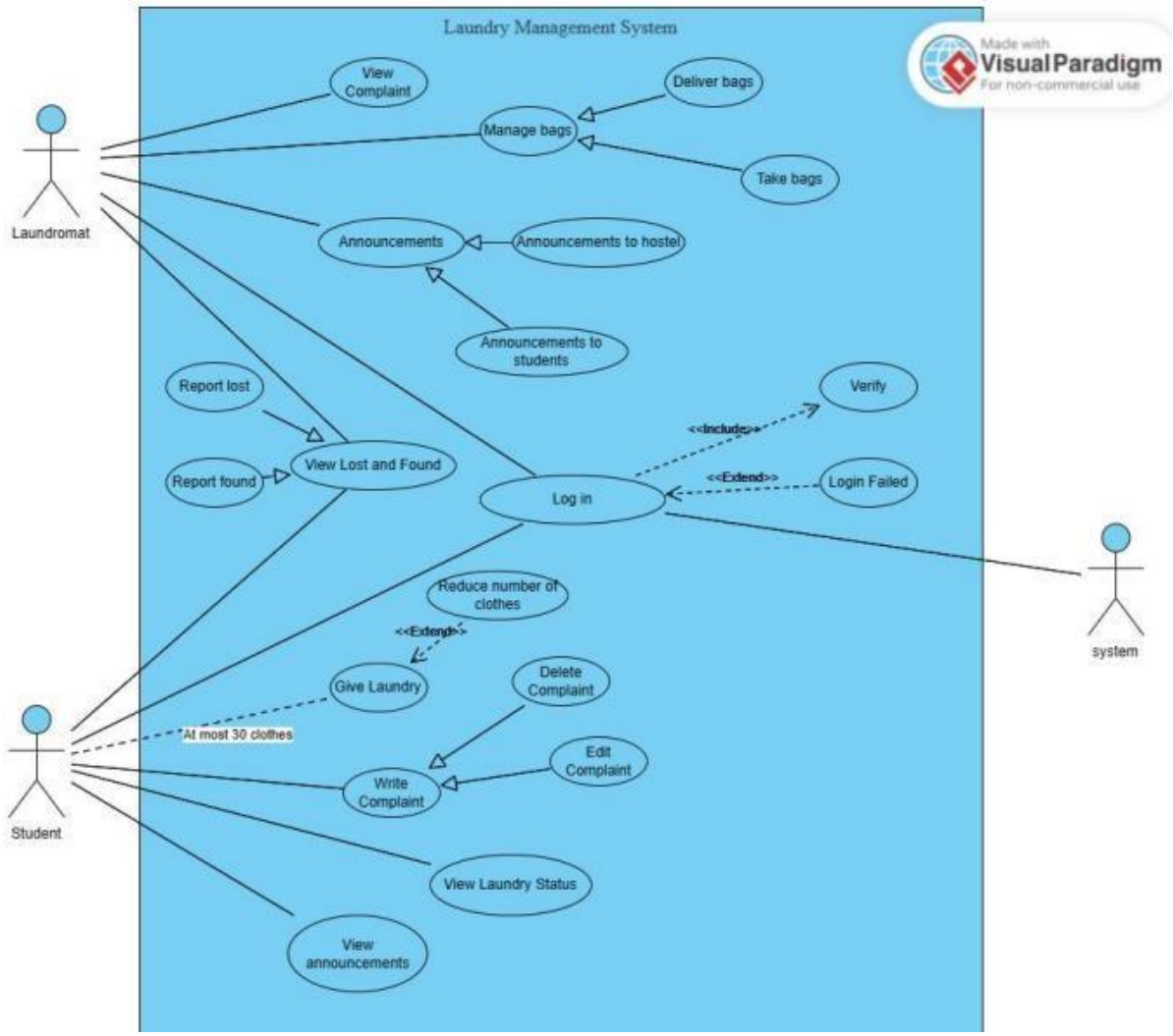
Table 13: Sprint 6

ID	Description	Status	Story Points	Actual Equivalent Story Points	% Completed
110	***As a student**, I want the system to have a lost and found portal **so that** I can report lost items and check for found items.*	C	18	18	100%

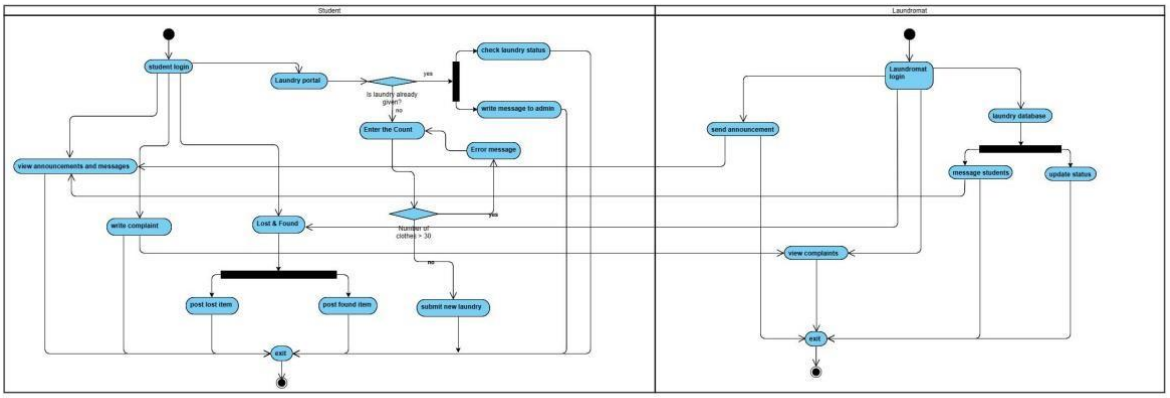
ID	Acceptance Criteria	Verification
111	The system should provide a dedicated section or page for reporting lost items and checking for found items.	Create test cases to ensure that the lost and found page is accessible from the system's interface.
112	Students should be able to submit details about lost items, including description, location, and date/time lost.	Create tests to verify the process of reporting lost items, students can input necessary details of the item.
113	Staff should have access to view and manage reported lost items, including marking them as found if recovered.	Create test cases to verify that staff can view and manage reported lost items, marking them as found if recovered.

