Project Title: Resident Clubhouse Online Booking System

Background

Definition of a resident clubhouse

Clubhouse in the apartment complex often refers to a central building that provides different amenities for multi-purpose. It only provides services to its members. And being a resident of the apartment complex is necessary for becoming a clubhouse member. Some standard amenities include gymnasiums, event spaces, and study rooms. Nearby the clubhouse, there is often surrounded by pools, possibly a tennis court, and basketball court. It is a convenient hub for socializing with other community members. It's common that a portion of the rent is for the upkeep of these facilities.

Booking of clubhouse amenity

Theoretically, if a resident of the apartment wishes to use the service at the clubhouse, he/she would need to reserve in advance. Some clubhouse management teams would provide free-of-charge amenities and uphold the "first-come-first-served" principle, some would prefer deposit or charge fees for booking and clean-up. Either way, the member would need to go to the clubhouse in person or call if they want to check the vacancy and make reservations.

Limitations of the traditional clubhouse management system

Traditionally, paper records have always been the major, most familiar way of managing people's personal data and the reservation made. However, paper media have always had the limit of data inconsistency, redundancy, and low accessibility and readability when facing a large database. Over the past decade, making an online reservation and payment via a website or application has become more generalized, the need for more modern information and reservation management technology towards customers is soaring. Though in many property management companies, digitalization of resident's personal data is already applied, having an online booking system for clubhouse facilities for members is still not very common.

Project aims

We would like to build an online booking system that could process massive amounts of information without creating redundant data. The project would emphasize on providing a more flexible facility booking process to the members so that they are more willing to use the amenities. From the view of the clubhouse members, they could have a better understanding of the vacancy of facilities at different time periods.

The system also provides them the flexibility of reserving facilities and making modifications to them regardless of the time and location constraints.

From the view of the management team/company, this system aims to design a system that allows better customer relationship management and facilitates the utilization of community facilities and resources. As it could act as a tool that helps to utilize data visualization and data analysis, lead to more constructive insights and actions of the clubhouse management team.

Project Scope

This project could become a potential solution for all clubhouses that wish to have a more consistent, efficient management of facility reservations and records of the members. But for now, our team assumes that all facilities of the clubhouse need to charge a certain amount of booking fees, and all of them are first-come-first-served. The common trend of resident clubhouses in Hong Kong has a surprisingly low utilization rate. Therefore, this project assumes that all facilities would not have peak hours at all-time unless it becomes a necessary factor that needs to be tackled in the future.

Risk Management

It's difficult to say that we could always predict what would happen in the developing process and stick to the planned schedule constantly. Before the design is finalized, many risks could be created due to various factors. Before the project really starts, a risk assessment is conducted to identify the probability and impact of the risks on the project. The following two risk factors are valued the most after evaluating.

Poor productivity

Poor management and supervision inside the team might hinder productivity and lead to time waste and fall behinds on a planned schedule. It's unrealistic to expect the team to be like a machine and make productive progress every hour at work, an assistant project manager is necessary to assist the team. He/she would be given the task of monitoring and evaluates the progress of the team each week. He/she would directly collaborate and receive updates of individual works. When there is a chance that the weekly goal might not be achieved, he/she would report to the project manager and arrange changes to fix it.

End-user engagement

To make sure that the target users like and are willing to adopt the software, it's important to gather feedback from end-users. Since the project has the potential to provide services to all resident clubhouses, user engagement is the key link to success and profit. To provide user participation, we would conduct surveys and votes for gathering their opinions before and during the development of the design. A prototype design of the application would be released in the late period and is open to suggestions.

Development phases

We have 6 members and 13 weeks to develop the whole project. The whole phase would be similar to a combination of a waterfall model and a spiral model. We would first select the project manager and other job posts, gather information, and build up the overall framework of the project. Then the use-case diagram, class diagram and description, sequence diagram, and prototype design would be produced sequentially, with peer review activity after each diagram design is finished.

The actual group contribution and weekly activity log could be accessed in the last part of the report. For now, we initially assign the tasks to members as the table indicates.

