Software Requirements Specification

for

Laundry System

Version 1.0

Prepared by

GROUP: Group 4

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Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Ti-Jean Dehaney, Sean Thompson, Darian Matthews, Caudillo Jones, Ruth-Ann Allen, Tristan Thompson	Initial completed version of the Software Requirements Specification (SRS) for the Laundry Appointment and ID Verification System	23/10/25

1 Overall Description

1.1 Product Context and Need

Taylor Hall's laundry system lacks an organized booking process, causing overcrowding, long waits, conflicts over machine use. A digital appointment and ID verification system is needed to streamline scheduling and improve the student experience.

1.2 Product Functionality

The system allows users to add, edit and delete appointments while preventing double bookings. It assigns each user an ID for managing appointments, viewing available time slots and confirming bookings using their appointment ID.

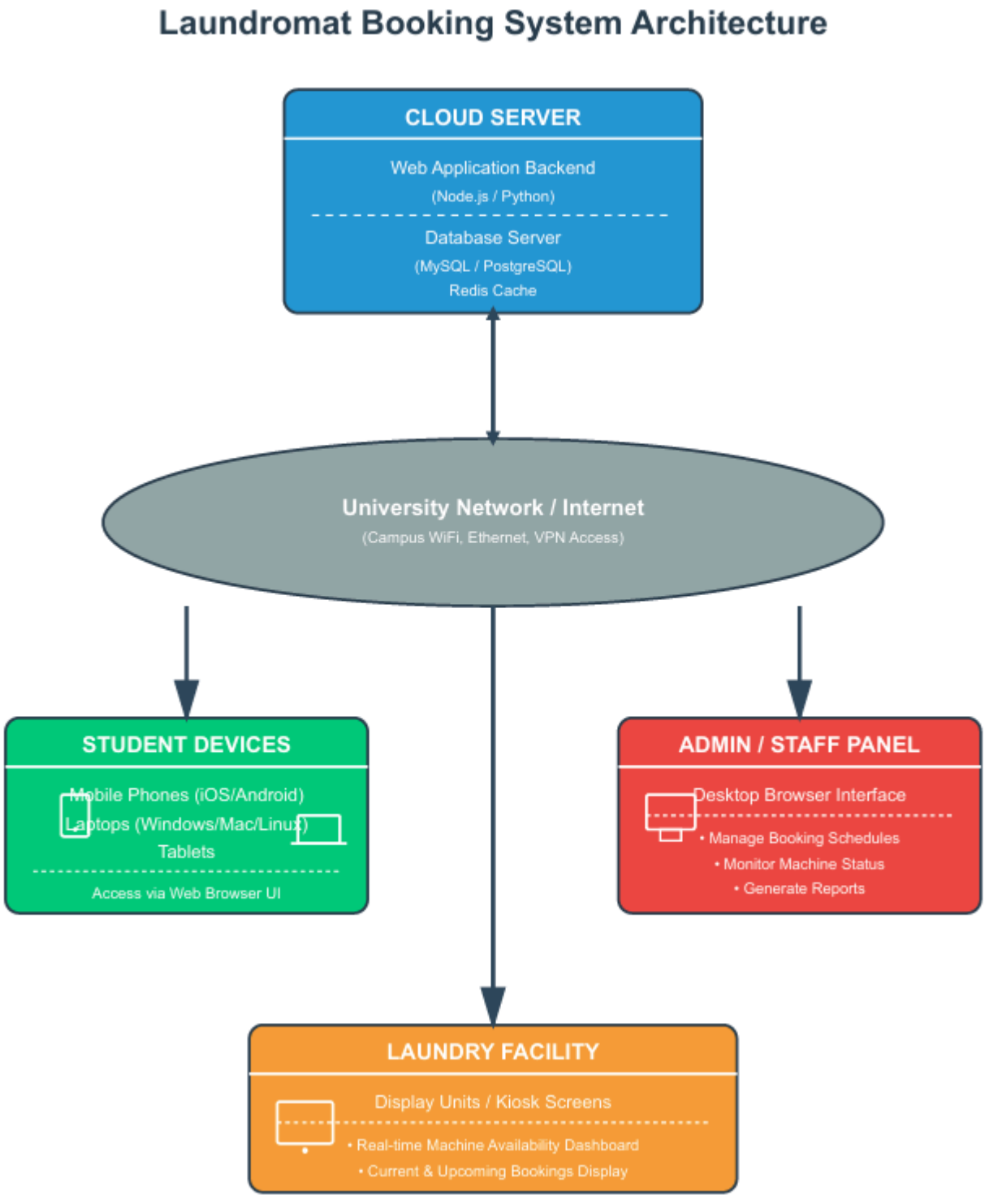
1.3 Stakeholders and Users Characteristics

Primary stakeholders include Taylor Hall residents who book laundry slots and hall administrators who manage schedules and monitor usage. Secondary stakeholders include maintenance staff and the development team responsible for system implementation and upkeep.

