Group 5

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Requirement specs + Sketch diary

Requirement Elicitation: User Interviews

We conducted interviews with the primary users (Older adults) and secondary users (Caretakers). The aim of the interview was to find out how they manage their medications - dosage, schedule and timing. We were curious to know the problems they faced while doing this. We were also curious to know if the user had used or thought of using technology - like pill management apps or automatic pill boxes to solve some of the problems they faced. We wanted to find out what the users wanted as a service and also how they would respond to an app like Piller.

Some of the questions which we asked the users were:

1. How do you manage your medications?
2. Does your caretaker/anyone remind you to take your medication?
3. If yes, how do you communicate with each other? What is your ease of use with phone calls/text messaging?
4. Have you ever forgotten to take your medication on time?
5. Do you think that's a major problem for you?
6. How comfortable are you using calendar reminders or voice assistants to schedule your medication?
7. Do you or did you in the past use any medication management app?
8. What did you think of it? How was your experience using it? What's your take on technology based solutions to medication management?

Apart from the questions above we asked them some additional questions to get to know their experience with Pill Tracking applications and what they think was the best way to manage pills.

Results and Analysis of the Requirements Elicitation:

We interviewed 3 older adults and 2 caretakers of older adults. The older adults and the caretakers we interviewed all agreed that medication management has its own set of problems. Almost all of the users relied on memory to remember to take their medication so they often forgot to take medication (Almost all of them had missed 2-5 pills in the past 5 months), ran out of medication due to mismanagement of dosage, missed alarm reminders, etc.

From the interviews we understood that a technological solution must be very much in tune with older adults' needs- it needs to be intuitive, non confusing, and serve the purpose without the need to be an expert mobile user. We must implement adding and viewing medicine names, dosage, schedule, and purpose. To supplement typing, there must be a scan input option too.

The older adults didn't really use technology based solutions for tracking medication due to added costs, general non adoption of technology based solutions, technological constraints and a dependence on an existing system that more or less works. The caretakers expressed an interest in a technological solution that would serve them better than a reminder app.

Our solution must be highly specific to medication management and thus superior to a general purpose reminder app. We should add checks or reminders that help a user track their remaining dosage so they can buy new medication as needed. It must take into consideration special needs of older adults- like icon size, memory retention etc.

There must also be an effective way of communication between the older adults and their caretakers. If an older adult misses their medication, there must be an effective way of letting the caretaker know about the missed dosage. The same can be said for quick updates- like if the older adult wants the caretaker to know about a depleting medicine stock, there must be an efficient way to do so. A phone call is not always viable (the caretaker might be in a work meeting) and text messaging is often too confusing for older adults. We can provide such a service where the older adults can send one of a selection of messages that they might need - like 'need meds refill' or 'left meds at home' and so on. These can also be customizable and frequently needed questions can be bumped up the list.

Requirement specification:

Terminology:
Primary users = Older adults
Secondary user = Caretaker
Users = Primary users + Secondary users

1) Functional Requirements:
    - The users should be able to input their medication dosage, schedule and purpose.
    - The users should also be able to use the camera to scan the name of the medicine and input it without having to type it.
    - The users should be able to view/update their medication dosage, schedule and purpose.
    - The users should be able to check their upcoming and previous medications on the dashboard
    - The users should be able to check the number of doses remaining for a particular medication and also get reminders for the same in advance
    - The users should be able to receive audio notifications for their set medication schedules
    - The users should be able to turn off/on audio notifications as per their needs
    - The primary users should be able to add a secondary user's contact details.
    - The primary users should be able to communicate with their secondary user using prefilled text messages
    - The secondary user should be notified when the primary user misses or forgets to take the medication

Changes made to the scope of the project:

- Based on the results of the interview we have made the following changes to the requirements from our project scope:
    - Removed Tracking Location feature where caretakers can see location of the older adults.
    - Replaced speed dial option to call the caretaker with an instant messaging system with pre-filled messages.

2) Non-functional Requirements:
    - Privacy:
      The primary user's data should remain private and only be visible to them and their caretakers
    - Availability:
      The application should be available all the time as the user will be dependent on it to receive notifications about when to take the medicines
    - Accessibility:
      The interface should be designed such that it is accessible both by the primary(older adults) and secondary users (caretakers) (Font sizes, colors etc)
    - Simplicity and Minimalism:
      The interface should be easy to use and understand, keeping in mind the age of primary users
    - Control and Flexibility:
      The user should be given complete access to switch on/off the notifications as per their need
    - The alarm should be clearly audible and should not be dismissed until the user takes an action- take/skip/snooze

3) Usability Requirements:
    - Learnability:
        - The labels and texts used in the applications should be clearly visible and and easy to understand, designed keeping the older adults in mind
        - Help and documentation should be provided if the user finds it difficult to navigate the application
        - The metaphors used should be appropriate and match with the real world
        - The information displayed on the notifications must be clearly visible and easy to understand
    - Efficiency:
        - The notifications should be sent at the expected time without any delay
        - The application should be able to at least allow the user to input and manage upto 50 medicines per day without any lag
    - Safety:
        - The application should be made such it reduces the chances of human errors (slip, lapses and mistake)
        - The application should help users recognize, diagnose, and recover from errors
        - The user should be provided with proper feedback about where they are in system all times

Individual Contributions :

S.No.	Name	Contributions
1.	Bhuvana Sridhara	Requirement Elicitation Results and analysis
2.	Irshad Badarpura	Requirement Elicitation Functional requirements
3.	Shreya Shrivastava	Requirement Elicitation Non-functional and Usability requirements

Sketch Diary:

Design challenges:

- Content Management
- Entering medication details
- Receive notifications for primary users
- Primary user communicating with Secondary User

Challenge 1: Content management

Goals:
Distinguish between the functionalities and the ease to navigate between them.