ID	Tasks	Resource
001	Develop the user interface for the lost and found portal.	Tanishka
002	Implement backend logic for submitting and managing lost items.	Kartheek
003	Test the process of reporting a lost item, ensuring all necessary details can be input and submitted successfully.	Sanjay
004	Develop functionality for staff members to view and manage reported lost items, including marking them as found if recovered.	Ramakrishna

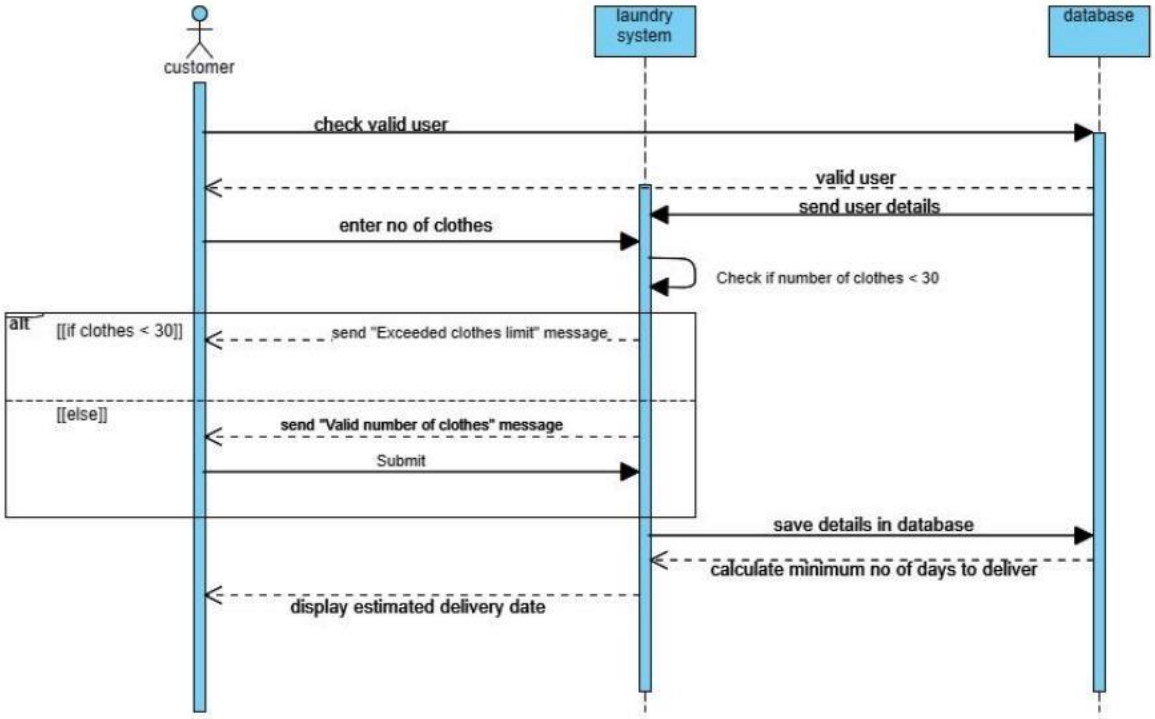
5.5 USE CASE DIAGRAM

