2DV609

GymUP!
Requirements Specification

Author 1: Fabian Dacic
Author 2: Yuyao Duan
Author 3: Fredric Eriksson Sepúlveda
Author 4: Li Ang Hu
Author 5: Long Ma

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1. Introduction

Health or fitness club, fitness center, there are various names for this location however universally is referred to as the gym. A gym can provide numerous facilities and services such as a workout area, group exercise classes, personal training, swimming pools, and so forth. Considering that the gym is a significant part of today's population [1], it is only natural that issues will arise. During a thorough investigation, it has been discovered that at times recent, small to medium gym businesses are overwhelmed due to an influx of new members. This leads to other gym members waiting in line for a single piece of equipment. That can be both frustrating for those waiting in the line, and unnerving for the one manning the machine. What if instead of waiting in line, gym members can simply check the availability of the equipment and avoid unnecessary queues?

The purpose of this document is to introduce a possible solution to a gym equipment booking system where an individual can select the equipment of their choice and based on either their schedule or separate times, determine the availability of the respective equipment. This solution is a prototype for the gym system and therefore as such should be restricted within the location's premises, and it will be beneficial to both customers and gym staff alike.

The purpose of this gym equipment booking system is to aid gym staff and members of the gym alike, ease equipment management, and improve workflow in general. This system is to be considered as a module that can be mated to various software applications and therefore could support gyms worldwide first and foremost, providing a comfortable experience along with the best equipment management available.

2. System-wide Requirements

2.1. Identified Stakeholders

- Customers:
  The gym customers (gym members) are the main users who use the gym facilities and equipment. The demand of the equipment booking service is from them.
- Gym equipment maintainers:
  The gym maintainers are responsible for maintaining the equipment, the maintaining service may influence the gym members' activities, therefore, they are also counted as stakeholders of the system.
- Gym administrators
  The gym administrators are responsible for managing the gym in various aspects including the gym equipment booking. Gym administrators have authority over the equipment booking system, and they shall have access to it to manipulate the general management stuff.
- Gym Owners
  Gym owners own the gym and they care about how does the system work and how will this system affect/benefit their business. As the gym owners, they have the authority to decide whether to implement this system or not.
- Investors
  Investors help us maintain our servers, if the program works as intended more investors will be interested in financing our server.

2.2. Functional requirements

Requirement: GU.FR.1: The customer shall be able to book equipment for a certain amount of time and be able to cancel that booking.

Requirement: GU.FR.2: Administrators shall be able to remove and add equipment and also administrate bookings to the system.

Requirement: GU.FR.3: The system shall be able to gather member and equipment information from gym existing systems.

Requirement: GU.FR.4: User shall be able to enter GymUP by clicking the link/button on the legacy system menu.

Requirement: GU.FR.5: The system shall be able to provide a method for customers to send feedback.

2.3. Non-functional requirements

Requirement: GU.NFR.1: The process of booking and giving a response should take no more than 10 seconds.
Requirement: GU.NFR.2: Every operation should have security verification, so that the status of each user who sends the request is verified.
Requirement: GU.NFR.3: Usernames and passwords should only use alphanumerics

2.4. Faceted classification of requirements

Requirement	System	User Interface	Database	Communication
GU.FR.1	√	√	√	√
GU.FR.2		√	√	√
GU.FR.3	√		√	√
GU.FR.4	√	√	√	√
GU.FR.5		√	√	√

2.5. Checklist-based requirement analysis

	GU.FR.1	GU.FR.2	GU.FR.3	GU.FR.4	GU.FR.5
Premature Design	×	×	×	×	×
Combined Requirements	×	×	×	×	×
Unnecessary Requirements	×	×	×	×	×
Use of non-standard hardware	×	×	×	×	×
Conformance of business goals	√	√	√	√	√
Requirements ambiguity	×	×	×	×	×
Requirements Realism	√	√	√	√	√
Requirements testability	√	√	√	√	√

2.6. Systematic risk assessment

	GU.FR.1	GU.FR.2	GU.FR.3	GU.FR.4	GU.FR.5
Performance Risks	medium	low	medium	low	low
Safety and security risks	low	low	medium	medium	low
Process risks	low	low	low	low	low
Implementation technology risks	low	low	medium	low	low
Database risks	low	low	medium	medium	low
Schedule risks	low	low	medium	low	low

External risks	low	low	medium	low	low
Stability risks	low	low	medium	low	low

2.7. Systematic validation

Are the requirements	
Complete?	√
Consistent?	√
Comprehensible?	√
Ambiguous?	×
Is the requirements document structured?	√
Traceable?	√
Does the requirements document as a whole or do the individual requirements conform to defined standards?	√

2.8. Test cases for requirements:

2.8.1. Requirement: GU.FR.1

GU.FR.1 also utilizes **GU.FR.3** to gather customer information and equipment information.

Description of requirement goals:

This test would work with the process of booking equipment and receiving a response. It utilizes requirement 3 because existing gym systems already have a database where they save customer information, so creating another database for the same purpose will not be efficient. If this test is successfully

satisfied then it would mean that the required qualifications are met and so the system provides the base functionality.

Test 1
Customer wants to book equipment and cancels all bookings afterward:

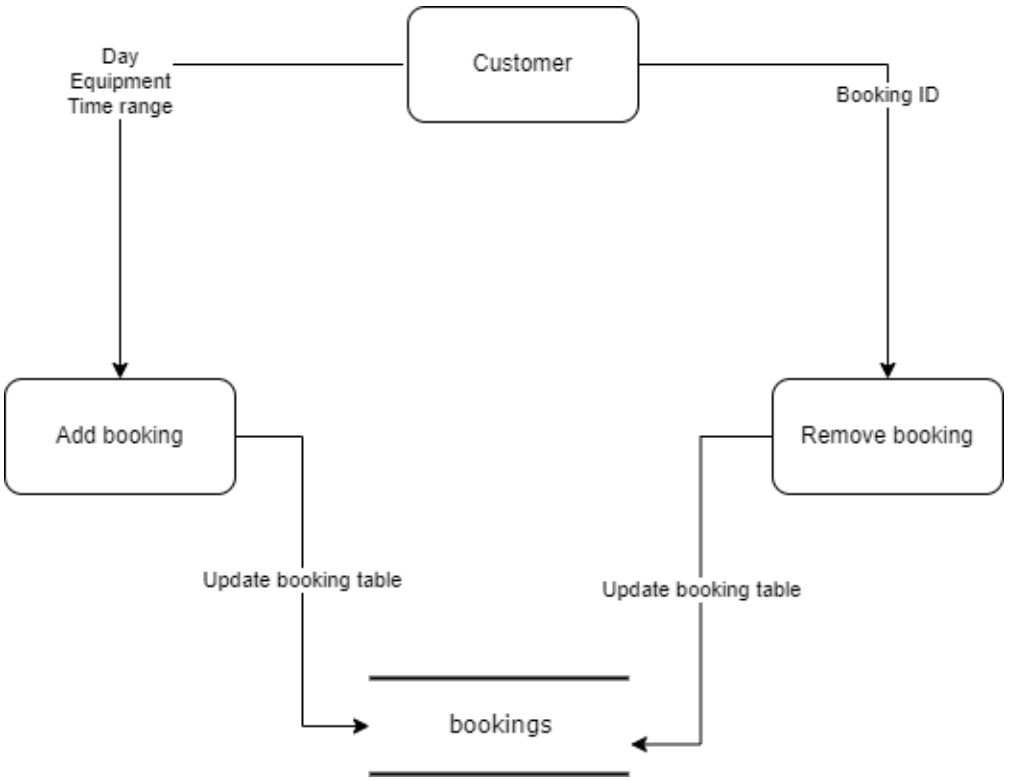

Figure 1. GU.FR.1 requirements data flow diagram test 1

2.8.2. Requirement: GU.FR.2

GU.FR.2 utilizes **GU.FR.3** to gather equipment information.