Project manager	Initiate discussion, plan and monitor the activities and schedules. Define the main purposes and scope of the project.	Ng Cheuk Sze
Assistant project manager	Assist the project manager to carry out the duties. Record and manage schedules, minutes and other necessary documentations.	LAM Man Lai
Software designer	Design use-case diagram	AU Sze Chit and Chan Ka Yu
Software designer	Design and describe class diagram design	Chan Chun Ho and LIU Sze Yi
Software designer	Design and justify sequence diagram	Ng Cheuk Sze

Software designer	Prototype overall design	LAM Man Lai

Requirement

Functional Requirements

The unregistered residents (i.e., newcomers) can check facilities availability through the clubhouse system, so that they can know what facilities are available in the clubhouse. This attracts more unregistered residents to join the membership and use the facilities. Once the unregistered residents decide to join the membership, they need to use the system to do the registration. Followed by the staff verifying the registration, if the information filled are correct and fulfill the membership eligibility, the unregistered resident will become a registered resident. The unregistered residents can check the registration status through the system.

The registered residents can use the system to make facilities booking. First, they need to use the system to check the availability of the facilities. Then, they need to select the timeslot of using the selected facility. Finally, it comes to the payment section. If the registered resident does not have a monthly pass, they need to pay the booking fee by either cash or credit card. If they choose to pay by credit card, they need to enter the required information into the system. If they choose to pay by cash, they just need to pay when they arrive at the venue and the staff will collect the money. The registered residents can buy a monthly pass through the system. Same as before, they can also choose either to pay by credit card or cash. One monthly pass is for one facility only.

The registered residents can view the booking made by themselves. They can also choose to cancel or modify the booking. If the registered residents want to cancel a booking and the booking fee is already paid by credit card, the refund is done through credit card. If the registered residents want to modify the booking, they may get the refund or need to pay more. This is because the booking fee varies for different facilities and booking time slots. If the payment of this booking is done through credit card, then, after modifying the booking, the registered users may need to pay more or get a refund through credit card.

The staff can use the system to view statistics, including the registration status, the facilities' availability, the bookings and the payment progress to support their administration work. The staff verify unregistered residents' registrations and can view their activities. When the registered residents decide to pay the booking fee by cash, the staff will collect the payment in the front desk.

Non-functional Requirements

Different users including unregistered residents, registered users and staff can use the system. The system provides different functions to different types of users. Also, different registered residents may or may not need to pay the booking fee, based on whether they have bought the monthly pass. Therefore, user authentication is needed before using the system. The system has high dependability and security. Personal data is protected and can only be viewed by the residents themselves or the staff.

Registered residents with monthly passes can enjoy the facilities unlimitedly in a month and have to renew it every month. The monthly pass is non-refundable and non-transferrable. Residents with monthly passes can enjoy a lower average cost of using different facilities. For registered residents who do not have a monthly pass, they pay per time either by credit card through online or cash through the front desk. The system has high accessibility with 2 payment options, both online and offline mode. Residents can also modify or cancel the booking and the paid fee will be refunded through credit card directly and they can do it anytime and anywhere without time and location constraints.

Some of the existing clubhouse facilities booking systems require face-to-face booking. Residents have to go down to the clubhouse reception area in person and tick the facilities they want to book on a paper, as well as filling in personal information. Our system is environmentally friendly as it digitalized the booking process. Less paper is used for registration and booking. The e-version not only reduces the paper-usage, but it also increases the time-efficiency for both the staff and residents. Residents no longer have to visit the front desk area and they can make the request directly using their smartphones.

The system has high usability. The user interface is clear and easy-to-use. Residents can sign up directly on the system in the registration interface and set up the login password. Users can sign in the system in the login interface once their registration is being verified. They can view the current facilities availability and choose the favourable time slots and dates to book the facility in the My Record interface. They

can pay directly afterwards using a credit card online. The process is simple and clear and they can view the registration status, booking record, payment status and facilities' availability anytime and anywhere.

Software Prototype

It is important to have effective feedback and communication from all team members before resembling the final product. Therefore, our UI designer illustrated a software prototype of the Clubhouse mobile application, to ensure that all aspects of UI satisfy the requirements and could be implemented with no difficulties.

1. Design of the Landing Interface

When we open the application, we would first see the landing page(Figure 1). The vector icons show the main facilities in the clubhouse in a relatively straightforward way. Users need to log in if it is the first time they signing in. The "remember my account" setting is the default so that users need not log in every time they open the application.

For the unregistered users, they could sign up or use the guest mode to check the availability of all facilities in real-time only. By clicking the purple underlined text "Guest: check the availability of all facilities", the user will be directed to the Facility Booking interface.