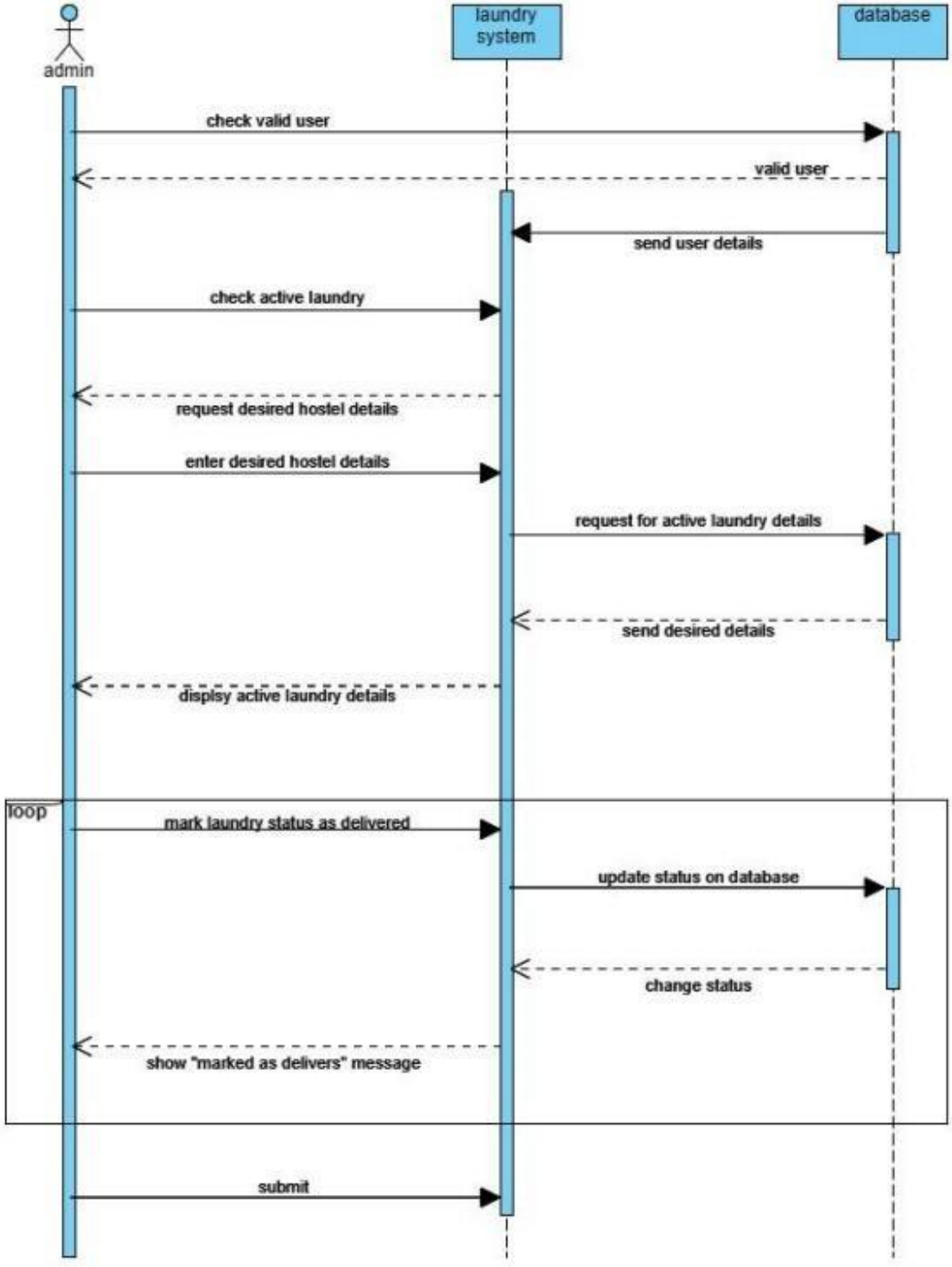


5.6 ACTIVITY DIAGRAM

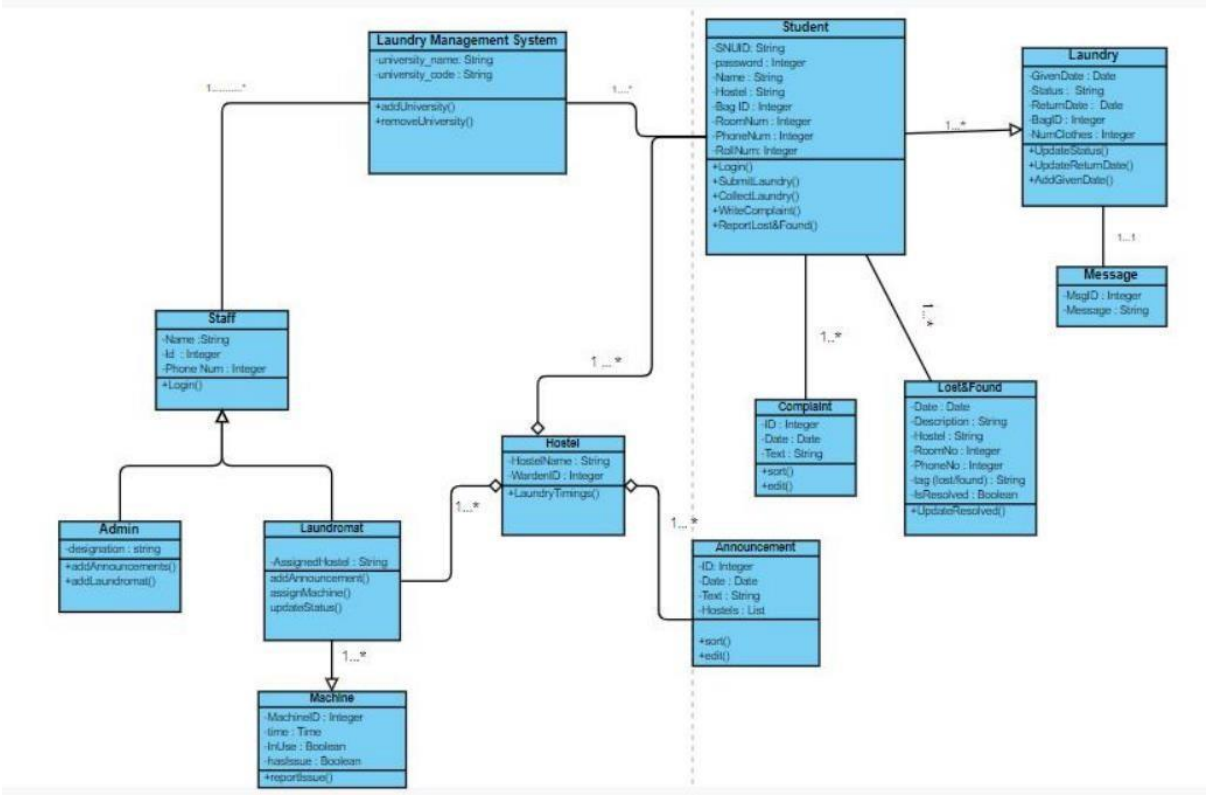


5.7 SEQUENCE DIAGRAM




admin
laundry system
database
check valid user
valid user
send user details
check active laundry
request desired hostel details
enter desired hostel details
request for active laundry details
send desired details
displsy active laundry details
loop
mark laundry status as delivered
update status on database
change status
show "marked as delivers" message
submit