Description of requirement goals:
This test is relevant to the maintenance and moderation of the system, the reasoning is because gym equipment might not always be available and to prevent mismanagement.

Test 1
Administrator wants to add new equipment to the system and later remove another piece of equipment in the system:

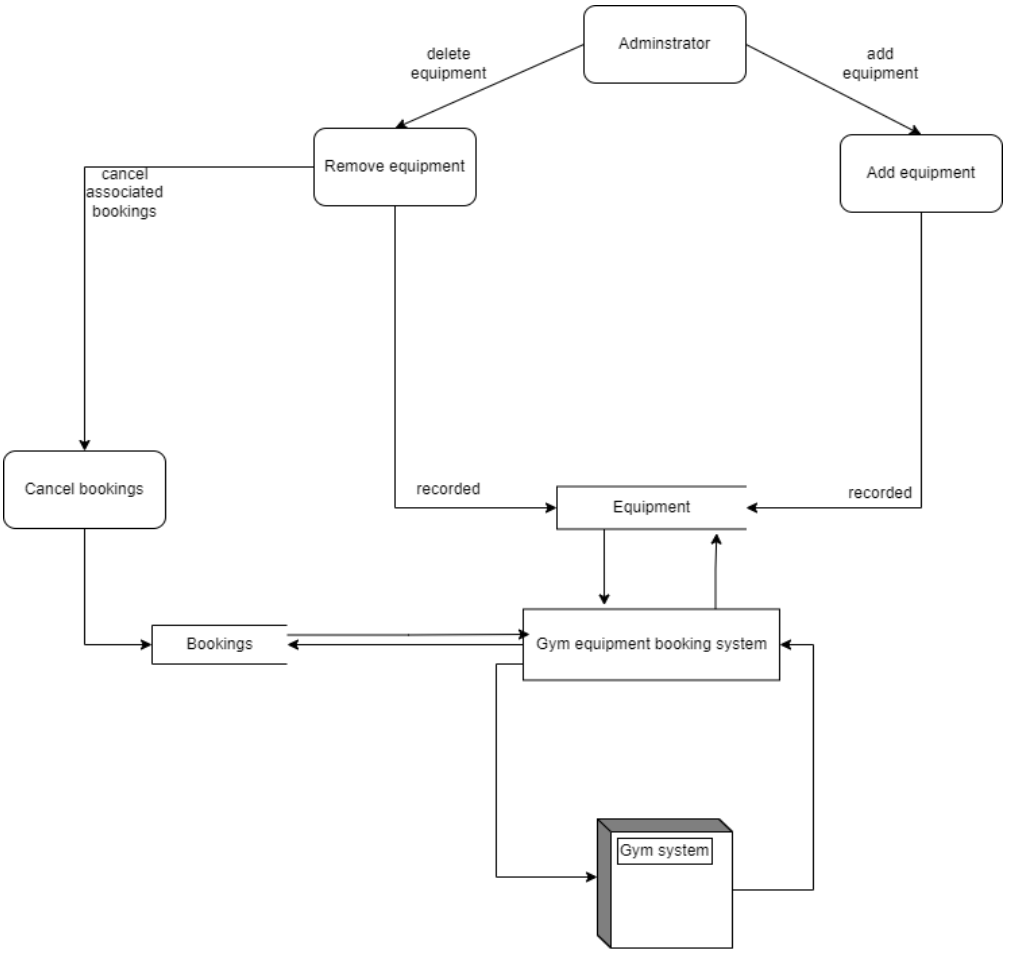

Figure 2. GU.FR.2 requirements data flow diagram test 1

Test 2

Administrator removes and adds new bookings with the id of a customer:

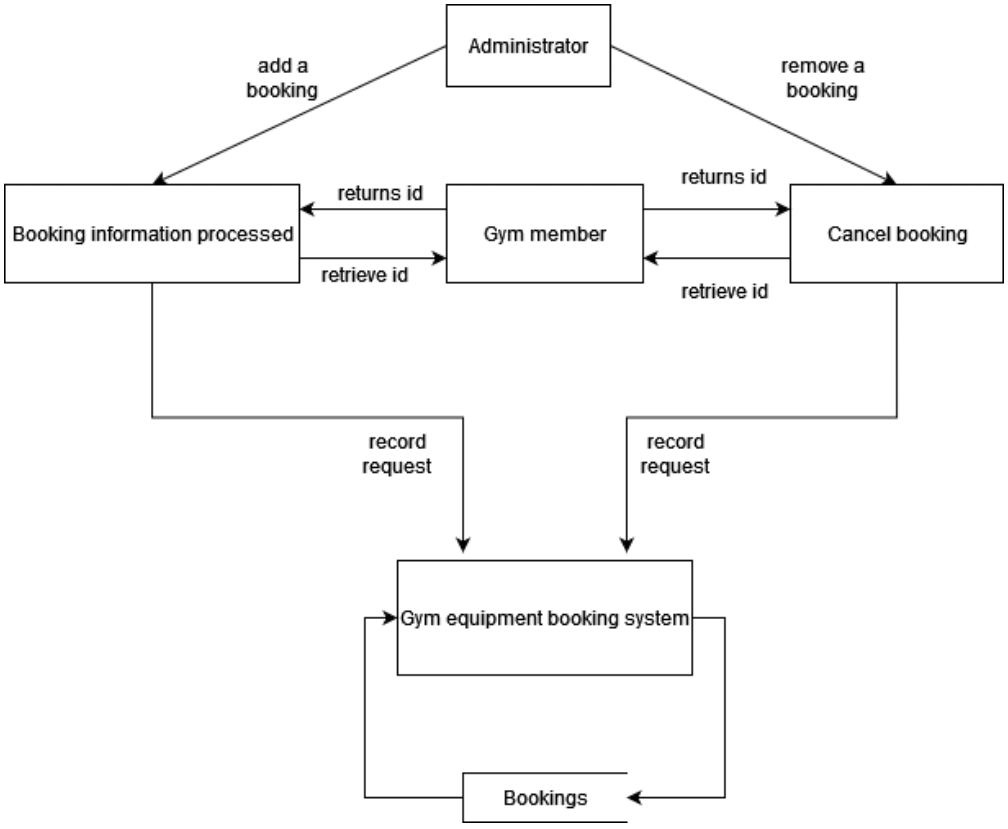

Figure 3. GU.FR.2 requirements data flow diagram test 2

2.8.3. Requirement: GU.FR.4

Description of requirement goals:

This test aims to show front-end functionality, so logins and menus are going to be tested, if these pass the tests then the required quality is met.