1.4 Operating Environment

The proposed laundromat booking system will operate through a web-based platform which will be accessible by both desktop and mobile devices to allow portability. The backend will be linked to a database such as MySQL or PostgreSql and the frontend will be available through web browsers in which an internet connection will be required.

-Desktop/Laptop: Windows 10 or later, macOS 10.14 or later, linux Ubuntu 20.04 or later.
- Mobile Devices: IOS 13+ or Android 8.0 and above
- Memory: 4GB ram minimum to allow smooth browser operation
- Stable internet connection with minimum 2Mbps bandwith


Laundromat Booking System Architecture
CLOUD SERVER
Web Application Backend
(Node.js / Python)
Database Server
(MySQL / PostgreSQL)
Redis Cache
University Network / Internet
(Campus WiFi, Ethernet, VPN Access)
STUDENT DEVICES
Mobile Phones (iOS/Android)
Laptops (Windows/Mac/Linux)
Tablets
Access via Web Browser UI
ADMIN / STAFF PANEL
Desktop Browser Interface
• Manage Booking Schedules
• Monitor Machine Status
• Generate Reports
LAUNDRY FACILITY
Display Units / Kiosk Screens
• Real-time Machine Availability Dashboard
• Current & Upcoming Bookings Display

1.5 Design and Implementation Constraints

- *Limited server resources since we will be constrained to free cloud hosting with maybe a maximum capacity of 100 users which will require optimized code with real-time booking responses.*
- *Preventing double-bookings*
- *Browser and device compatibility as the system must remain functional across the standard browsers and various display sizes for both desktop and mobile*

1.6 Assumptions and Dependencies

- *The laundromat has a fixed number of washing and drying machines.*
- *The server hosting the system will remain and have sufficient uptime and resource*
- *Machine availability data will be updated in real time without delays*
- *The project will function through standard web technologies and proprietary software*
- *Both user and administrators will have stable internet connections to conduct tasks.*
- *All users will access the system through modern and current web browsers and operating systems.*

2 Specific Requirements

2.1 External Interface Requirements

2.1.1 Hardware Interfaces

Resident Devices

- ***Devices:*** *smartphones, tablets, laptops.*
- ***Use:*** *book, reschedule, cancel*
- ***Interaction:*** *web browser, touch or keyboard*

Laundry Room or Tablet

- ***Device:*** *Android or iPad tablet mounted in the laundry room.*
- ***Use:*** *A laundry room worker would ask you for your id number to verify that it is indeed your time for washing*

2.1.2 Software Interfaces

Supported OS:

- ***Windows*** *10 or later.*
- ***macOS*** *12 or later.*
- ***Linux*** *Ubuntu 20.04 or later.*
- ***Android*** *11 or later.*
- ***iOS/iPadOS*** *15 or later.*

Browsers: *latest two versions of Chrome, Edge, Firefox, Safari.*

OS Services the app uses:

- ***Networking:*** *OS TCP/IP stack through the browser.*
- ***Camera:*** *OS camera permission through the browser.*
- ***Notifications:*** *optional web push routed to the OS notification center.*
- ***Storage:*** *local cache with browser* ***IndexedDB*** *and* ***localStorage*** *for session data, no system files.*
- ***Time and locale:*** *read via browser to format dates and times.*