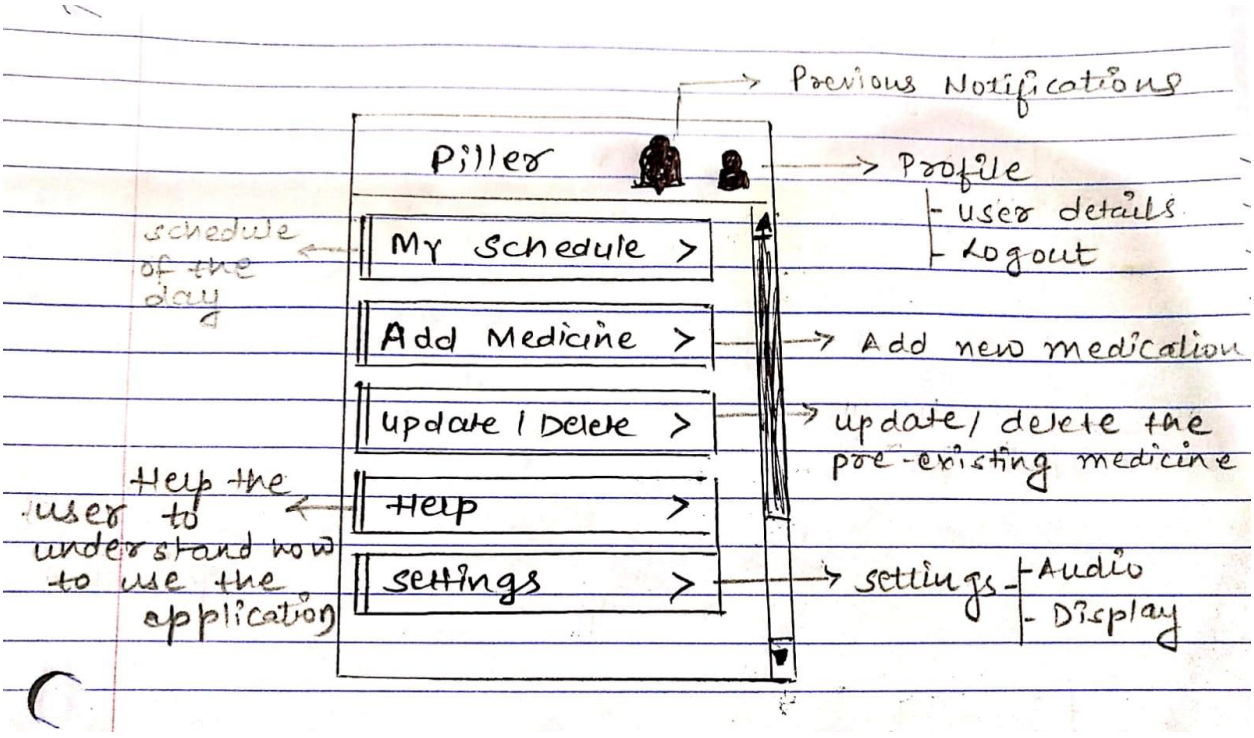


Figure 1: Alternative - 1

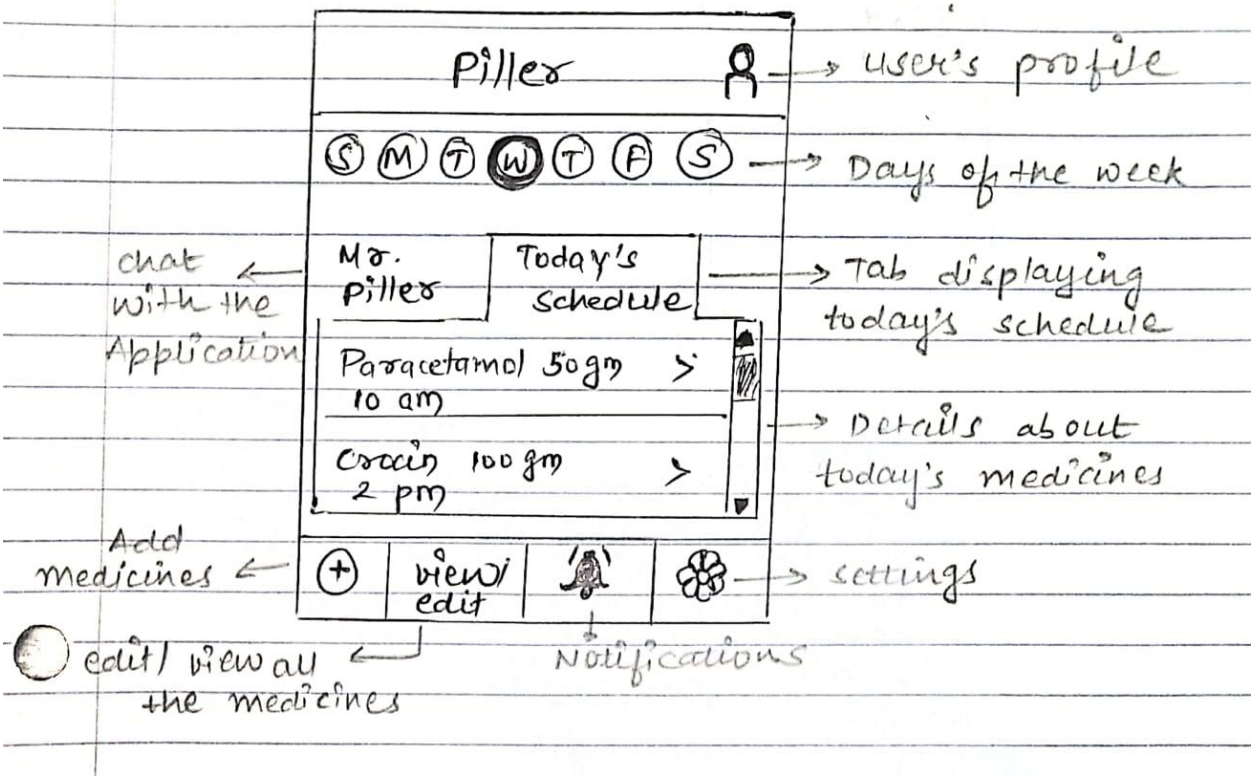


Figure 2: Alternative - 2

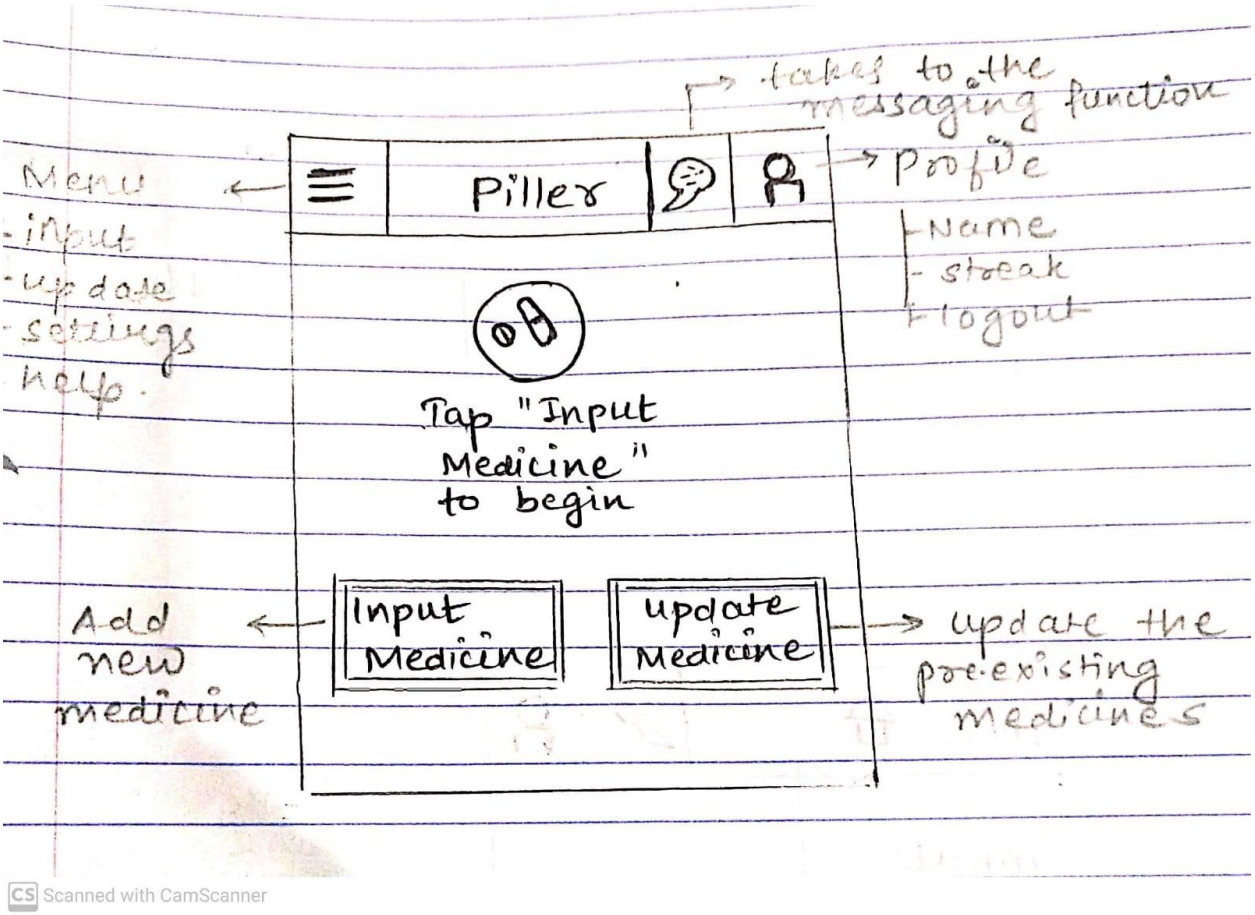


Figure 3: Alternative 3- (Part 1)

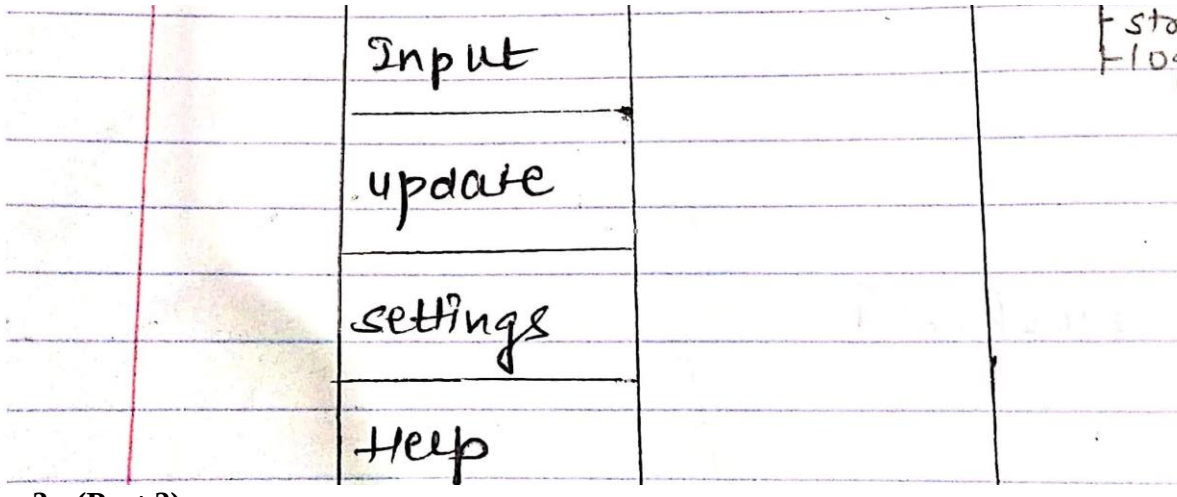


Figure 4: Alternative 3- (Part 2)