Test 1

Customer logs in to the website and goes to the booking page menu:

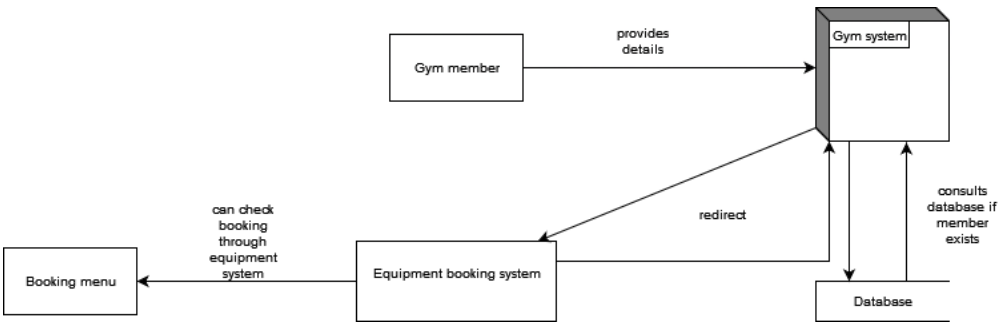

Figure 4. GU.FR.4 requirements data flow diagram test 1

2.8.4. Requirement: GU.FR.5

Description of requirement goals:

This test will focus on how the customer can provide feedback to the system if any errors or improvements can be made.

Test 1

Customer wants to give feedback about the system:

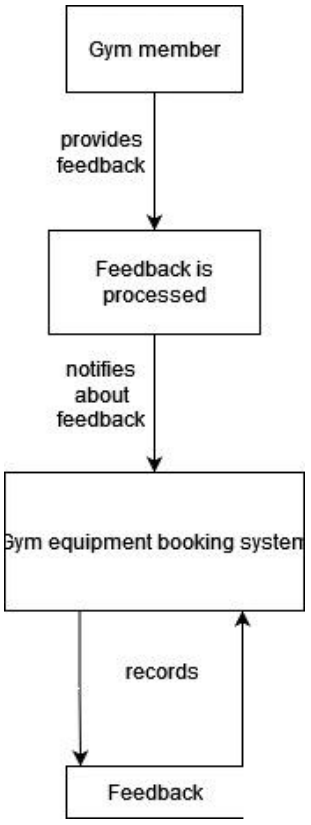

Figure 5. GU.FR.5 requirements data flow diagram test 1

3. System Interfaces

3.1. User Interfaces

3.1.1. Look & Feel

This booking system includes two main parts: the user interface for gym members to access equipment booking-related services and the user interface for gym administrators to manage the bookings.

The identified requirements from the gym member user interface:

Requirement: GM.LF.UI.1

Gym member interface for this system needs to deliver a convenient user experience, clear and concise that the user can easily find the related functions.

Requirement: GM.LF.UI.2

Gym member interface must be presented well in mobile devices such as smartphones and tablets which indicates that it is critical to adapt touch screen usage scenarios.

Requirement: GM.LF.UI.3

Gym member interface must be compatible with PC.

Requirement: GM.LF.UI.4

The user interface must implement short drop-down menus to improve user experience.

Requirement: GM.LF.UI.5

Simple and clear process is a key to making the booking enjoyable and predefined processes/stages with options must be applied instead of demanding intensive typing from the user.

Requirement: GM.LF.UI.6

The buttons in the user interface must fit the finger's size (ergonomics).

Requirement: GM.LF.UI.7

Gym member interfaces must apply vibrant colors to fit the industry.

The identified requirements from the gym administrator:

Requirement: GA.LF.UI.1

Gym administrator interface must include a dashboard to display booking statistics.

Requirement: GA.LF.UI.2

Gym administrator interface must include search bars to support search functions where the user can input search conditions.

Requirement: GA.LF.UI.3

Searched booking information must be displayed below the search bar for users to review the results and search conditions.

Requirement: GA.LF.UI.4

The search result must be organized chronologically in a form, and each booking record must be displayed in a single row.

Requirement: GA.LF.UI.5

Gym administrator interface must apply vibrant colors to fit the industry.

3.1.2. Layout and Navigation Requirements

Layout and navigation play an important role in this application. According to the related experiments, 70% of people started a task by clicking on a link, and only 30% used search [2]. Based on this principle, the following requirements are identified in this document.

The layout and navigation requirements for gym members:

Requirement: GM.LNR.UI.1

The layout and navigation requirements for gym members must fit the smartphone screen i.e. vertical rectangle layout.

Requirement: GM.LNR.UI.2

The navigation for gym members must be designed as “one flow” which means that the user only needs to follow the predefined steps to finish booking.

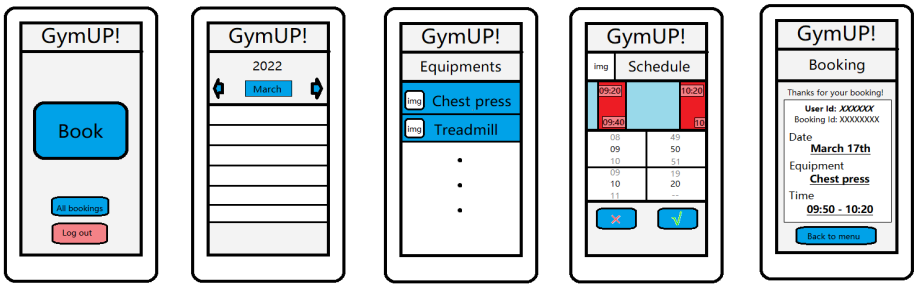

Figure 6. Renderings display of GM.LNR.UI.1 and GM.LNR.UI.2

Requirement: GM.LNR.UI.3

A monthly-based calendar must be implemented so the user can select the date for booking.

Requirement: GM.LNR.UI.4

The calendar must include buttons to change to the previous month and next month. However, the user cannot access the past months i.e. if the user is in April now, the user cannot browse March.

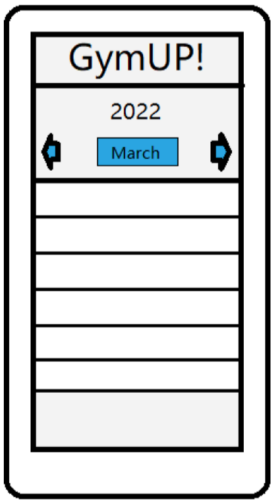

Figure 7. Renderings display of GM.LNR.UI.3 and GM.LNR.UI.4

Requirement: GM.LNR.UI.5

The system must implement a slidable equipment list (sliding as up and down manner), each piece of equipment will be displayed in a horizontal rectangle as a row which includes a picture of the equipment (which can be tapped and zoomed in), the name of the equipment, the row height must fit the finger's size (ergonomics requirement).

