UI FINAL

PROJECT REPORT

PREPARED FOR

COMS W4170 - Introduction to User Interface Design (Fall 2019)

PREPARED BY

Shenqi Zhai (sz2805)

Jinho Lee (jl5027)

Jiawen Li (jl5303)

Wei Pan (wp2251)

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1. Team Information

Team number: 10

Project Name: CU there!

Team members:

Shenqi Zhai (sz2805)

Jinho Lee (jl5027)

Jiawen Li (jl5303)

Wei Pan (wp2251）

2. Target User Population

Our target user population will be Columbia students who usually spend an unnecessary amount of time and energy on finding an available seat library by library, floor by floor. We chose to focus on making library seats finding more efficient and time-saving by taking the Science & Engineering Library as our first step. Therefore, our users are limited to students who often use the Science & Engineering Library.

3. Project Concept

We want to make a library-seat-reserving app that aims to save time for students who want to know if there are any empty seats in the Science & Engineering Library on Columbia campus and allows them to reserve a seat through a mobile app with their smartphones. There are always situations like when students go to the library and they need to find an available seat floor by floor. Thus, by using this app, the user can definitely save time, for they can quickly find an available seat on their app and just check-in the seat by Columbia ID.

To use this app to reserve a seat, firstly users will be required to enter their UNIs to use the app. The app will show users which seats are available with the floor plan of the library like that of a movie theater. After users reserve their seats through the app, they have to be in their seats in fifteen minutes. Otherwise, reservations will be terminated. Users are required to tap their Columbia ID onto an external machine we implement to replace the existing machine onto which students tap their ID at the entrance of the library so that the app can confirm the users' reservations.

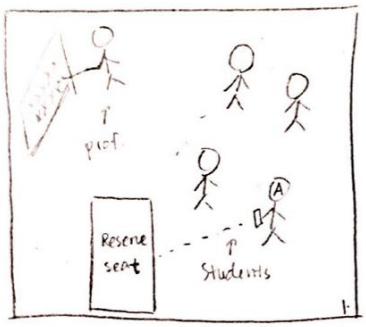
When users need to leave their seats for a small amount of time, they are allowed to make temporary leaves for up to two hours. The number of the leaves does not have a limit as long as the duration of the leaves does not exceed two hours. Users will have to tap their ID to get out of the library as well.

When users want to make their temporary leaves, the external machine will give them two choices. One for making temporary leaves and another for exiting the library. When temporary leaves are made, their seats will turn to temporary leave status. Seats in temporary leave status will still be visible as reserved. Users will be notified fifteen minutes before the given two hours are expired through the app. Users can check how much temporary leave time they have left on the app at all times. As soon as the users miss their given time for temporary leaves, the temporary leave status will be turned off and the seats will be open for reservation again. If a certain user misses one's temporary leave time three times a week, the user will get a penalty which is to get banned from the library for a week.

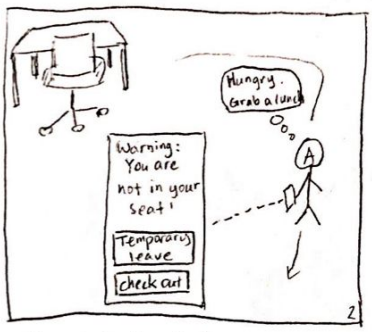
If the users want to change their seats to other available seats for any reason, the users can click the "Change Seat" button during the current session and switch to another seat without checking out from the library and check-in again. When the users want to exit the library, they will simply choose "Exit" on the external machine and their seats will be open for reservation.

4. Storyboards

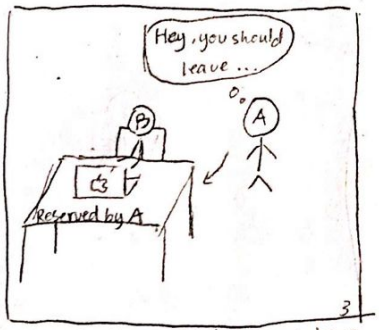
Here is the storyboard showing our first version of the project concept.



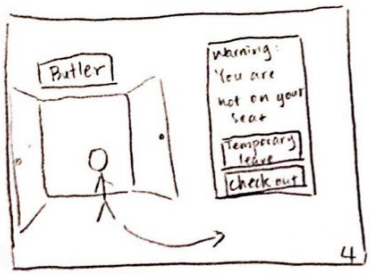
It's almost the end of the class and A used the app to reserve a seat because he wants to go to the library to study after class.



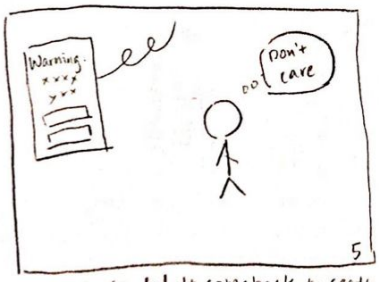
When GPS detect that you left your seat area, it will notify you to request for a temporary leave for less than 40 mins or checkout the seat.



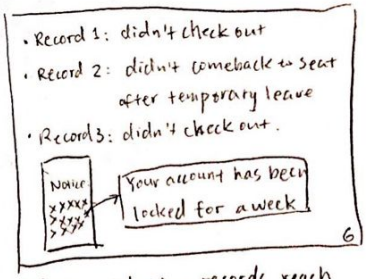
Students who reserved the seat have higher priority than students who did not make reservation. So in this situation B should leave and find other seats.



When leaving the library, students either preferrably check out 5 mins before leaving (to let the system release the seat for other's to reserve) or the GPS will detect you position and popup the notification to let you check out

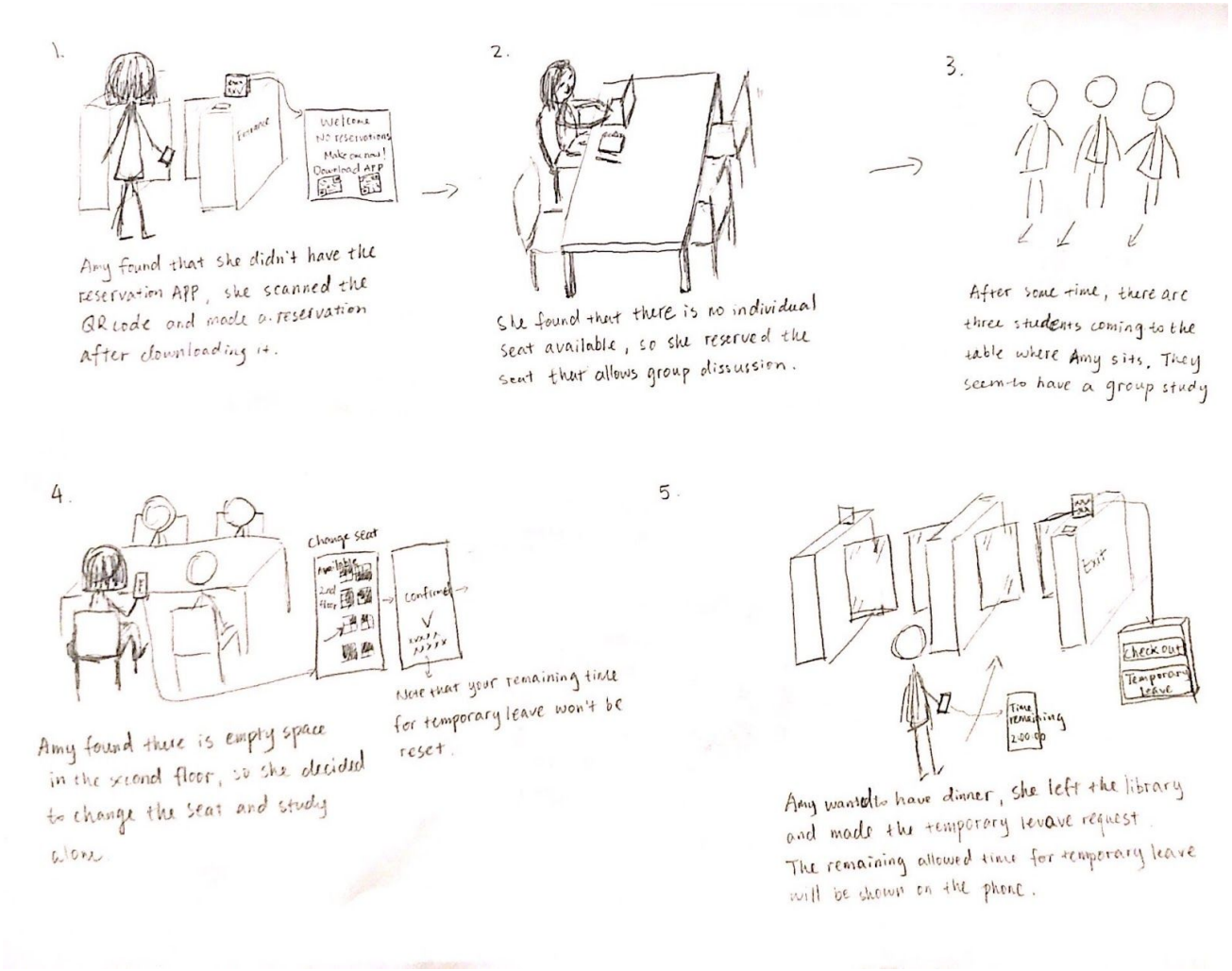


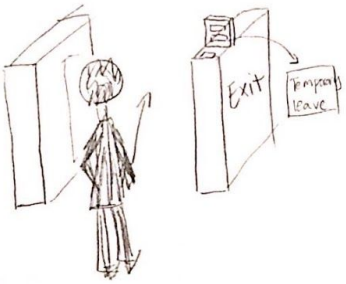
If students didn't comeback to seats after temporary leave is timeout or didn't check out, then the system will force checking out and record that students violation of rules



If the violation records reach to 3, then there will be punishment for using the system.

Here are the storyboards showing how our design solution works after progress report 1.





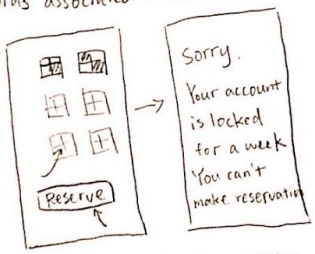
Ben left the Library with temporary leave

×3

He spent all of the temporary leave time but he didn't come back to the library.
The system will give this account a warning

×3

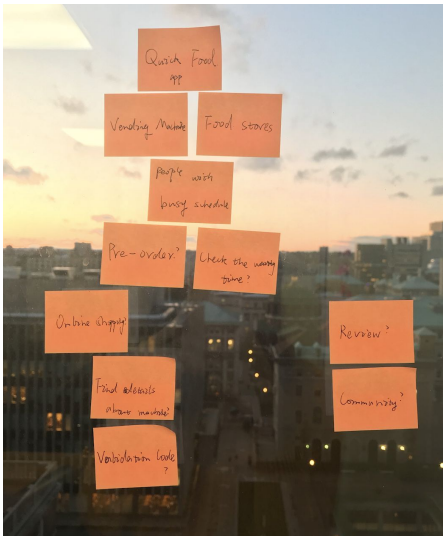
He did it for 3 times in a week
The system has 3 violation-of-use records associated with his account

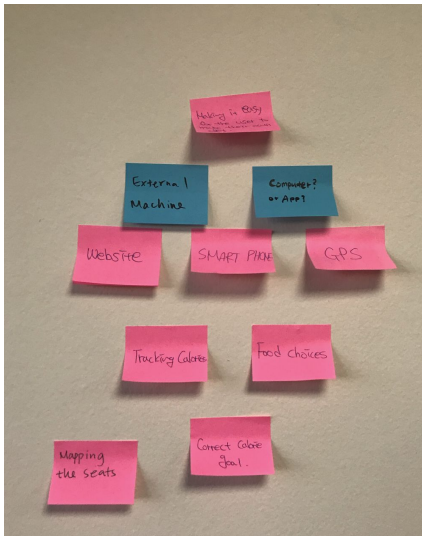


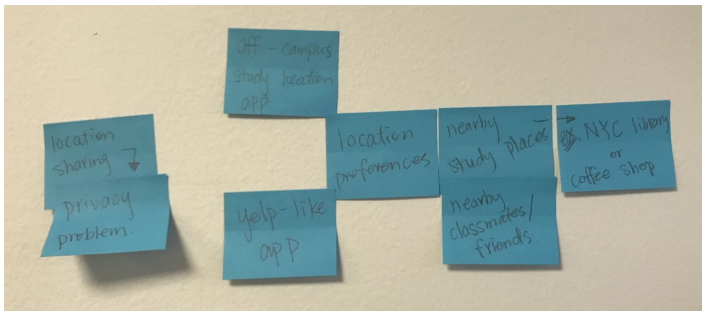
There will be penalty for wasting the public resources

5. Brainstorming Process

During the brainstorming process of Progress Report 1, we used stickers to express each of our previous project's keywords and features. We compare each project's usability and usefulness with each other. Then we discussed the difficulty and feasibility level of each project. Finally, we decided to focus on the idea of reserving seats in Columbia's library as our final project because the library seat problem is indeed a serious problem that students are facing now. Our team members can easily get access to one of the libraries to do research. We all believe that exploring this idea is valuable and can really help a lot of students in the end. (Brainstorming of other design solutions is shown in the next section)







6. Comparative Analysis

6.1 Current existing solutions

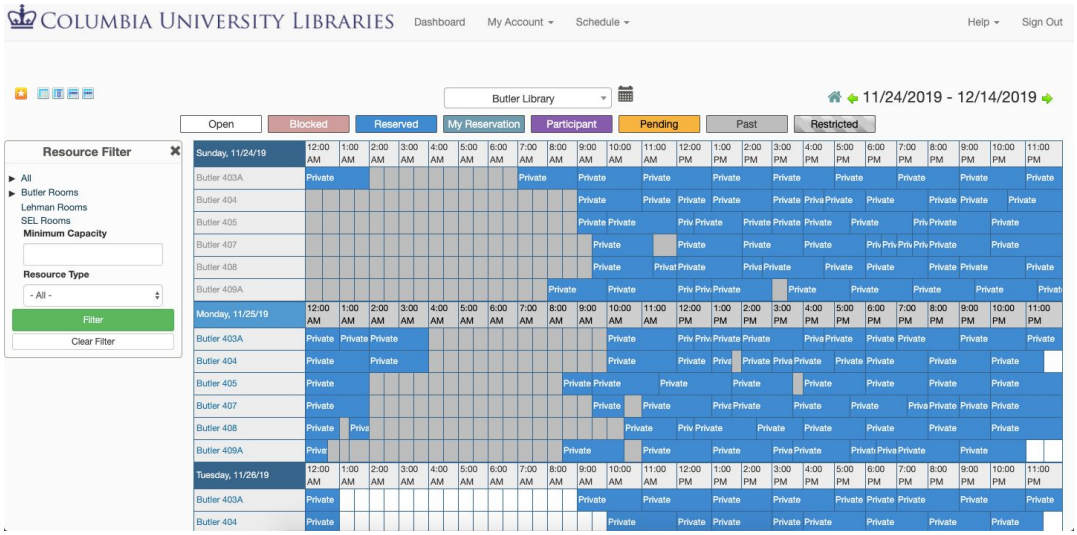
- Just grab a desk/seat
    - People hog desks
- Columbia's library room reservation website
    - Only for group reservation
    - Requires 2+-day advance to reserve a room
    - The limited reservable time interval
- Smartphone app associated with Wechat in China
    - Not adaptable to the U.S. universities

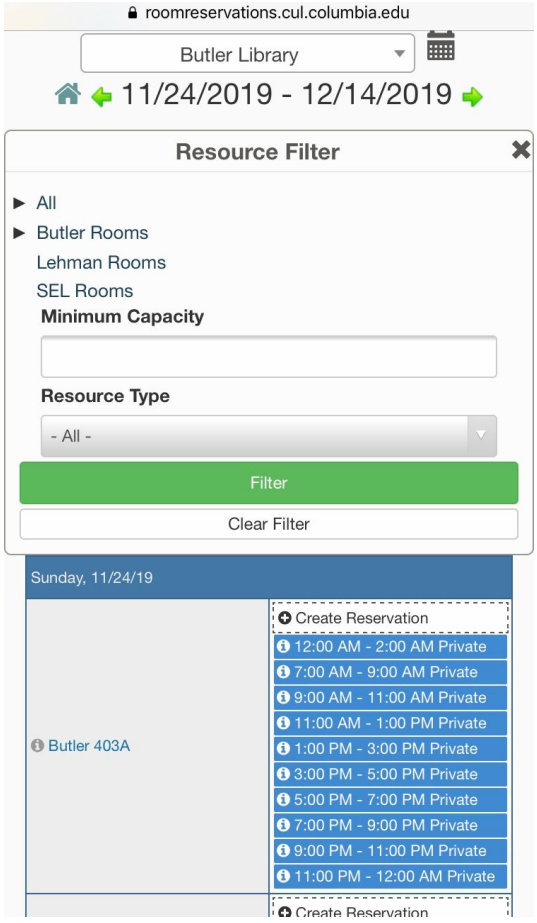
6.1.1. Just grab a desk/seat

It is the way everyone at Columbia is doing currently studying in the libraries. It is indeed a working method because the current library situations do not seem to have any problem, however, there are students who leave their stuff on the seat and never come back. In Butler, housekeeping will need to clean those overnight stuff in the morning for new students. In addition to that, just grab a desk or seat seems to be very straightforward and easy, however, it is usual that there does not exist an empty seat or desk for you to grab. Therefore the current situation definitely needs to be improved.

6.1.2. Columbia's library room reservation website

We realize that Columbia has a website to reserve group study space. On the website, you can check which group study room is empty in which library and what time. As the picture below shows, it is pretty clear and straightforward on how to use the reservation site. However, it only offers group study rooms' reservations, and you might not book a preferable space unless you reserve the room a few days in advance. Besides that, the pain point of the reservation system is that it is a website. When you are using a laptop to open the website, the available time slots are clear to see, however, if you are using a phone to reserve spaces, it only shows the time slots that are already booked and you need to click the "create reservation" to find time slots that are available. In our opinion, the usability of the website is not quite ideal, however, considering that students do not always need a group study space, the existing website should be sufficient for group study room reservations. If we inherit the group study room reservation UI and implement our library seat reservation application as a website, students will not likely to use it often. Instead, making it a mobile app will allow students to use it anywhere and anytime for their own seat's reservation.

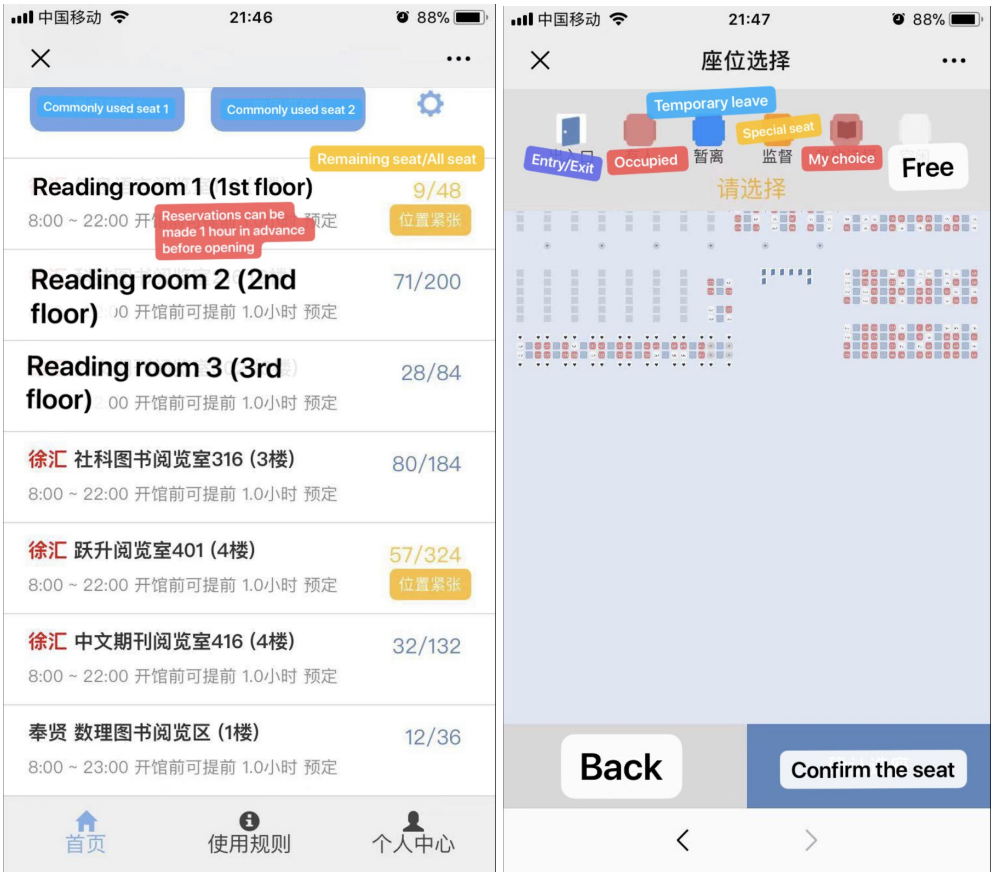




6.1.3. Smartphone app associated with Wechat in China

In fact, the library seat reservation app is implemented in many universities in China. Each university has an official account in Wechat, which is a commonly used chatting app with many other social media functions. Students usually need to reserve a seat

through the official account on Wechat. In the library entrance, there will be a standing machine that allows you to tap your student ID to confirm your reservation and when you leave the library, you are also required to clear your reservation through that machine. Sometimes students forget to sign out and the system will penalize you accordingly. Usually, the punishment will be that you are not able to use the booking system in the following week or weeks according to how many times you did not sign out properly. Another interesting fact is that sometimes there will be student workers who will check on each floor whether students are seated in the seats they reserved or if they left the seats without requesting temporary. This reservation system is already mature in China, however, it is not popularized in the U.S.. Although our idea will be similar to this one, we will actually make it a smartphone application instead of a feature implemented in the school official account, and we will not need student labors to supervise students. However, we will use the penalty system as a reference to make sure students are aware that they are affecting other student's opportunities to reserve seats if they are not properly checking out. As shown in the pictures below, we translated some information into English to make the system readable. It shows a list of every study area and to the right, the numbers are showing by available seats/total seats, and the idea of the reservation page is similar to that in the previous Columbia's room reservation page.



6.2 Our Design Solutions

- Cleaning desks if stuff is still on seats even after they are released.
    - Pros
        - The next users can use those seats right after the seats are released.
        - There will be no confusion between the users using their seats and the users who want to use seats.
        - Seats will be kept clean at all times so that the users enjoy their seats much more.
    - Cons
        - An office that is in charge of keeping possessions should be installed.
        - There should be signs saying “unattended possessions will be taken to the library office.”
        - The library needs to hire more people with authority to timely check which seat is released or occupied and to take unattended possessions to the office built to keep taken possessions.
- Buy more desks / build more library
    - Pros
        - Provide more study resources for students in a straightforward way.
        - Students are more likely to find a seat since the overall amount of seats increased.
    - Cons
        - Limited land resources.
        - It needs a huge amount of investigation.
        - Adding more libraries won’t solve the problem that students waste time and energy in finding available libraries. In other words, students still don’t know if the library has empty spaces to study.
        - Adding more libraries might just cause more confusion on choosing which library to go to.
- Recommend other study spaces (off-campus locations, empty classrooms, etc)
    - Pros
        - If students have a preference in their desired place to study, this design can give them more options to choose a preferable place to study. For example, users can choose either study at the library or study at a coffee shop.
        - This will help students who live off-campus to easily find a place to study.
        - Since this is a recommendation system, there are no real costs needed.
    - Cons
        - Since this is just a recommendation system, students cannot secure a seat for study. The frustration of finding a place to study might still exist.
        - Students who live in the dorm might want to study on campus.
        - Empty classrooms cannot assure a quiet study space.

- Library Seat Reservation system
    - Pros
        - It is more time-efficient because users do not need to find an available seat floor by floor. They can firstly use the app to find available seats, reserve the seat and then go to that target floor.
        - This system can make better use of each seat. If users reserve a seat, they need to check-in within the required time such as 15 minutes. Otherwise, the system will release the seat automatically for the next user. This feature helps to avoid the situation like some students use backpacks or books to occupy seats for their friends but actually their friends go to the library 1 hour later.
    - Cons
        - We may need to modify the existing library machine for reservation check-in and check-out which might be a big cost.

Based on the design solutions we came up with, we found that only the Library Seat Reservation System can truly solve the problem that students waste time on finding available seat library by library, floor by floor. Therefore we decided to stick to this solution as our final project idea.

We also finalized the features that will be supported by our app.

Features
Our app has two parts, one is the mobile app used to reserve a seat and another part is the external kiosk used to check-in and check-out.

- Features of the mobile app:
    - Reservation
        - The app will show the floor plan and available seats or tables for reservation.
        - After confirming the reservation, you need to check-in within 15 minutes.
        - In order to reserve a seat, users need to provide their UNI.
        - Users can only reserve for one seat at once.
    - Temporary leave
        - It will show the time remaining for temporary leave.
        - If users want a temporary leave, they need to choose “Temporary Leave” at the exit external machine when they tap the id. Then the app starts timing. If the user cannot go back to the library in the maximum time for temporary leave, the seat will be free and the user will receive a warning.
        - The maximum time for temporary leave is 2 hours.
        - The number of temporary leave is unlimited.
    - Change seat

        - You can change your seat options on the phone, once you select another seat, you will be checked out automatically from your current seat and check-in for your new seat. Note that the temporary leave time limit will not be reset.
    - Check out
        - Will just show the check out status. (check out functionality will be implemented in the machine)

- Features of the kiosk:
    - Tap id
        - At the entrance, students tap the id and the screen will show your reservation record. You need to click confirm to check-in and go to the seats you reserved.
        - At the exit, students will need to tap the id again.
        - After tapping, the kiosk interface will have two buttons for you to choose between check-out and temporary leave. After clicking temporary leave, your timer will be automatically started. After clicking check-out, the seat will be released to the system.

7. Risks to Mitigate

We analyze the risks of the reservation system, the severity level of each kind of risk, the solution to each kind of risk, and the benefit of the solutions. If two kinds of risks are of the same severity level, we need to compare the easiness level and try to first mitigate the easier one. We use T-shirt sizes (S, M, L, XL) to size each risk, and easiness level 1-5 to measure the difficulty for mitigating the risks.

Risk	Getting approved by Columbia
Severity	XL
Tasks to mitigate	Assumed as resolved
Easiness	5
Benefits	By getting approved by Columbia, the app will eliminate seat-hoggers for good and thereby make Columbia libraries a better place where no frustration that students experience when they find all the seats taken by students whose stuff occupying their seats instead of them exists. Each seat gets to be used efficiently..

Risk	Implementing Kiosks
Severity	XL
Tasks to mitigate	Designing the machines with specific and clear functions and user-friendly looks. To achieve it, a lot of prototypes should be built from scratches and each prototype should be tested through user studies. Focusing on the usability and usefulness of the machines, a series of user studies will be carried out. For their usability and usefulness, such as, a question like “does the kiosks really help the app?” or “how long does it take for the user to check-in and out of the library through the kiosks?” we will be conducting usability labs due to the fact that the library itself is already controlled environment so that we can collect data that, when used by users, how seamlessly the machines work with the app in terms of gathering information of confirmation of reservation and seats reserved. Also, data related to the time that the users take to get in or out of the library will be collected in the same manner by calculating how fast the users can get out of the lab through the kiosk with exit or temporary leave options.
Easiness	4

Benefits	By implementing kiosks comprised of the machines onto which the users tap their Columbia IDs to get in and out of the library, the app will track the users' entry and exit record in a not creepy way so that the app can confirm the users' seat reservations and their statuses, such as temporary leave or exit, in and out of the library.

Risk	Floor plan changes
Severity	M
Tasks to mitigate	Getting cooperation from the library periodically and whenever a change is made among the seat locations are the best way to solve this problem
Easiness	2
Benefits	By reflecting the completely same floor plan with locations of the seats, the app will reduce confusion that might occur among the users when they reserve a seat but cannot find the reserved seat since the floor plan updated on the app is different from that of the library.

8. Project Tasks and Sub-challenges

ID	Task	Status
1	Think about user stories and decide features of the app	Complete
2	Lo-fi prototype	Complete
3	Hi-fi prototype	Complete
4	Implementation of the app	In progress
5	Design the external machine for students to use it as convenient as possible.	Complete
6	Get the users' agreement on using their UNI and password to use the app.	To be started
7	Get cooperation from the library for keeping track of how many students have entered it.	To be started
8	Implement the external machine that will replace the existing check-in machine at the entrance of the Science & Engineering Library.	To be started
9	Implement the external machine at the exit for students to properly check out of the library either for temporary leaves or exiting the library.	To be started
10	Figure out a reasonable penalty to enforce upon students who violate the reservation system and the temporary leave system offered by the solution.	Complete
11	Assessing the right amount of temporary leave time.	Complete
12	Consider if the app should count in unexpected occasions that might happen to students on their temporary leaves	In Progress
13	When a user has not returned to the seat even after he or she uses up the temporary leave time, decide who cleans up the seat and takes the user's stuff to a secured office.	In Progress
14	Decide if there should exist an option for reserving a group table	Complete
15	Decide the number limit of how many times the users can change their seats using the "Change seat" option.	In Progress

16	How should the app notify that the user has only fifteen minutes left for the user's temporary leave time and is fifteen minutes enough for the user to get his or her affairs in order?	In Progress
17	Making the layout of the options on the app self-explanatory and easy to use.	Complete
18	The users are only required to tap their Columbia ID's onto the external machine to check in to the library. Then how can it be prevented if some users check their friends in with the friends' ID?	To be started

* The project tasks may change accordingly during each UCD iteration

Sub-challenges

We analyze sub-challenges that might happen during using the process and try to find the best solution to each challenge. For some challenges, now we do not have an appropriate solution. But we may add some new features in the future to solve that.

- Kiosks are broken
    - We can provide backup kiosks, whenever on the kiosk is broken, we can send staff to replace the broken one and repair it.
- How to prove that people are actually using it?
    - We can simply check how many seats are reserved through our app.
- How to get users on board?
    - We will talk more about this in the Future Plan section.
- Students forgot id
    - If students have already reserved a seat, they can tell the library staff their UNI and name to check-in.
- Students don't download the app
    - We provide QR codes with users to help them easily download the app at the entry machine.
- Students don't use smartphones
    - We can provide a web version of the app in the future.

9. Progress Report 1 Feedback follow up

Feedback on our Progress Report 1 (From TA Melanie):

1. Privacy problem for GPS tracking
2. Target user population is too wide
3. Users who are not aware of this app might violate the rules in the app.

Our response to the feedback:

1. We decide to remove the GPS tracking feature. Instead, in order to track whether users go to their reserved seats on time, we plan to place an external machine at the entrance and another one at the exit of the library. Users have to tap their student ID on the machine so that we can track users' movement.
2. We decide to narrow down our target user population to students that want to reserve their seats in Science Building Library.
3. Based on what TA suggested to us, we pretend that we have many users to simulate how it might actually work. Therefore, users have to use our app to reserve a seat at the Science Building Library. Otherwise, the external machine at the entrance of the library will provide instructions on how to reserve a seat using our app.

10. Prototype

10.1 Prototyping process

To begin the prototyping process, firstly we need to modify some features of our app based on the feedback to the progress report 1. The main problem is the privacy problem caused by GPS tracking. We came up with another solution. We no longer check whether the user is at the reserved seat by GPS tracking but check whether the user is in the library by Columbia ID if the user has reserved a seat. Because now we also need to tap our Columbia ID before entering the library, this solution seems more feasible and users might be more familiar with this method. We assume that there are two external machines, one is at the entry of the library and another one is at the exit. Users can tap their Columbia ID on these machines to check in and check out. So in the next prototyping stage, we also need to design the interface of two external machines. The second problem is about users who are not aware of this app. Because they cannot find whether the seat has been reserved, they may occupy seats already be reserved by other users. As for this problem, we assume that people who want to enter this library need to download the app and reserve the seat first. So we also need to design a download page to direct new users to download this app by scanning QR codes. And for the mobile app, we need to design a login page for new users. New users use their uni and password to log in. To design the first version of our app, now we only consider Science Library.

Need to design:

- For external machines
    - Entrance machine: check-in page, download page
    - Exit machine: check-out page
- For mobile app
    - Login page

Secondly, we try to think about several situations our users might face. Based on each situation, write down the specific feature we need to implement. The first situation is about individual users (the user has already logged in). We need to explore the solution to the first question: how to reserve a seat? Based on Shenqi's original design, a home page will show several library options. Users click one library and there will be a floor plan page showing floor plans on different floors. The occupied seat is black and the free seat is white. Then users select a seat and there will be a confirmation page to show the location detail of this seat. Users can confirm the reservation of this seat or back to floor plan page to re-choose another seat. If the user confirms the selected seat then go to the successfully confirmed page. This is the whole process of reservation. When the user taps Columbia ID at the entrance machine, the user successfully check-in. If the user has reserved a seat, the machine shows the details of the

reservation and the user needs to confirm. Then go to the successful check-in page. Otherwise, it shows no reservation. Because this is the normally used situation of the app, we start to prototype. We will add other features and pages based on other “edge case”.

Prototyping process:

- For mobile app
    - Home page (show several library options, now only has Science Library)
    - Floor plan page (show library name, different floor options, floor plans, seats)
    - Reservation page (location detail of selected seat, confirm button, back button)
    - Successfully confirmed page (checkmark)
- For external machines
    - Entrance machine: check-in page (detail of reservation, confirm button), successful check-in page (checkmark), no reservation page

Thirdly, we consider new users. We assume that our app links to the Columbia library system. So for the login page, new users need to enter uni and password. If people do not know this app and tap ID at the entrance machine, the machine will show a download page with QR codes for IOS and Android systems. After the discussion, we combine the download page and no reservation page of the entrance machine. Because we think new users can regard as users with no reservations.

Prototyping process:

- For mobile app
    - Login page (uni and password)
- For external machines
    - Entrance machine: another check-in page (download QR codes, no reservation notice)

Then we want to explore the solution to the second question: if the user wants to temporarily leave the library, what will happen? This is a common situation in real life. Maybe we just want to attend an office hour or eat a meal but do not want to lose the seat. At first, We want to implement the feature that the user needs to set the time of temporary leave such as 10 mins, 20 mins on their app and then they can leave the library with the ‘temporary leave’ status. The risk if that users might forget to set the time temporary leave and lose their seats accidentally. After asking some people’s opinions about this feature, it seems that it is easy to forget to change the status in the app before leaving the library. To mitigate this risk, we choose another simpler way: users do not need to change their status by themselves. If they tap Columbia ID at the exit machine, their status will be automatically changed to ‘temporary leave’ and they need to back to the library in 2 hours. Otherwise, they will lose their seats. To

implement this feature, we need to design two options of the check-out page. One is to check out and another one is for temporary leave. If the user wants to check out, the machine will show a successful check-out page. Otherwise, for temporary leave users, there will be a temporary leave page to notice the time they need to back to the library.

Prototyping process:

- For external machines
    - Exit machine: check-out page (two options), successful check-out page (checkmark), temporary leave page (the time users need to back to the library)

Then we think we need to do something for users who set a temporary leave but cannot go back to the library on time and users who reserve a seat but cannot check-in on time. Now we need to explore the solution to the third question: how to set the penalty for users who violate the rule several times? After discussion, we think if a certain user violates the rule three times a week, the user will get a penalty which is to get blocked and cannot reserve any seat in a week. So users may need to see their violation records somewhere. Because of that, we add the user center part and the violation record option.

Prototyping process:

- For mobile app
    - User center page (violation records)

Reservation status is also important. Sometimes users might forget the specific seat they reserved. So we add another option “reservation status” in the user center part. There are three types of status: before check-in, after check-in, no reservation.

Prototyping process:

- For mobile app
    - User center page (violation records, reservation status)
    - Reservation status page (before check-in, after check-in, no reservation)

After that, we think about an “edge case”. What will happen if the user wants to change the seat after check-in? Do users need to first check-out, reserve a new seat then check-in again or do something else? We need to explore the solution to this problem. So we add a ‘change seat’ button on the reservation status page (after check-in)! Now users can easily change the seat in the library rather than check-out and check-in again.

Prototyping process:

- For mobile app

    - Reservation status page (after check-in & change seat button)

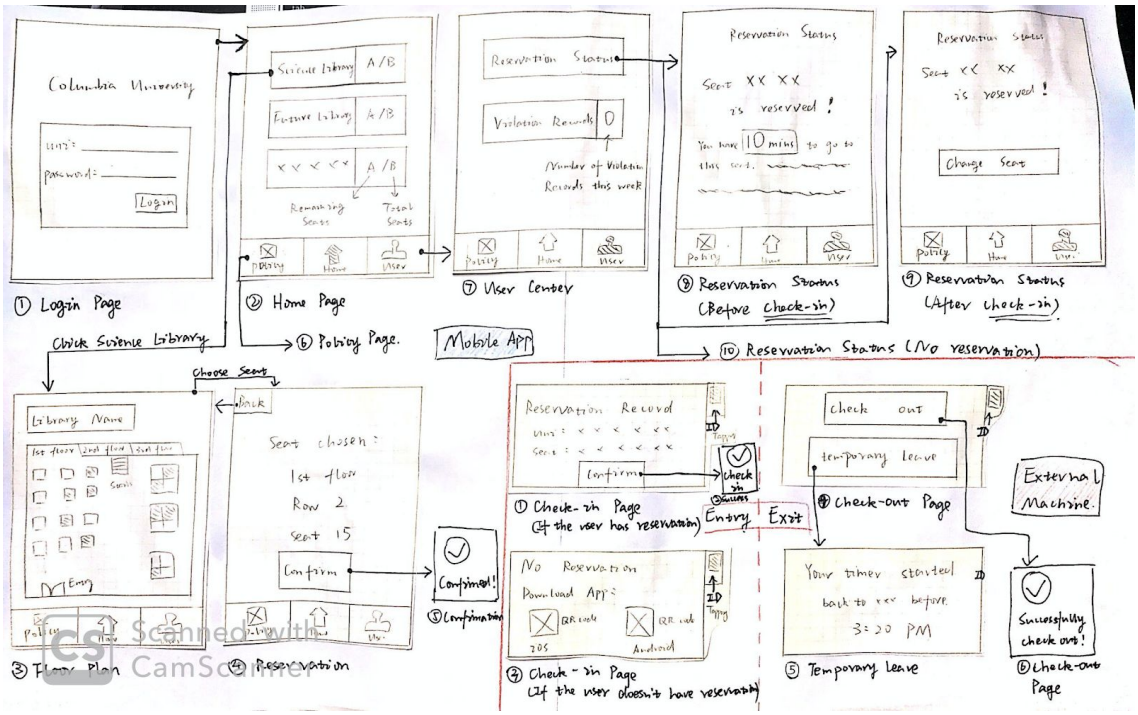
To help users easier to find the rule of our app, there will be a Policy part. In this part, users can easily find the rule of reservation, temporary leave and how to use external machines.

Prototyping process:

- For mobile app
    - Policy page (rule of reservation, temporary leave, external machines guidance)

We also find that there are several group study tables on the first floor. We need to explore the solution to the group study reservation. At first, we want to use the invitation system like Google docs which allows one person to reserve a seat at a group table and sends the invitation link to other members then other people reserve their own seats separately. Or like the Columbia conference room booking system, one person can reserve a whole group table. But there are many problems when we want to add the group table reservation feature. The first problem is the temporary leave. Because each group member can have an unlimited number of temporary leave, maybe a group table can be occupied for a long time with one person but waste lots of seats. Another problem is that sometimes individual students also want to study at the group table because of the good view of the group table. We ask some people at the Science & Engineering Library and they think it is not a good idea if the group table can only be reserved by a group. If they want to occupy a whole space, they need to book a conference room. How to balance the individual reservation and group reservation? How to make the best use of seat? It is difficult to handle each violation situation between group reservations and individual reservations. So our solution is that users can just reserve their own seats. If they want a group study space, the Columbia Conference Room Booking System is more appropriate. If they want to study in a group at the Science & Engineering Library, then group members can reserve adjacent seats.

10.1.2 Lo-Fi Prototype



10.1.3 Hi-Fi Prototype

The PDF version is attached separately.

https://www.figma.com/file/xeDsQHr9nX85p1inu1Lsl2/Untitled?node-id=0%3A1

11. Code Implementation

We used Figma to implement our project. Since we only focused on designing a mobile app, we cannot do the real implementation of a mobile app by the amount of knowledge that we learned in this class. Rather than trying to use some new coding languages to do the real implementation, we decided to focus on to improve our Figma prototype.

12. Instructions to run our program

In order to run our program, you can just simply click the Present button. We tried to make our Figma prototype as connective as possible. The bottom navigation bars on every page are clickable. On the floor plan pages, you can freely click the tabs, which are located on the top of the page, to check out the floor plan of each floor. However, only one section per floor plan is clickable, because we think to implement all sections on the floors plans might be redundant. For example, only section A1-A24 on the 1st floor, section D1-D14 on the 2nd floor, and section H1-H20 on the 3rd floor are clickable.

13. Progress Report 2 Feedback follow up

Feedback on our Progress Report 2 (From TA Melanie):

- We can pay more attention to get the “design right” and improve our Figma prototype.

Our response to the feedback:

- We drew the floor plan of each floor in detail. Designed more pages and linked buttons to different pages to show the using process of our app in different situations.

Feedback on our Progress Report 2 (From Professor Smith):

- Need to analyze other design solutions, talk about the advantages and disadvantages of different design solutions.
- Consider the potential risks and how to mitigate.
- Need to consider more on potential sub-challenges during using process and think about the possible solutions.

Our response to the feedback:

- Some parts have been discussed in the former progress report and added the analysis of different design solutions in the final report.
- Brainstormed on potential risks and possible solutions.
- Brainstormed on sub-challenges and possible solutions.

14. Future Plans

- Reservation system is a good choice to save time and make better use of facilities. Maybe in the future we can apply this kind of reservation system to all libraries in Columbia, other buildings or facilities such as sports equipment reservation, locker reservation, etc.
- We may adapt Columbia's study room reservation system to our mobile app for better reservation experience.
- We may add more study spaces besides on-campus libraries. We can make use of empty classrooms as students temporary study space between short classes breaks by tracing and providing available classrooms to users.
- Other than classrooms, we can recommend off-campus libraries or coffee shops as a reference for students who live off-campus or students who want to change a study environment.
- We may add other functionalities related to booking or reservation but not restricted to space reserving. We can provide food reservation such as pre-order feature for campus cafe or dining hall.
- This app might become a part of Columbia Booking System, or even a very useful app for improving campus life standards. Helping every student in as many aspects as possible, and making use of modern technologies to make life more efficient.
- More future improvement plans will be considered based on feedback from our users.

15. Post-Mortems

Jinho Lee:

Now that I finished the project with my group, I kind of see how to build structure for designing an idea for future projects of which I might be part. If I could go back in time and do this project all over again, I would tackle what kind of problems this idea could cause in the users since this time I feel like I focused too much on "how does this idea solve the problem" rather than "what problems this idea would cause in the users." Because I mostly concentrated on how the idea should work, I think I overlooked the fact that, if the users do not use this idea, it is nothing but failure a lot. Due to this, I ran into an impasse where I could not think about this idea in the users' perspective. The moment I figured it out was when I was writing down "Project Tasks" which I was in charge of. I realized that the users might actually not use this app due to instability and limitation the app create. We figured it out thankfully, but I would focus more on "what would the users feel like using this app?" rather than what this app does.

Shenqi Zhai:

What went well in our design process is that we indeed provide a solution for solving a specific problem. In other words, we tried to make the right design. I think we also did well on getting the design right even though we were a bit lost in the beginning. What went wrong was that we decided the design solution too quickly, without considering other design solutions at first. If I were to undertake the project again, I would focus more on the preliminary work. I will spend more time on the thinking process including brainstorming, doing some surveys, explore more design solutions and combine them to make an optimal solution. Once you stick to one solution, it gets harder to make changes as the time spent on the project gets longer. Therefore it is important to try to choose a relatively right way at first.

Wei Pan:

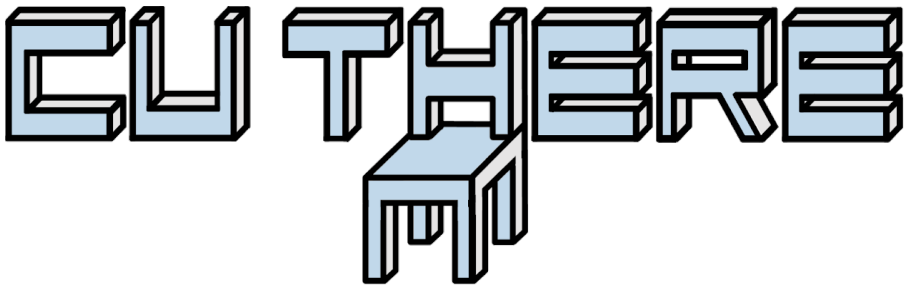
Now we've finished the design project. Three weeks is not enough to get a perfect product but during this process I learned much about user-centered design with my group. We did a good comparative analysis on existing group study booking system and similar apps in another country which helps us to think more about our original idea. I think in the design process we need to consider more about the potential sub-challenges. For many challenges, we just give a general idea of how to solve that, but there are many details need to be added. If I'm able to undertake the project again, I would think more about potential challenges when we decided the original idea of our project. Think more details about the possible solutions rather than give a general idea because some problems might be more difficult than we thought.

Jiawen Li:

In our design process, I think our project design went pretty well. Since our program is a library reservation system, which has lots of time limitations, users might easily violate some of the rules without noticing. Therefore, we carefully formulate the policies and rules for a better user experience. We were only focused on how to make the design right, however, we should focus more on how to make the right design. Our brainstorming process went a little off-track. Our brainstorming process only talked about the decision making of our project design idea and how to make our solution design better. However, we didn't keep on going with think about how to make the right design. We didn't think about any alternative design solution other than our current one. If I'm able to undertake the project again, I would really think about how to make the right design before going deeper into making the design right.

16. Screenshot, Overview Paragraph, Permissions

Screenshot



Overview Paragraph

CU There is a library seat reserving app that aims to make library seats finding more efficient and time-saving for students who usually spend an unnecessary amount of time and energy on finding an available seat library by library, floor by floor. Users have the ability to choose a seat in the library and reserve it, then simply tap their IDs at the entrance of the library through a kiosk to confirm reservations. The app supports features of changing to another seat and temporary leaves during users' reservation session in case of users dislike the current study environment or users want to grab lunch without losing the seat. When exiting the library, users can simply tap their IDs again to make a choice between temporary leave and check out. This allows the app to keep track of users remaining temporary leave time and reservation status so that it can release the seat to the system for next users to reserve.

Permissions

Shenqi Zhai, Jinho Lee, Jiawen Li, and Wei Pan are willing to have their names appear next to their presentation of their work on the project web page for W4170.