5.6 CLASS DIAGRAM

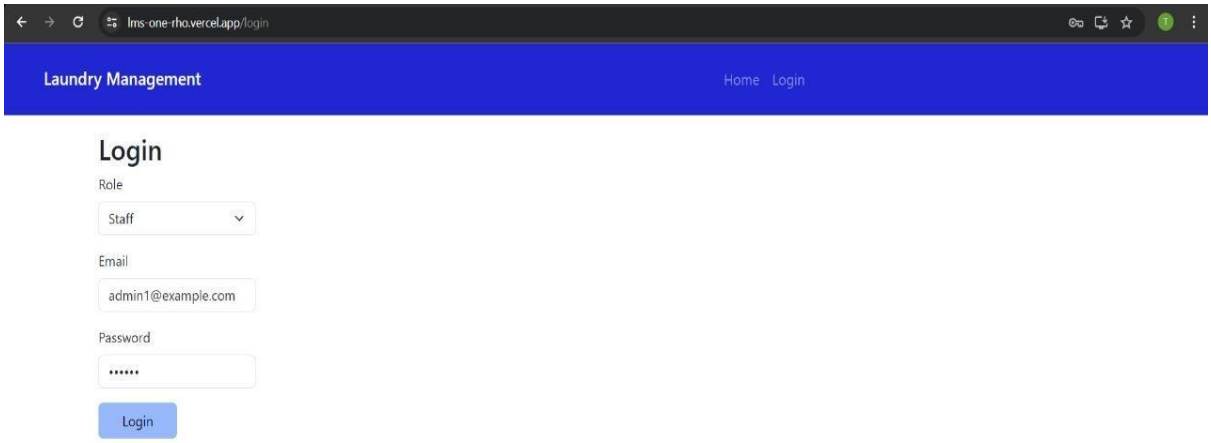


CHAPTER SIX

DEMO

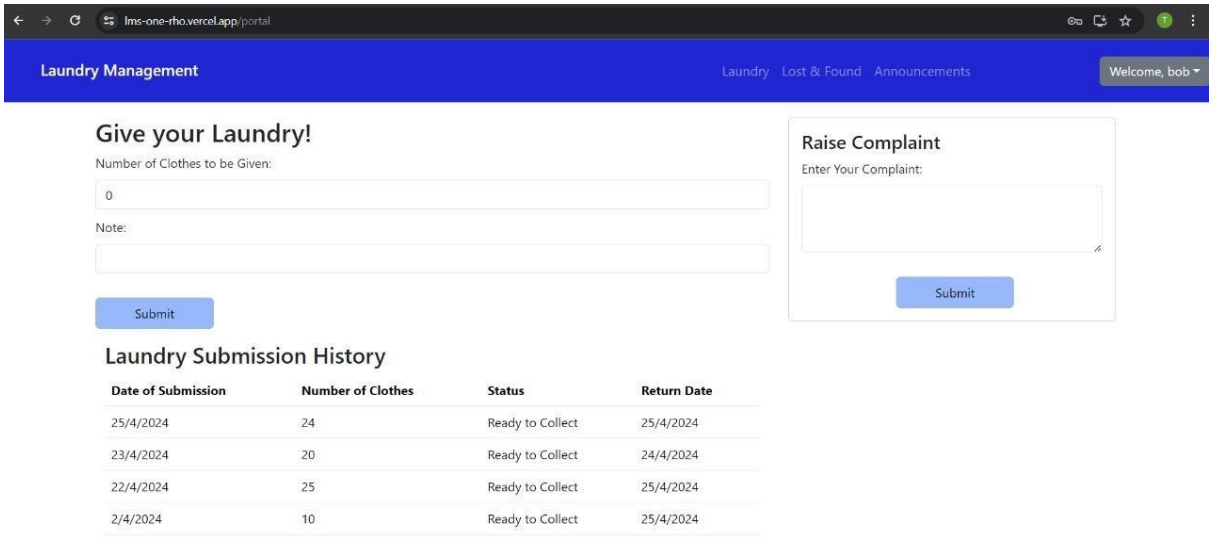
Login page

Both admin and students can login from here

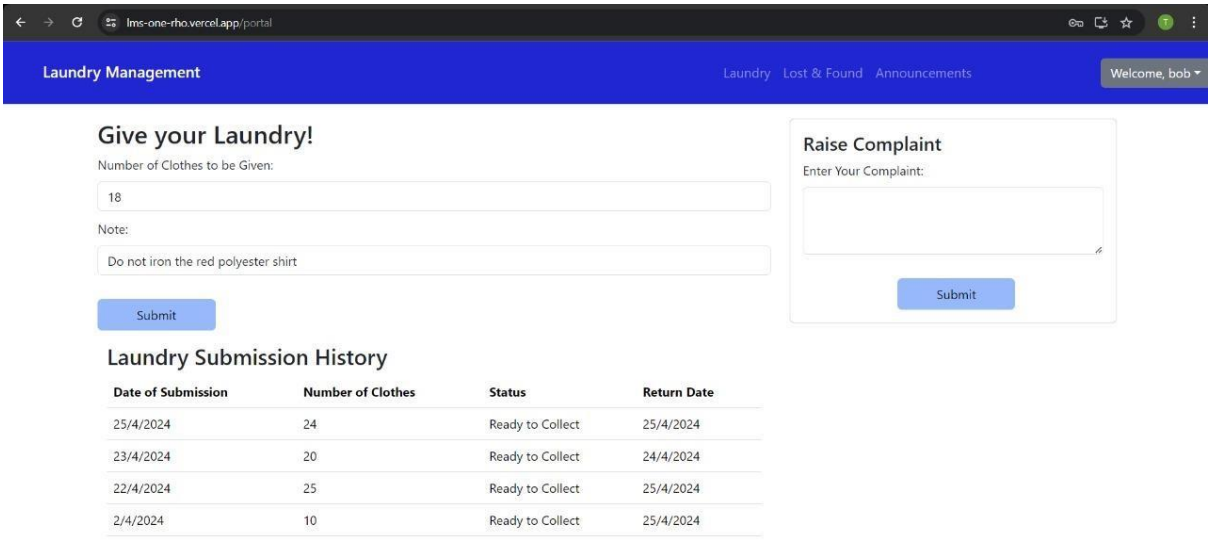