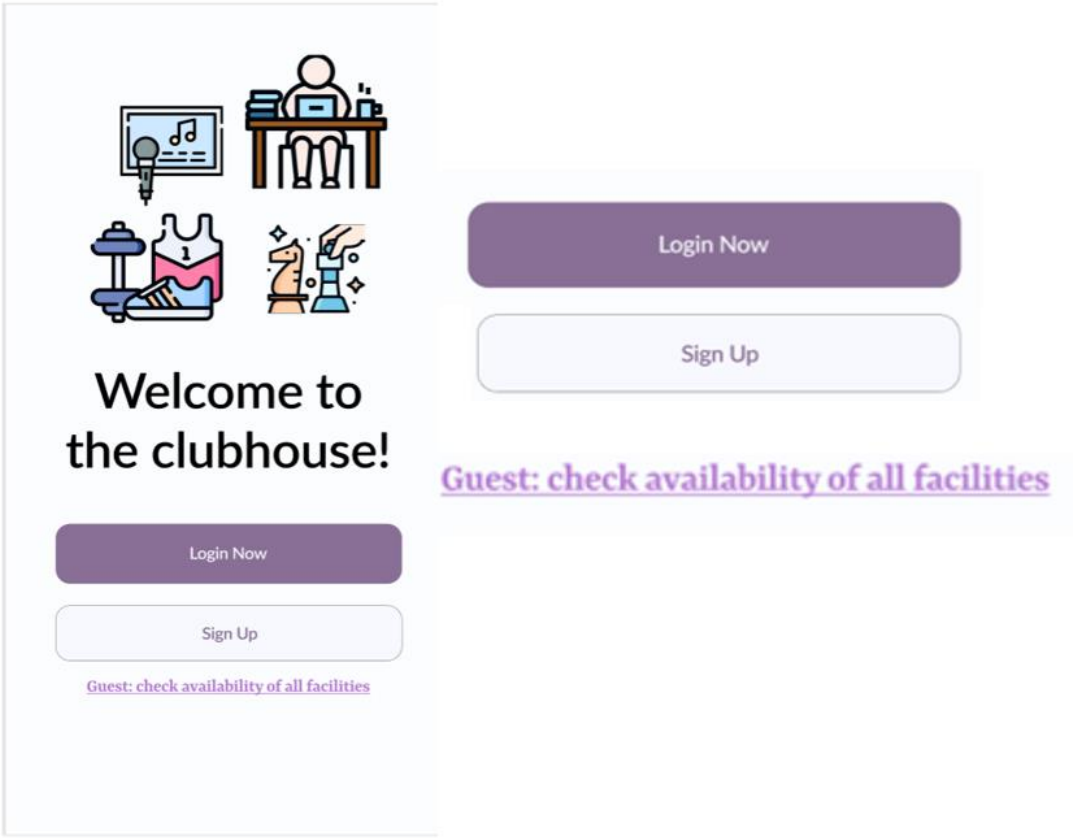

Figure 1

2. Design of the Login Interface

After clicking the purple button in the landing page, users are directed to the login page(figure 2). Users could log in by entering a valid email and password. A "Remember me" function is by default on. Clicking its icon again would change its color from green to grey as the figure showed.

If users forgot their password, they could click the blue text "Forget your password?" for help. A password reset email would be sent to the registered email account of that user.