Requirement: GM.LNR.UI.6
The row must be tappable, after pressing, the user can check the available time slot, other booked time periods will be displayed.

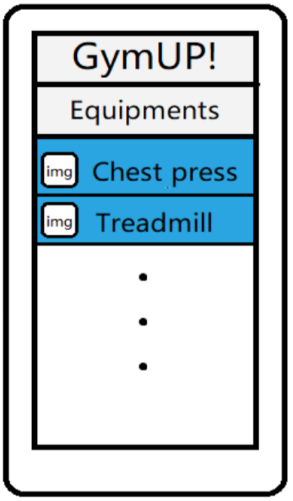

Figure 8. Renderings display of GM.LNR.UI.5 and GM.LNR.UI.6

Requirement: GM.LNR.UI.7
Time selecting operations must be easy for the user to set up a start time and end time.

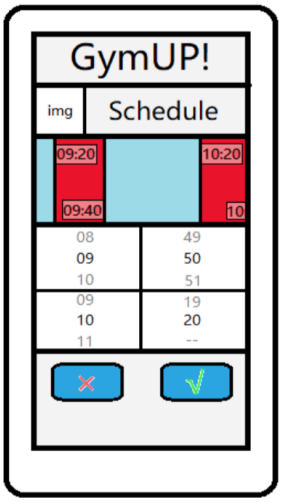

Figure 9. Renderings display of GM.LNR.UI.6 and GM.LNR.UI.7

Requirement: GM.LNR.UI.8
When the reservation is completed, the booking receipt page must be displayed.

Requirement: GM.LNR.UI.9

The user must be able to return to the initial menu page to conduct extra bookings or log out.

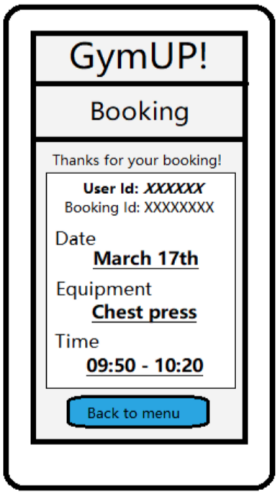

Figure 10. Renderings display of GM.LNR.UI.8 and GM.LNR.UI.9

Requirement: GM.LNR.UI.10

The user interface must include a button to review all bookings.

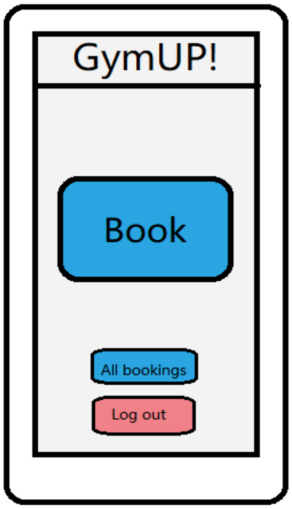

Figure 11. Renderings display of GM.LNR.UI.10

Requirement: GM.LNR.UI.11

The user can review the bookings sorted by equipment or by date.

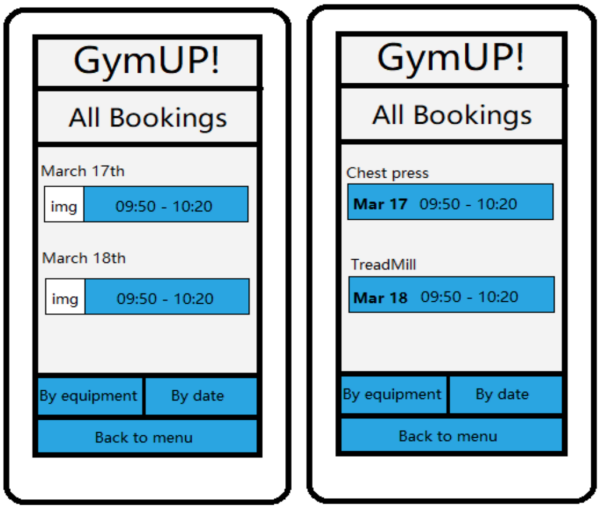

Figure 12. Renderings display of GM.LNR.UI.11

Requirement: GM.LNR.UI.12

The user interface must include the buttons regarding cancel booking, check-in booking, and return to the previous page on the same page.

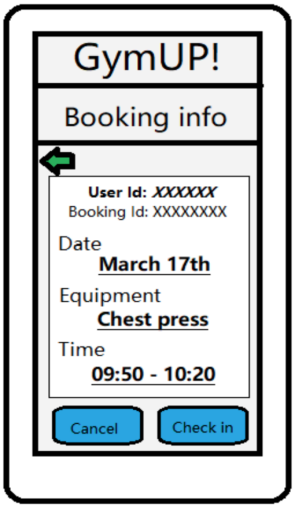

Figure 13. Renderings display of GM.LNR.UI.12

The layout and navigation requirements for gym administrators:

Requirement: GA.LNR.UI.1

The gym administrator interface must focus on the scenarios of using the PC that the user interface layout should display more information to adapt to the PC's large screen.

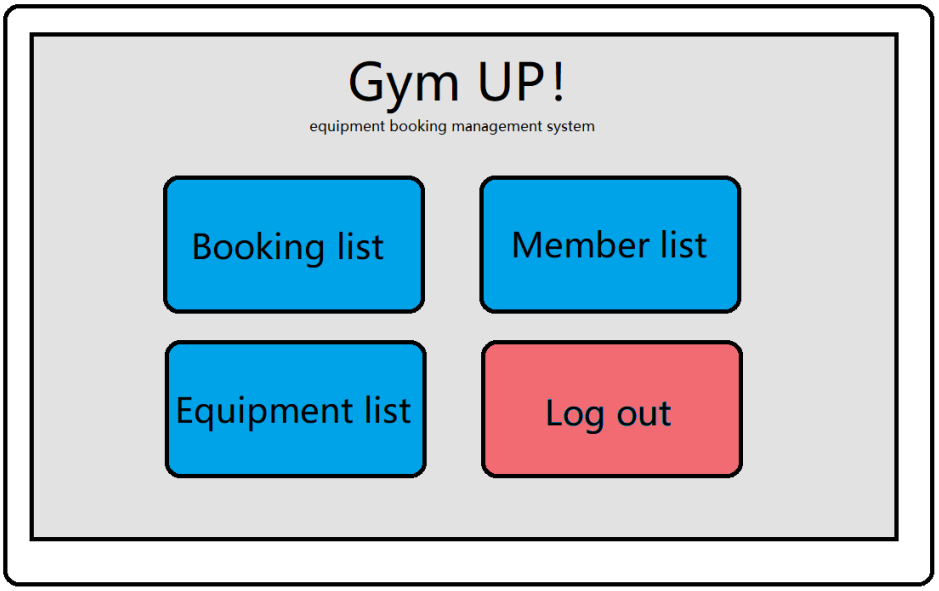

Figure 14. Renderings display of GA.LNR.UI.1

Requirement: GA.LNR.UI.2

The user interface must include comprehensive search functions and related customer booking information is displayed in a slidable form to show all aspects of booking-related information.