Constraints: *no kernel modules, no admin rights, no native installers.*

2.1.3 Communications Interfaces

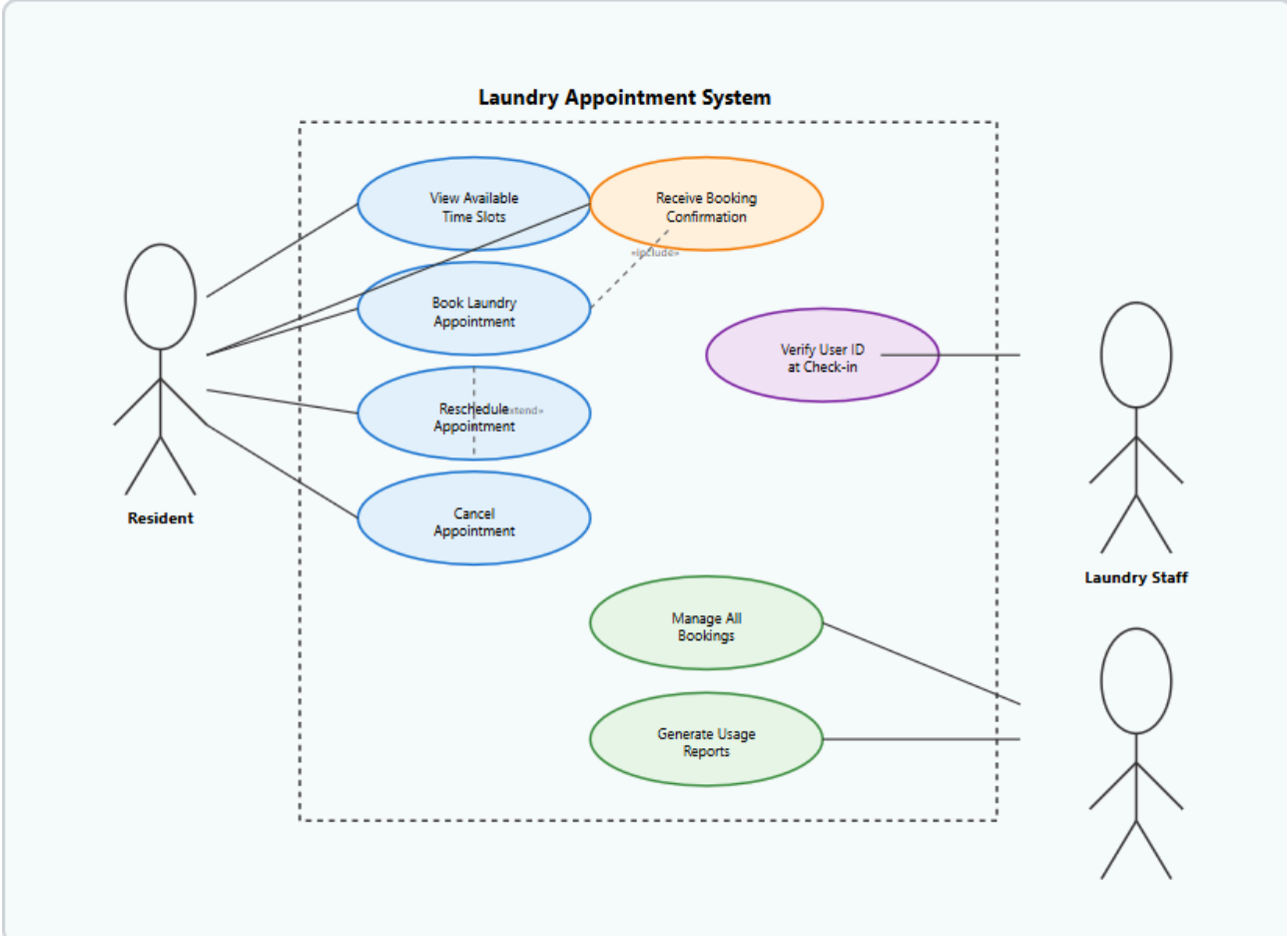
- *The Laundry Appointment and ID Verification System will use standard web communication protocols to connect users, the web server, and the database. All interactions between the user's device and the system will occur through a web browser using* ***HTTPS****, ensuring that all data is securely transmitted.*
- *Email and SMS services will be used for appointment confirmations and reminders. Emails will be sent using secure* ***SMTP*** *connections, and SMS messages will be sent through a verified third-party gateway over secure HTTPS connections. All communication will be encrypted to protect user credentials, booking details, and system messages.*

2.2 System Features

Feature ID	Feature Name	User Story	Description / Expected Outcome	Priority	Team Owner
F1	View Available Time Slots	As a resident, I want to view all available washing and drying machine time slots, so that I can choose a convenient time to do my laundry.	The system will display all available and booked slots in a clear schedule format, updating in real time whenever changes occur.	High	Ti-Jean Dehaney
F2	Book Laundry Appointment	As a resident, I want to book a laundry machine at a specific time, so that I can secure a machine when I need it and avoid conflicts with others.	The user can select an available slot and confirm a booking. The system stores the appointment and sends a confirmation message with a unique booking ID.	High	Sean Thompson
F3	Reschedule or Cancel Appointment	As a resident, I want to reschedule or cancel my laundry booking, so that I can make changes if my plans change.	The system allows users to view their bookings and modify or cancel them up to 30 minutes before the start time. The schedule updates automatically.	Medium	Darian Matthews