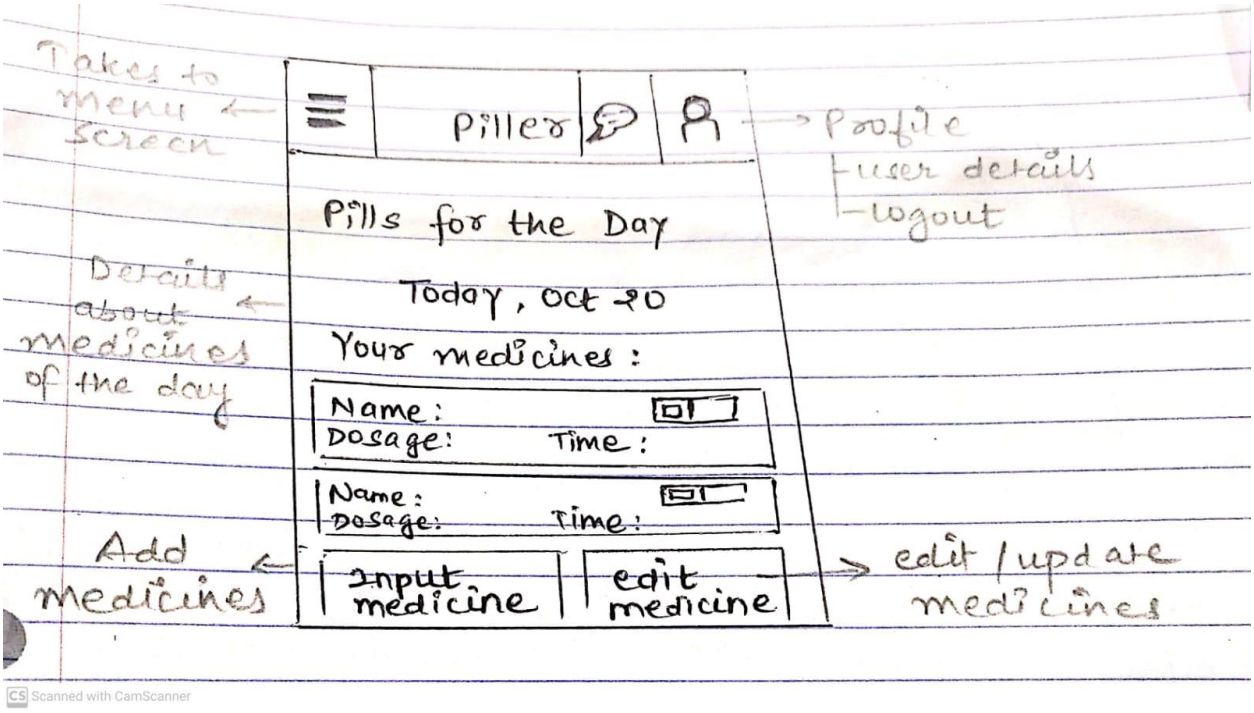


Figure 5: Alternative 3 - (Part 3)

Sketch commentary:

For content management, among the three alternatives, Alternative 2 would be the best because it is a tab menu which provides the user more freedom to switch tabs/content at any point in the application. But we are also borrowing the design of alternative 3 part 1 in the case of there are no medicines input by the user.

The reason we thought the other alternatives are better than alternative 1 is that it contains too many buttons and also the user has no way to see how their schedules look for the day- they cannot see what medicine they have to take. They also cannot see which medicines they have already added in the application.

Challenge 2: Entering medication details

Goals:

Add medicines without any mistakes

Provide feedback to the user where they are in the system

Simple and user friendly interface

Ability to correct mistakes easily

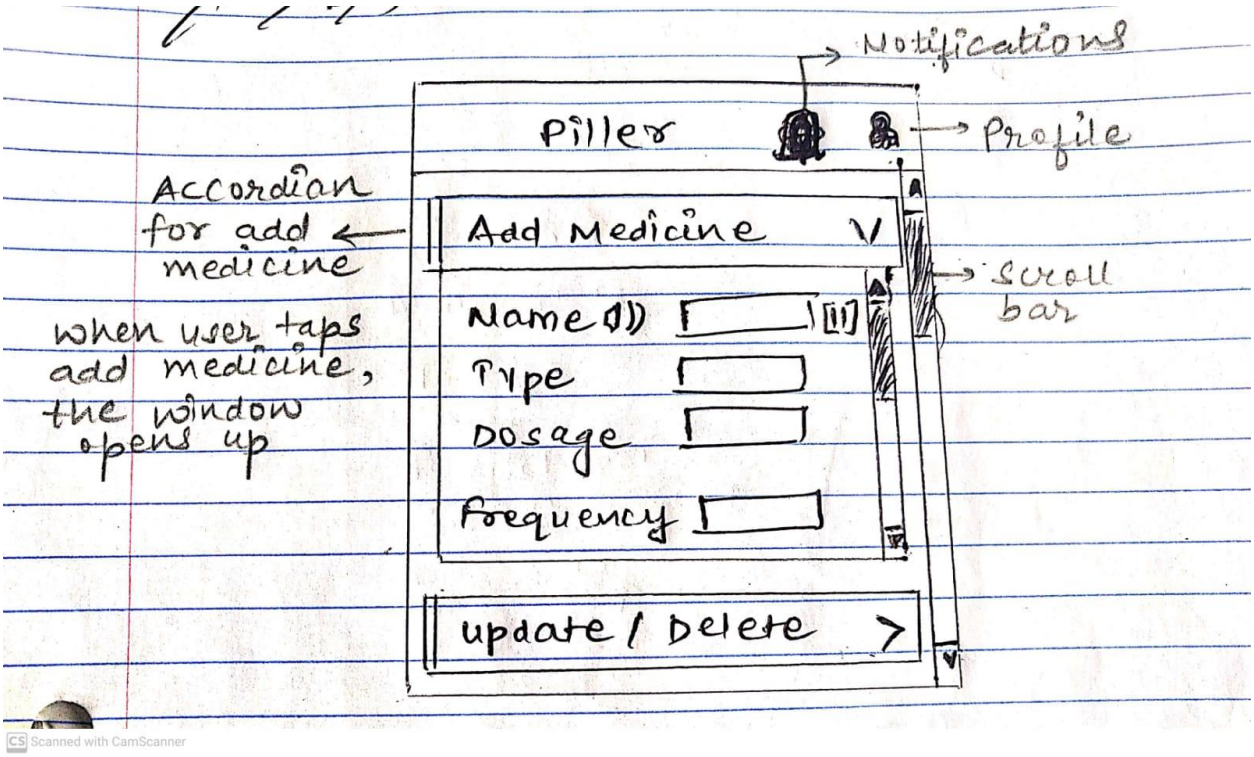


Figure 6: Alternative - 1 (part 1)