Requirement: GA.LNR.UI.3

On the top of the system UI, it must have search bars with different filters for searching member ID, member name, booking ID, booking date, etc.

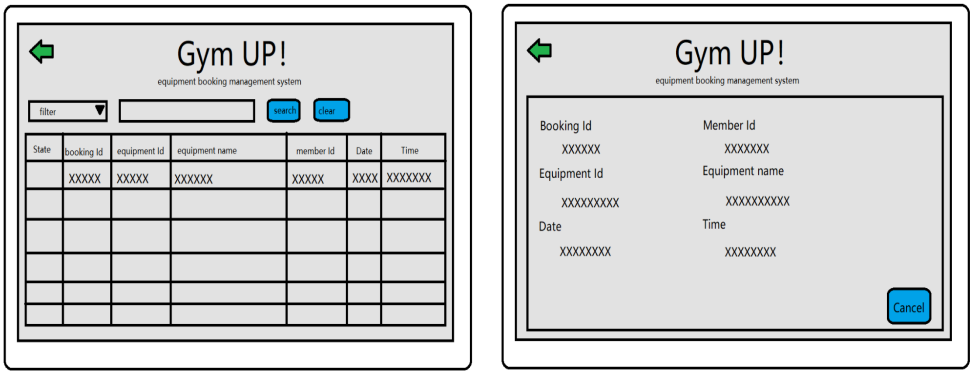

Figure 15. Renderings display of GA.LNR.UI.2 and GA.LNR.UI.3

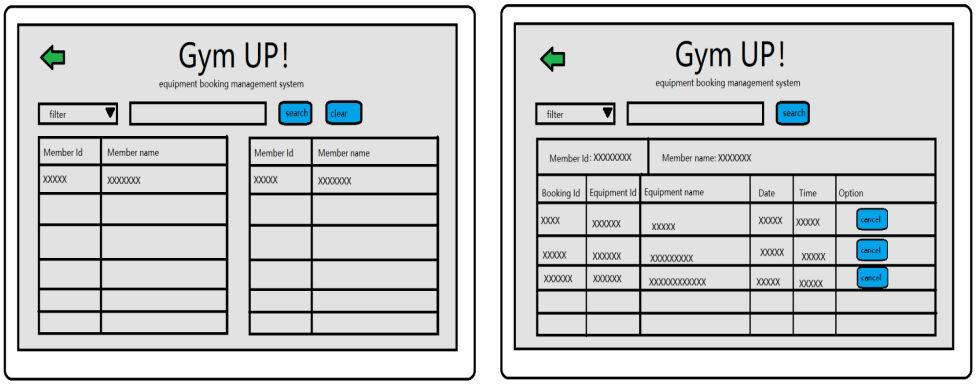

Figure 16. Renderings display of GA.LNR.UI.3

Requirement: GA.LNR.UI.4

The equipment form must have a cancellation button to cancel the availability of the system, in case of maintenance of the equipment.

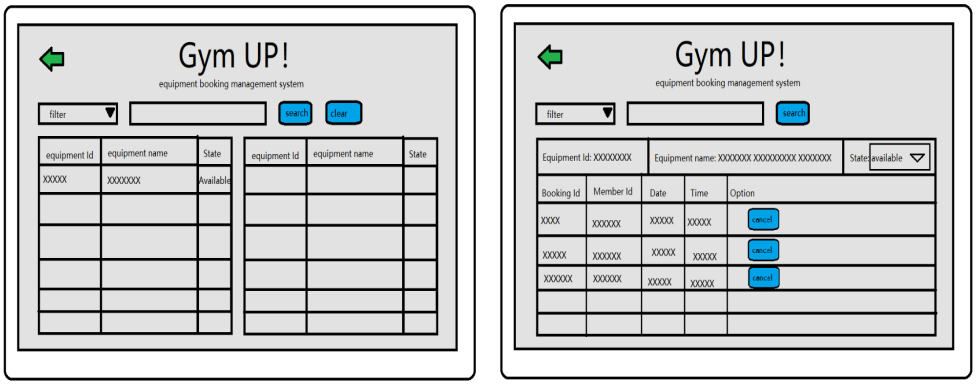

Figure 17. Renderings display of GA.LNR.UI.4

Requirement: GA.LNR.UI.5

The user interface must have a cancellation button to cancel a typical booking.

3.1.3. Consistency

Requirement: C.UI.1

When it comes to navigation controls, the users can expect navigation controls based on the role that they have in the system. For example, members of the gym can expect navigation controls to be related to adding or canceling bookings, schedules, additional information about the bookings themselves, and the equipment whereas administrators will expect navigation controls related to managing members, bookings, and equipment. These

would also serve as principal aids to navigation as the system in its entirety is based around gym equipment with bookings associated with them. Considering that the focus for the gym members is to provide as much flexibility and availability as possible when using our system and it is oriented toward more mobile applications, it is expected of them that the navigation controls will be touchscreen navigation whereas for administrators, considering the amount of responsibility and functionalities they will have in the system, the implementation will be oriented towards computers and therefore navigation controls will consist of cursors (mouse pointer). It is noted that this can and possibly will change in the future to allow for interchangeability to devices used accessing the system.

Requirement: C.UI.2

When it comes to terminology, the user can expect terminology related to the gym and its equipment. The user should expect a basic fitness equipment glossary when it comes to the equipment with non-jargon explanations integrated as well. Considering the constant influx of innovations and products when it comes to gym equipment, the user can also expect that the system will remain as up-to-date as possible with the information about the respective equipment that the gym possesses in its inventory. When it comes to the information that the user can expect, it will include the name and possible abbreviations for the equipment, the category of the equipment, body parts aimed for, and as mentioned before a quick non-jargon explanation about the equipment on how it operates. Users can expect that most of the other gym terminology is quite self-explanatory i.e a booking implies an act of reservation of a service which in this system's case it would be the equipment, a schedule implies a timetable, and so forth.

Requirement: C.UI.3

When it comes to design style consistency, the theme color, background color, button color and shape, and the interaction effects must be implemented and behave in the same way.

Requirement: C.UI.4

When it comes to screen area size and shapes, the user can expect that the screen area size is quite responsive and adaptive to the device that they are using, and in that regard, the shapes will also adjust themselves in accordance.

Requirement: C.UI.5
When it comes to placements for entering/presenting data, the user should enter as little data as possible, and the data entry method should be selected from as many preset conditions as possible. This makes it easier and faster for users to use the system. Data output and display need to be easy for users to observe, so fonts need to be as large as possible. Each piece of data needs to be distinguishable from other distinct pieces of data.

3.1.4. User Personalization & Customization Requirements

Personalization and customization should first and foremost enhance the user's experience when using this product and not be mitigated by broken features. Personalization can be either role-based or individual. When referring to role-based personalization, it is usually a reference to user personas having specific characteristics based on their roles.

Requirement: GU.UP.1
The application must differentiate between member and administrator by presenting the two respective entities with a menu and functionalities that reflect their roles in the system. As of now, the focus of this design is to provide a stable foundation with the ability to implement features in the future.