Student home page

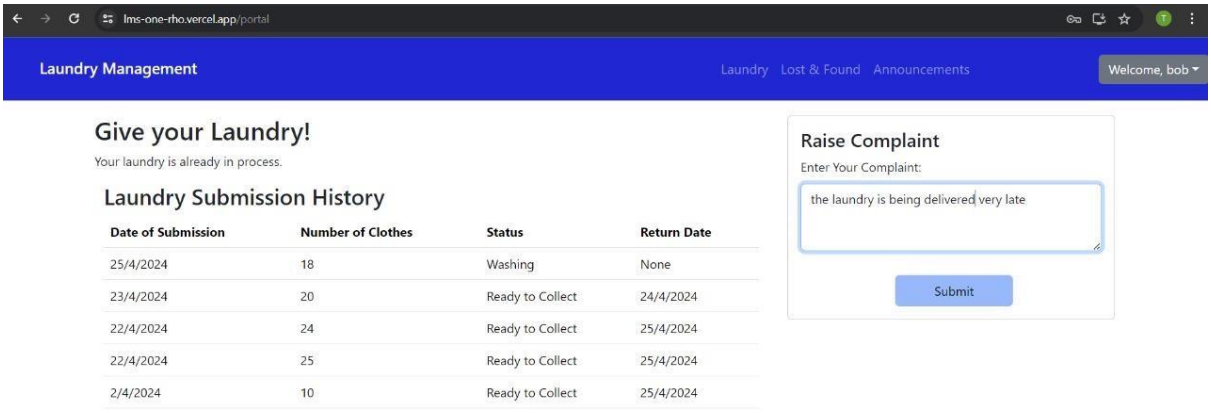
Student can give laundry(limit of 30 pairs applied) , add a note and raise complaints anonymously.



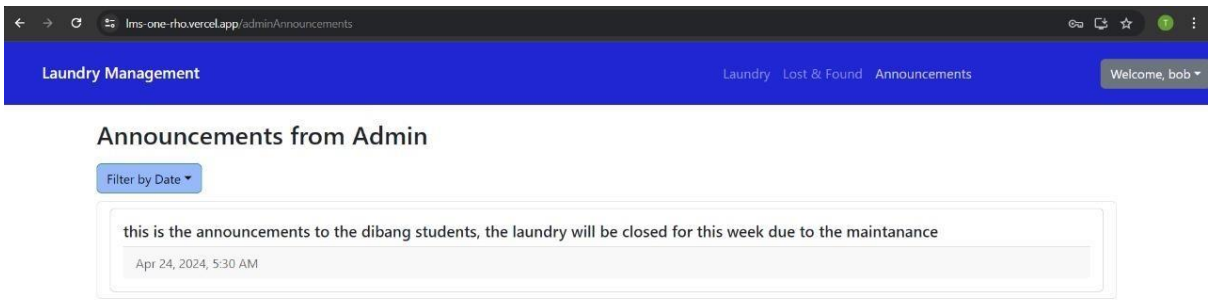
With no of clothes and note added.