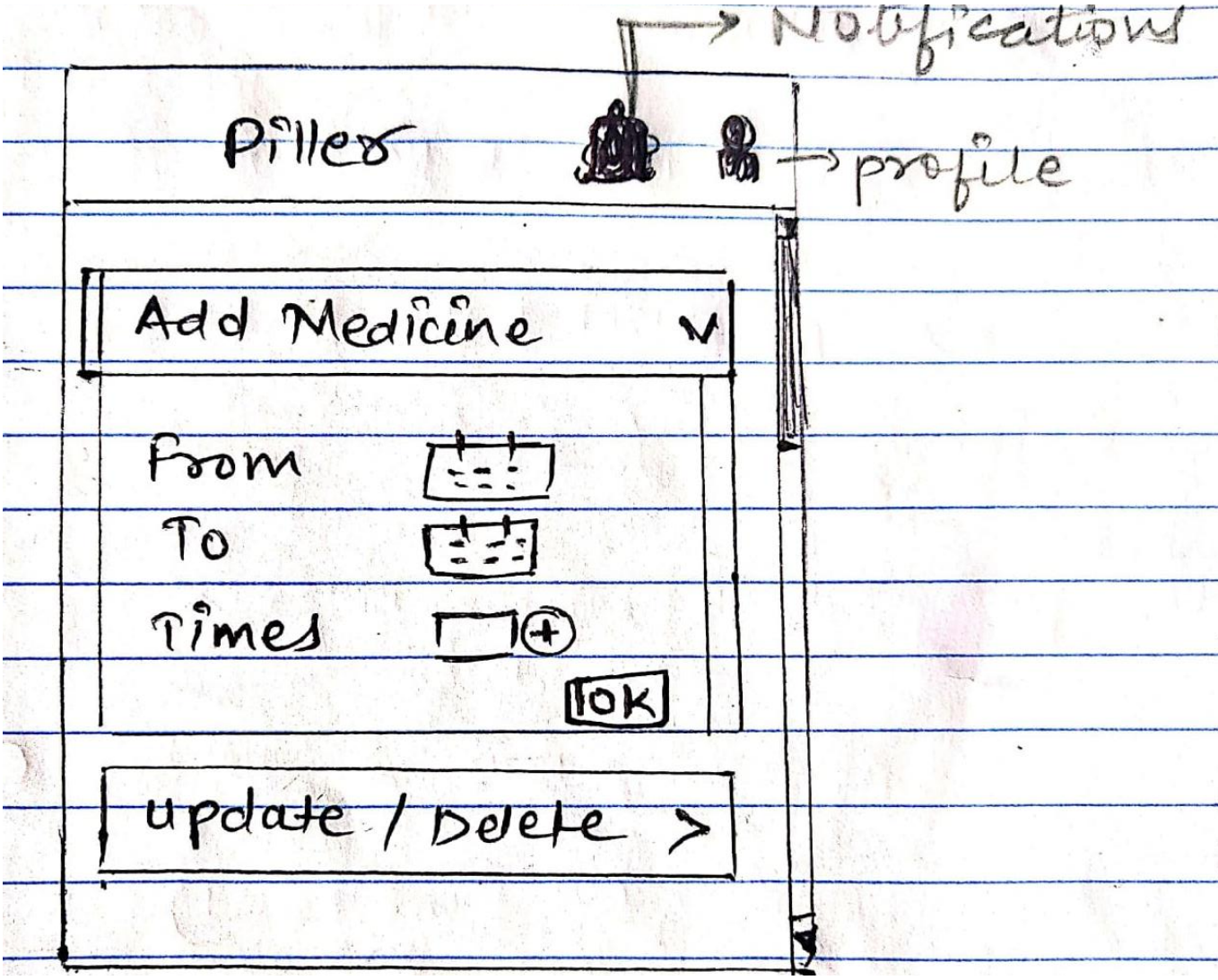


Figure 7: Alternative - 1 (part 2)

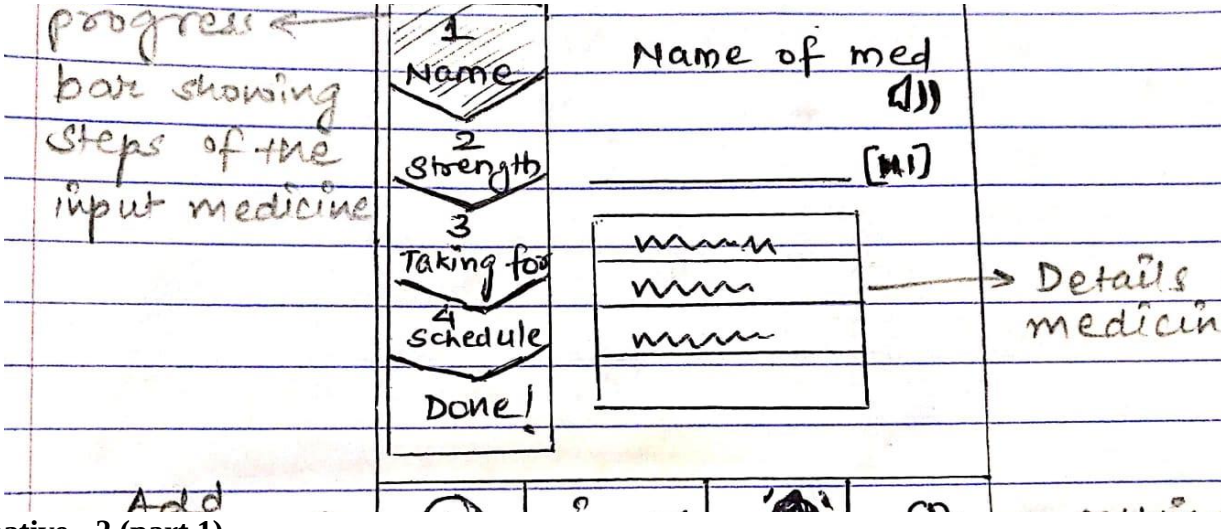


Figure 8: Alternative - 2 (part 1)

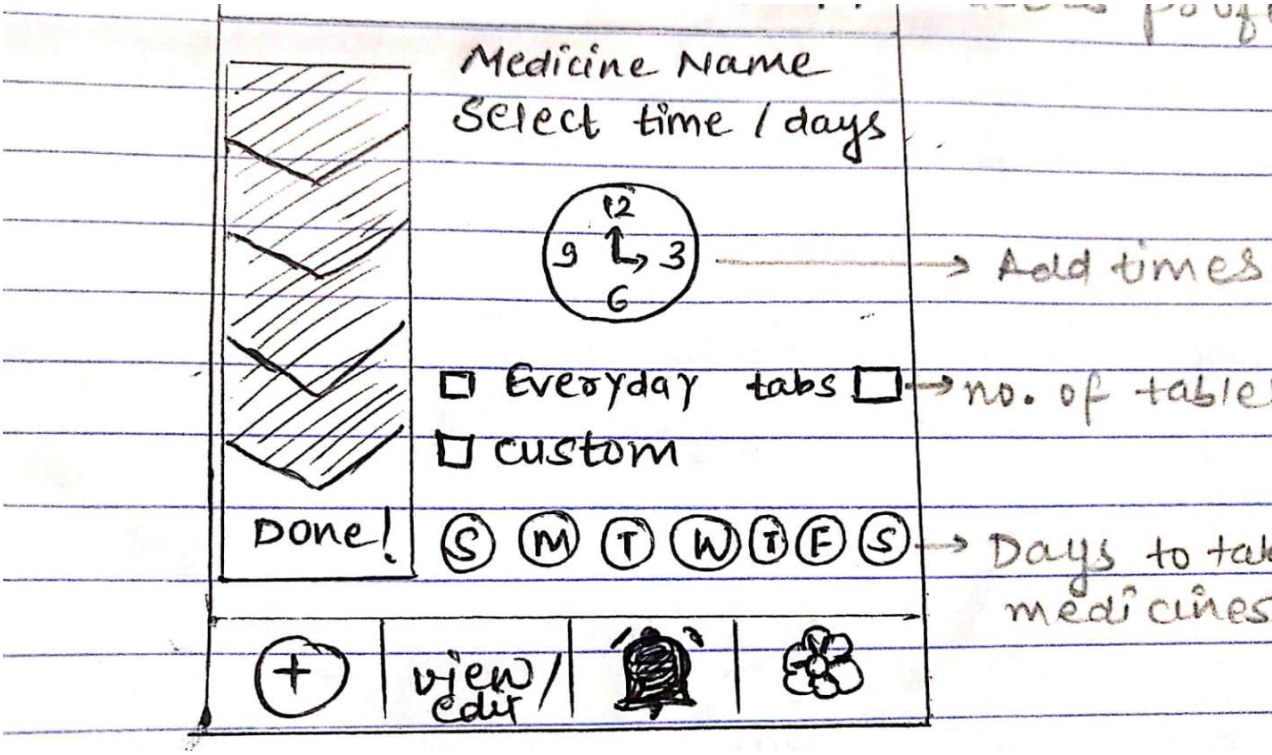


Figure 9: Alternative - 2 (part 2)