Various features would include:
Requirement: GU.UP.2
Avatars and frames for the users with the color of the avatars for a member being blue, and for administrators being green.

Individual personalization is personalization that has utilized the user's individual characteristics from the history of interactions and data they have provided. A future implementation would be for example.

Requirement: GM.UP.3
Based on the gender that the member has specified, the system will display recommended gender-specific exercises related to the most preferred equipment that the member has used.

Other future implementations would be to include:

Requirement: GM.UP.3.1
A news feed in the main menu where news and tips related to the exercises and equipment the members use the most.

Requirement: GU.CR.1
Users will also be able to create a custom home page by which they will be greeted once they enter the application.

Requirement: GU.CR.2
Users will be able to customize their profile pictures (avatars).

Requirement: GU.CR.3
Users will be able to change the background to either light or dark mode.

To conclude this section, the design is not restrictive when it comes to adding and implementing features and therefore the fundamentals are the priority.

3.2. Interfaces to External Systems or Devices

3.2.1. Software Interfaces

Requirement: SI.IESD.1
The application will be deployed on AWS Cloud servers, and the system will be deployed on Amazon Linux Intel 64-bit (x86_64).

Requirement: SI.IESD.2
The system must be able to integrate with MyBatis 3 and MySQL 5.0 to access the database.

Requirement: SI.IESD.3
The system will apply REST API to achieve the interaction between the client and the web servers.

Requirement: SI.IESD.4
The system's database will apply Docker as the container to run the application and database.

Requirement: SI.IESD.5

The system needs to implement a Single Sign-On (SSO) protocol for user authentication, this will enable gym members to only enter their password once on their gym website, and when the home page redirects the user to the equipment booking page, the user will no longer need to enter their account information again.

Requirement: SI.IESD.6

The gym equipment booking system will be connected to a cloud service and the gym's domain system.

3.2.2. Communications Interfaces

Requirement: CI.IESD.1

Devices shall be internet capable and connected to a computer network.

Requirement: CI.IESD.2

The gym equipment booking system shall be able to identify the user's login authentication information and use it to access the booking services.

Requirement: CI.IESD.3

The gym equipment booking system shall be connected to the email service.

4. Business Rules

4.1. Gym member

Requirement: GM.BR.1

If the gym member has a subscription then they will be allowed to book gym equipment.

Requirement: GM.BR.2

If the gym member cancels their subscription then their booking will also be canceled.

Requirement: GM.BR.3

If the gym member disrupts the queue by overstaying their booking by an hour or more then they will be banned from the gym for an amount of time that the gym decides upon and their bookings covering said period will be canceled.

Requirement: GM.BR.4

If the gym member has more than a specified number of bookings on a day assigned by the gym (customizable) then that equipment will be deemed as unavailable for the day to the respective gym member.

4.2. Gym equipment

Requirement: GE.BR.1

If the gym equipment is unavailable due to a booking then bookings should not be possible until the said booking has been either canceled or completed.

Requirement: GE.BR.2

If the gym equipment is unavailable due to maintenance then bookings for respective equipment should be canceled and disabled for the time being.

4.3. Gym administrator

Requirement: GA.BR.1

If gym administrators deem equipment for maintenance and label it as such then all bookings related to it should be canceled.

5. System Constraints

5.1. User Interface Constraints

The system should have an interface that keeps it simple and easy to use. Complex actions and/or fancy artwork should not be included to minimize system complexity.

5.2. Software Constraints

In order to initiate the equipment booking service, the system needs the users to login their account to the legacy system, and the equipment booking system needs to read the login information from the legacy system.

The system is developed based on the mainstream browsers covering Microsoft Edge, Chrome, Firefox, and Safari web browsers. The users have to avoid using minority browsers in order to avoid potential problems.

5.3. Communications Constraints

The system must be able to communicate via TCP/IP. Bandwidth should be greater than 200 KBps.

5.4. Operational Constraints

Minor Bugs (displaying incorrect information, others displaying failures) will remain at a maximum of 3 bugs/KLOC (Thousands of Lines of Code). Critical Bugs (e.g. users having too much or not enough access) will remain at max 1 bug/KLOC. Major Bugs (e.g. system crash, data loss) will remain at a maximum of 1 bug/KLOC.

5.5. Design Standard Compliance

Systems should be designed using open-source languages and/or free software. System interfaces should be developed using the ECMAScript(JavaScript) programming language version ECMAScript 2015(JS ES6) to be able to run on multiple browsers. The system should be developed with MySQL 5.0 or higher to store the data. The system should be designed to be able to switch interfaces and/or backends (databases).

6. Use-Cases

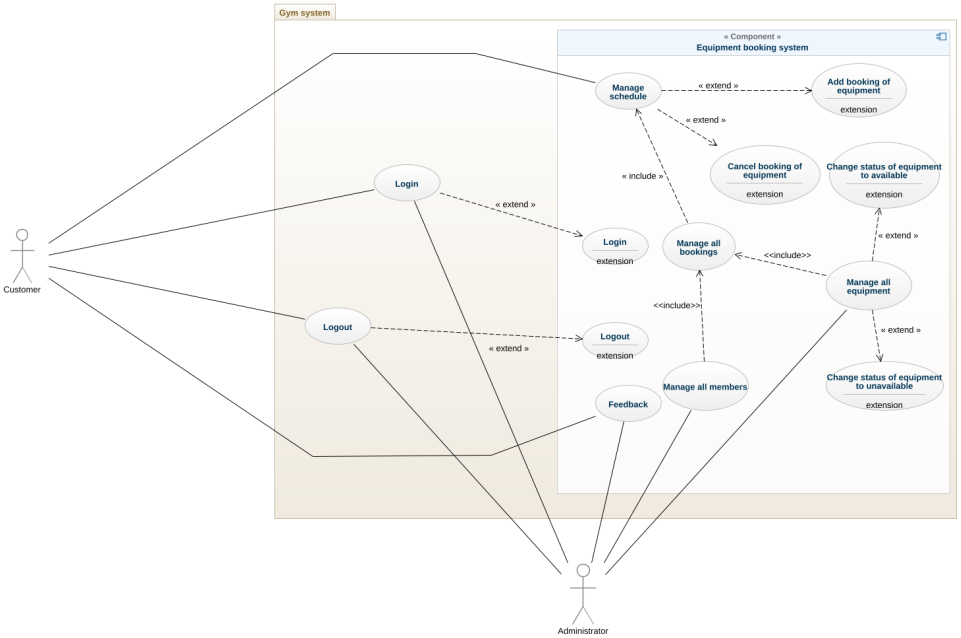

Figure 18. General use case diagram for the system.

The figure above illustrates the general case diagram for the system and its connections to the gym system. Bear in mind that various extensions and inclusions are presented in the more specific use cases, and that is due for clarity's sake. There are various use cases presented for possible entities although these are a few of the many use cases that the system has and potentially will have in the future.

6.1. Use-Case for a customer: Booking an equipment

6.1.1. Brief Description

The customer can use our app to book equipment in the gym and help the customers avoid rush hour. After the recent pandemic, a lot of people will go back to the gym. This could lead to overcrowding in smaller to medium gyms.