F4	ID Verification in Laundry Room	As a laundry room staff member, I want to verify users' bookings using their student ID or booking code, so that only authorized residents can use the machines at their booked times.	Staff can check booking validity through a tablet interface. The system confirms or rejects access instantly.	High	Caudillo Jones
F5	Notification and Reminder System	As a resident, I want to receive booking confirmations and reminders, so that I don't forget my scheduled laundry times.	The system sends email or SMS confirmations after booking, and reminders 30 minutes before the scheduled time.	Medium	Ruth-Ann Allen
F6	Administrator Dashboard	As an administrator, I want to view and manage all laundry bookings and reports, so that I can monitor usage, resolve conflicts, and maintain system efficiency.	Admins can view all bookings, edit or delete them if needed, and generate usage reports or export data in CSV/PDF format.	High	Tristan Thompson

2.3 Use Case View



Use Case Narratives

UC1: View Available Time Slots

Actor: Resident
Description: A resident views the schedule of all available and booked laundry machine time slots to determine when they can book a machine.
Precondition: The resident must be logged into the system with valid credentials.
Basic Flow:

1. *Resident logs into the laundry booking system.*
2. *System displays the main dashboard.*
3. *Resident selects "View Schedule" or navigates to the booking page.*
4. *System retrieves current machine availability from the database.*
5. *System displays a calendar or time-slot grid showing available and booked slots.*
6. *Resident views available time slots for washing and drying machines.*

Postcondition: The resident has viewed the current availability and can proceed to book an available slot if desired.

UC2: Book Laundry Appointment

Actor: Resident
Description: A resident books a specific time slot for a washing or drying machine to secure it for their use.
Precondition: The resident is logged in and has viewed available time slots. The selected time slot must be available (not already booked).
Basic Flow:

1. *Resident selects an available time slot from the schedule.*
2. *System displays booking confirmation screen with selected date, time, and machine type.*
3. *Resident confirms the booking.*
4. *System validates that the slot is still available and checks for booking conflicts.*
5. *System creates the appointment record in the database with a unique booking ID.*
6. *System generates and displays a booking confirmation with the booking ID.*
7. *System sends a confirmation notification (email/SMS) to the resident. (includes UC5)*

Postcondition: The appointment is recorded in the system, the time slot is marked as booked, and the resident receives a confirmation with their unique booking ID.

UC3: Reschedule Appointment

Actor: Resident
Description: A resident changes the date or time of an existing laundry appointment to a different available slot.
Precondition: The resident has an existing booking and is logged into the system. The current time must be at least 30 minutes before the scheduled appointment.
Basic Flow:

1. *Resident navigates to "My Bookings" section.*
2. *System displays all current and upcoming appointments for the resident.*
3. *Resident selects the appointment they wish to reschedule.*
4. *System verifies the booking is eligible for rescheduling (at least 30 minutes before start time).*
5. *System displays available alternative time slots.*
6. *Resident selects a new time slot and confirms the change.*
7. *System updates the appointment record with the new date/time.*
8. *System releases the original time slot and marks the new slot as booked.*
9. *System sends an updated confirmation notification to the resident.*

Postcondition: The appointment is updated with the new time, the original slot becomes available again, and the resident receives updated confirmation.

UC4: Cancel Appointment

Actor: Resident
Description: A resident cancels an existing laundry appointment, freeing the time slot for other residents.
Precondition: The resident has an existing booking and is logged into the system. The current time must be at least 30 minutes before the scheduled appointment.
Basic Flow:

1. *Resident navigates to "My Bookings" section.*
2. *System displays all current and upcoming appointments.*
3. *Resident selects the appointment they wish to cancel.*
4. *System verifies the booking is eligible for cancellation (at least 30 minutes before start time).*
5. *System prompts resident to confirm cancellation.*
6. *Resident confirms the cancellation.*
7. *System deletes or marks the appointment as cancelled in the database.*
8. *System releases the time slot, making it available to other residents.*
9. *System sends a cancellation confirmation notification to the resident.*

Postcondition: The appointment is cancelled, the time slot is available for booking, and the resident receives cancellation confirmation.