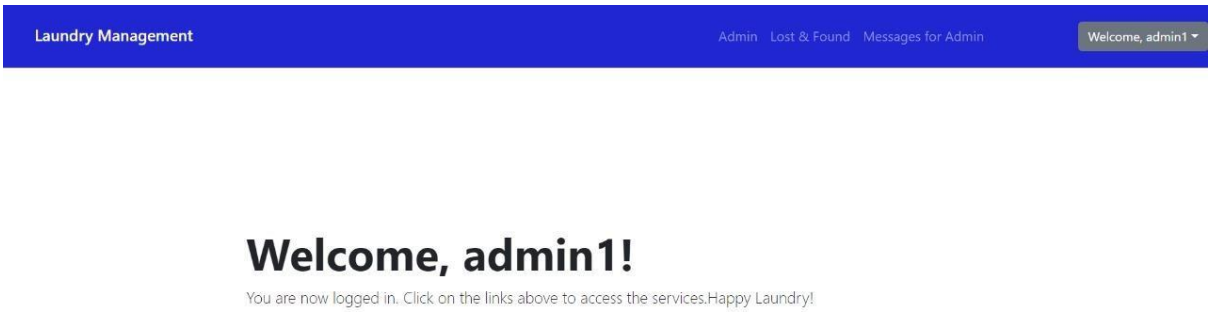
Student raising complaints



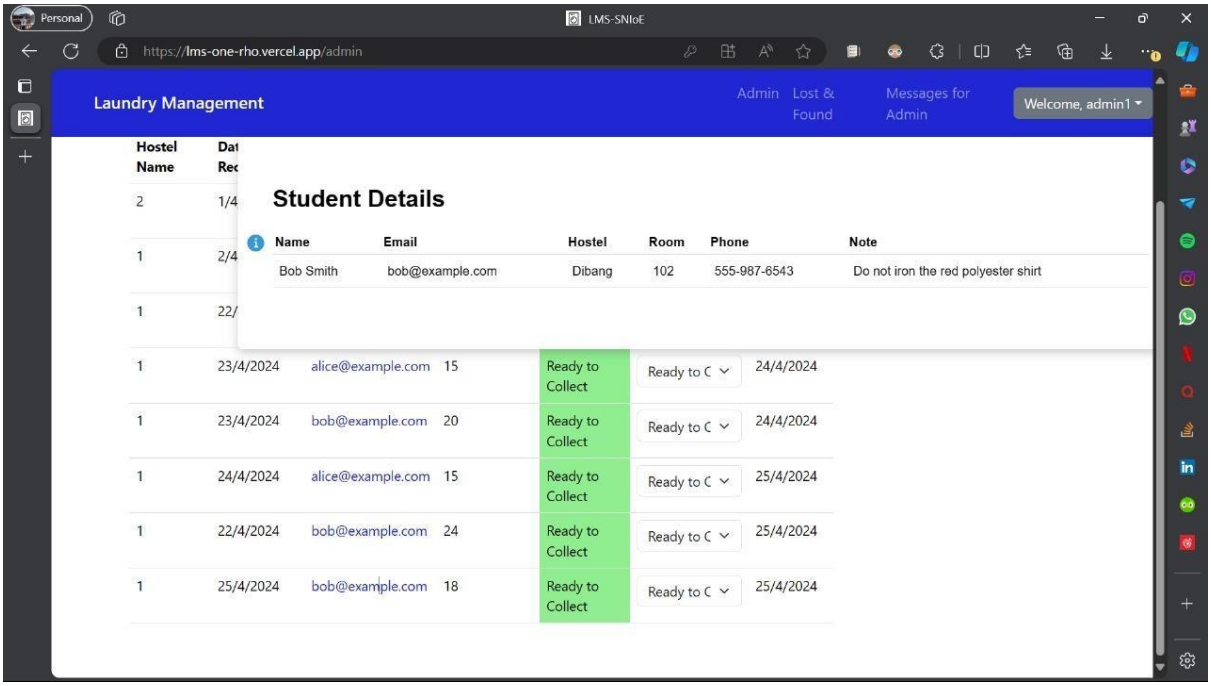
Students can view announcements from admin here.