6.1.2. Actor Brief Descriptions

Actor Jill is a person who loves sports and would like to exercise a bit on the treadmill.

6.1.3. Preconditions

The booking will be done on a Wednesday for Thursday from 15:00 to 16:00.

6.1.4. Basic Flow of Events

On Wednesdays, the customer Jill wants to book the treadmill between 3 PM to 4 PM for Thursday. Firstly, she checks that the treadmill 1003 is vacant at that time then she confirms the booking. On Thursday, she goes to the treadmill she booked yesterday. She uses the treadmill for 1 hour in the gym and goes back home happily. After Jill leaves, the treadmill is listed as available.

6.1.5. Subflows

Subflow booking the treadmill

1. After Jill logs in, she then checks her schedule and proceeds to choose what she wishes to train and what equipment she would like to use.
2. The list of times and equipment available for the time she has chosen is displayed to her.
3. She chooses the treadmill and confirms her choice. She is then prompted with a display that shows her booking id, the time she has chosen, and the equipment id she will be using.

Subflow before and after a booking is finished

1. 5 minutes before Jill's booking is over, she receives a notification from the app stating that her booking is soon coming to an end.
2. After the booking ends, another notification is sent to Jill displaying a message confirming it.
3. After the booking ends, the equipment is listed as available to the others in the system.

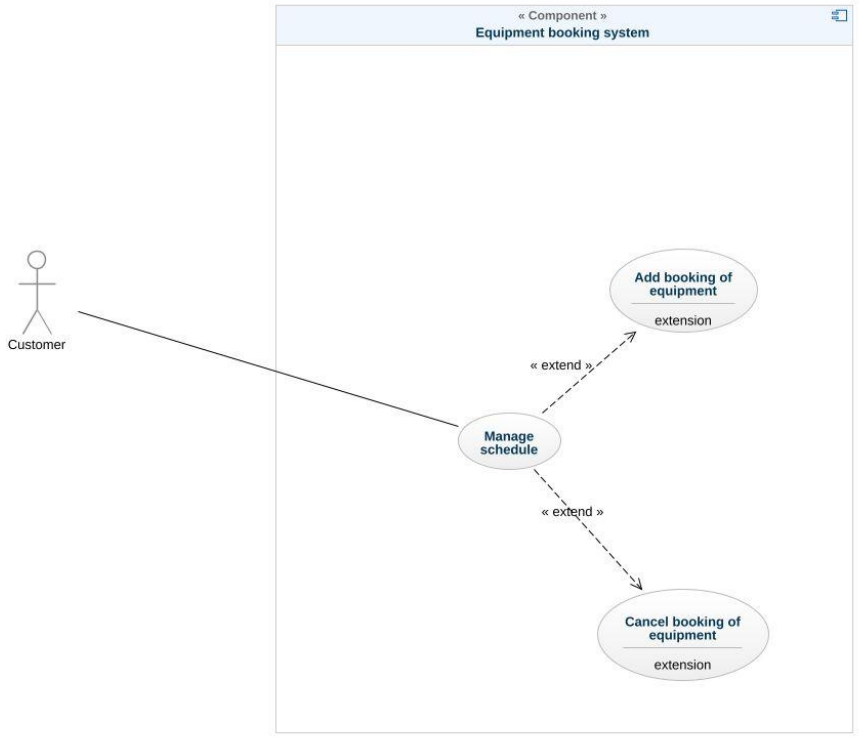

Figure 19. Use case diagram for the customer in this particular use case.

6.2. Use-Case for gym administrator: Managing bookings related to faulty equipment

6.2.1. Brief Description

The gym administrator can use the application to manage bookings related to faulty equipment which helps avoid the dissatisfaction of those members that have bookings related to respective equipment. This functionality will aid gym administrators greatly and reduce stress in the working environment.

6.2.2. Actor Brief Descriptions

For this use case, the gym employee named Leon will use the application. He is an employee who has been with the establishment since its foundation.

6.2.3. Preconditions

The equipment that is the rower has been detected to have faulty springs and will need maintenance.

There are three bookings related to this equipment.

It is a Friday, 12:30 when the issue was detected and the bookings are in the late afternoon starting from 16:00.

6.2.4. Basic Flow of Events

During his shift, Leon spots a piece of equipment that seems to be somewhat out of shape. The piece in question is a spring that is part of the rower and Leon quickly logs into the system using the application and checks for the equipment's ID. After having done so, Leon schedules the equipment for maintenance which in turn will result in all bookings associated with the rower being canceled.

6.2.5. Subflows

Subflow scheduling the equipment for maintenance:

1. After Leon logs in, he then proceeds to enter the sub-menu for managing equipment and he enters the ID of the rower. This in turn shows technical information about the equipment and bookings associated with it.
2. Once Leon labels the rower as unavailable due to maintenance and chooses the time that approximately will take to fix it (being one day).

Subflow after having labeled the equipment for maintenance:

1. After the system finishes the subflow above, it then sends notifications to all the members that had bookings associated with the said rower.
2. The sending of notifications is done by sending the members affected automated emails about the change and asking them to book another time.
3. The members can then access the message through their email.

6.2.6. Key Scenarios

6.2.6.1. Subflow scheduling the equipment for maintenance.

6.2.6.2. Subflow after having labeled the equipment for maintenance.

6.2.7. Post-conditions

The system will label the equipment as unavailable while it is under maintenance and the members will not be able to book any times associated with it.

If the equipment is deemed as fixable and once it is functional again, the system will label it as available and allow all members to book times associated with it.

6.2.8. Special Requirements

- The user can use this device to log in to the account (system) within 3 seconds.
- The system can malfunction at most once a year.
- The gym staff without proper logins should not be able to manage equipment and should contact an administrator instead.
- The system should keep logs of the management of equipment within the gym while also keeping track of their status.

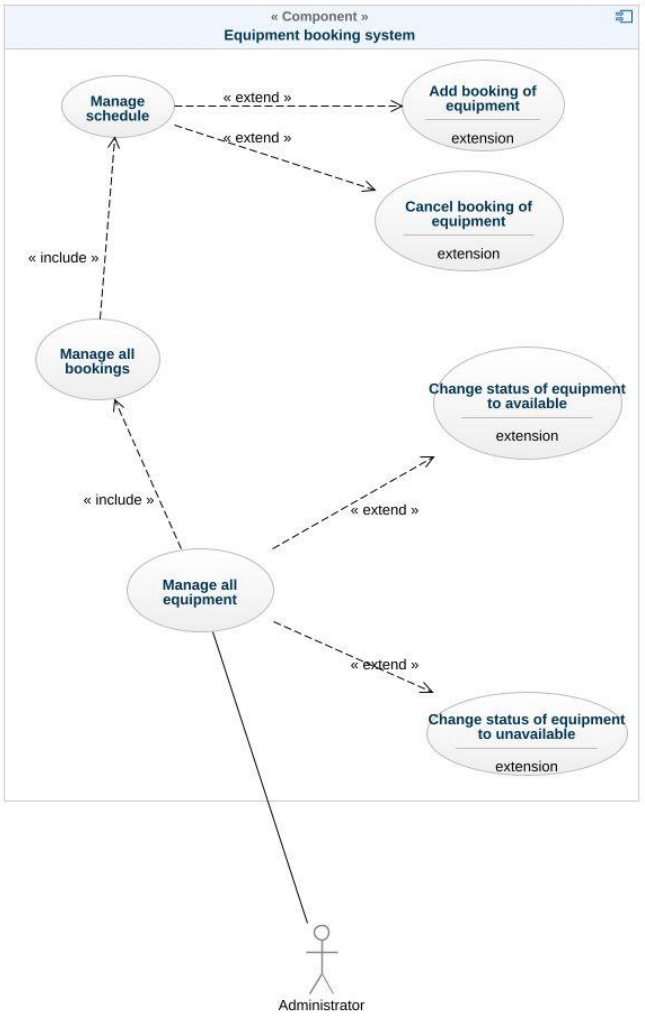

Figure 20. Use case diagram for the administrator for changing equipment status.

6.3. Use-Case for gym administrator: Managing equipment in the system

6.3.1. Brief Description

The administrators can use the application to manage equipment in the system which helps members and staff around perform operations with existing equipment in the system only. This in turn mitigates any possibilities of there being bookings or maintenance related to non-existing equipment.

6.3.2. Actor Brief Descriptions

For this use case, the administrator named Ada will use the application. She is an employee who has been with the establishment since its foundation similar to the aforementioned gym staff actor Leon.

6.3.3. Preconditions

The equipment that is the rower has been determined to be irreparable due to the amount of wear and tear it has endured. All bookings related to respective equipment have been canceled.

6.3.4. Basic Flow of Events

Ada logs into the system as an administrator and goes to manage equipment. She notices that one of the pieces of equipment has been labeled as irreparable regarding maintenance and therefore should be removed from the system. Ada checks the reasoning as to why the rower is irreparable and as she deems that the reason is valid, she proceeds to remove the equipment and confirms her choice.

6.3.5. Subflows

Subflow removing equipment from the system:

1. After Ada logs in, he then proceeds to enter the sub-menu for managing equipment, the rower shows up as a color-coded row that displays irrecoverability.
2. After Ada chooses to view said rower in more detail, another window displays technical information in regards to the equipment and the reasoning as to why it is irreparable.
3. Ada confirms the deletion of the equipment from the system and the system proceeds to delete the rower from the database.

6.3.6. Key Scenarios

6.3.6.1. Subflow removing equipment from the system.

6.3.7. Post-conditions

If a confirmation for a deletion regarding equipment has been made then the system will delete the respective equipment off its database.

If the equipment has been labeled wrongfully then the system shall not delete the respective equipment from its database.

6.3.8. Special Requirements

- The machine has to be able to log in to the users within three seconds.
- The system can malfunction at most once a year.
- Any unauthorized personnel without proper authentication should not be able to manage equipment and should contact an administrator instead.
- The system should keep logs of all management of equipment and the assignee of the management.

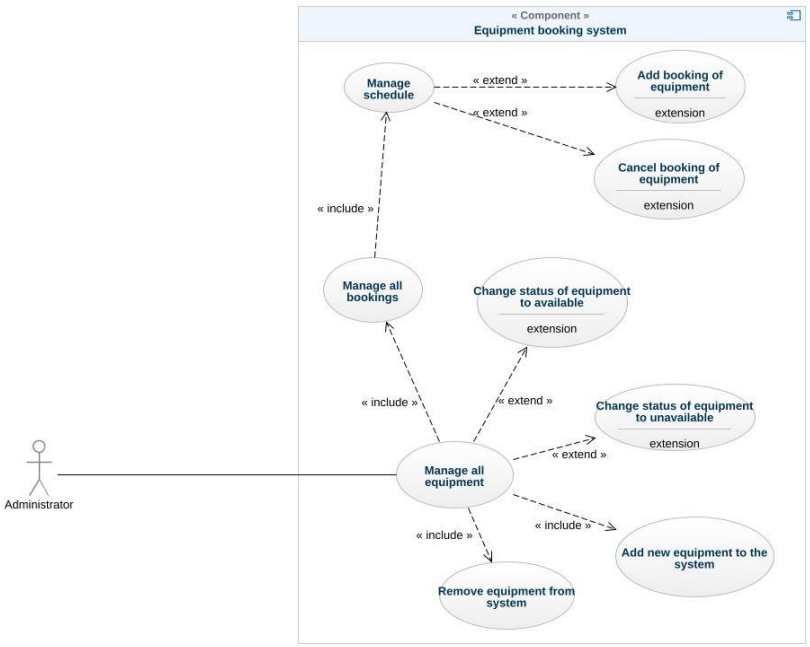

Figure 21. Use case diagram for the administration on removing the equipment from the system.

References

1) Lloyd, N., 2022. *Surprising Gym Membership Statistics - Expert Fitness*. [online] expertfitness.org. Available at: <https://expertfitness.org/surprising-gym-membership-statistics/> [Accessed 21 April 2022].

2) Uxbooth.com. 2022. *The Rules for Modern Navigation | Ux Booth*. [online] Available at: <https://www.uxbooth.com/articles/the-rules-for-modern-navigation/> [Accessed 21 April 2022].

Appendix – Time Report

Date	Member	Activity	Time (hours)
2022/04/12	Long Ma	Writing Section 5	2
2022/04/13	Long Ma	Modify Section 5	0.5
2022/04/13	Fredric Eriksson S	Writing Section 1	0.5
2022/04/13	Fredric Eriksson S	Writing Section 4	0.5
2022/04/16	Fabian Dacic	Modify Section 6	1
2022/04/17	Fabian Dacic	Writing Section 6	1.5
2022/04/18	Yuyao Duan	Writing Section 3	2
2022/04/18	Fredric Eriksson S	Writing Section 2	4
2022/04/19	Li Ang Hu	Writing Section 6	1
2022/04/19	Long Ma	Modify Section 5	0.5
2022/04/19	Fredric Eriksson S	Modify Section 2	2.5
2022/04/19	Yuyao Duan	Writing Section 3	6
2022/04/20	Long Ma	Writing Section 3	4.5
2022/04/20	Li Ang Hu	Writing Section 6	2
2022/04/20	Fredric Eriksson S	Modify Section 2	4
2022/04/20	Fabian Dacic	Writing Section 3	0.5
2022/04/20	Long Ma	Modify Section 6	1
2022/04/20	Li Ang Hu	Writing Section 3	1
2022/04/20	Fabian Dacic	Modify Section 6	0.25
2022/04/20	Yuyao Duan	Writing Section 3	10
2022/04/21	Fabian Dacic	Modify Section 2	2
2022/04/21	Li Ang Hu	Modify Section 3	3
2022/04/21	Yuyao Duan	Writing Section 3	3
2022/04/21	Fabian Dacic	Writing Section 3	1
2022/04/21	Fredric Eriksson S	Modify Section 2	1