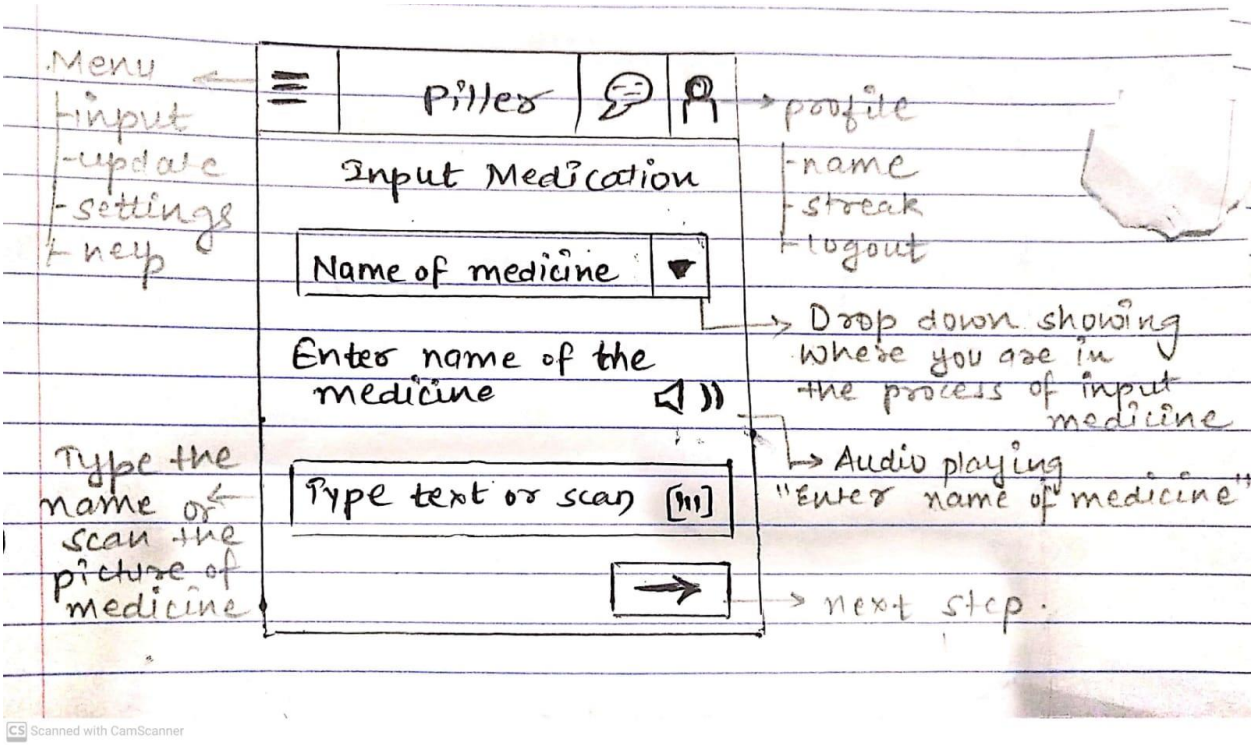


Figure 10: Alternative - 3 (part 1)

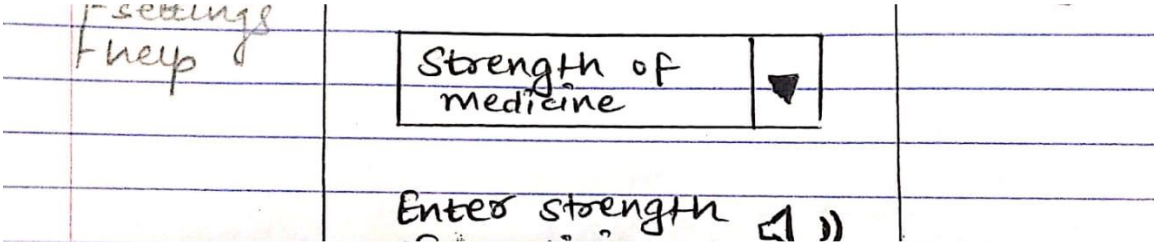


Figure 11: Alternative - 3 (part 2)

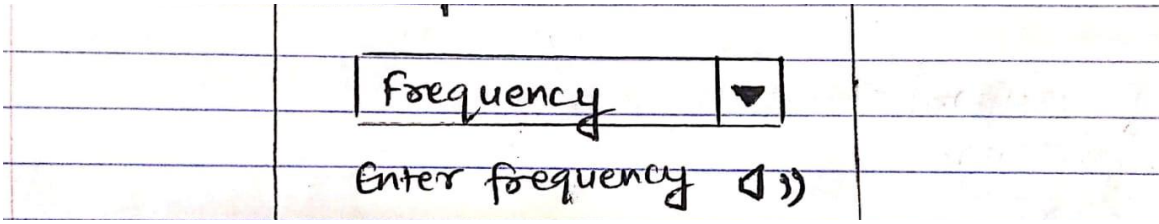


Figure 12: Alternative - 3 (part 3)

Sketch commentary:

For adding medication, alternative 2 would be the best choice because it has a progress bar and hence shows the user where they are in the system at all times. It is also easy to correct mistakes since they can go to any section they want using the bar. Previous details like the name of the medication is also mentioned so the user doesn't have to remember it from previous sections. Alternative 3 has a dropdown to do the same but is less intuitive. Alternative 1 has a scrolling section which restricts user space and may increase possible errors.

Challenge 3: Receive notifications for primary users

Goals:

Get notified at the specified time, with an option to skip or snooze
Audio notifications

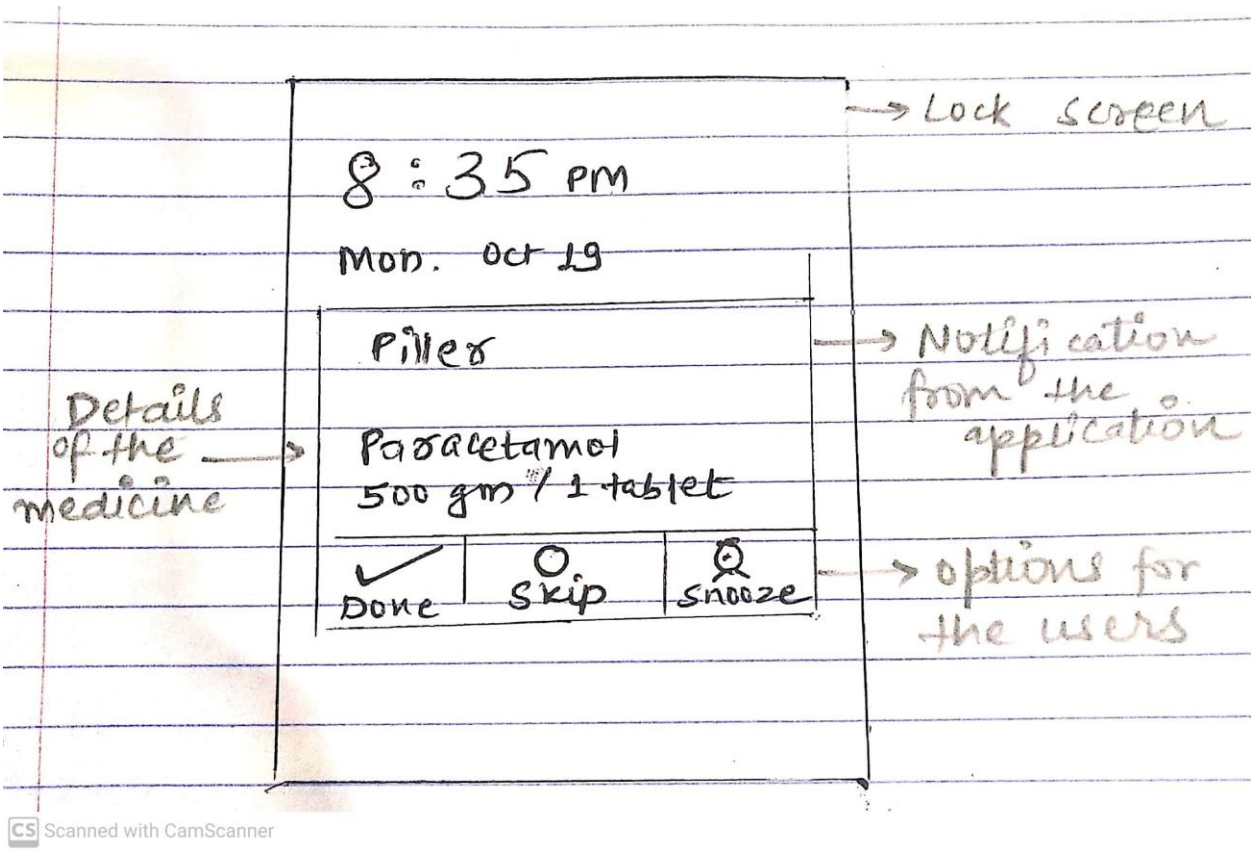


Figure 13: Alternative - 1

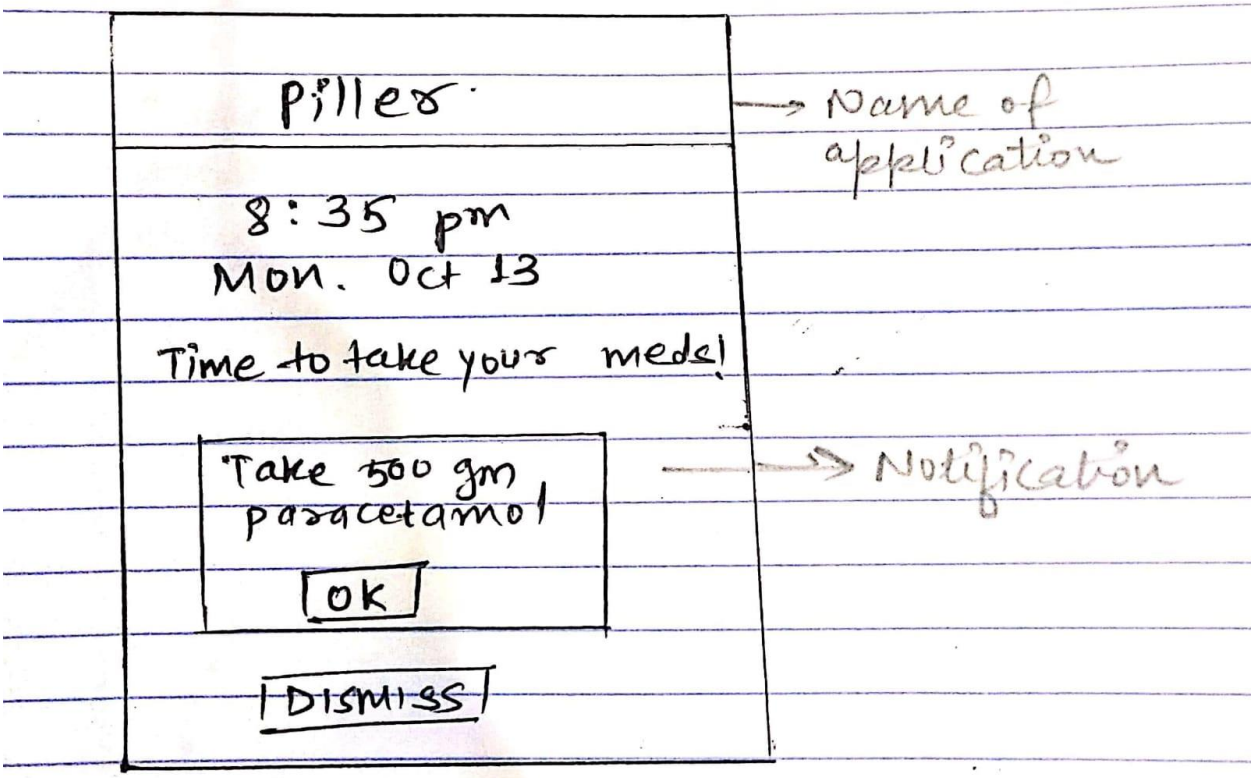


Figure 14: Alternative - 2

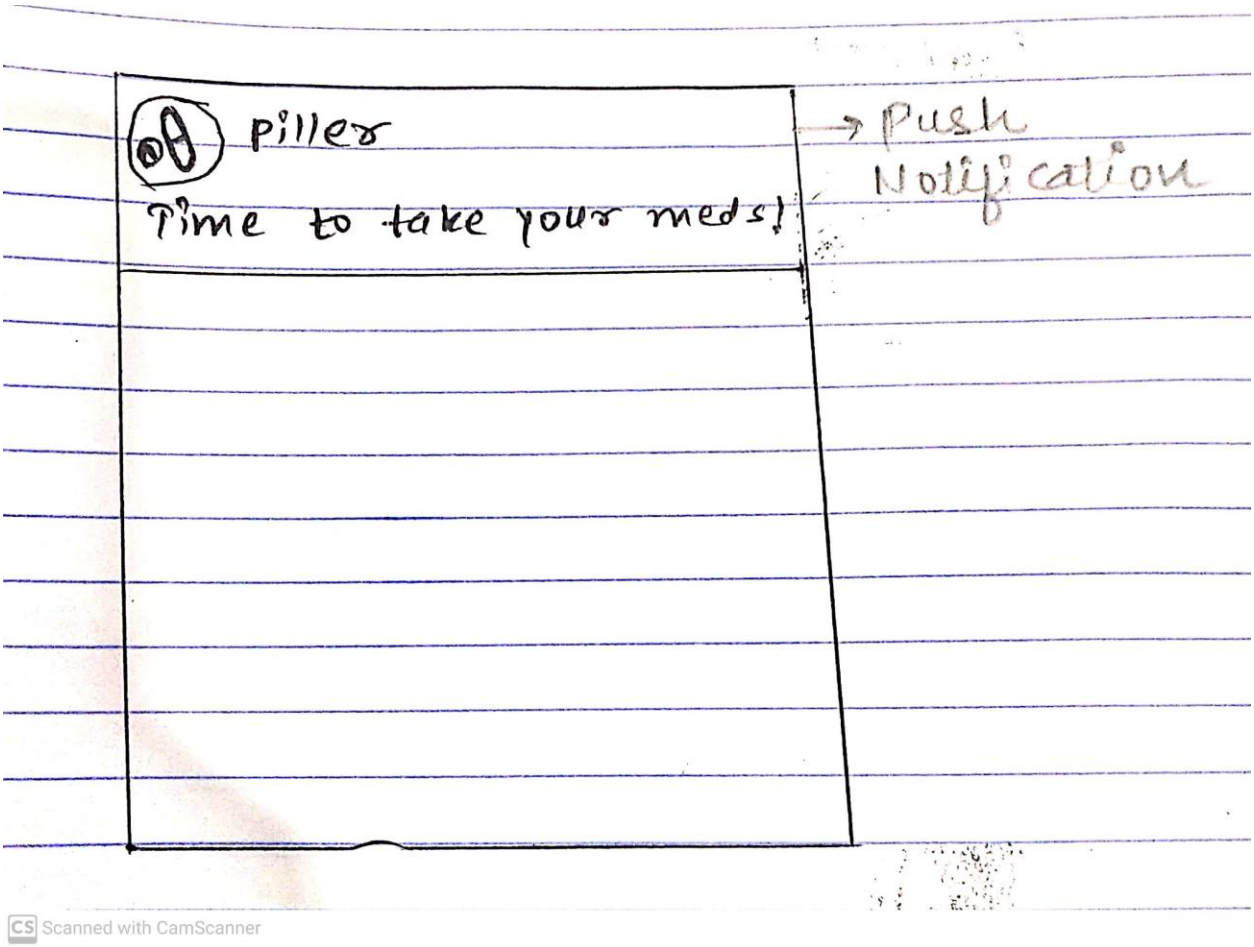


Figure 15: Alternative 3 (Part 1)

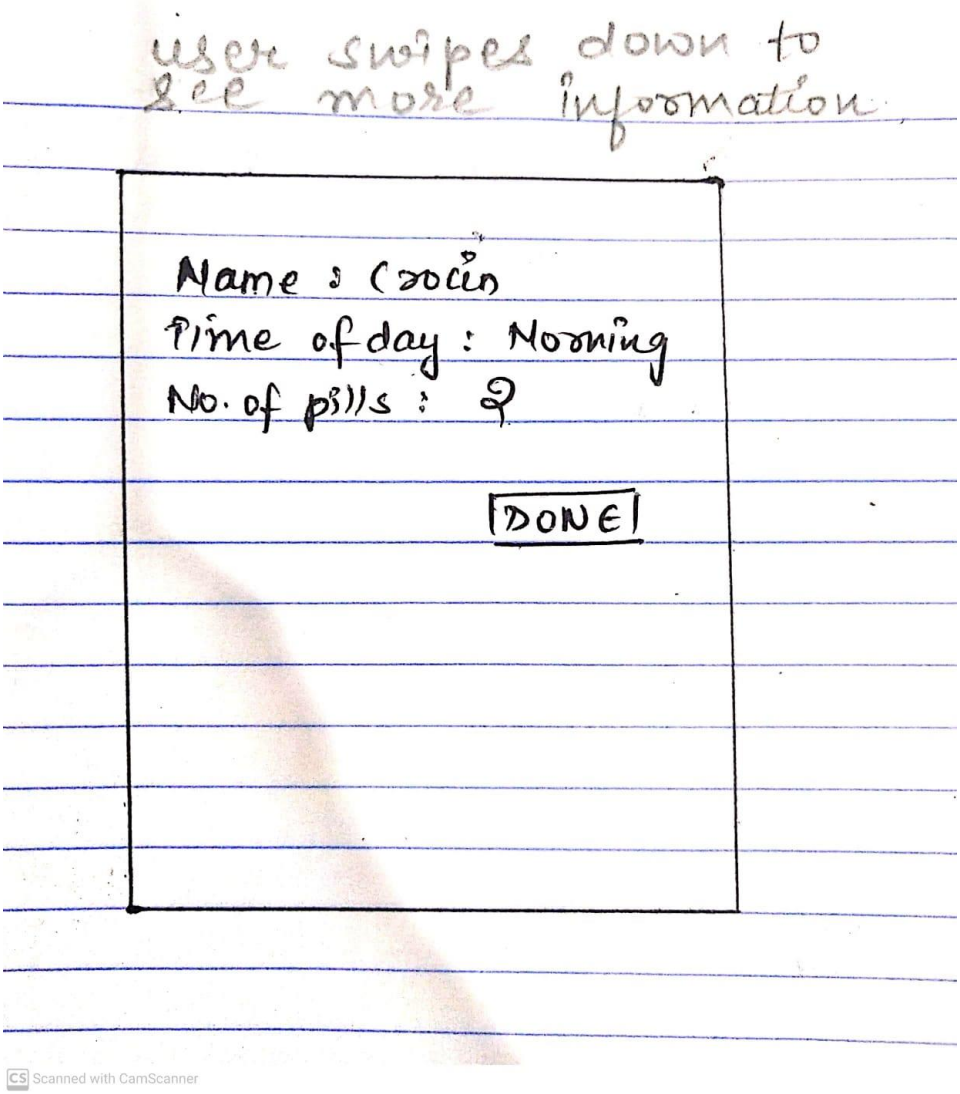


Figure 15: Alternative 3 (Part 2)

Sketch commentary:

For notifying the primary user, alternative 1 is the best option because it pops up as an Alarm/blocker notification and the user cannot dismiss the notification without taking action. Furthermore it provides buttons - done, skip and snooze. So, if the user has taken the medicine they press done, if they want to take it later they press snooze and if they press on the skip button a notification is sent to the caretaker about the same. So, it makes sure that the user does not skip the medication.

Alternative 2 provides the user with a dismiss button and the user can skip the medicine. So, that is the downside of it. Alternative 3 is a push notification which can again be easily dismissed.

Challenge 4: Primary user communicating with Secondary User

Goals:

Primary users should be able to send a bunch of pre-selected messages to the secondary user.

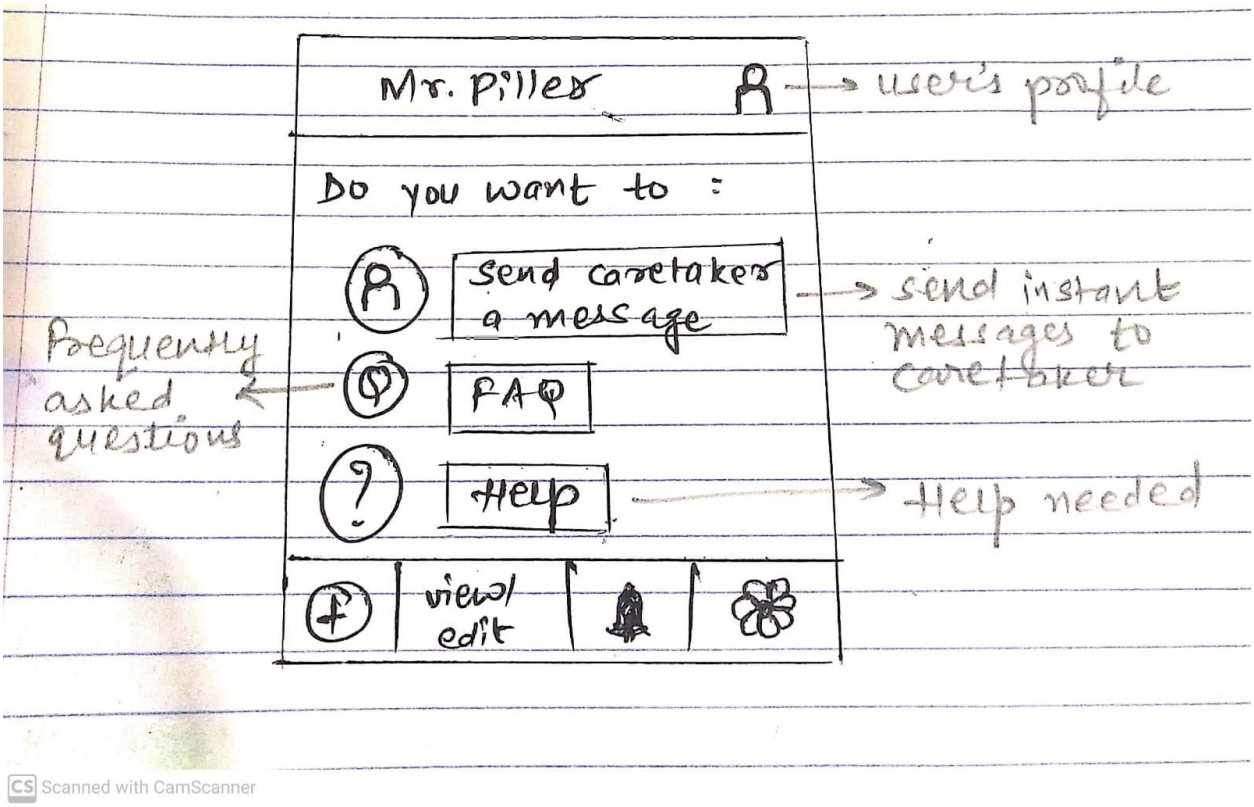


Figure 16: Alternative - 1 (part 1)

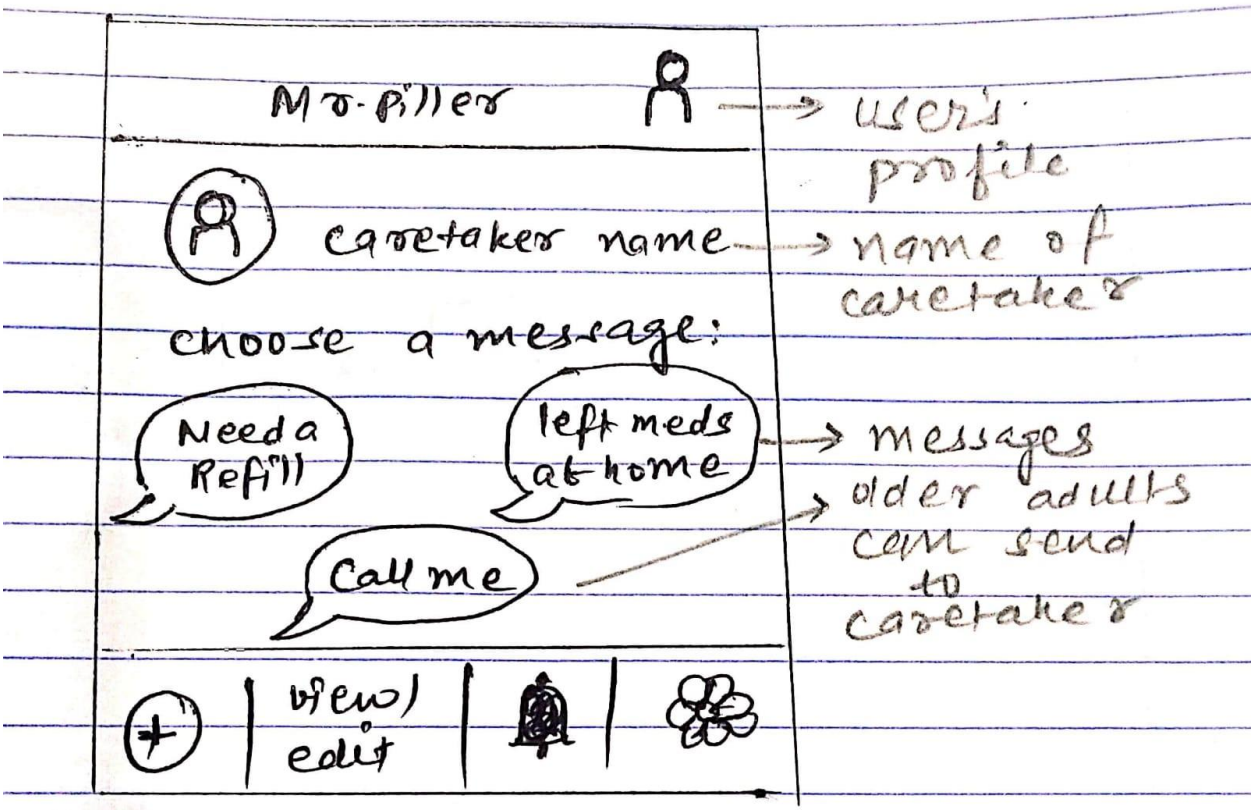


Figure 17: Alternative - 1 (part 2)