UC5: Receive Booking Confirmation

Actor: Resident
Description: The system automatically sends booking confirmations and reminders to residents after they book, reschedule, or when their appointment is approaching.
Precondition: A resident has successfully booked or rescheduled an appointment, or has an appointment scheduled within 30 minutes.
Basic Flow:

1. *System triggers notification event (after booking/rescheduling or 30 minutes before appointment).*
2. *System retrieves resident's notification preferences (email/SMS).*
3. *System generates notification message including booking details and unique booking ID.*
4. *System sends notification through selected channel(s).*
5. *Resident receives the confirmation or reminder message.*
6. *System logs the notification delivery status.*

Postcondition: The resident receives confirmation or reminder notification and is informed of their booking details.

UC6: Verify User ID at Check-in

Actor: Laundry Staff
Description: Laundry room staff verifies a resident's booking using their student ID or booking code to ensure only authorized users access machines during their reserved time.
Precondition: Staff has access to the verification tablet interface. The resident has arrived at the laundry room with their booking ID or student ID.
Basic Flow:

1. *Resident arrives at laundry room during their scheduled time slot.*
2. *Staff requests the resident's student ID number or booking ID.*
3. *Staff enters the ID into the verification tablet.*
4. *System queries the database for active bookings matching the ID and current time.*
5. *System validates that the booking exists and the current time falls within the scheduled slot.*
6. *System displays verification result (approved or denied) on the tablet.*
7. *Staff grants or denies access to the machine based on the system result.*
8. *System logs the check-in event in the database.*

Postcondition: The resident is either granted access to use the machine or informed their booking is invalid. The verification event is logged.

UC7: Manage All Bookings

Actor: Administrator
Description: An administrator views, edits, or deletes any booking in the system to resolve conflicts, handle complaints, or perform system maintenance.
Precondition: The administrator is logged into the system with administrative privileges.
Basic Flow:

1. *Administrator logs into the admin dashboard.*
2. *Administrator navigates to "Manage Bookings" section.*
3. *System displays a comprehensive list of all bookings (past, current, and upcoming).*
4. *Administrator can filter bookings by date, resident, machine, or status.*
5. *Administrator selects a booking to view details.*
6. *Administrator chooses to edit or delete the booking.*
7. *System prompts for confirmation if deleting.*
8. *Administrator confirms the action.*
9. *System updates or removes the booking record from the database.*

Postcondition: The booking is modified or deleted, affected residents are notified, and the administrative action is logged.

UC8: Generate Usage Reports

Actor: Administrator
Description: An administrator generates reports on laundry system usage to analyze patterns, identify peak times, and make informed decisions about resource allocation.
Precondition: The administrator is logged into the system with administrative privileges. Historical booking data exists in the database.
Basic Flow:

1. *Administrator navigates to "Reports" section in the admin dashboard.*
2. *System displays available report types (usage by day, by resident, by machine, peak times, cancellation rates, etc.).*
3. *Administrator selects report type and specifies parameters (date range, machines, residents).*
4. *System queries the database and aggregates relevant booking data.*
5. *System generates the report with visualizations (charts, tables, statistics).*
6. *System displays the report on screen.*
7. *System generates the export file and provides download link.*
8. *Administrator downloads the report for external use or record-keeping.*

Postcondition: The usage report is generated, viewed by the administrator, and optionally exported for further analysis or documentation

3 Other Non-functional Requirements

3.1 Performance Requirements

Availability and Reliability:

- The system should maintain atleast **99% uptime** per month, with automatic recovery in case of minor failures.
- *Reasoning:* Laundry scheduling is a daily activity, and downtime can cause missed appointments or overcrowding.

System Response Time:

- All user transactions (such as booking, editing, or canceling an appointment) must complete within short time under normal network conditions.
- *Reasoning:* Users expect fast response when booking or checking time slots, especially during peak hours.

Database Update Efficiency:

- Any updates to appointment records or machine availability should reflect in the system database within **a short time** of user action.
- *Reasoning:* Ensures that real-time scheduling information remains accurate and prevents booking conflicts.