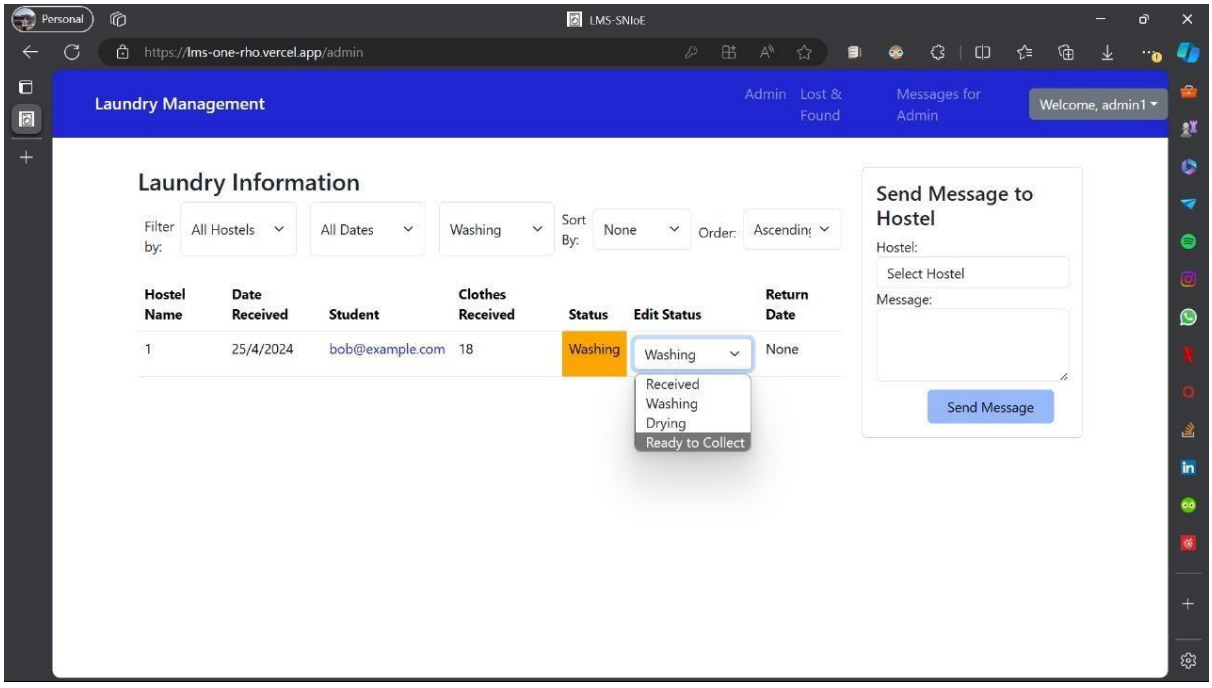
Admin home page



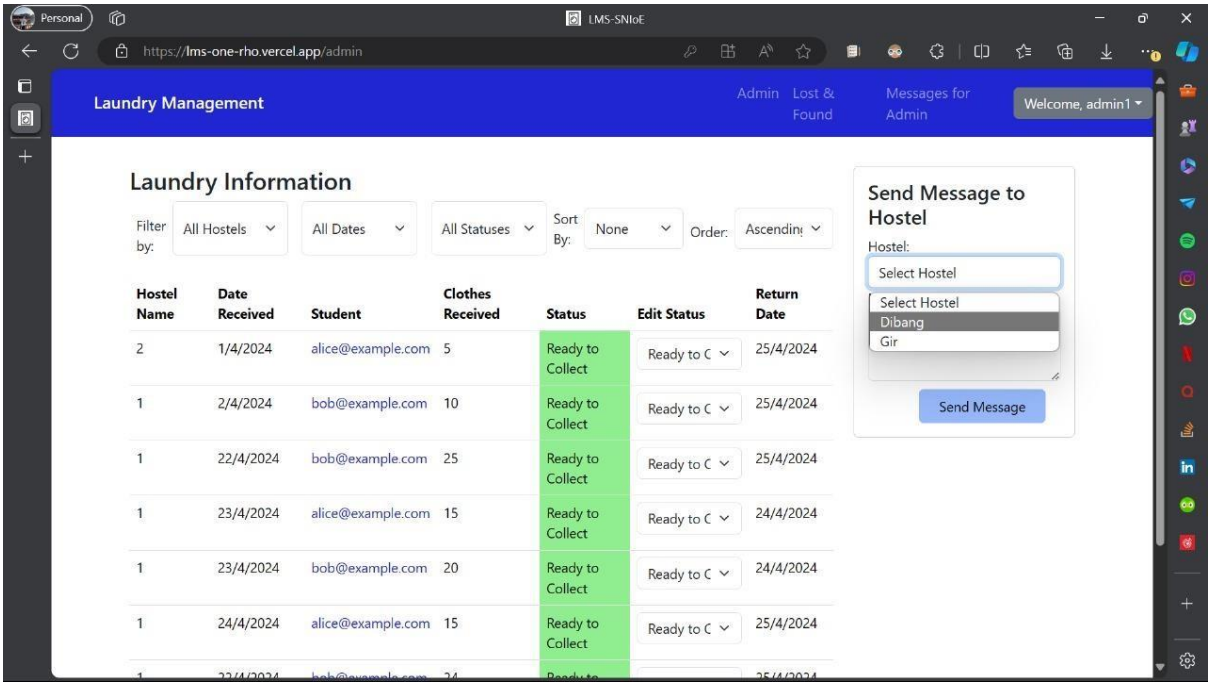
Admin can see laundry sent by students here along with student details.