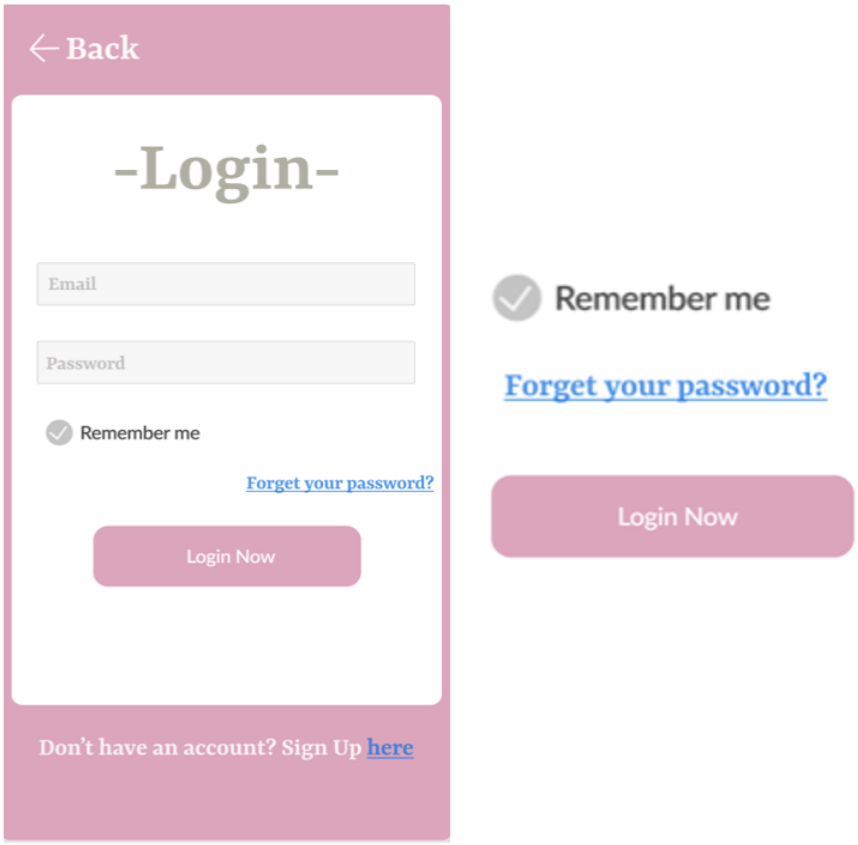

Figure 2

3. Design of the Registration Interface

For newcomers, they could sign up by clicking the "Sign up" button on the landing page. Users need to fill in their personal information so that administrative staff who are responsible for verifying it by checking with the resident information database. Users need to check 2 checkboxes to acknowledge that they've learned that the data gathered would be used for registration verification and the process could take some time. A notification would be displayed to indicate that the application is successfully submitted(figure 3).

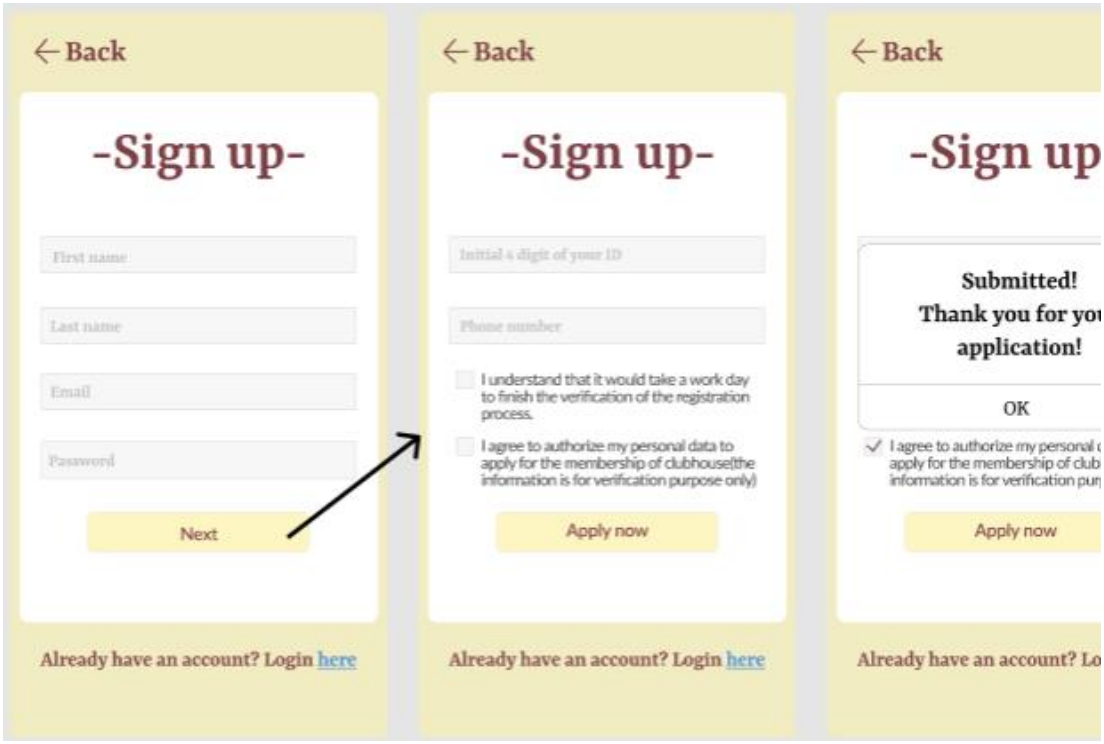

Figure 3

4. Design of the My Record Interface and Navigation bar

Navigation bar

Once everything is settled, a member ID would be assigned to the new member. Members could always call out the navigation bar by swiping to the right(Figure .4.1). They could navigate to the My Record interface and Facility Booking interface using the navigation bar.

The bottom-left "Help" icon would provide common answers or suggestions for problems that might be encountered.

Figure .4.1

a. My Record

Buy monthly pass

As the name suggested, users could browse and purchase different kinds of monthly pass on this page(Figure 4.2).

My payment

Linking credit cards for facility booking or equipment renting could be done so in the "My payment" function(Figure .4.3).

Figure 4.2

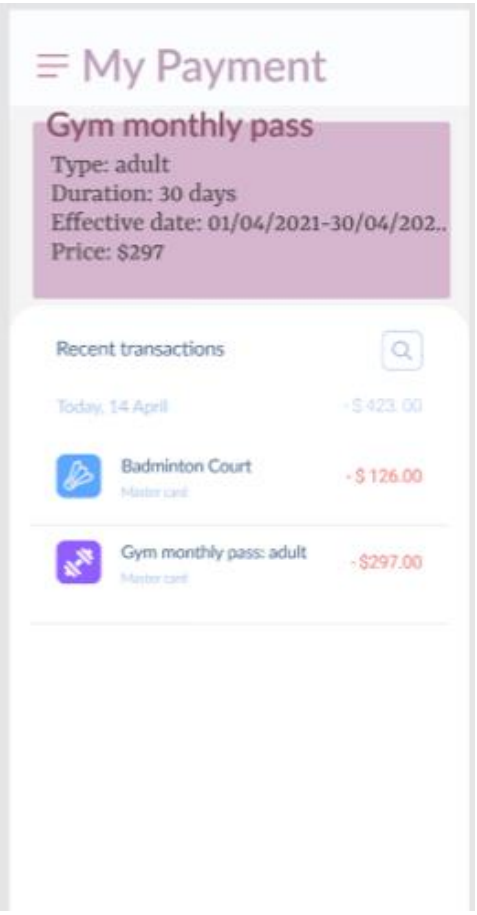

Figure 4.3

My Booking

After submitting the booking, the successful reservation would be added to the "My Booking" function in the My Record interface. By clicking the blue edit icon on the bottom-right corner of the reservation (Figure 4.4), members could modify their booking such as changing the time slot to another unoccupied time slot. Or, they could cancel their booking by swipe their booking information to the left(Figure 4.5). Long pressing the information would call out the menu that provides operations that modify the booking(Figure .4.4).

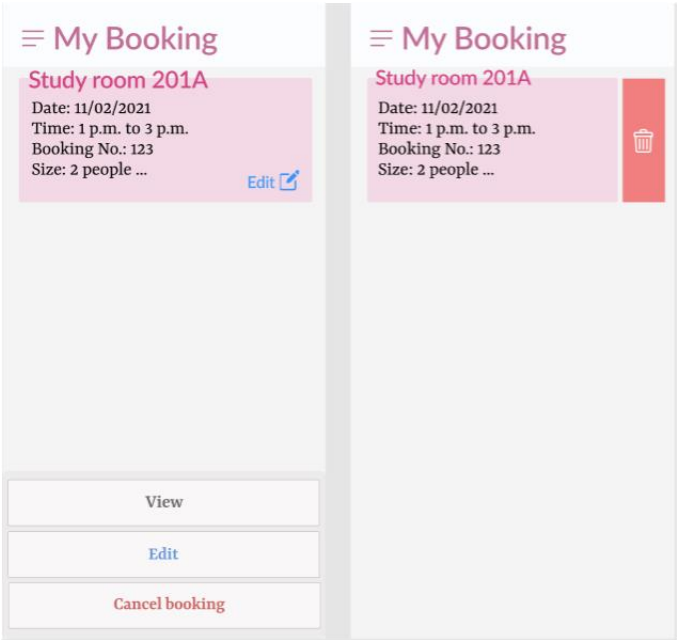

Figure .4.4

Figure .4.5

5. Design of the Facility Booking Interface

For both unregistered or registered users, they all could check the availability of all facilities using the search and filter function(Figure .5.1). They could check if a facility is booked at most 5 days ahead by specifying the number of people involved, time period, and cost in the filter(Figure .5.2). The search function allows users to look up the information of a specific facility sharply, whether the facility is taken already at a certain time slot(Figure .5.3).

The only difference is that only registered members could book the facility.

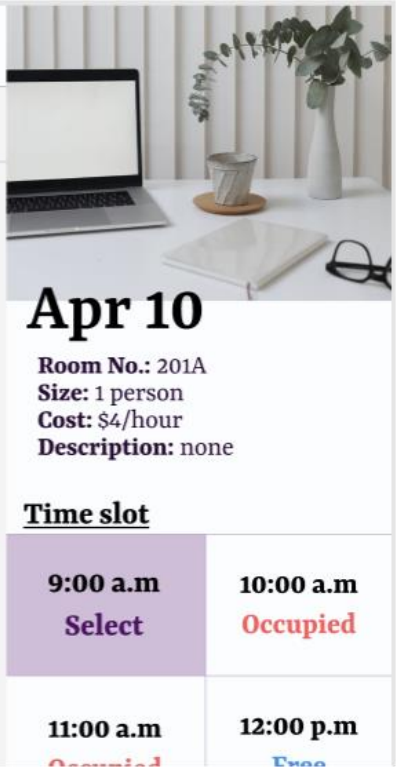

Figure .5.1 Figure .5.2 Figure .5.3

Reflection

Overall, we've learned that it's crucial to have good time management skills and work review by others. It's good for the productivity of individuals and the team. Adoption of the mix of spiral and waterfall model allows our team to review one's work before starting the next step. This greatly improves the quality of the work.

For example, in the prototype design stage, a redundant design was found in the My Record interface in the peer review period. The designer made a logical mistake by adding a "Registration status" function to the interface(figure 1). It was for the unregistered users to check whether their application is valid or not. But according to the logical flow, unregistered users could access this interface if and only if they've become a member and successfully logged in. After receiving this feedback, the bug was immediately informed and fixed(figure 2).

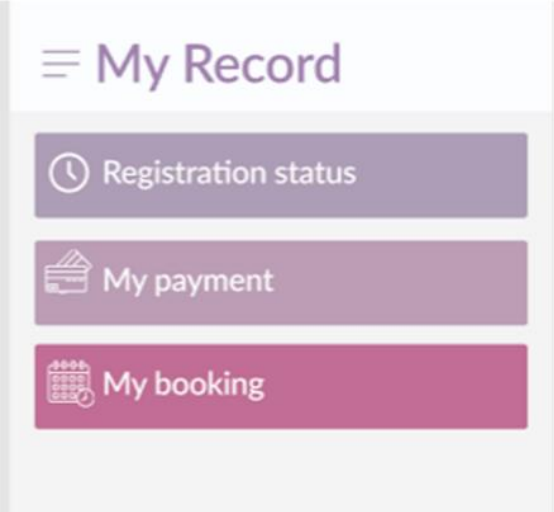

Figure 1

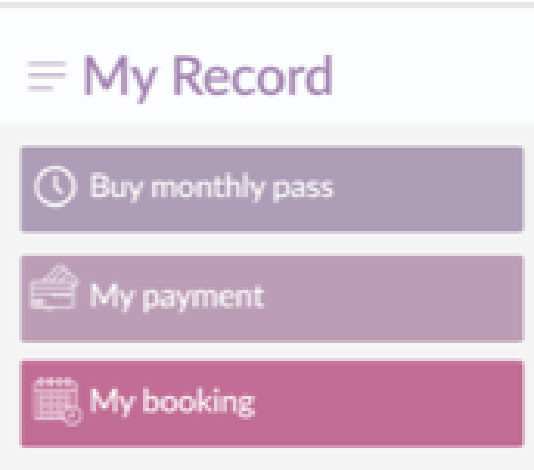

Figure 2

During the development, we tried our best to make the design OCP-compliant so that the functions of the application could be extended easily. Most sequence diagrams are fork diagrams so that features could be implemented by centralized control. Changing operations order and inserting new operations are more convenient due to this factor.

Possible future implementation

If possible, we wish to add more additional functions in the future. For example, it would be great to add a 'Notice' function. Under these unprecedented times, the opening hours and special regulations could change frequently. Therefore, it would be great if users could check out the latest arrangements on services of the resident clubhouse in a more handy way.

Also, not all resident clubhouse facilities require booking fees. Some of them could be free or deposit-required, hence making it more important to further optimize the payment system of the application to adapt to these variations.

Conclusion

Generally, the utilization rate of resident clubhouse is not high and lacks means that are more technologically advanced and convenient when it comes to booking amenities. To improve this condition, we've designed an mobile application that provides online booking services for resident clubhouse members. We tried to uphold the OCP principle throughout the design process. And we did our best to identify problems and minimize its influence.

Appendix

Prototype display:
https://www.figma.com/file/TWK5ACssV9HHYSiewJlONq/Booking-system-for-3342?node-id=0%3A1