SLEEPMATE

LOW-FI PROTOTYPE

Derek C, Aaron H, Tristan W, Michelle X | CS 147 Winter 2022

INTRODUCTION

Value Proposition

Sleeping easy, made easy.

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!

SKETCHES

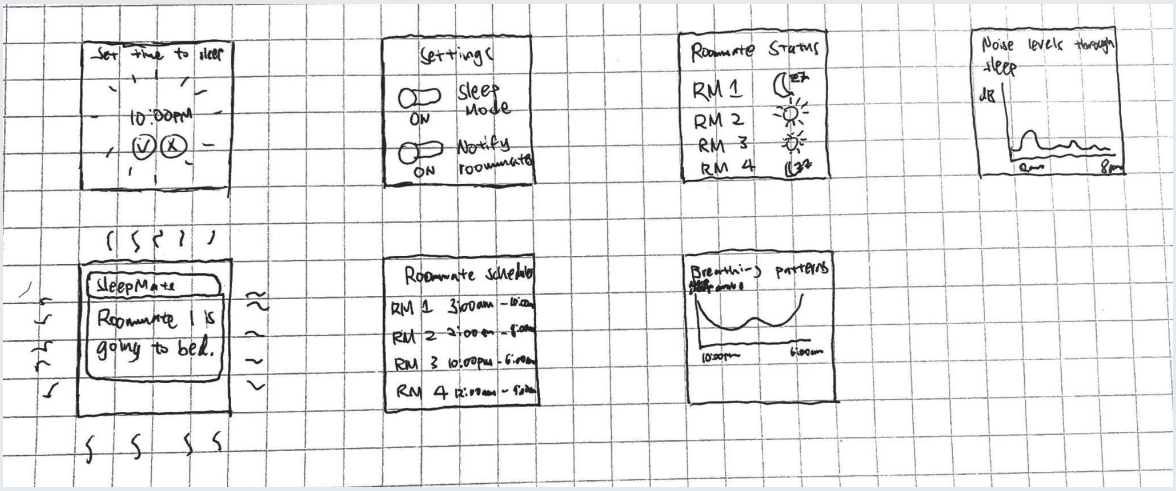

Figure 1. Wearable device with small icons, interactive buttons, and graphs.

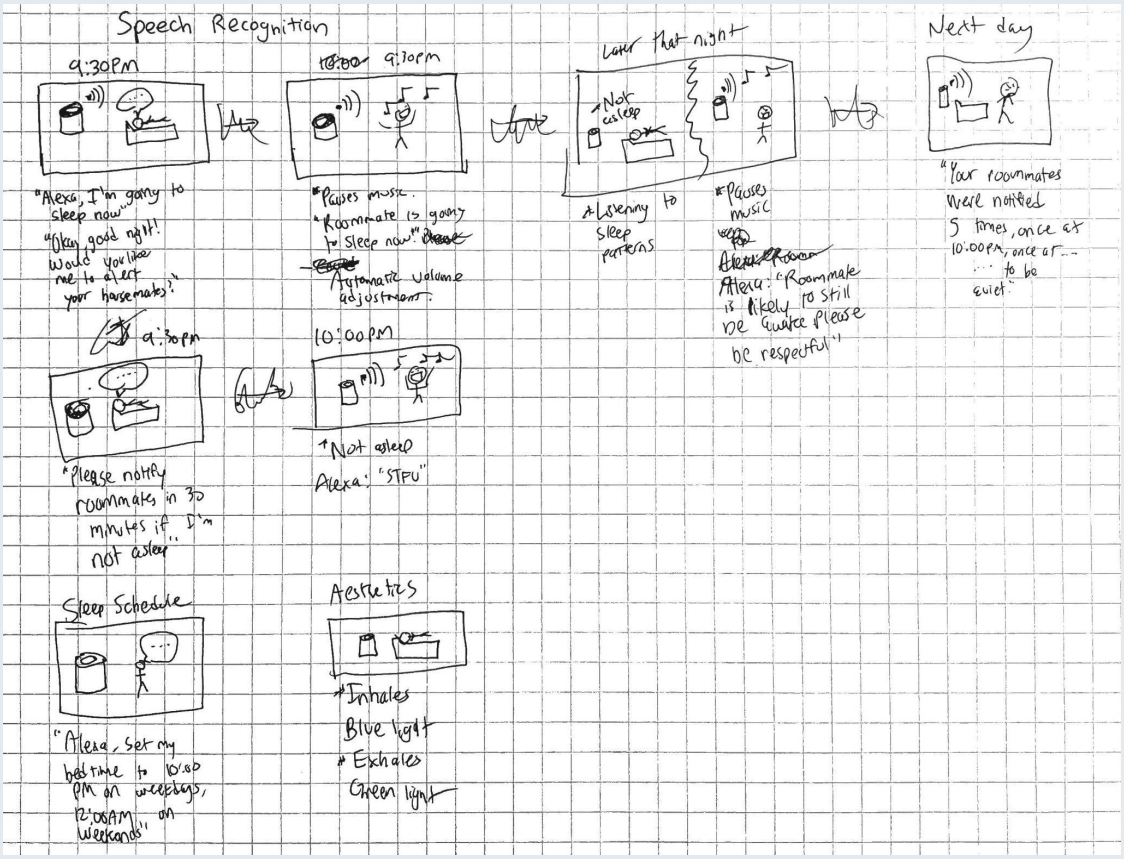

Figure 2. Smart home device for monitoring voice levels.

Figure 3. Text-based app to notify roommates of bedtimes.

SLEEPMATE

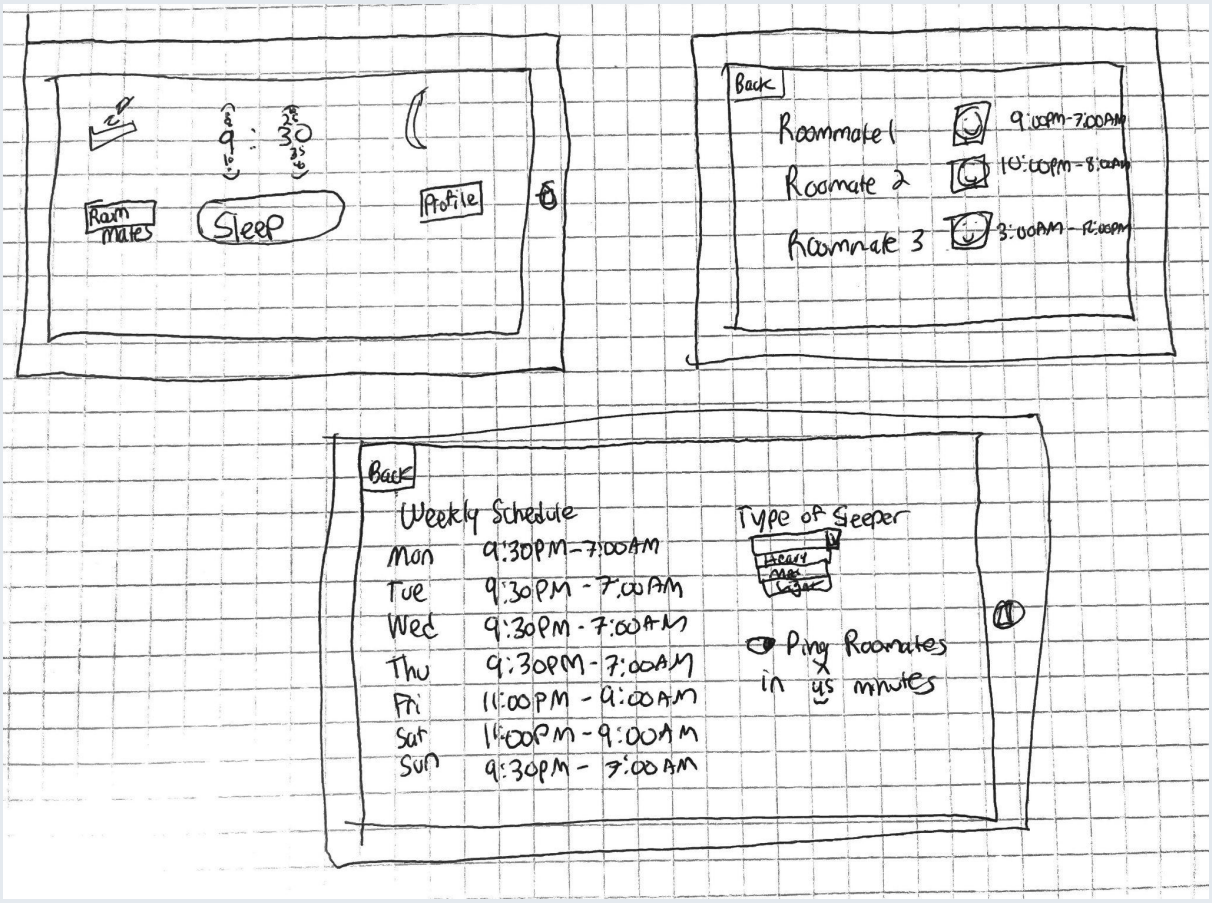

Figure 4. Tablet app that focuses on sleep schedules.

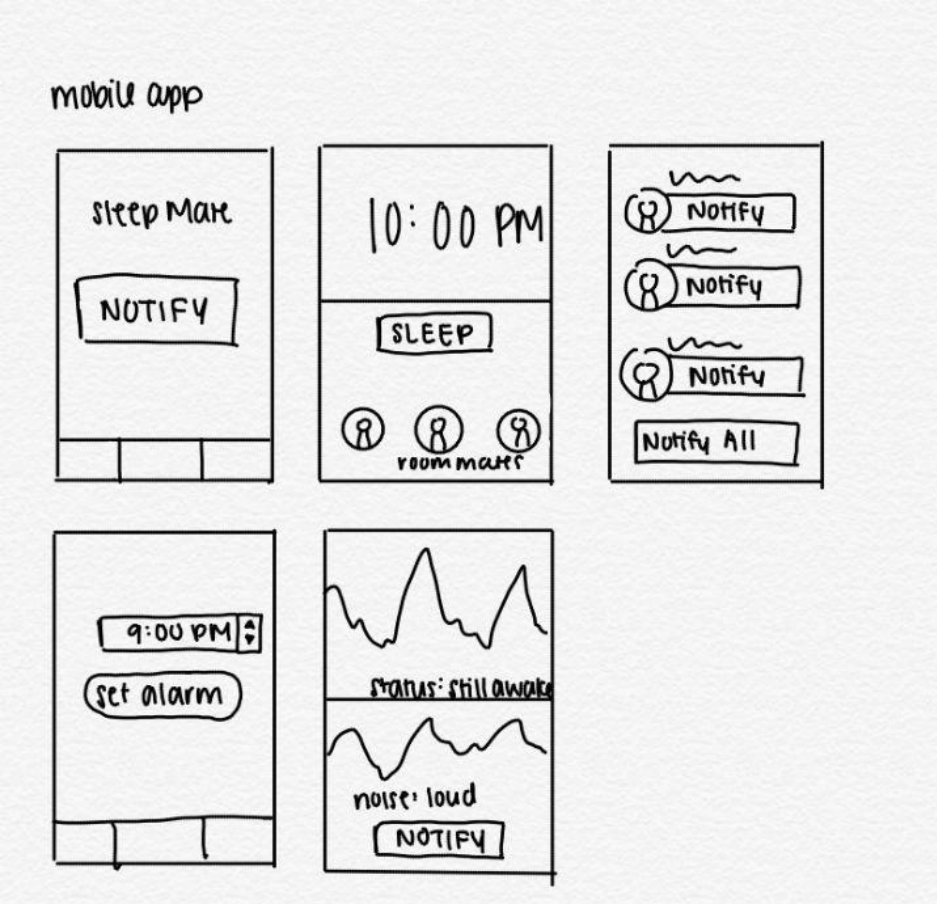

Figure 5. Mobile app that focuses on notifying roommates through tracked breathing during sleep.

STORYBOARDS

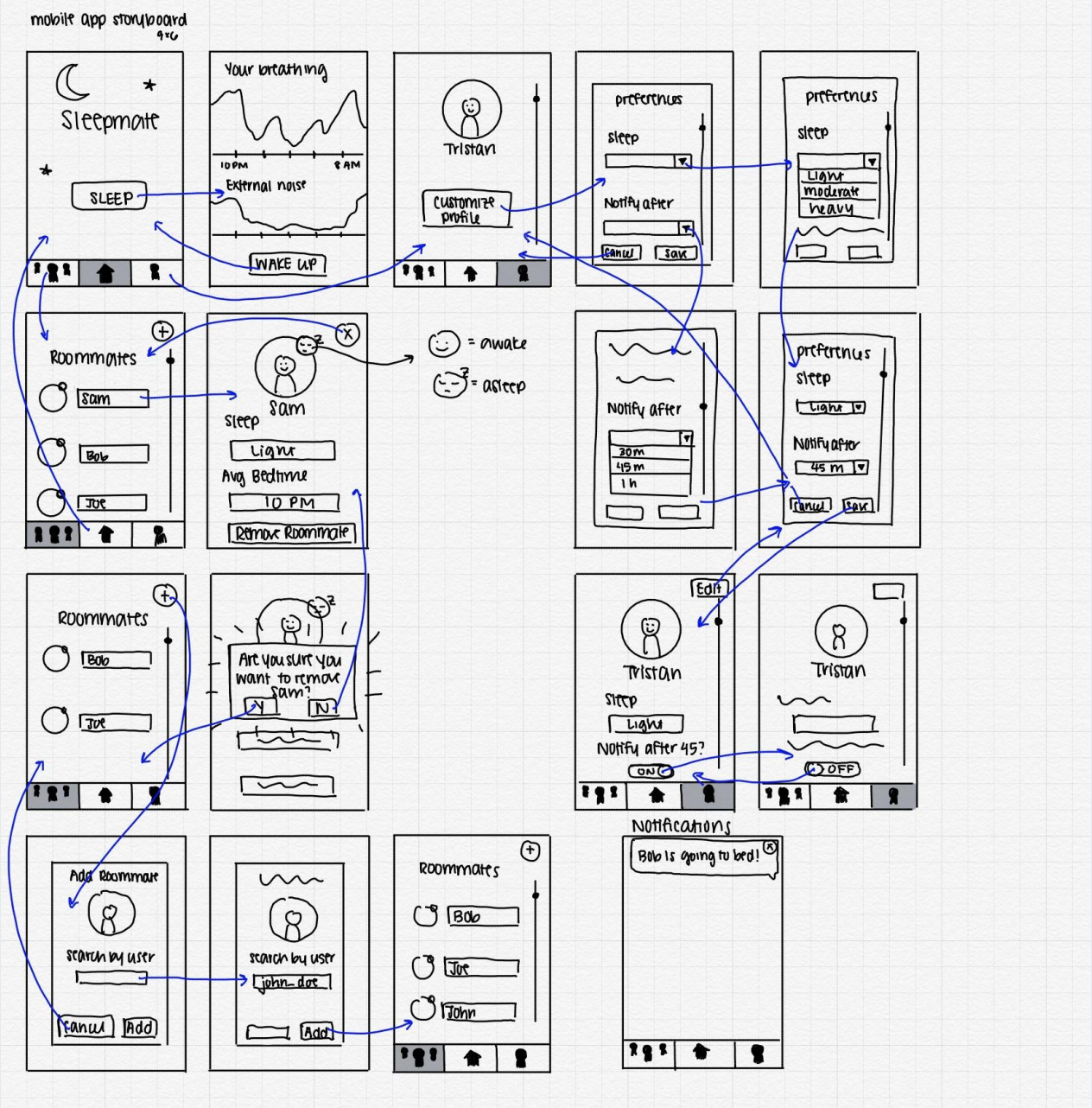

Figure 6. Sleep-tracker app storyboard to track sleep consciousness and alert roommates.

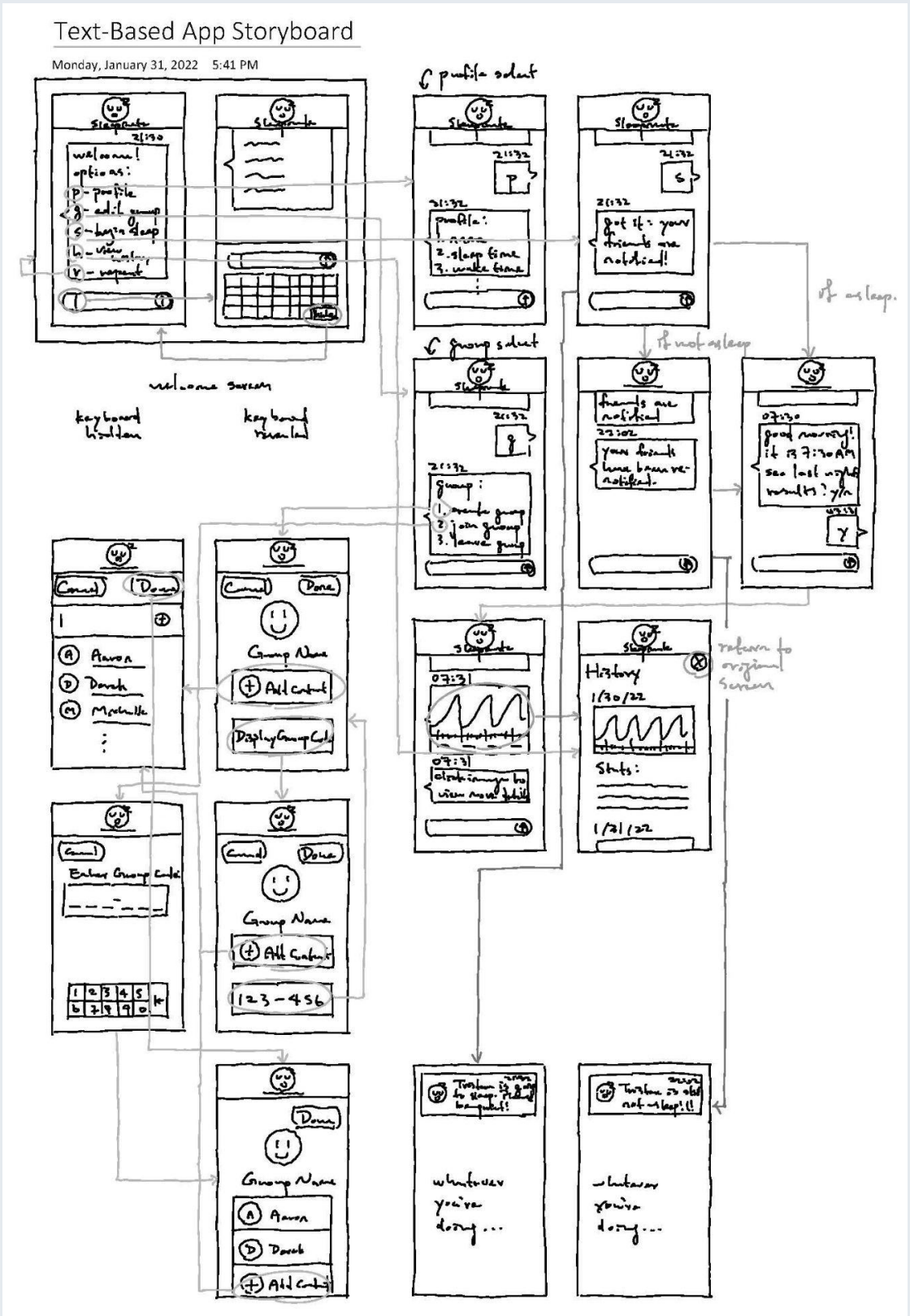

Figure 7. Text-based app storyboard to remind roommates to be quiet.

Sleep-tracker app

Pros	Cons
• **Visually-appealing:** including profiles of roommates and graphs of breathing patterns makes the app more visually-appealing • **Functional:** the ability to modify the household and update sleeping preferences makes this a highly-functional app • **Easy to use:** a big "sleep" button on the home screen makes notifying roommates easier	• **Inaccurate:** some sounds the app detects might not be coming from roommates' voices and therefore trigger false alarms • **Remembering to "Wake Up":** if the user also uses an alarm, their first instinct when they wake up would be to turn off the alarm and they might forget to click "wake up" in SleepMate

Text-based app

Pros	Cons
• **Memory-efficient:** minimalistic interface cuts down on memory use • **Customizable:** a mostly text-based interface is relatively easy to customize based on personal preferences • **Intuitive:** users can draw on their experiences with messaging apps and contact lists when operating the app, which makes it easy to learn	• **Unaesthetic:** most displays are dominated by text bubbles (akin to messaging apps) • **Incoherent:** UI style jumps between chat-based displays, phonebook-style displays, and overlaid graphic pop-ups • **Difficult to operate:** many functions require texting precise commands or an NLP model that can parse what the user is asking for, which may be confusing to navigate and prone to error

We selected the sleep-tracker mobile app as the version of SleepMate to move forward with for prototyping. This is because it adheres to our mission statement better – automatically detecting noise levels during sleep and alerting roommates should ease the anxiety from having to confront them. In contrast, a text-based app would still require a user to prompt the app to notify the roommate, which would simply be confronting roommates via a proxy.

TASK FLOWS

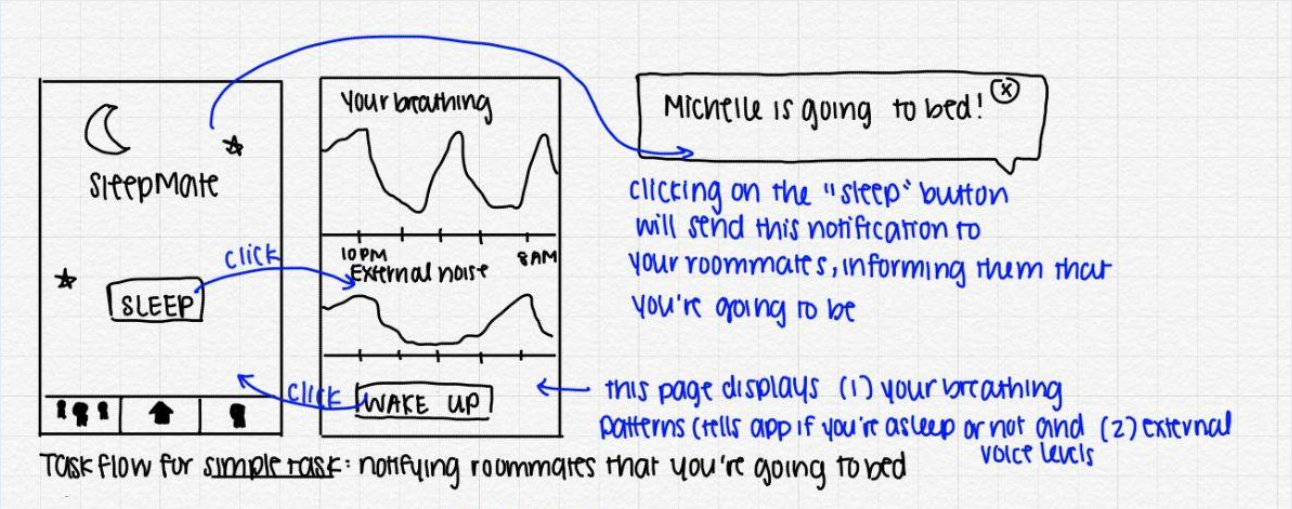

Figure 8. Simple task: Notify your roommates you're going to bed through the app.

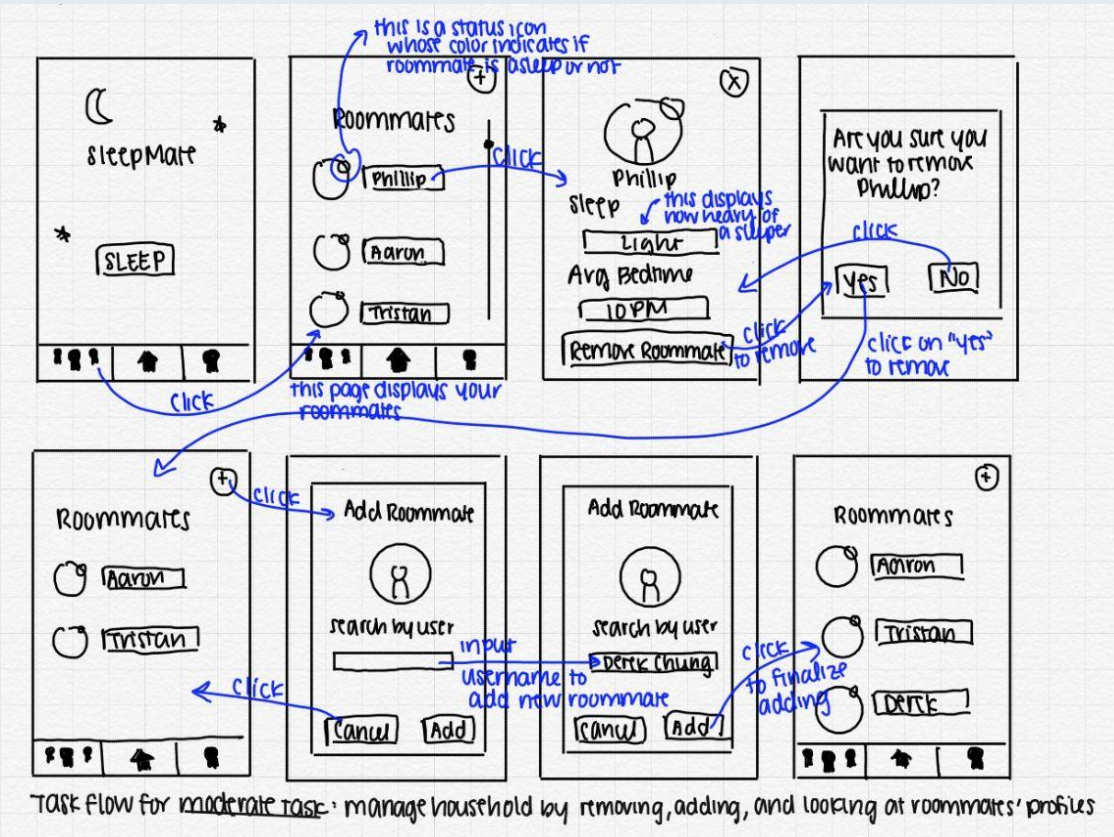

Figure 9. Moderate task: Modify your household by adding or removing roommates.

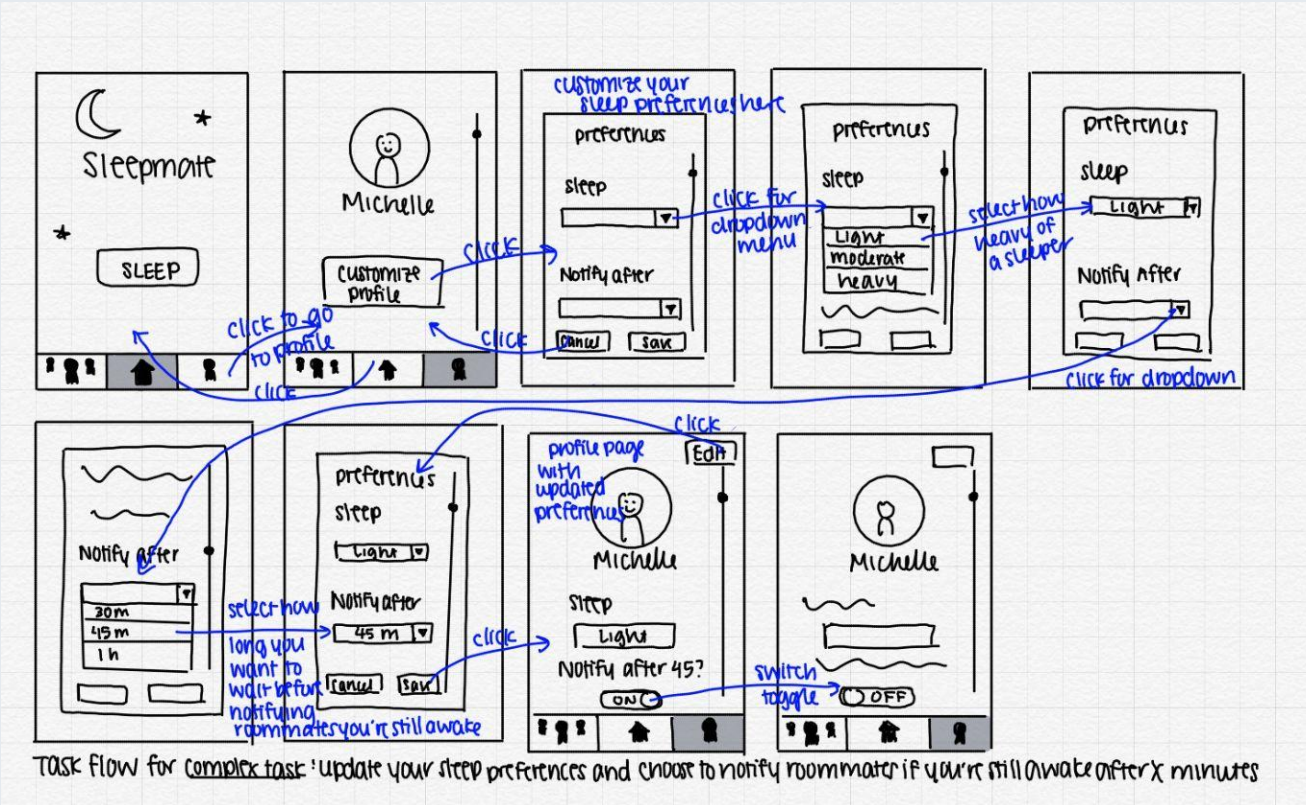

Figure 10. Complex task: Update your sleeping preferences and notify your roommates if you're still awake after X hours.

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.

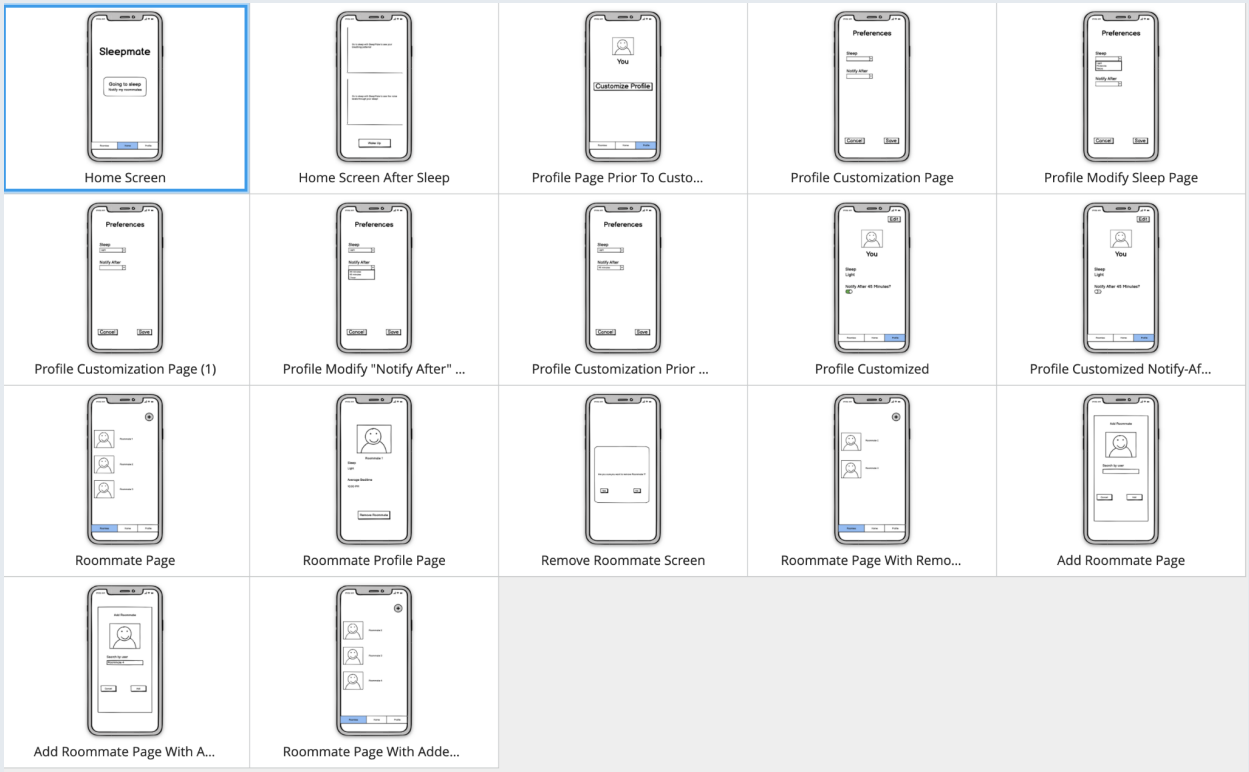

Figure 11. All the screens of our Balsamiq prototype.

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

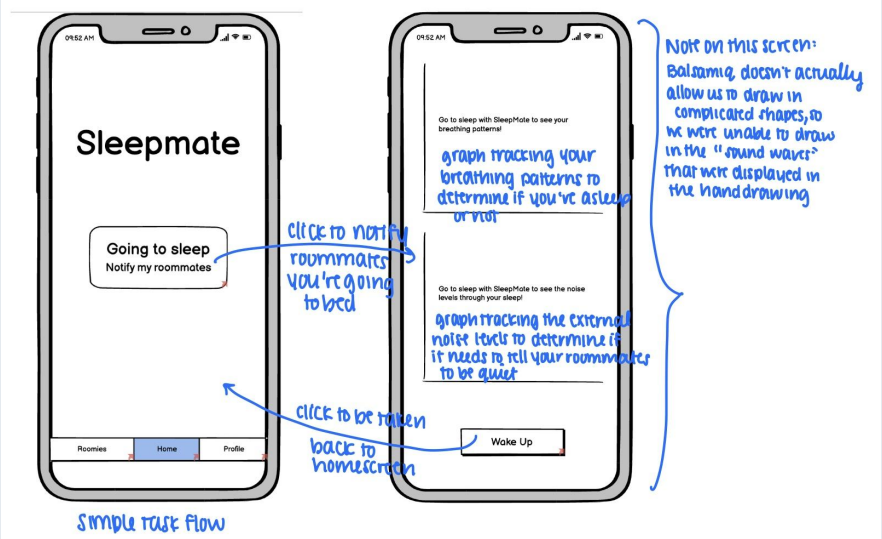

Figure 12. Simple task flow using the Balsamiq prototype.

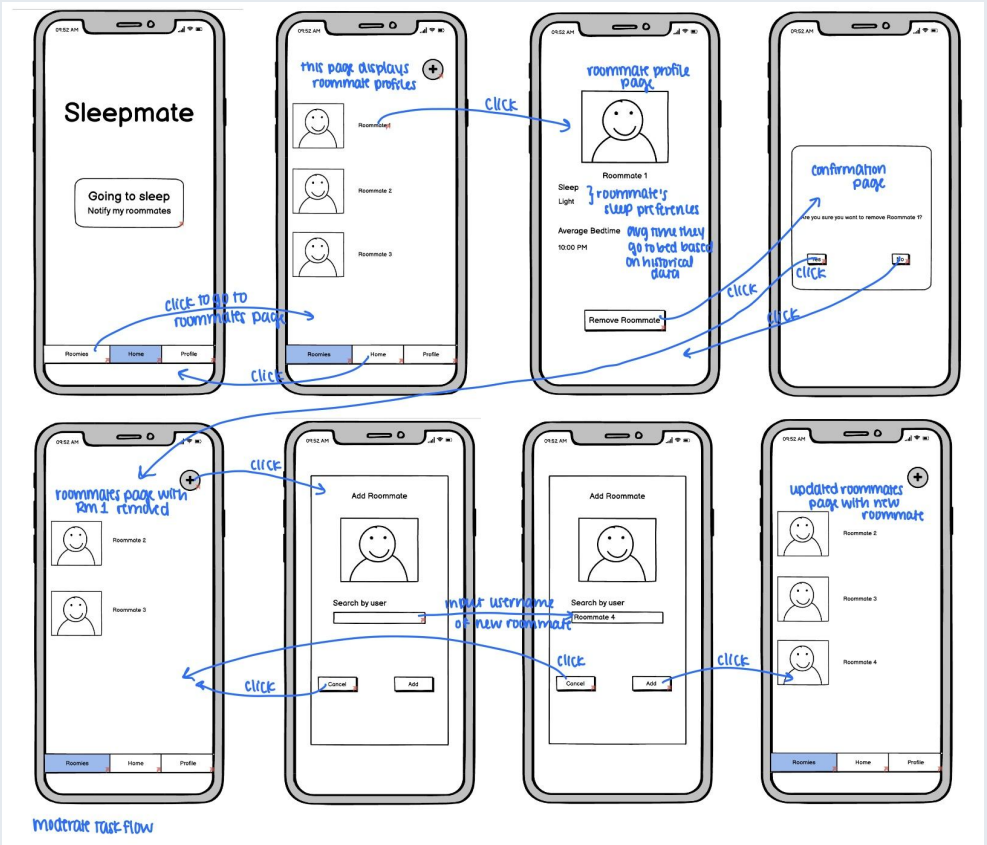

Figure 13. Moderate task flow using the Balsamiq prototype.

SLEEPMATE

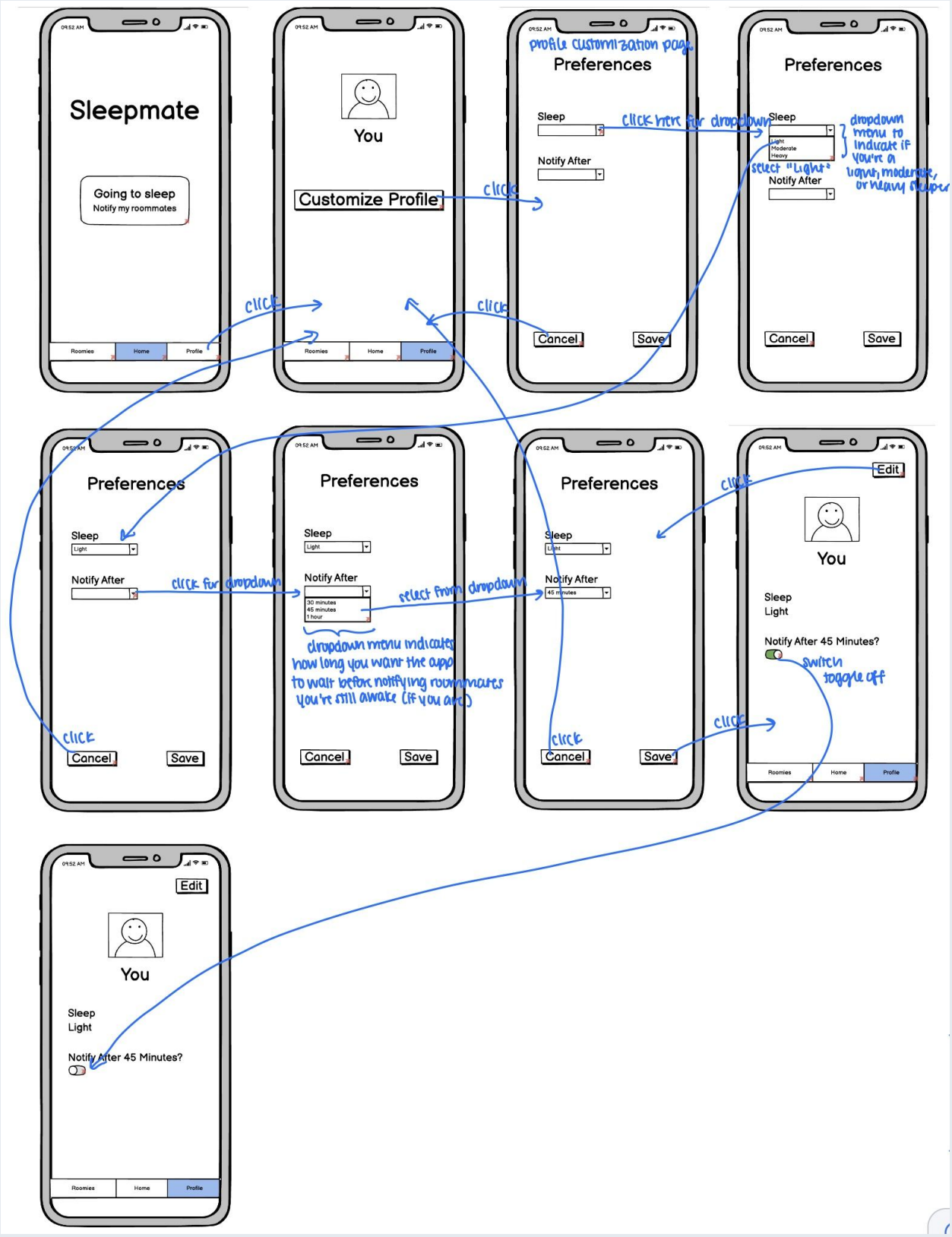

Figure 14. Complex task flow using the Balsamiq prototype.

TESTING METHODOLOGY

Participants

We tested the design with:

- **Lauren**, pre-med student, living in downtown Los Angeles (4 roommates)
- **Elvis**, engineer, living internationally in Taiwan (2 roommates)
- **Nathan**, graduate student, living in Urbana-Champaign (3 roommates)

We focused on young adults because they are most likely to live with roommates and would use an app like SleepMate. To ensure diversity, we chose people who lived in diverse scenarios (urban, rural, international) and people who also had different backgrounds. Due to the remote environment, participants did not receive explicit compensation.

Environment

We conducted our prototype-testing over Zoom. We screenshared our prototype on Balsamiq and had a team member act as the "computer" (so the participant wouldn't have to create their own Balsamiq account).

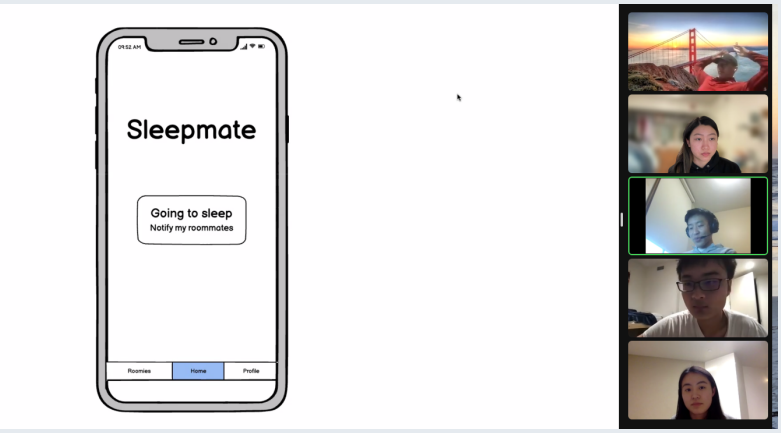

Figure 15. Participant testing via Zoom.

Tasks

1. **Simple:** Notify your roommates that you're going to bed through the app.
2. **Moderate:** Modify your household. First remove a roommate from the household, and then add a new roommate to the household.
3. **Complex:** Customize your profile to update your sleep preferences.

Procedure

We began by providing the participants with the context behind SleepMate as well as the hypothetical scenario they are in, which is that they are living with a few roommates and are trying to communicate their sleep schedules. We asked participants to complete 3 tasks and recorded their behavior. Because we had a "human computer" acting on their behalf, we also asked them to be very specific in what they were intending to do (e.g. say "press the 'home' button in the bottom middle as opposed to just 'home'"). After they finished each task, we asked them to reflect on which functions they thought were clear and intuitive (and why), which functions they thought were unclear and misleading (and why), and how they can be improved. We asked them for final thoughts and feedback after completing all three tasks.

Usability Goals

- Efficient: user performs tasks quickly
- Robust: user performs tasks with minimal error rates

Test Measures

Success:

- User was able to complete a task swiftly and without help
- User finds the interface intuitive, straightforward, and aesthetically designed

Error:

- User got stuck and / or needed to ask for help to complete a task
- User got lost or took an incorrect path when trying to complete a task
- User found the interface unintuitive, misleading, or unaesthetic

Team Member Roles

- Facilitator: Derek

- Computer: Aaron
- Notetaker: Michelle & Tristan

RESULTS AND DISCUSSION

Positive

- The idea behind notifying roommates to be quiet during bedtime was positively received
- All participants succeeded in adding and removing roommates without critical incidents
- All participants succeeded in customizing their sleep profiles without any error

Negative

- Two participants failed to click on the “go to sleep” button to notify roommates on their first try
    - Both elected to go to the “Roomies” tab instead
    - One participant went to the “Roomies” tab expecting to be able to message roommates on the tab, akin to how most messaging services e.g. WhatsApp work
    - One participant missed the “go to sleep button” due to lack of clarity
- All three participants were confused on how to go back to the home screen from the sleep monitoring screen
- All three participants glossed over the “sleep tracking” portion of the app
    - Primarily due to lack of graphical limitations on Balsamiq

Suggested UI changes

- Add menu bar to sleep monitoring screen
- Add color and/or shading to the “go to sleep” button to add clarity
- Add back buttons where applicable for easier navigation

Other feedback

- Include a walk-through tutorial for first-time users
- Make roommate-adding a two-way agreement (e.g. Facebook friend request)

Discussion

We discovered that while some parts of the design caused confusion, the overall concept of the app was communicated well and most tasks were completed without major complications.

One of the largest areas for improvement we saw was in the home screen of the app. Two participants were not able to complete what we considered as the "simple" task in alerting their roommates that they're going to bed, which required clicking the central button on the home screen. This was in part due to the limitation in Balsamiq, which allows predominantly black and white designs. Added clarity through colors in future prototypes should alleviate this issue. However, a participant mentioned that they expected to reach out to their roommates through the "Roomies" tab as they would in messaging apps like WhatsApp.

Another change we expect to make is the interface of the "sleep monitoring" screen. All participants were unable to quickly identify how to return to the home screen from this screen, which required pressing the "wake up" button. Additionally, none of the participants commented anything on the sleep/noise tracking portion of the app even though we consider it to be a core component of the app. We will have to ideate on how to make this part of the interface more eye-catching for users.

We received positive feedback on the other parts of the app where users described the other two tasks (adding roommates and customizing "sleep profile") to be "straightforward." All users also promptly understood the purpose of the app without any confusion and commented on potential usage.

We also received potential functionality ideas including roommate adding being on a invite-based system (ala Facebook friend requests), adding an onboarding process for new users, and potentially allowing a user to be in multiple "households."

Overall, this round of prototyping was rather successful – we have a clear understanding of the aspects of our design that need improvement as well as confirmation of what works.

APPENDIX

Word count: 1492, excluding title page

Testing script

Context:

Today, you will be testing our app, SleepMate, which is designed to help monitor noise levels among roommates during bedtime to remind roommates to be quiet after someone has gone to bed.

Imagine the scenario that you are living together with a few different roommates. We are going to ask you to do a few tasks with our prototype with this context in mind. As we go through with the prototype testing, please try to THINK OUT LOUD–anything you are confused about, anything you want to try out, etc. Any questions before we get started?

Simple task:

Your first task is: Notify your roommates that you're going to bed through the app.

Moderate task:

Modify your household. Can you first remove Roommate #1 from the household? [wait] Now can you add a new roommate, Roommate #4 to the household?

Complex task:

Your final task is: Customize your profile to update your sleep preferences. Let's pretend that you are a light sleeper, and if your roommates are still being loud after a certain amount of time, let's say you want the app to really bug them about it after 45 minutes.

Critical incident log

Incidents on the left and severity rating (0–not a problem; 4–most severe problem) on the right.

Participant 1

"Pretty simple. It said 'notify your roommates'." Found the sleep button intuitive.	0
Not sure how to return to the home screen after clicking the sleep button. Very long pause. "I was expecting a 'home screen' button".	**3**
Confused by what breathing graphs represented (should be more intuitive if actually implemented).	**3**
Successfully removed a roommate	0
"I just looked at the words that were on the screen and it seems like 'Roomies' was the closest to what I was looking for"	1
Successfully added a roommate	0
"The plus sign was really easy to recognize because I see it in a lot of apps"	0
Initially thought "sleep" dropdown meant "How long do you plan to sleep?" instead of "How heavy a sleeper are you?". Made sense after seeing the dropdown options.	1
"I think toggle is clear enough, maybe you can also clarify who is being notified after X minutes"	1

Participant 2

Clicked on the "Roomies" tab to notify roommates he's going to sleep instead of using the "Sleep" button. Got it on the 2nd try.	**4**
Not sure how to return to the home screen after clicking the sleep button. Required significant prompting before succeeding.	**3**
Successfully removed a roommate	0
Tried clicking on the roommates profile pic to remove him before	1

clicking on his name. “Maybe both should allow me to remove him?”	
Not sure what roommates are being removed from (group or contacts list).	1
Successfully added a roommate	0
“What if this roommate doesn’t want to be added? Would he be able to confirm my request on his side?”	1
Found common app elements like the Add and Toggle buttons very intuitive.	0
Thought that customizing sleep preferences and notification times was very straightforward.	0
“I still think you should have the bottom menu on the breathing patterns page.”	1

Participant 3

Clicked on the “Roomies” tab to notify roommates he’s going to sleep instead of using the “Sleep” button (“Oh, is that a button?”). Got it on the 2nd try.	**4**
Was able to go back to the home page after the breathing patterns page but took a little prompting.	2
Successfully removed a roommate	0
Successfully added a roommate	0
Found the Toggle button and dropdown menus intuitive.	0
Wished the home page was a bit more interactable.	1

Consent Form

This student team is interviewing and observing as part of the coursework for Computer Science course CS 147 at Stanford University. Participants provide data that is used to understand the possible opportunities of the design. Data may be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Derek Chung, Aaron Han, Tristan Wang, Michelle Xu) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be maintained by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the research and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the team's research. I also give permission for images or audio/video recordings of me being interviewed to be used in presentations or publications, as long as I am not personally identifiable in the images/video. I understand that I may withdraw my permission at any time.

Name _____

Participant Number _____

Date _____

Signature_____

Witness name _____

Witness signature_____