3.2 Safety and Security Requirements

Data Backup and Recovery:

- *The system must perform automatic **daily backups** of all appointment and user data. In the event of a system crash, recovery should be possible within **30 minutes**.*
- *Rationale: Prevents data loss that could disrupt operations or cause double bookings.*

Access Restriction to Authorized Users:

- *Only registered residents and authorized staff can log into the system using valid credentials (e.g., student ID or institutional email).*
- *Reasoning: Ensures unauthorized individuals cannot access the machines when its not their appointment time book or modify appointments.*

3.3 Software Quality Attributes

Maintainability and Design for Change

- ***Goal:*** *ship small changes in under 3 days, hotfix in 4 hours.*
- ***How you will achieve it:*** *services for Booking, Machines, Notifications. Config-driven rules for slot length, per-resident caps, blackout windows. Feature flags for risky changes. API Coding standards, linting, and code reviews. Automated unit and integration tests. Simple logs and error codes.*

2) Usability

- ***Goal:*** *a resident completes a booking in ≤ 60 seconds. Task success ≥ 95% for book, reschedule, cancel, check-in.*
- ***How to achieve it:*** *one-page booking flow. Mobile-first layout. Plain language labels. Inline validation. Clear undo for cancel. Keyboard access.*

3) Security and Privacy

- ***Goal:*** *protect resident data, enforce least privilege.*
- ***How you will achieve it:*** *HTTPS for all traffic. Role-based access for Resident, Staff, Admin. Session timeout after 10 minutes idle. Audit logs for login and booking edits. Input validation, prepared statements.*

Appendix

To acquire these requirements a questionnaire was given out to the residents of Taylor hall on October 11,2025. This questionnaire consisted of 15 questions both open ended and closed ended. This method was chosen as it is cost effective and is a easy way of eliciting requirements.

Questionnaire :

Section A: General Information

1. ***How often do you use the laundry facilities at Taylor Hall?***
   ☐ *Daily*
   ☐ *2–3 times per week*
   ☐ *Once per week*
   ☐ *Occasionally*

2. ***How do you currently schedule or manage your laundry time?***
   ☐ *Walk-in (first come, first served)*
   ☐ *Written sign-up sheet*
   ☐ *Through staff assistance*
   ☐ *Other (please specify):* _____

3. ***On a scale of 1–5, how satisfied are you with the current laundry booking process?***
   (1 = Very Dissatisfied, 5 = Very Satisfied)
   ☐ *1* ☐ *2* ☐ *3* ☐ *4* ☐ *5*

4. ***What issues have you experienced with the current booking process?***
   (Open-ended)

   _____

   _____

Section B: System Use and Needs

5. ***Do you find it difficult to know when machines are available?***
   ☐ *Yes*
   ☐ *No*
   ☐ *Sometimes*

6. ***If an online booking system were introduced, how likely would you be to use it?***
   - ☐ *Very likely*
   - ☐ *Somewhat likely*
   - ☐ *Neutral*
   - ☐ *Unlikely*

7. ***What features would you find most useful in an online laundry appointment system?*** *(Open-ended)*

   _____

8. ***Would you prefer to receive booking confirmations and reminders via:***
   - ☐ *Email*
   - ☐ *Text message (SMS)*
   - ☐ *In-app notification*
   - ☐ *Any of the above*

Section C: Performance Expectations

9. ***How long are you willing to wait for a booking confirmation to load?***
   - ☐ *Less than 5 seconds*
   - ☐ *5–10 seconds*
   - ☐ *More than 10 seconds*

10. ***Would you expect the system to be available 24/7, including weekends?***
    - ☐ *Yes*
    - ☐ *No*
    - ☐ *Unsure*

11. ***How important is it to you that machine availability updates instantly after a booking?***
    - ☐ *Very important*
    - ☐ *Somewhat important*
    - ☐ *Not important*

Section D: Safety and Security

12. ***How should the system verify a user's identity before allowing a booking?***
    - ☐ *Student ID number*
    - ☐ *Hall email address*
    - ☐ *Password and verification code*
    - ☐ *Other (please specify):* _____

13. ***Are you concerned about non-residents using the system to reserve machines?***
    - ☐ *Yes*
    - ☐ *No*

☐ *Not sure*

14. ***How important is it to you that your personal and booking data remain private?***
    ☐ *Very important*
    ☐ *Somewhat important*
    ☐ *Not important*

15. ***Should the system automatically log users out after a period of inactivity?***
    ☐ *Yes*
    ☐ *No*
    ☐ *Not sure*

INTERVIEW

An interview consisting of 4 open-ended questions was conducted with Caudillo Jones, a Taylor Hall resident, on October 20, 2025.

1.What challenges do you face when trying to book or access a washing machine using the current system?

2.Have you ever experienced scheduling conflicts or long wait times when doing laundry? If yes, describe what happened.

3,How do you currently know when machines are free, and does this method cause confusion or delays?

4.What changes would make the current laundry process more organized and convenient for you?