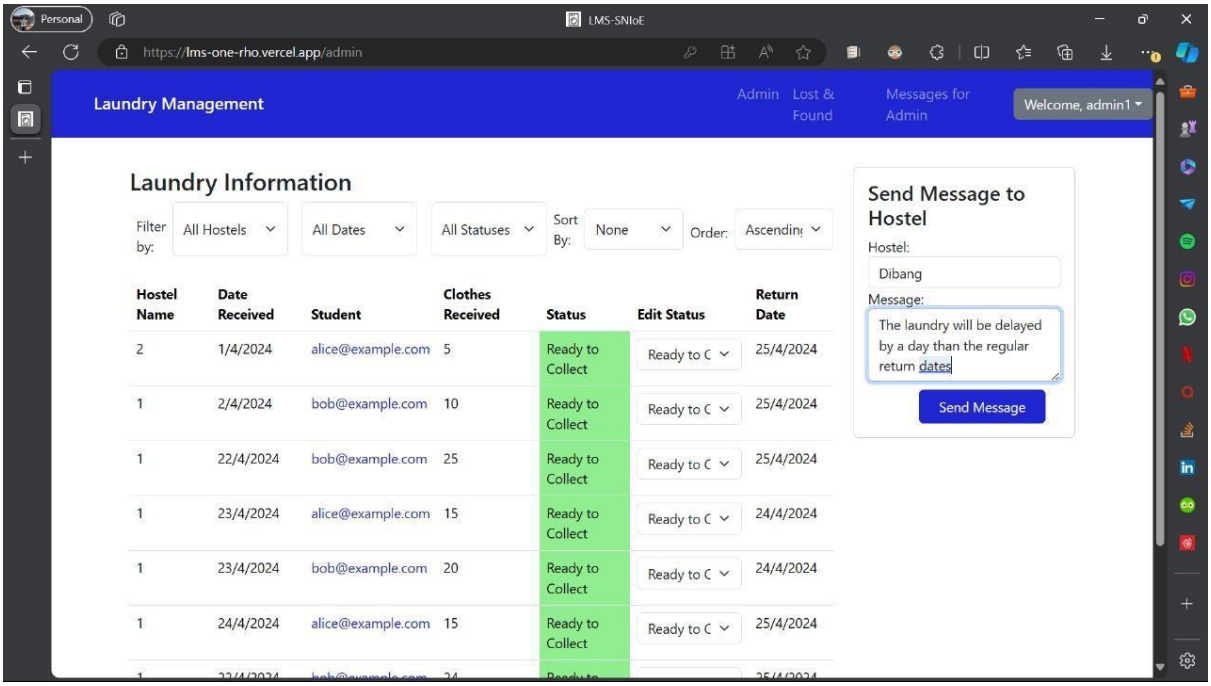


Admin can update laundry status here.

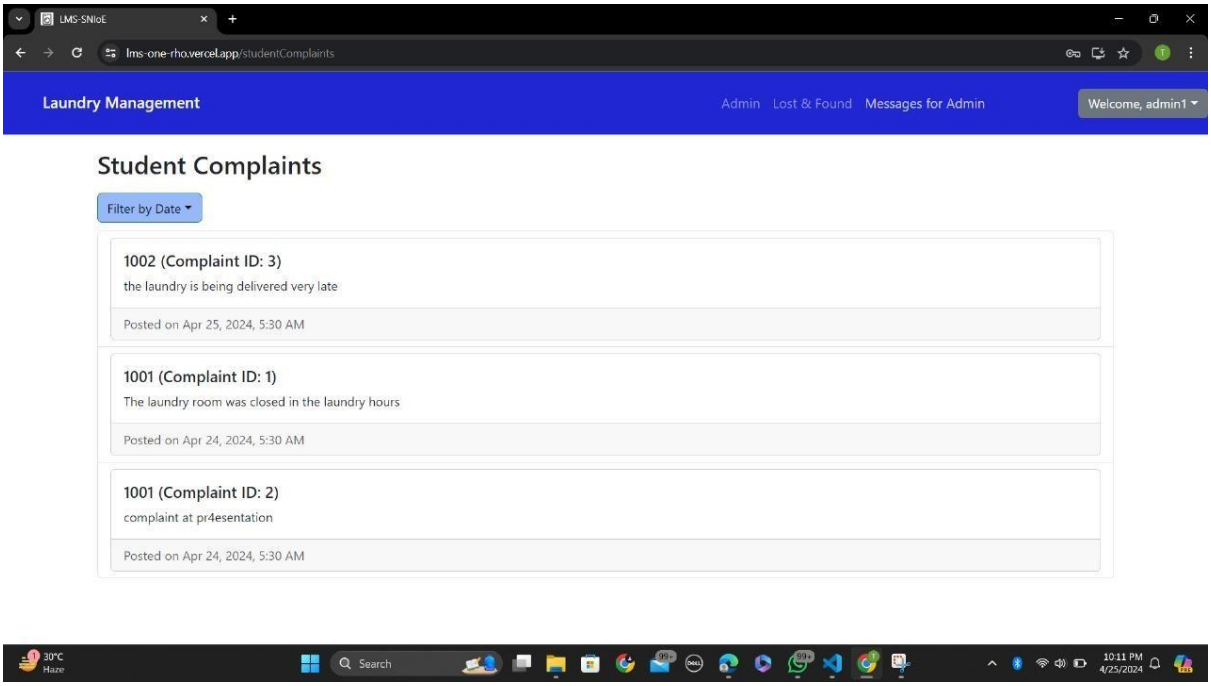


Admin can send messeges to selected hostels.





Admin can view anonymous student complaints here.



Lost and found: