SLEEPMATE

FINAL REPORT

CS 147 Winter 2022 | Caring From Within

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PROJECT NAME & VALUE PROPOSITION

Project Name

SleepMate

Value Proposition

Sleeping easy, made easy.

TEAM SLEEPMATE

- **Derek C.** — Developer
- **Aaron H.** — User Researcher
- **Tristan W.** — Designer & Developer
- **Michelle X.** — Product Manager

PROBLEM & SOLUTION OVERVIEW

Mission Statement

SleepMate's mission is to ease anxiety when it comes to sleeping with roommates by reminding roommates to keep noise levels low during sleeping hours.

Problem Overview

It can be difficult to tell your roommates over and over again to be quiet when you're trying to sleep. SleepMate helps you rest at ease by monitoring your roommates' noise levels and alerting them when they're being too loud so you don't have to!

NEEDFINDING INTERVIEWS

When we first began brainstorming topics for our CS 147 project, we knew we wanted to focus in the realm of mental health but we weren't sure what specific aspect we wanted to target. As such, we decided to start our needfinding interviews by asking users about their

experiences during the COVID-19 pandemic, which amplified many mental health issues. Participants were asked broad questions such as:

- How was the transition to remote work?
- How did the lockdown affect your personal relationships, if at all?

A common issue from our initial interviews seemed to be annoyance among people living under the same roof for an extended period of time. Based on this, we then narrowed down our participant group to people living together with others.

Our participants are as follows:

From the initial needfinding interviews

- **Angelo R.** — post-grad SWE at Facebook
- **Chris M.** — university Economics professor
- **Jessie S.** — Stanford Class of 2020 graduate and current freelancer
- **Maryanne F.** — Northeastern University student
- **Sueanne M.** — middle-aged piano teacher

From the narrowed-down needfinding interviews

- **Allison H.** — New Jersey high school sophomore who spent a year living at home
- **Andrew Z.** — recent Georgia Tech graduate who has lived with many roommates
- **Bryan C.** — SWE at Google who is living at home with his wife
- **David S.** — UC Berkeley senior who lives in his own apartment with roommates
- **Diane J.** — consultant who is living in San Francisco with three roommates

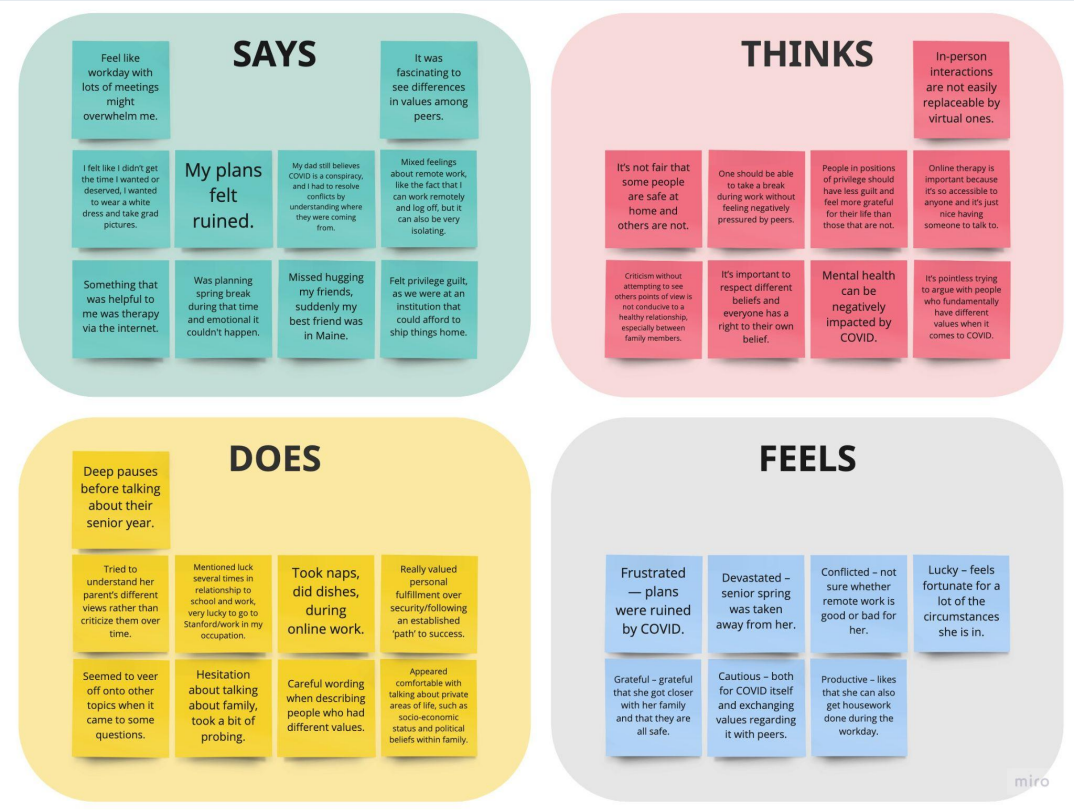


Figure 1. Empathy map from Jessie

The four main things we learned during our initial set of needfinding interviews is:

1. <u>People get into arguments when they're in the same space for too long</u> — many participants mentioned that tensions and annoyances would arise due to the small space that they were confined in with the people they were living with. We recognized this as **a need for people to have their own "space" when they physically don't have enough space**.
2. <u>People are not motivated with remote work</u> — the participants mentioned Zoom fatigue and a lack of social interaction with their coworkers. We recognized this as **a need for people to feel engaged with coworkers while being apart.**
3. <u>People feel guilty with all their privilege</u> — one extreme user mentioned that the main thing she felt during COVID was a lot of privilege guilt due to not everyone having a place to return home to and an institution to ship your things for you. We recognized this as **a need for these people to make productive use of their privilege.**
4. <u>People have differences in values when it comes to COVID</u> — participants noticed that they interacted with people who might have differing views from them on

COVID and weren't sure how to handle the situation. We recognized this as **a need for people to maintain relationships that suffer from a difference in values.**

For our narrowed-down set of needfinding interviews, we decided to hone in on the insight that people get into arguments when they're in the same space for too long. We wanted to target people who were in different kinds of living situations. We learned that in many cases, the tensions that came from people living under the same roof were due to incompatible living conditions. For example, below is a quote from Diane's interview:

"My roommate was a light sleeper and would sleep earlier, so when I shifted around the room, I would always wake her up. I also can't turn on the AC when she sleeps. These tensions weren't enough to burn bridges, but we both were a little annoyed."
— **Diane J.**, Consultant

Figure 2. Quote from Diane's interview

POV & EXPERIENCE PROTOTYPES

From all of our needfinding interviews, we decided to focus on Andrew, Diane, and David to proceed with narrowing down the problem even further.

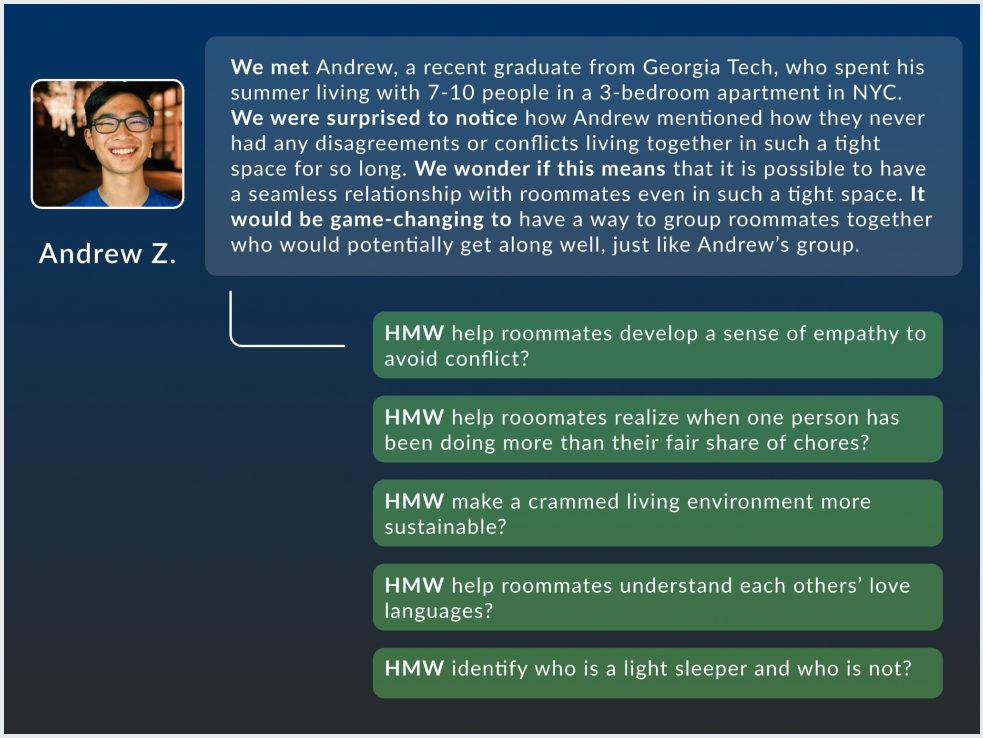


Figure 3. Andrew's POV and HMWs

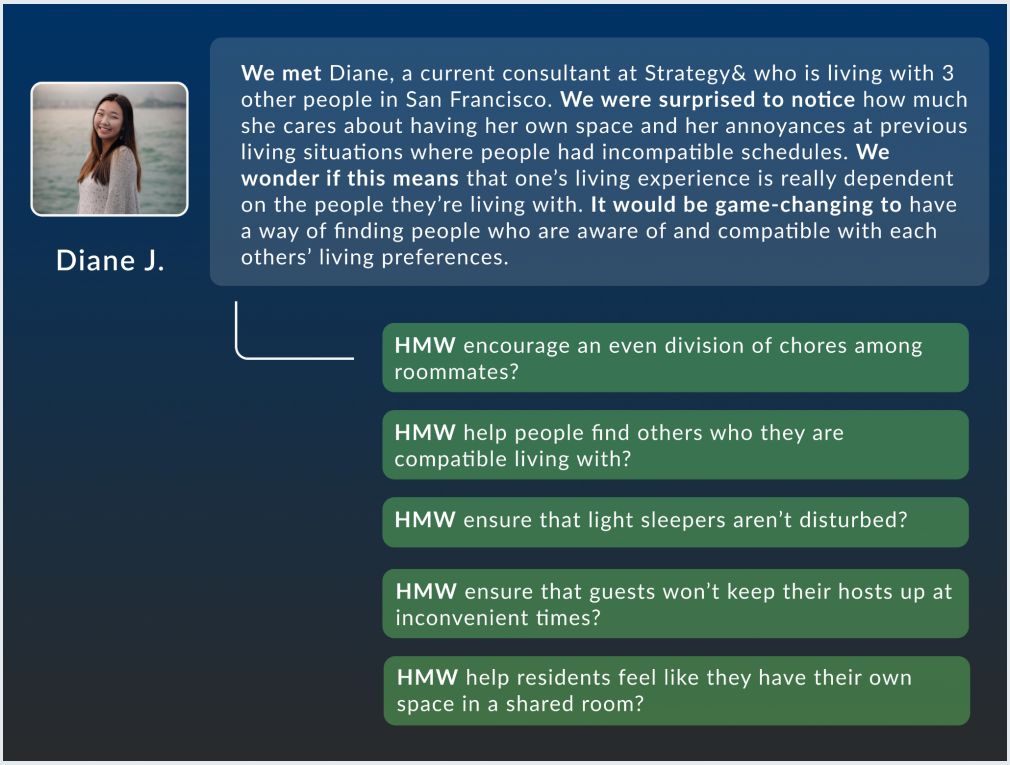


Figure 4. Diane's POV and HMWs

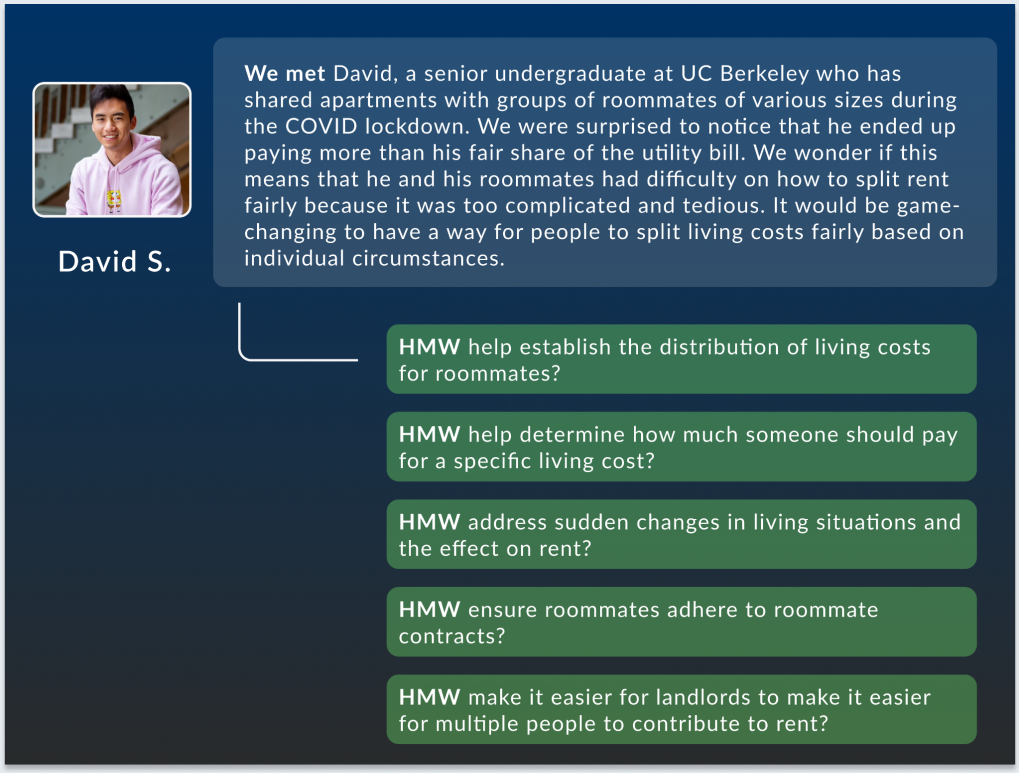


Figure 5. David's POV and HMWs

Here are the HMWs we decided to focus on and the corresponding solutions that we came up with.

HMW help people find others who they are compatible living with?

- Solution #1: Roommate matching app that will match people together as roommates given preferences such as cleanliness
- Solution #2: A roommate "trial" period where you can experience what living with someone is like, and if you're not compatible with them, you can switch to someone else

HMW help roommates realize when one person has been doing more than their fair share of chores?

- Solution #3: Conflict resolution app that will allow roommates to anonymously post their feelings and things they are afraid to bring up in person to their roommates

Roommate Matching App Experience Prototype

For the roommate matching app experience prototype, we made a slideshow of fake roommates with certain traits (age, job, cleanliness, bedtime, etc.) that the participant can scroll through. The participant was asked to scroll through the slideshow and pick 2 roommates that he would like to live with and explain why.

- Assumption: People moving to a new city have little to no connections and are in need of finding a roommate.
- What worked: The participant was able to quickly screen through roommates he didn't want to live with based on certain traits.
- What didn't work: The participant expressed that he would not want to room with strangers and that it would be very unlikely to be somewhere where he has zero connections at all, thereby negating our assumption.

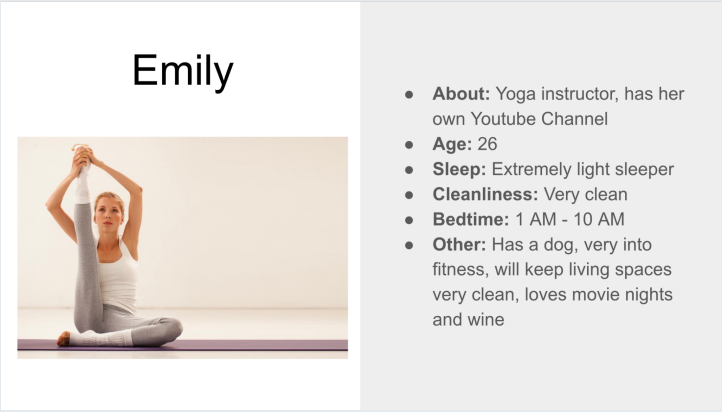


Figure 6. Example slide that was shown to participant

Roommate "Trial" Experience Prototype

For the roommate "trial" experience prototype, we designed it as a 5-minute blind speed date with a potential roommate since we didn't have the timespan for an actual trial period. The participant hopped into different zoom rooms where he met his "roommates" to learn about their living styles.

- Assumption: People are willing to discuss their lifestyles with strangers.
- What worked: The candidate was able to quickly get a sense of the roommate candidate's basic qualities, including sleep time and interests.
- What didn't work: It's difficult to see what a roommate is like online, and an actual "trial" period living in someone's home would be difficult to execute.

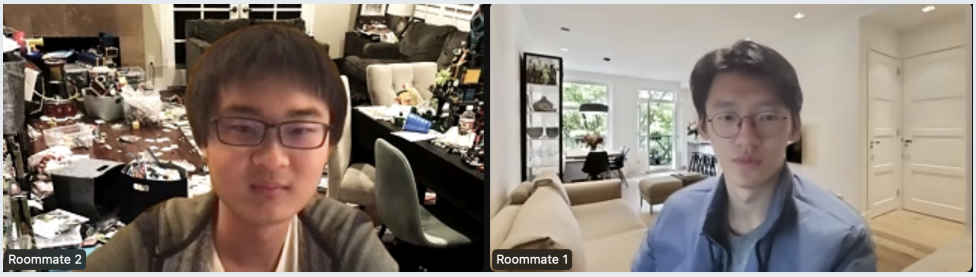


Figure 7. Roommate Zoom "rooms" with roommate "candidates"

Conflict Resolution App Experience Prototype

For our conflict resolution app experience prototype, we had two teammates pretend to be roommates with certain traits (i.e. never does chores). The participant was first asked to get to know both roommates, and then was given access to an anonymous Google doc where all three "roommates" submitted their grievances about each other.

- Assumption: Roommates would be more open about conflicts/problems they have with each other if they share them anonymously.
- Things that worked: This experience prototype helped initiate conversations regarding conflicts between roommates.
- Things that didn't work: The anonymity can be foiled sometimes, and not everyone is openly ready to post on the conflict board even when there is a conflict.

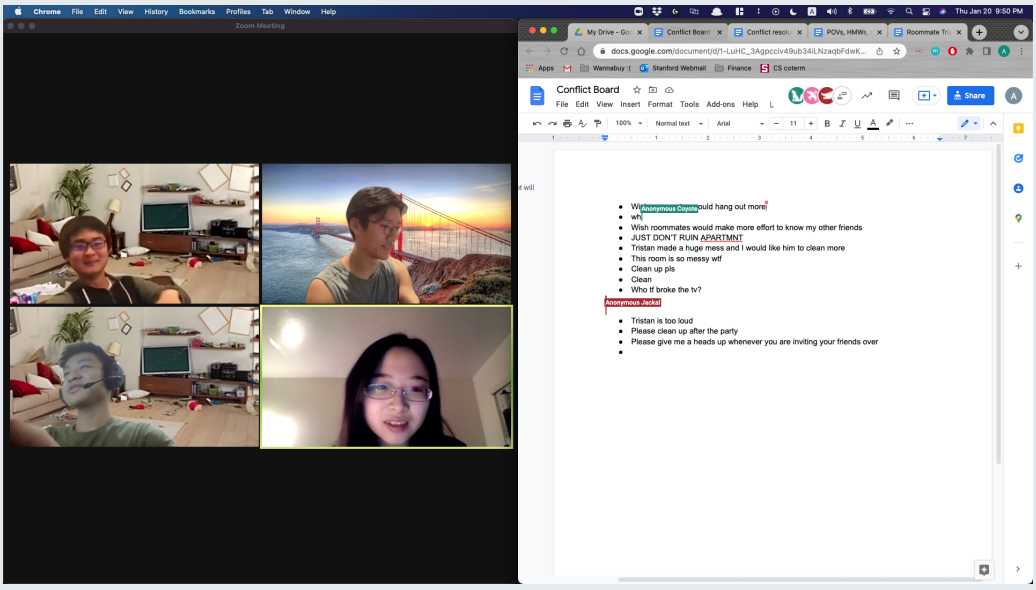


Figure 8. Screenshot of conflict board experience prototype interview

DESIGN EVOLUTION

Out of all three potential solutions we thought of (a roommate matching app, roommate trials, and a conflict resolution app), we felt that our first idea was the most promising and applicable. We felt that roommate trials would be impractical to actually implement in real life, and that a conflict resolution app would not be the most productive.

However, upon doing further market research and with the input of our CA, Emily, we noticed that roommate matching apps were already widespread and that it would be hard for us to differentiate. Thus, we started re-brainstorming new ideas from scratch.

After a long brainstorming session and consulting Emily for feedback (since we didn't have time to redo our experience prototypes), **we decided on creating an app that helps roommates be mindful of each others' bedtime noise levels**. We noticed throughout many of our needfinding interviews that people were mentioning how they or their roommates were light sleepers and/or would get woken up from noise:

- *"I had a really good dorm living experience my freshman year. The only thing I wish I would have known is how light of a sleeper my roommates are. In the future, I'd like to know how light or heavy sleepers people are."* — Andrew Z.
- *"My freshman year roommate Caroline would get up early in the mornings, and I'm a light sleeper in the morning so I would get irked whenever I got woken up."* — Diane J.
- *"I kept on waking up my summer roommate so often that my mentality went from 'I feel bad for waking her up' to 'fuck it'."* — Diane J.

In addition, our teammate Michelle and her current roommate are both extremely light sleepers, and they spoke to both the panic attacks they experienced when being unable to fall asleep due to noise and the anxiety and annoyance when telling their neighbors over and over again to be quiet.

Our final solution was SleepMate: an app that tracks noise levels among roommates after you've gone to bed and alerts them to be quiet after a certain amount of time if it senses that you're still awake.

SleepMate Tasks

The three tasks that SleepMate accomplishes are:

- Simple Task: Notify your roommates that you're going to bed through the app.
- Moderate Task: Modify your household by adding or removing roommates.
- Complex Task: Update your sleeping preferences and notify your roommates that you're still awake after X minutes.

We felt that these three tasks covered the key functionality of SleepMate, which focuses on the roommate experience. The main function that users would use SleepMate for would be to tell roommates that they're going to bed and begin tracking noise levels, which can be done through our simple task. We believe that SleepMate will be mainly used by young adults, and young adults move around all the time due to career changes and other factors. Therefore, users should be able to keep track and modify the household that they're living with, as done through our moderate task. Finally, users should be able to add customization to the app–some users might want to give a longer span of time to let themselves fall asleep before the app starts notifying their roommates. This customization, for power users, can be done through our complex task.

Low-Fidelity Prototype

For our low-fidelity prototype, our team chose to use **Balsamiq**, a purely-electronic wireframing tool that has a sketch-like feel. We chose this electronic prototype to ease collaboration during COVID. Due to Balsamiq's limited toolkit, we encountered a few design limitations.

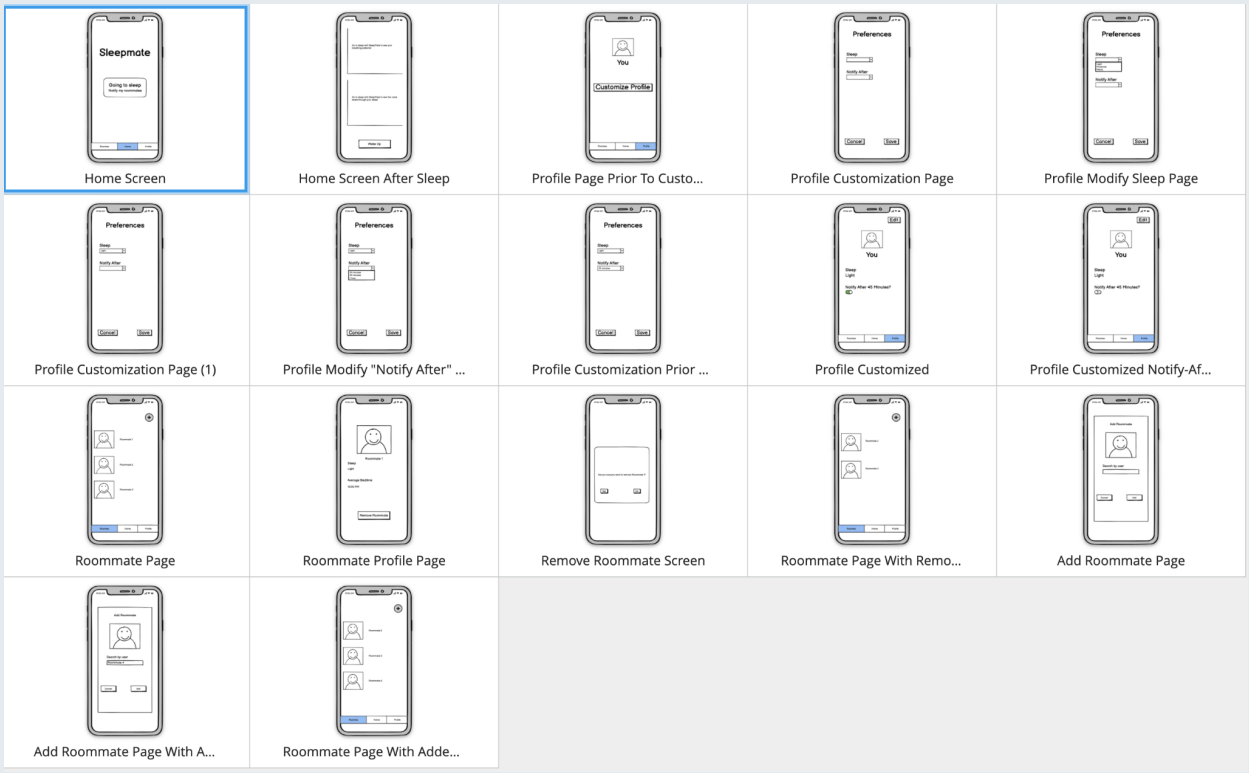


Figure 9. All the screens of our Balsamiq prototype

Below are the tasks flows laid out using the Balsamiq prototype.

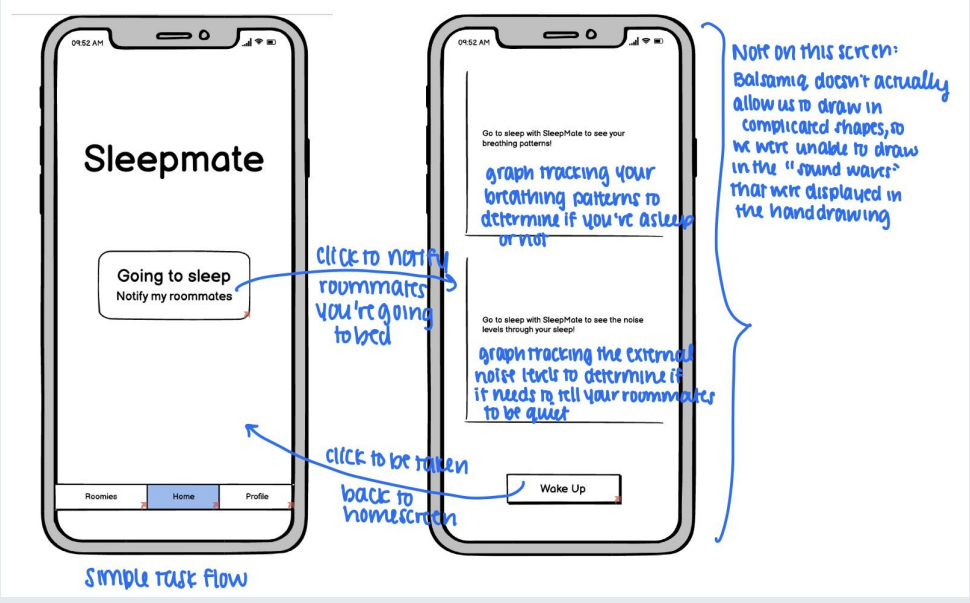


Figure 10. Low-Fi Simple Task Flow

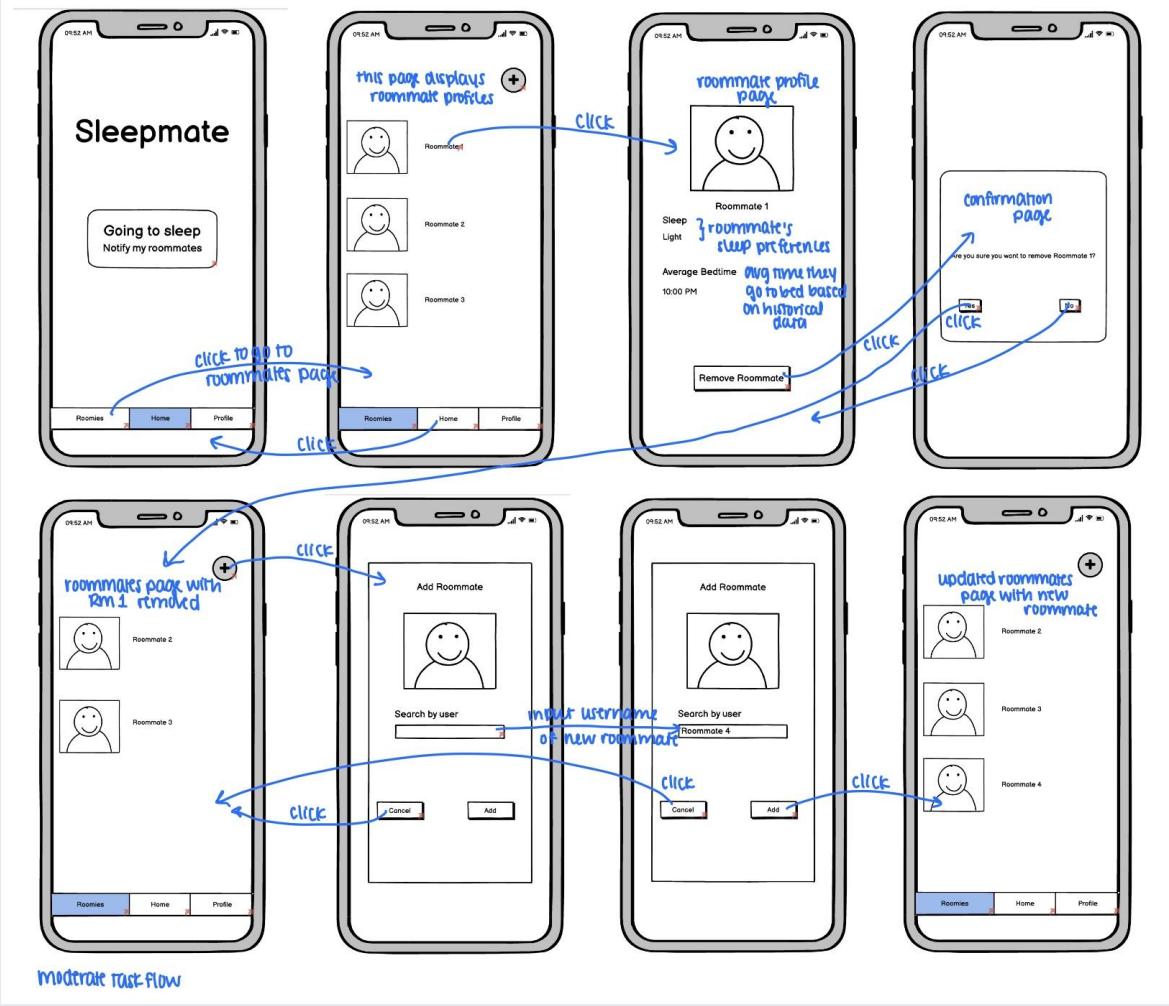


Figure 11. Low-Fi Moderate Task Flow

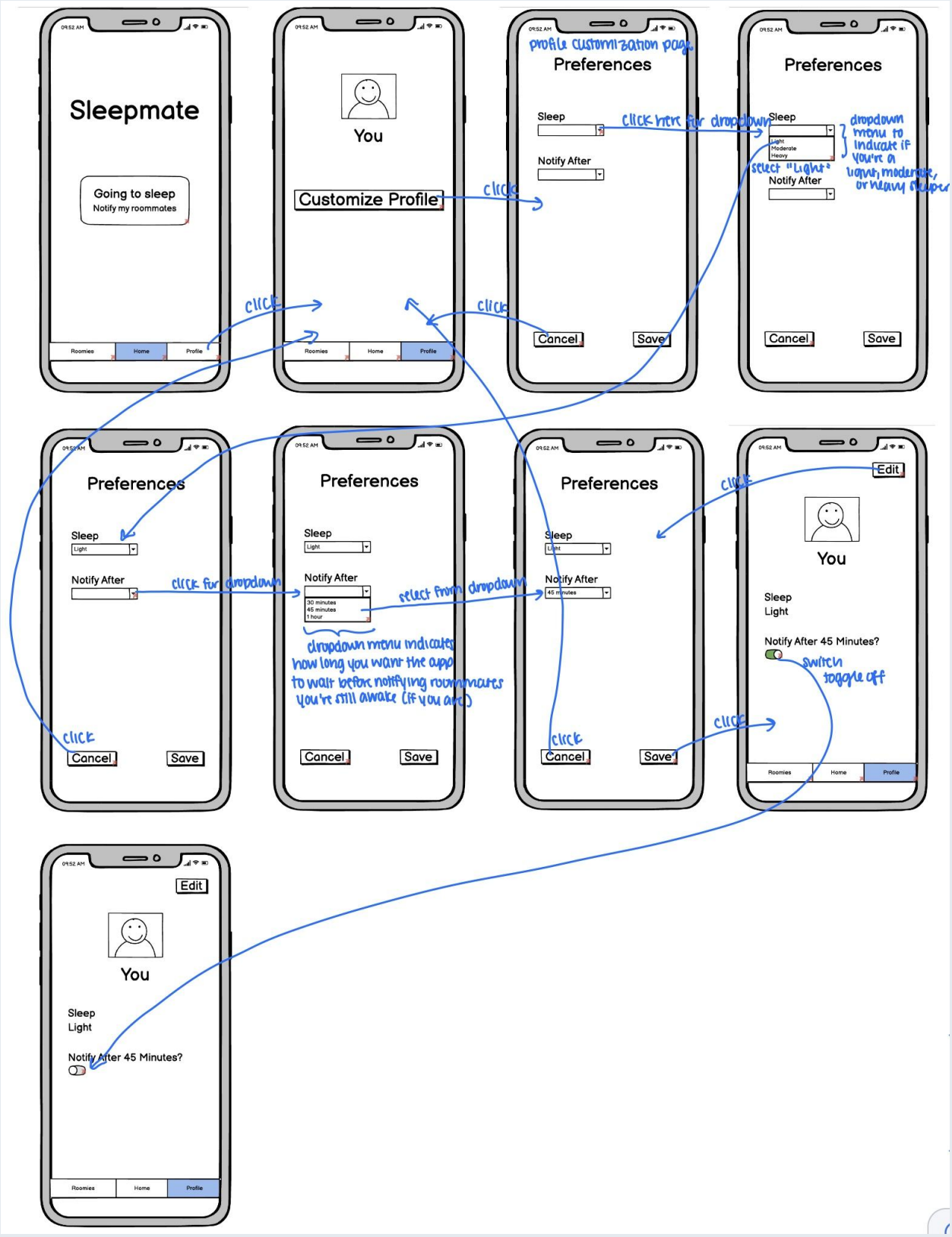


Figure 12. Low-Fi Complex Task Flow

Medium-Fidelity Prototype

Upon testing our low-fidelity prototype among users, all the participants succeeded in adding and removing roommates (moderate task) and customizing their sleep profiles (complex task) without any critical incidents. However, two participants failed to first click on the “Sleep” button on the homepage on their first try because they commented that it did not look like a button. We believe that this is primarily due to the graphical limitations on Balsamiq. Participants also had difficulty navigating from the “wake-up” page back to the homepage. Another user commented that adding roommates should be an invite-based system to eliminate the possibility of accidentally adding the wrong users. The changes that we decided to make when moving on to the medium-fidelity prototype are:

- Color and shading to make the “Sleep” button on the homescreen stand out
- Move the graphs (that tracks breathing and noise levels after the user has gone to bed) from the “wake-up” page to a separate stats page. This would simplify the design on the “wake-up” page and hopefully help participants notice the “wake up” button with the more minimalistic design
- A notification page to keep track of who was added/removed from the household and household-wide announcements (e.g. a roommate changing their sleep schedule)
- An invite-based system to add new roommates, similar to Facebook friend requests, to fix privacy concerns

For our medium-fidelity prototype, we decided to use **Figma** due to its ease of collaboration of team members, ease of copying and pasting elements, and wide expanse of design assets.

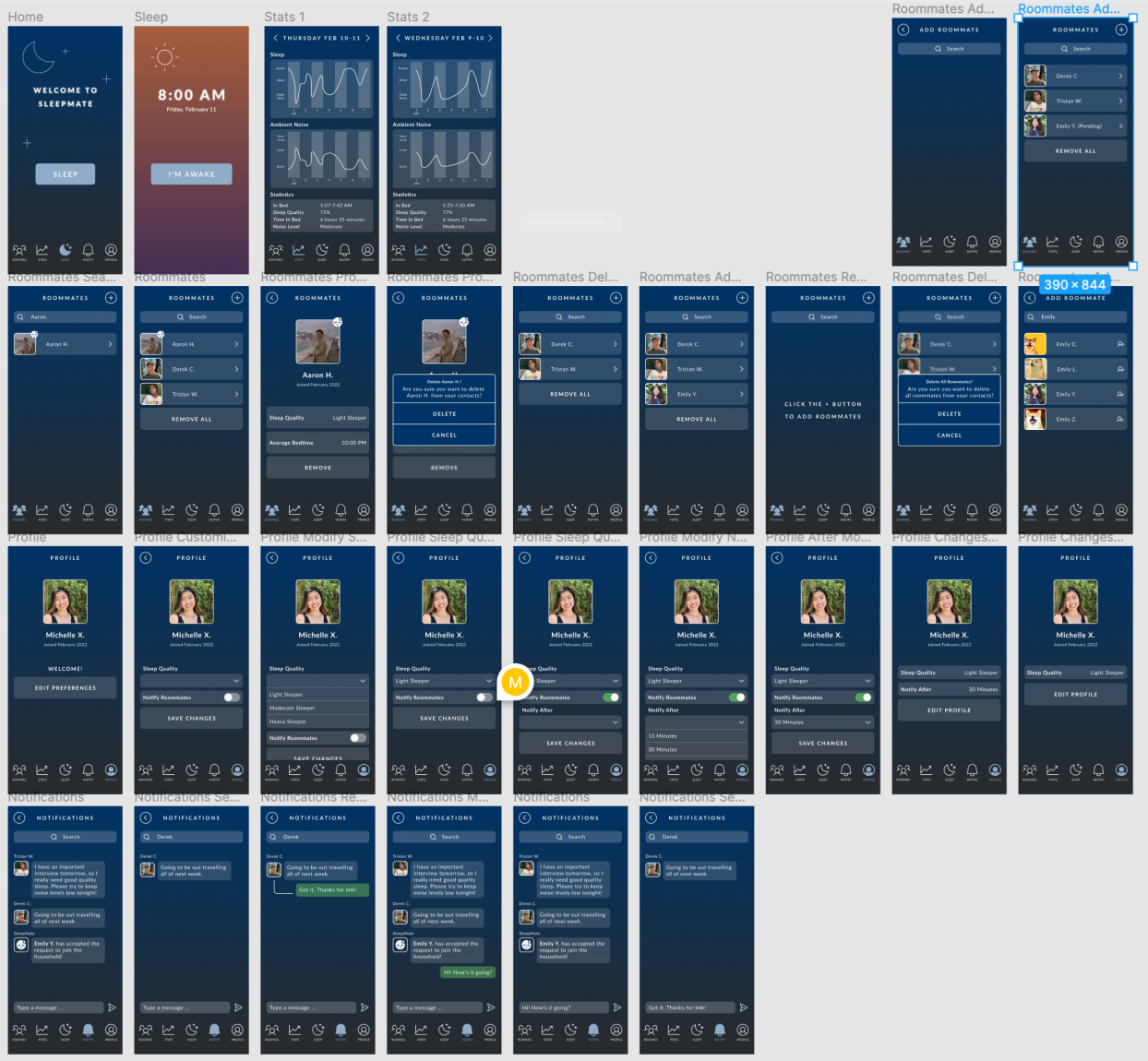


Figure 13. All the screens of our FIgma prototype

Below are the tasks flows laid out using the Figma prototype.

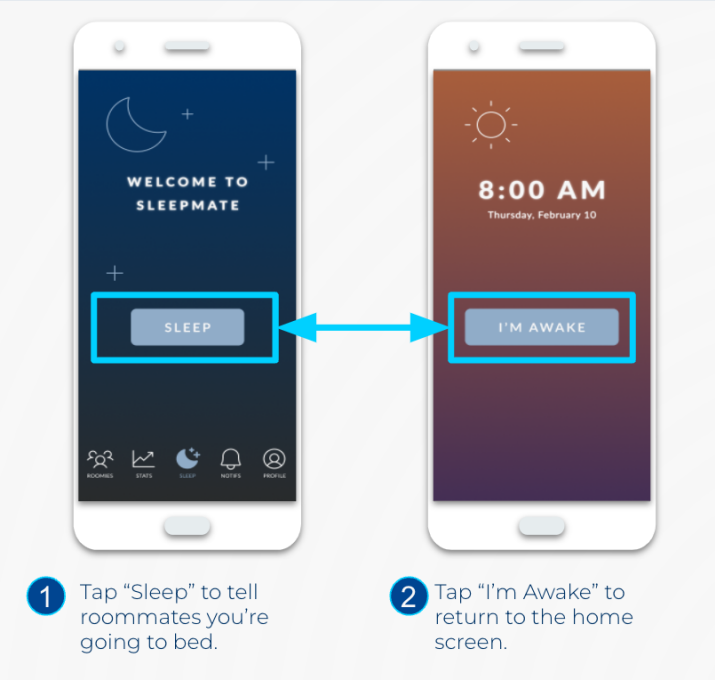


Figure 14. Med-Fi Simple Task Flow

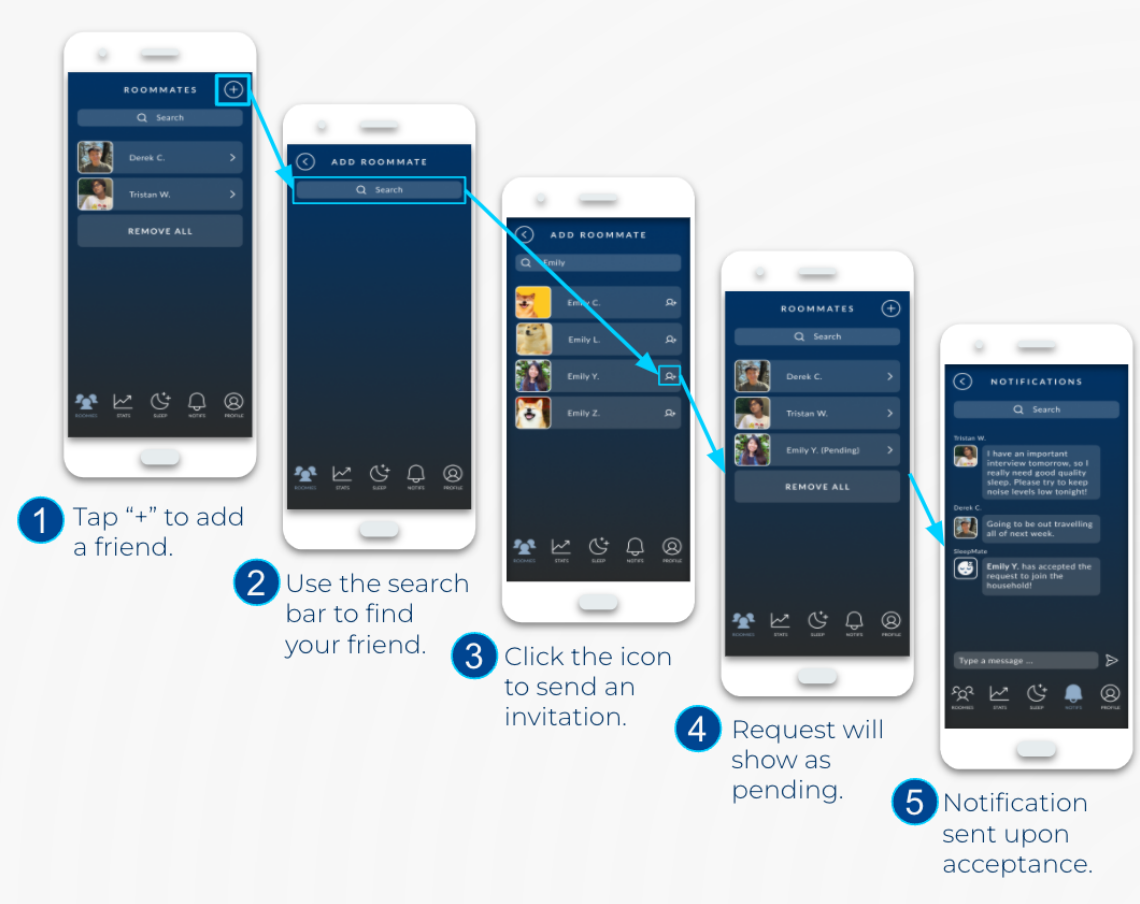


Figure 15. Med-Fi Moderate Task Flow: Add Roommate

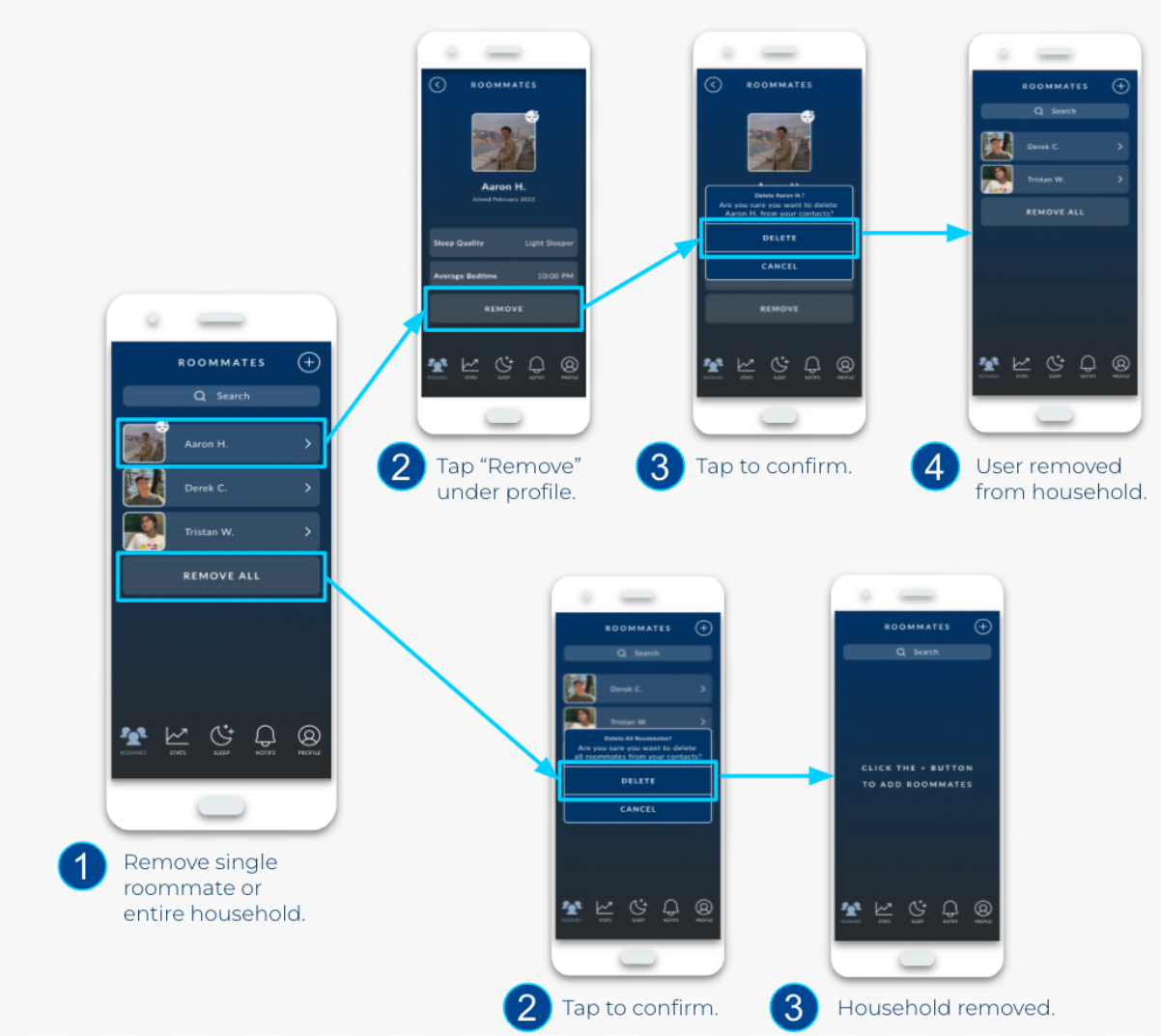


Figure 16. Med-Fi Moderate Task Flow: Remove Roommate

Figure 17. Med-Fi Complex Task Flow

Hi-Fidelity Prototype

During our med-fi prototype, we got a lot of feedback about the clarity, usability, and privacy of Sleepmate. In total, our evaluators identified 59 total violations, including 29 violations of severity 3-4 and 30 violations of severity 1-2. For each area of the app, we have included the relevant violations and how we address them.

1. **Home Page**
   For our home page, our evaluators provided us the following feedback:

   a. When a User presses the "Sleep" button to indicate that they are sleeping, there is no way to access other parts of the app. *(H1 Visibility of System Status / Severity 4)*
   b. Users might accidentally press "Sleep" on the Home screen which may contribute to incorrect information being registered on the Stats screen. *(H9 Help Users Recognize, Diagnose, and Recover from Errors / Severity 3)*

   We added new features to the home screen to address these points. When the user wants to go to bed, they need to hold down the "Sleep" button for a certain amount of time to prevent data from being accidentally registered. Additionally, a user can now access all other pages even when they are asleep.

Figure 18. Hi-Fi Home Screen Task Flow

2. **Roommates Page**

We received feedback on various areas of the roommates page. Evaluators commented on adding/removing roommates, as well as information displayed about each roommate.

a. No feature exists for instantly removing multiple roommates. One either has to go through each individual profile, or remove all of them at once. *(H4 Consistency and Standards / Severity 3)*
b. After the user selects who to invite into the household, there is no confirmation dialog. *(H5 Error Prevention / Severity 3)*
c. On the roommate adding screen, there are only photos and names of people, with no additional identifier. *(H5 Error Prevention / Severity 3)*

We made several changes to the roommates page. First, there is an option to quickly remove roommates without having to navigate into each profile. Second, confirmation dialogues appear before adding or removing a roommate and a corresponding notification shows up in the Notifications Page after the action is confirmed. Finally, in order to protect user's privacy, each profile has a unique username attached to it. When searching for roommates to add, users can only search profile by username.

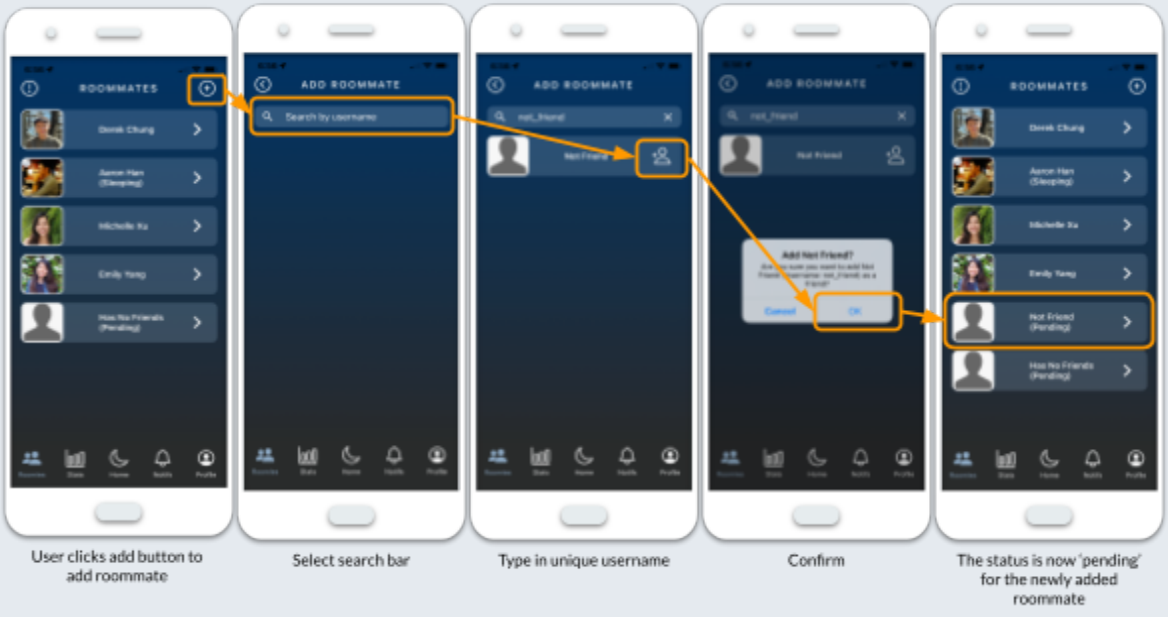


Figure 19. Hi-Fi Roommate Screen Adding Roommate Task Flow

Figure 20. Hi-Fi Roommate Screen Removing Roommate Task Flow

3. **Statistics Page**
   Evaluators were initially confused by the amount and meaning of information presented on the statistics page.

   a. There is no feature for users to navigate to a specific day without tapping the navigation buttons repeatedly. *(H7 Flexibility and Efficiency of Use / Severity 3)*
   b. The graphs on the Stats screen have way too much information. For a page that looks very information-heavy, there is very little guidance on how to interpret and apply this information. *(H10 Help and Documentation / Severity 3)*

   With these comments in mind, we implemented a calendar feature allowing the user to select the date on which they view stats. In addition, we used terms that other established sleeping apps used (such as Awake, Sleep, Deep Sleep) so that users are more likely to be familiar with the information displayed.

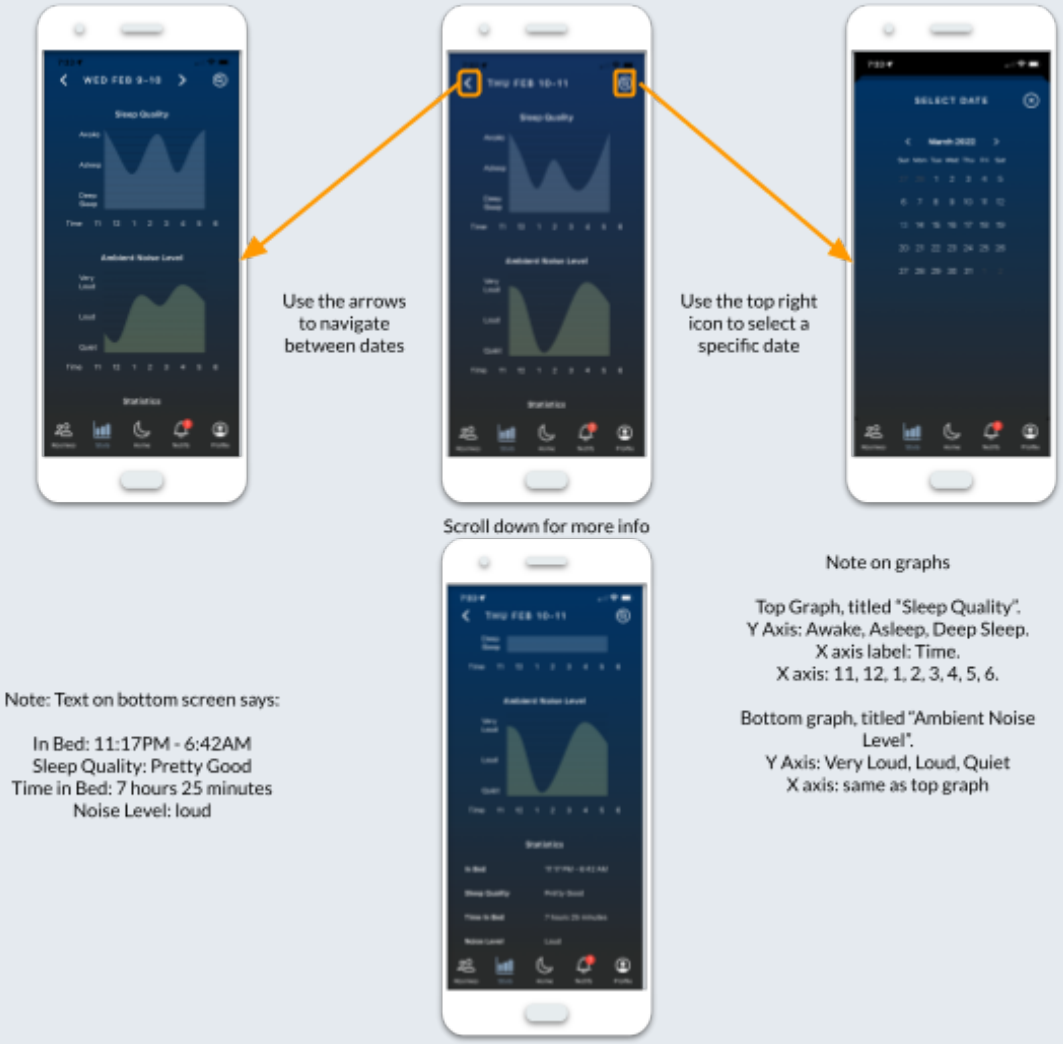


Figure 21. Hi-Fi Statistics Page Task Flow

4. **Notifications Page**
   The notifications page remained largely unchanged, aside from the addition of system-side notifications. Feedback on the roommates page indicated that users would like to know who exactly they are adding and protect their own privacy from strangers as well. To help users stay informed on events concerning roommates, we added a red badge counter to alert users how many unread notifications they have. Typically, users will receive notifications when a user has been added or removed from the household.

Figure 22. High-Fi Notification Page Task Flow

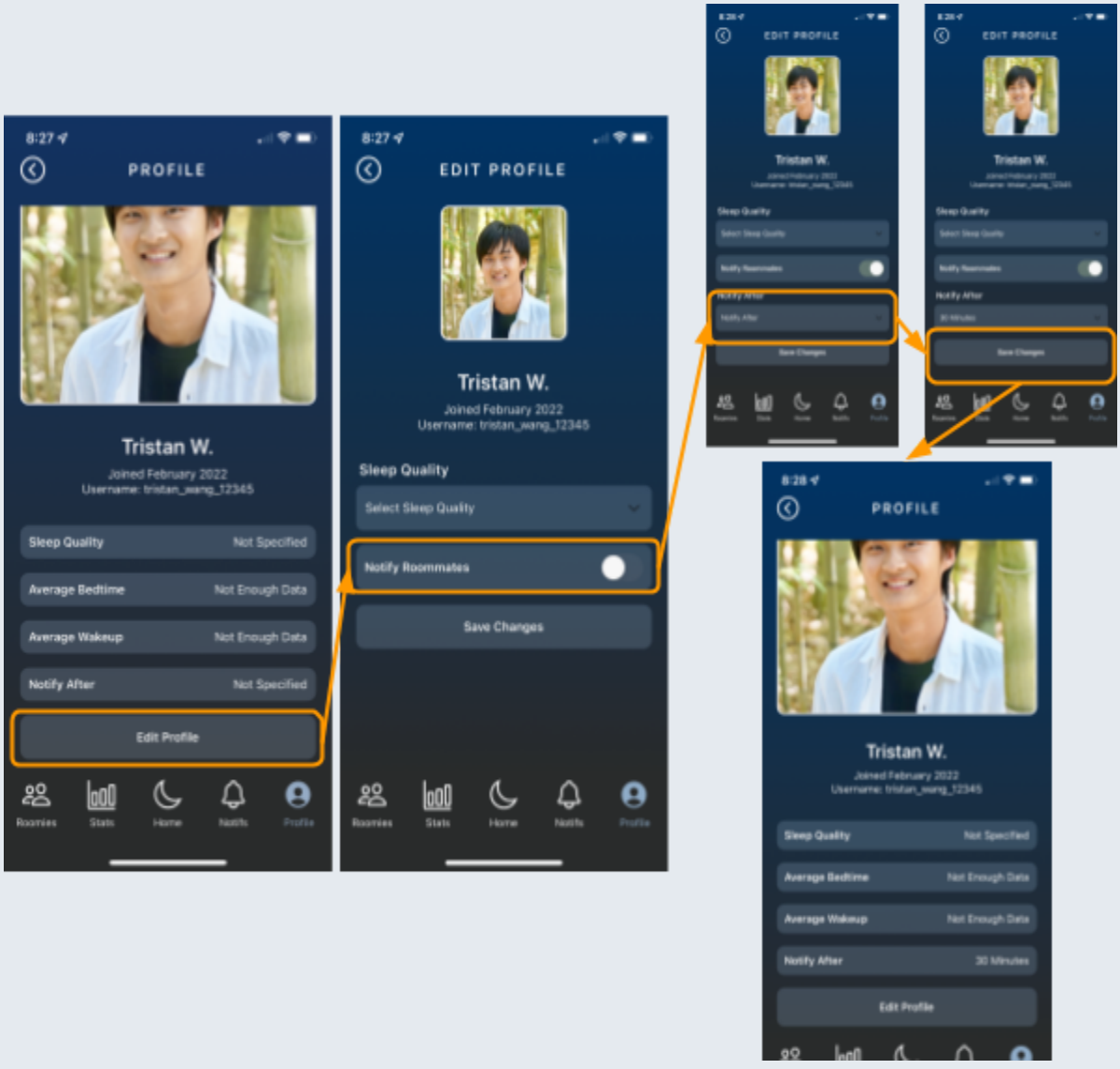
5. **Profile Page**
   On the profile page, the user is given the option whether to notify roommates that they are being too loud after a certain amount of time. Among other things, our evaluators had trouble understanding the phrasing behind this preference as shown in our med-fi prototype.

   a. When editing preferences on the profile screen, there is a dropdown menu with text saying “Notify After”. Users may not recognize what this means

without context and it may take them some time to recall it is actually referring to “Notify Roommates That I’m Sleeping After I Go To Sleep For (some time)”. *(H6 Recognition Rather Than Recall / Severity 3)*

b. While daily stats are available, there is no average available to the user. A user is able to view their roommates’ average sleep time, but not their own. *(H6 Recognition Rather Than Recall / Severity 3)*

Along with several UI problems, we fixed these concerns by adding average statistics for the current user on his/her profile page. We also changed the wording of “Notify After” to make it clear what the purpose of the setting is.



6. Additional Improvements

a. The average bedtime is available for roommates to see, but there is no average wake-up time. *(H1 Visibility of System Status / Severity 3)*
   Fix: Added average wake up time in profile and roommate info section
b. What does “Moderate” noise level even mean? Should I be aiming for “Low” noise level? This information has no practical use. *(H2 Match Between System and the Real World / Severity 3)*
   Fix: Changed statistics page to distinguish between ambient noise and sleep quality.
c. On the Stats screen, there is a “sleep quality” which is presented as a percentage. Users may be very curious about what the percentage means for sleep quality, as this is not a commonly known quantifiable measurement. What does “72% sleep quality” even mean? Is “100%” supposed to be the goal? Should I seek medical attention if my sleep quality is below x%? These numbers are trivial without further information. *(H2 Match Between System and the Real World / Severity 3)*
   Fix: Changed labels of sleep quality to better match conventional patterns.
d. Once users search a person in the “Roomies” tab, they cannot go back to the previous screen. *(H3 User Control and Freedom / Severity 3)*
   Fix: Fixed in hi-fi prototype
e. Once the user edits the profile once, the user is unable to edit it again. *(H3 User Control and Freedom / Severity 3)*
   Fix: Fixed in hi-fi prototype
f. Once I remove all roommates from the “Roomies” tab, it does not allow me to add anyone else. *(H3 User Control and Freedom / Severity 3)*
   Fix: Fixed in hi-fi prototype
g. On the “Profile” tab, after you press the drop down under “Notify Roommates”, you are unable to select all the options since it goes off screen and does not allow scrolling. *(H3 User Control and Freedom / Severity 3)*
   Fix: Fixed in hi-fi prototype
h. The back button on most screens does not work. *(H3 User Control and Freedom / Severity 3)*
   Fix: Fixed in hi-fi prototype
i. On the Profile screen without any set preferences, the primary button is “Edit Preferences”, but on the same screen with set preferences, the button is “Edit Profile”. Users may be confused by the different terminology for the

same function. *(H4 Consistency and Standards / Severity 3)*
Fix: Changed to "Edit Profile"

j. After searching for a user on the Notifications screen, the message users send becomes a direct reply (with a special curve indicating that it's a direct reply). Users may accidentally send an unexpected direct reply when they intended a group message. *(H5 Error Prevention / Severity 3)*
Fix: Added "Send" icon to confirm message delivery for user.

k. On the Roommates screen, there is a sleepy face on top right of the roommate's photo. Users may not know what the face represents without much context. There is no indication of the meaning of the face anywhere either. *(H6 Recognition Rather Than Recall / Severity 3)*
Fix: Added "Sleeping" in parenthesis next to roommate name to indicate they are sleeping.

l. Users must go back to the "Sleep" tab in order to navigate to other tabs. *(H7 Flexibility and Efficiency of Use / Severity 3)*
Fix: Fixed in hi-fi prototype

m. The plus icon on the Roomies screen does nothing. *(H8 Aesthetic and Minimalist Design / Severity 3)*
Fix: Fixed in hi-fi prototype to navigate to add roommates screen

n. There is way too much information on one page for the Stats screen. *(H8 Aesthetic and Minimalist Design / Severity 3)*
Fix: Added a scrolling view so information is not all cluttered into one screen

o. On the Stats screen, there are both "Sleep" and "Ambient Noise" charts. If I understand it correctly, the "Sleep" data is actually inferred from the "Ambient Noise", since this is possibly the only way a mobile phone could assess sleeping. *(H8 Aesthetic and Minimalist Design / Severity 3)*
Fix: Changed labels of "Sleep Quality" graph to show difference.

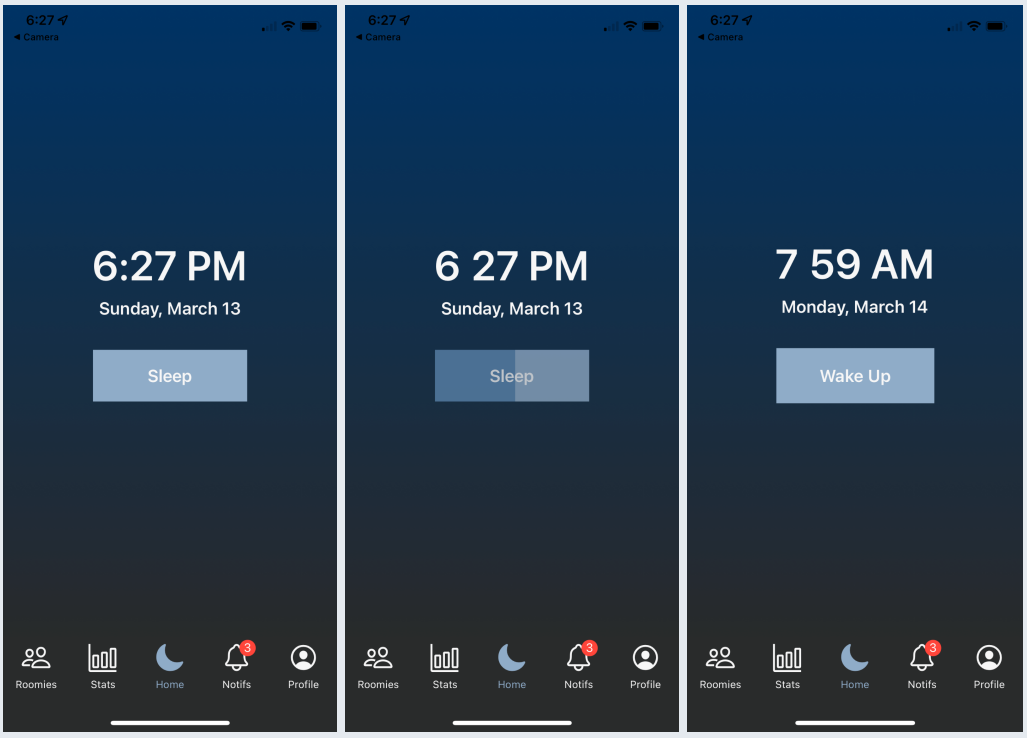
p. The search bar seems unnecessary. It is unlikely that a person will have more than 4 roommates, so the search function will likely be unused/used rarely. It unnecessarily takes up screen space. *(H8 Aesthetic and Minimalist Design / Severity 3)*
Fix: Removed the search bar.

q. What does "Notify Roommates" mean? What and how am I notifying them? There's very little information on this mysterious button. *(H10 Help and Documentation / Severity 3)*
Fix: Changed UI to make it more clear. Added toggle switch and drop down menu.

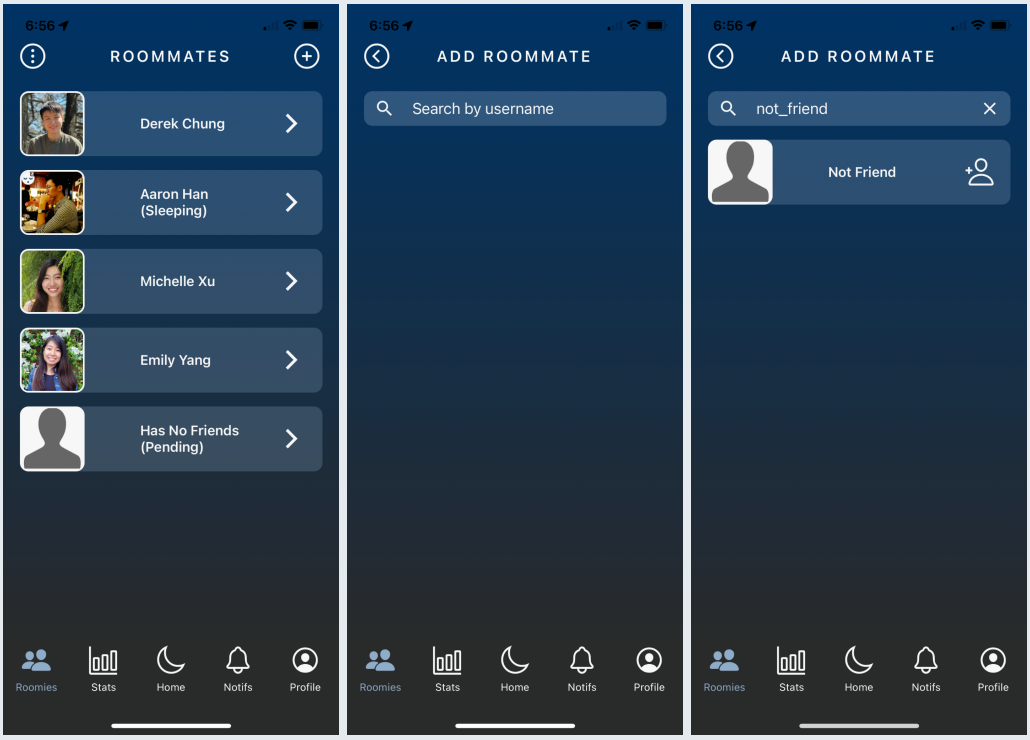
r. There is a lack of FAQ or help resources. *(H10 Help and Documentation / Severity 3)*
   Fix: Improved wording of certain texts to make understanding clearer.
s. On the main Sleep screen, there is only a button saying "sleep" and a button saying "I'm Awake" on the next screen. Users may struggle to know the implications of pressing the buttons, which can be intimidating. *(H10 Help and Documentation / Severity 3)*
   Fix: Changed "I'm Awake" to "Wake Up".
t. The user profile makes the user's photo and name stand out. It may be a dealbreaker for users who are socially introverted and do not want to share their photos and real names with roommates. This is especially common for roommates who keep their own personal lives apart. *(H12 Fairness and Inclusion / Severity 3)*
   Fix: Added a default avatar icon so that users don't have to upload a profile picture.

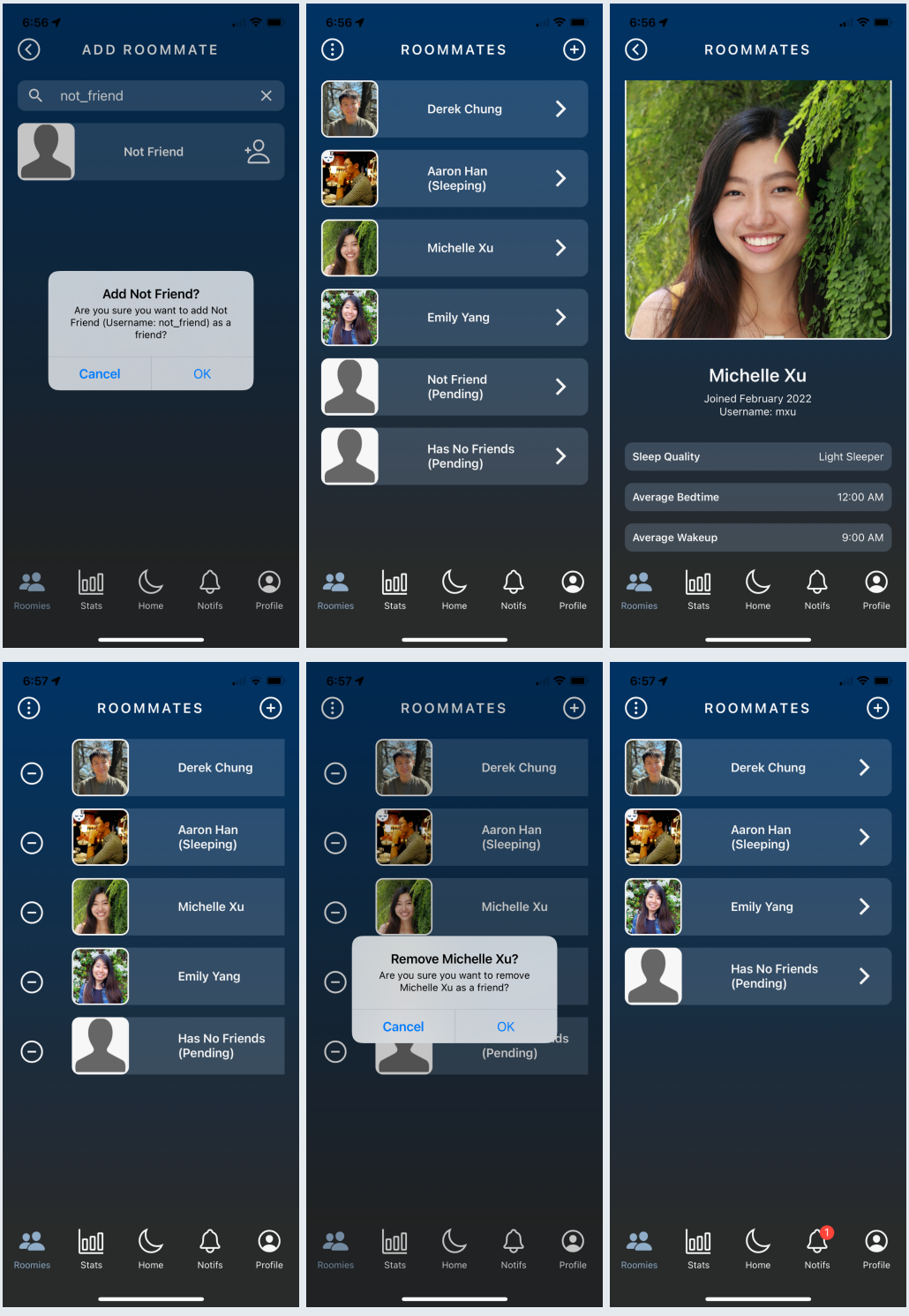
7. All Pictures From Hi-Fi Prototype

a. Home Screen

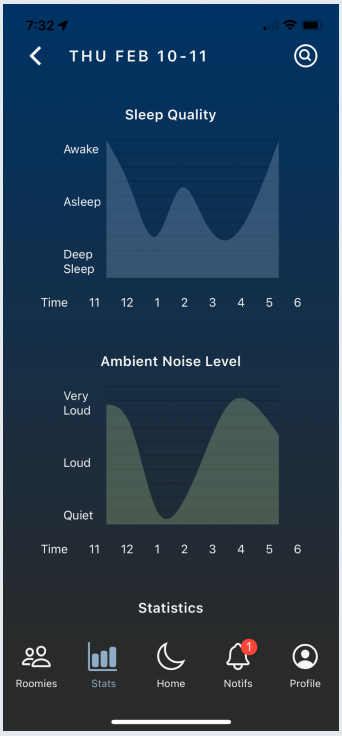


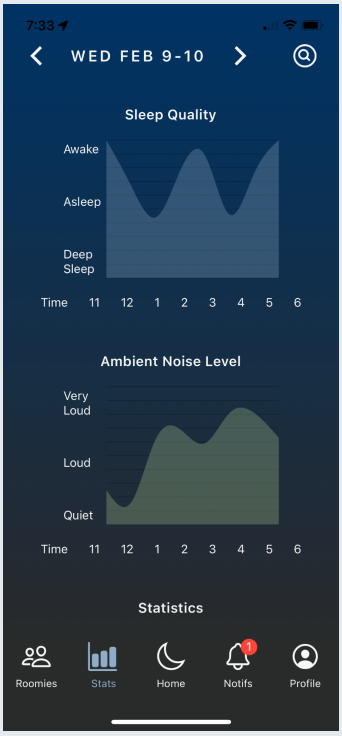
b. Roomies Screen

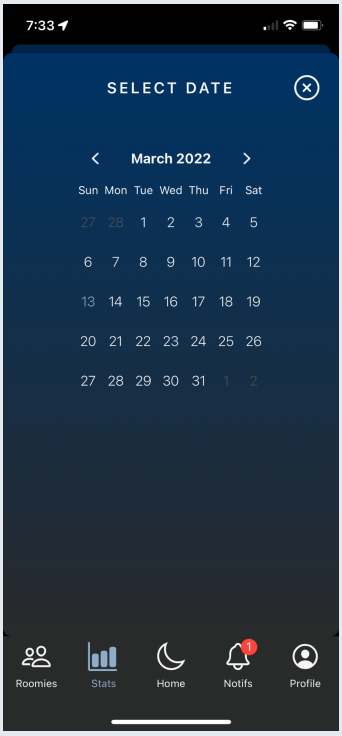


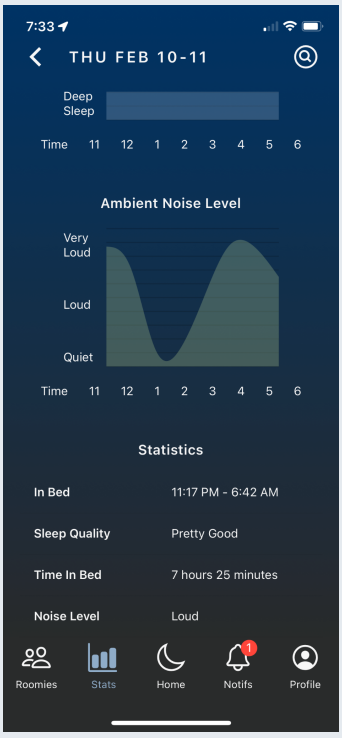

6:56
ADD ROOMMATE
not_friend
Not Friend
Add Not Friend?
Are you sure you want to add Not Friend (Username: not_friend) as a friend?
Cancel
OK
Roomies
Stats
Home
Notifs
Profile
6:56
ROOMMATES
Derek Chung
Aaron Han (Sleeping)
Michelle Xu
Emily Yang
Not Friend (Pending)
Has No Friends (Pending)
Roomies
Stats
Home
Notifs
Profile
6:56
ROOMMATES
Michelle Xu
Joined February 2022
Username: mxu
Sleep Quality
Light Sleeper
Average Bedtime
12:00 AM
Average Wakeup
9:00 AM
Roomies
Stats
Home
Notifs
Profile
6:57
ROOMMATES
Derek Chung
Aaron Han (Sleeping)
Michelle Xu
Emily Yang
Has No Friends (Pending)
Roomies
Stats
Home
Notifs
Profile
6:57
ROOMMATES
Derek Chung
Aaron Han (Sleeping)
Michelle Xu
Remove Michelle Xu?
Are you sure you want to remove Michelle Xu as a friend?
Cancel
OK
(Pending)
Roomies
Stats
Home
Notifs
Profile
6:57
ROOMMATES
Derek Chung
Aaron Han (Sleeping)
Emily Yang
Has No Friends (Pending)
Roomies
Stats
Home
Notifs
Profile

c. Stats Screen

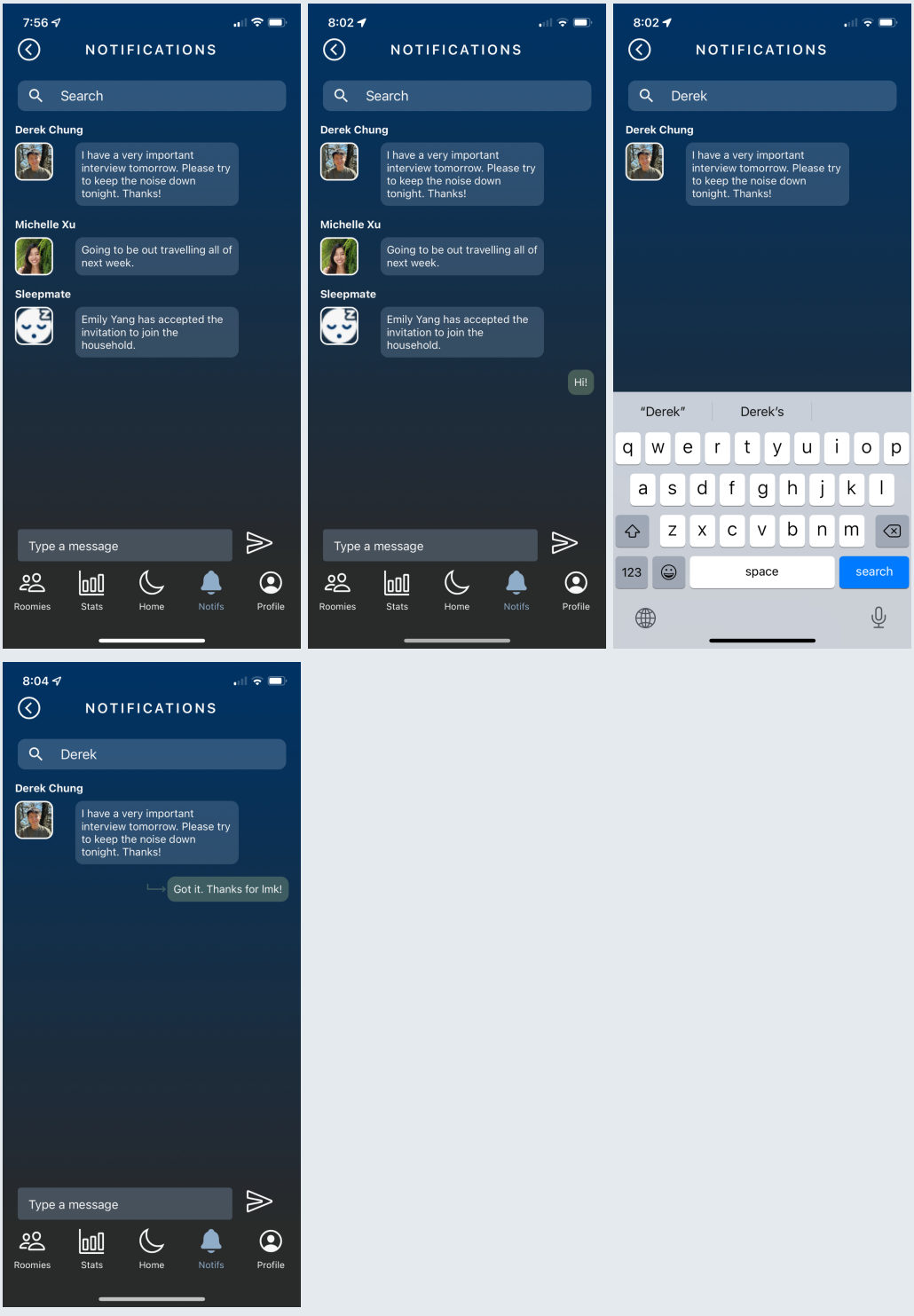




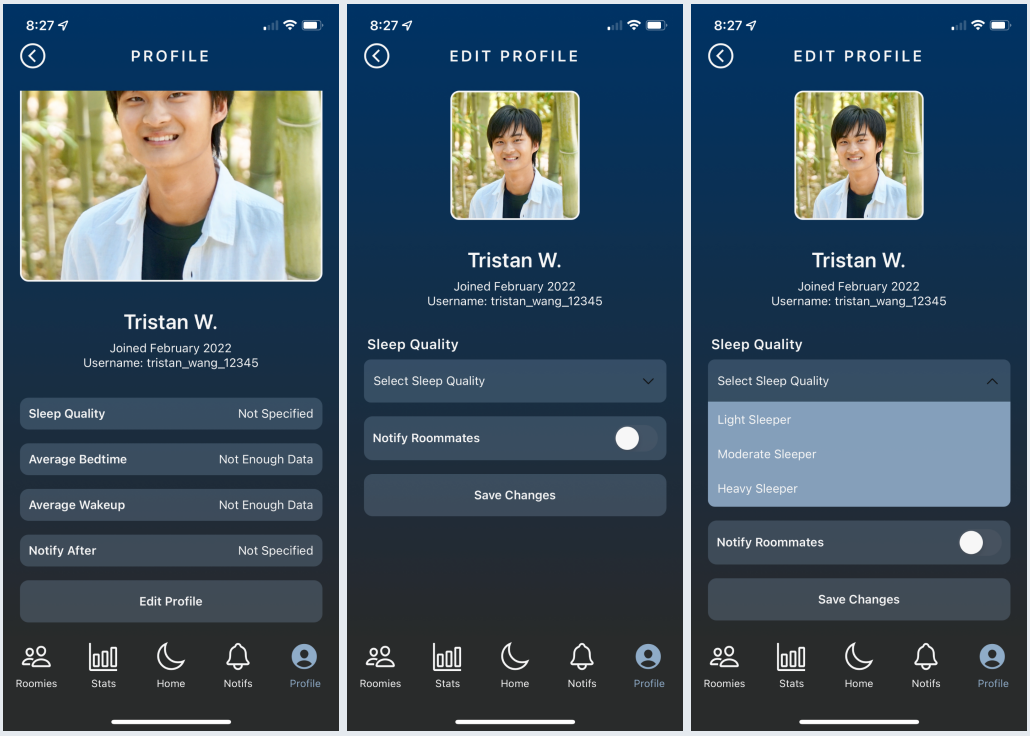




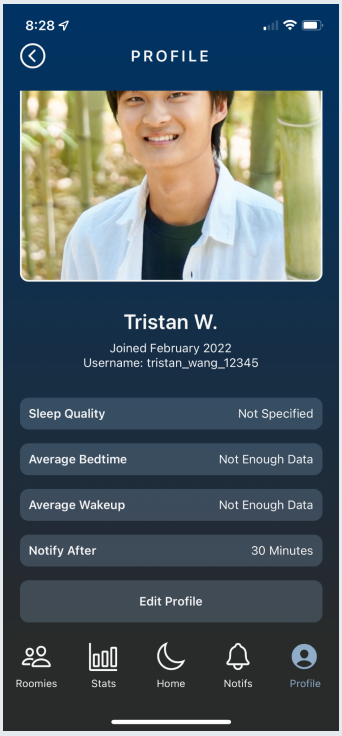
d. Notifications Page



e. Profile Page



Profile Page (cont.)



Values in Design

For our values, we had previously noted consideration, physical health, feelings, respect, privacy, communication, and cooperation.

The underlying goal of our app is to allow the user to get a better night's rest, which would improve the user's physical health. Our final prototype has a stats page which allows a user to see their noise levels historically, which aims to help users become more informed about their sleep and thus help them sleep better.

With a press of the "Sleep" button on the homepage, the user can notify roommates that he or she is going to bed. This opens the lines of communication between roommates and implicitly asks the roommates to be considerate and respectful of noise levels.

Once the user indicates that he or she is going to bed, SleepMate begins tracking noise levels. The user can customize the amount of time he/she allows for them to fall asleep before the app starts alerting roommates to be quiet. We implemented this feature because we value a user's privacy and want users to be comfortable telling their

roommates to be quiet without having to feel annoyed, afraid, or self conscious of what others will think of them.

To further improve communication and cooperation, our final prototype includes a notifications page where roommates can update each other on when they will be out of town, when they want to have friends over for a party, etc.

As for conflicting values, we believe that the values of feelings and privacy come into conflict with communication. We value the subject's feelings and privacy (it can be both scary and inconvenient to tell your friends to 'shut up' when they're having a good time), but we also feel in order to solve the problem itself, there must be clear communication so the other roommates are aware of when someone is sleeping.

FINAL PROTOTYPE IMPLEMENTATION

Tools Used

Our final prototype was built using React Native and Expo. Development and testing for the prototype was conducted via Xcode's iOS simulator. In particular, our application is optimized for iPhone X.

How the tools helped: Building the final prototype using React Native allowed us to implement features more advanced than what was possible with Figma.

- React Navigation makes it possible to customize the transitions and navigation between the app's numerous screens. Its routing features allowed the passing of variables and information between different displays, providing the user with an experience that is much closer to an actual app.
- React Native made it easier to build reusable components like search bars, navigation bars, buttons, and graphs to be used throughout various displays of the app.
- React Native allowed us to load in external libraries for components such as calendars and dropdowns, expediting our prototyping process.

How the tools didn't help: Despite having greatly expanded the usability and functionality of our prototype, given the time we had for the project, we could not rely on React Native to implement a backend for the SleepMate app. Also for this reason, almost all of the data

in our final prototype were either hardcoded or randomly generated. Below is a list of limitations for the SleepMate app.

- For the “Roomies” page, no roommates can be added or deleted besides the 6 sample roommates that exist when you first activate the app. As these contacts do not reflect actual user accounts, you can simulate the users accepting friend requests by clicking on the contact pending confirmation, and clicking the “Simulate user accepting request” button.
- For the “Stats” page, only 3 days’ worth of data exist. Because the app cannot actually track your sleep quality and ambient noise, no new data can be generated. The “Select Date” page does not have any actual functionality; clicking on a random date simply snaps you back to the statistics page you were viewing previously.
- For the “Home” (Sleep) page, the Sleep button does not activate any real sleep quality or ambient noise tracking capabilities.
- For the “Notifs” page, no actual notifications can be sent or received, aside from the auto-generated system-side notifications indicating that roommates have been added or deleted from the household.
- For the “Profile” page, no data exists for “Average Bedtime” or “Average Wakeup”. No such data can be generated by the app.
- Since the app is designed to be used across multiple users, a final version would have the option to allow the user to login using a username and password. However, since our app doesn't yet rely on Firebase and there aren't other users, the user will be automatically logged in as Tristan Wang with username tristan_wang_12345 with no ability to log out. If the app were fully functional, there would be a login screen with various options to create an account, recover a lost password, and sign in using other platforms such as Google and Facebook.
- For the "Profile" page, it is not possible yet to edit details such as name, profile picture, or username. The absence of these features do not contribute to the main tasks, and are obvious tasks that would be added in a real-world development setting.

Wizard of Oz Techniques

- On the “Home” (Sleep) page, engaging the Sleep button will take you to 7:59 AM of the following morning, and the 8:00 AM alarm will sound 5 seconds afterwards.
- On the “Roomies” page, if you added a roommate whose contact is pending confirmation, clicking “Simulate user accepting request” on their contact page will refresh the page as if the user had accepted your invitation.

Hardcoded Elements

- On the “Roomies” page, we hard-coded the various roommate profiles (Derek Chung, Aaron Han, Michelle Xu, Emily Yang, Has No Friends) that can be added or deleted.
    - A list of profiles and their usernames are here:
        - Derek Chung, username: dchung
        - Aaron Han, username: ahan
        - Michelle Xu, username: mxu
        - Emily Yang, username: eyang
        - Has No Friends, username: pending_friend
        - Not Friend, username: not_friend
    - The profile "Aaron Han" will always be sleeping, regardless of the time.
- On the “Stats” page, we hard-coded the conditions for the data for February 8-9, 9-10, and 10-11. Specifically, the “Sleep Quality” and “Ambient Noise Level” charts are generated at random. The statistics at the bottom are hard-coded.
- On the “Home” (Sleep) page, the wake-up time (8:00 AM) is hard-coded.
- On the “Notifs” page, we hard-coded 3 pre-existing messages (2 user messages from Derek Chung and Michelle Xu, respectively, and 1 system-side message from Sleepmate). The search bar is hard-coded to display only Derek Chung’s message no matter what is typed as a query; sending a message will result in the hard-coded personal reply: “Got it. Thanks for lmk!”. If the search bar is empty, any sent message will result in the hard-coded general reply: “Hi!”.
- On the “Profile” page, we hard-coded Tristan W. as the user profile (including the name, username, profile picture, and date joined).

SUMMARY & NEXT STEPS

Over the past 10 weeks, our team interviewed dozens of participants, discussed several ideas, and made multiple design prototypes to get to our final solution. At first, we had an initial idea of tackling some problem in mental health related to the pandemic - we had all been impacted in various different ways, some more significantly than others. At the time, we feared that due to the Omnicron variant, the pandemic would continue for some time, and we thought it was important to find a way to make something in response.

As we began to conduct interviews, we realized that we may have assumed beforehand that the pandemic affected everyone the way it had affected us: isolation from friends and

family, loss of motivation, and a desire for everything to return to normal. While some of these themes resonated with our participants, we realized that there were many other effects the pandemic had, some of which even invalidated our own. For example, while we, as college students, felt a great deal of social isolation, some interviewees welcomed the absence of having to fake politeness and social etiquette to people that they might have not necessarily liked. Others saw the pandemic as an opportunity to motivate themselves at their own disciplines or discover new interests. And finally, we found that some preferred a hybrid model of work going into the future, instead of things going back the way they were pre-pandemic.

Spurred by these findings, we tried even harder to expand our perspectives. We began to interview a more diverse group of people, and we realized that regardless of one's demographics, the pandemic changed one's living situations in one way or another. The majority of our participants found roommates to live with, while those with families began to see their spouses and/or children more often. Perhaps we could build something that addresses problems associated with living together with others. That's where the idea of Sleepmate - an app that manages sleep habits between housemates - came into play.

Some of our biggest takeaways include:

1. **Seeking out and listening to a variety of diverse perspectives**
   We never would have come up with Sleepmate if we had remained fixated on our lifestyle as college students, and the effects the pandemic had on us. By reaching out to a more diverse pool of interviewees, we discovered many views we hadn't considered, and a couple that contradicted our own. This forced us to broaden our problem scope and consider how we can make a significant impact on a much larger group of people.
2. **Communication is hard**
   Sleepmate is designed to help roommates communicate in a healthy manner so everyone can get a good night's rest. We had to first consider what makes conventional methods of communication difficult to begin with. Telling a roommate to be quiet while trying to sleep can be inconvenient, obnoxious, and nerve wracking. Furthermore, the roommate that is still awake may not have been aware that their roommate is sleeping or that they have an important interview scheduled tomorrow. They may have even planned a huge party in advance without knowing all of this. One of our biggest challenges was to design an app that addressed both sides of potential situations.
3. **It is difficult for roommates to have an app (or several apps) to manage their lifestyles**

There are laundry apps, chores apps, scheduling apps, money apps, and so much more for people living together. Having too many apps may be difficult to manage and may even be detrimental to productivity. Through our journey with Sleepmate, we tried to come up with an original idea and create an actual app for it. However, it may be necessary to have a centralized app consisting of chores, paying rent, food, roommates, and more.

During the poster session, one of the guest judges talked with us in length about how managing sleep schedules is just one item of a long laundry list of problems between roommates. He also mentioned how it is very difficult to get everyone on board with the idea — if roommates would agree to use an app like SleepMate, they probably wouldn't need it. We agree with his feedback, and would like to implement the following given more time:

- Single-side opt-in: if the user provides a list of phone numbers to send the "be quiet" notifications to, the recipients are
- A more holistic platform: add conflict management for other roommate-related issues such as bill splitting, chores, etc.

All of these would require more user research and testing, but would be worthwhile to optimize the product-market fit. We hope that we can continue to help people living together to respect one another and communicate effectively; perhaps, one day, people won't need apps to help them.

ACKNOWLEDGEMENTS

We would like to extend our heartfelt thanks to Professor Landay and the rest of the teaching team for making CS 147 possible. We would also like to express our appreciation towards Emily Yang, our CA, for all of her time and hard work teaching studio, answering our questions, and grading our assignments.