Figure 18: Alternative - 2 (part 1)

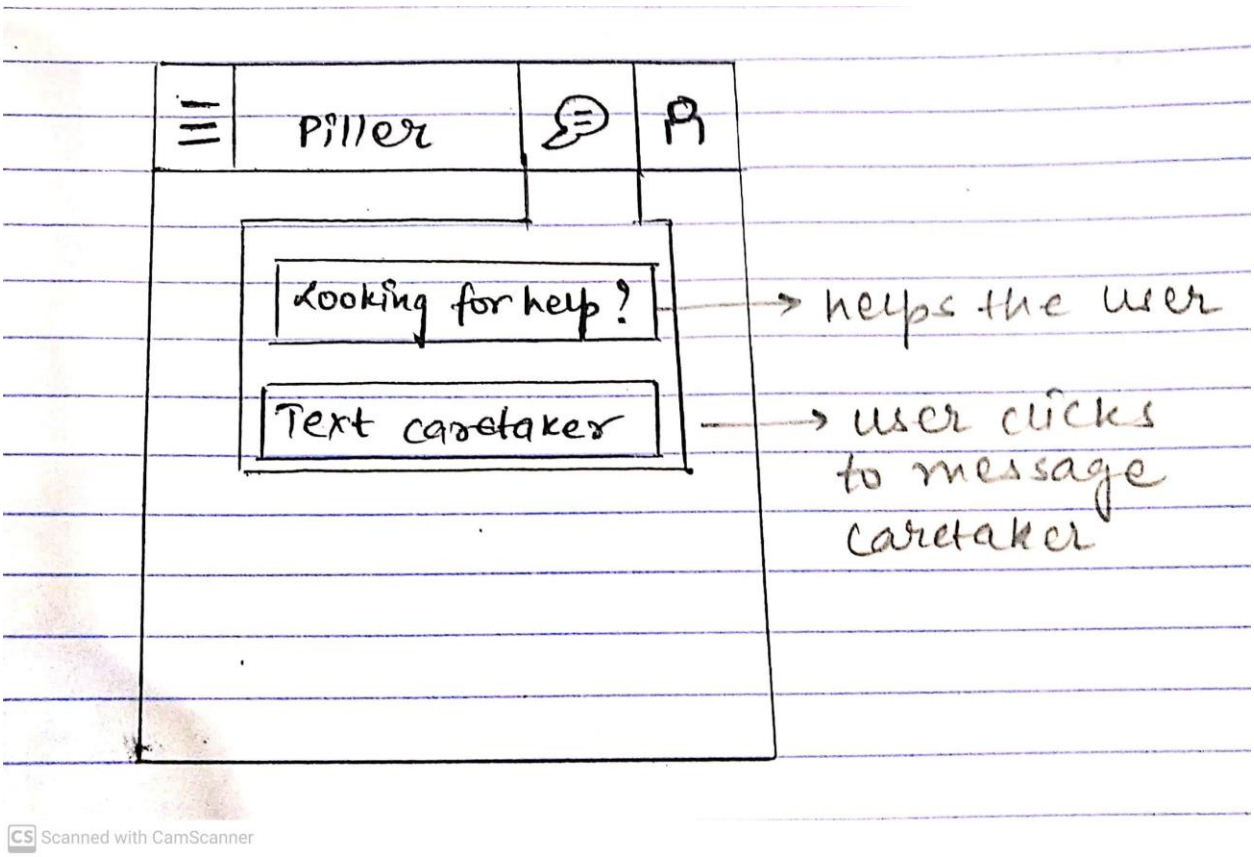


Figure 19: Alternative - 2 (part 2)

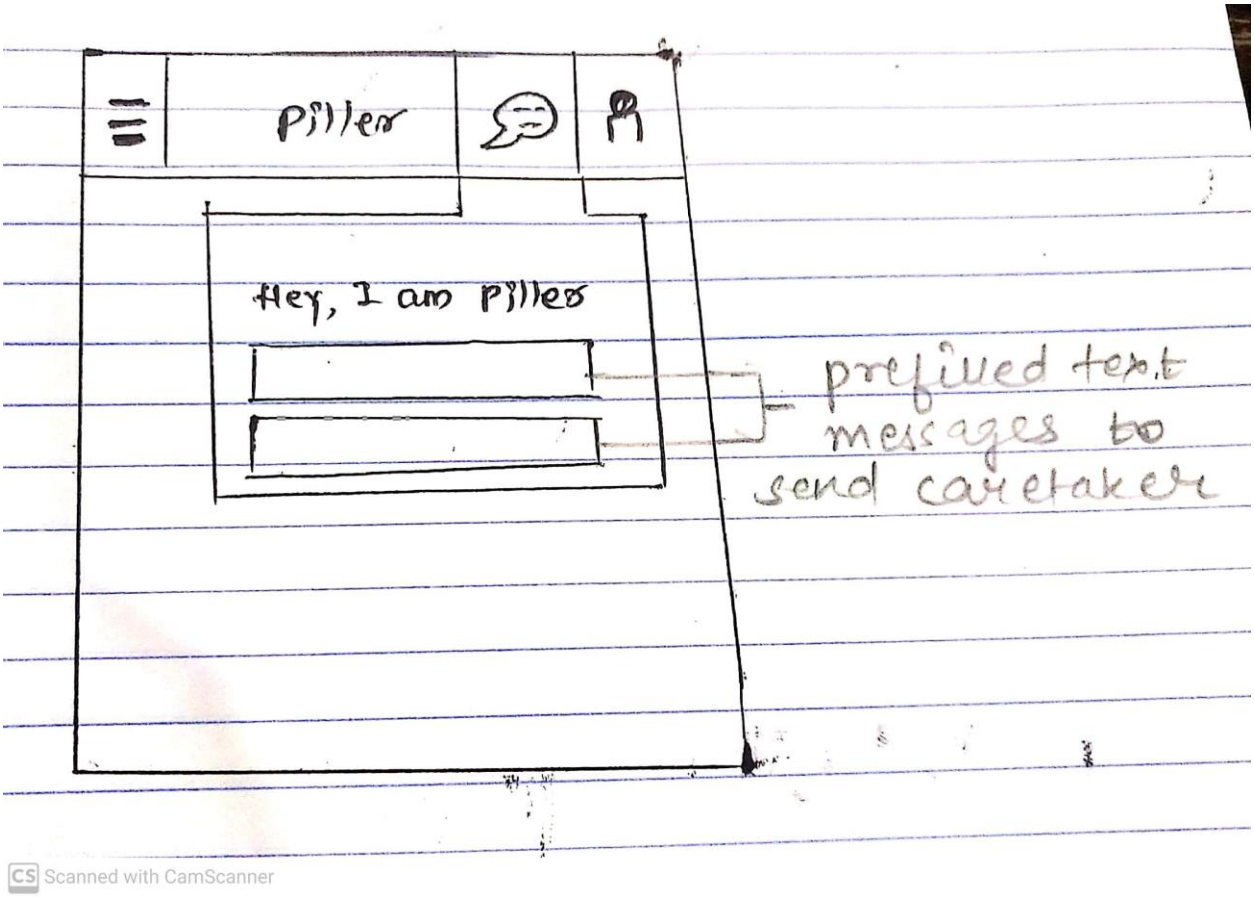


Figure 20: Alternative - 2 (part 3)

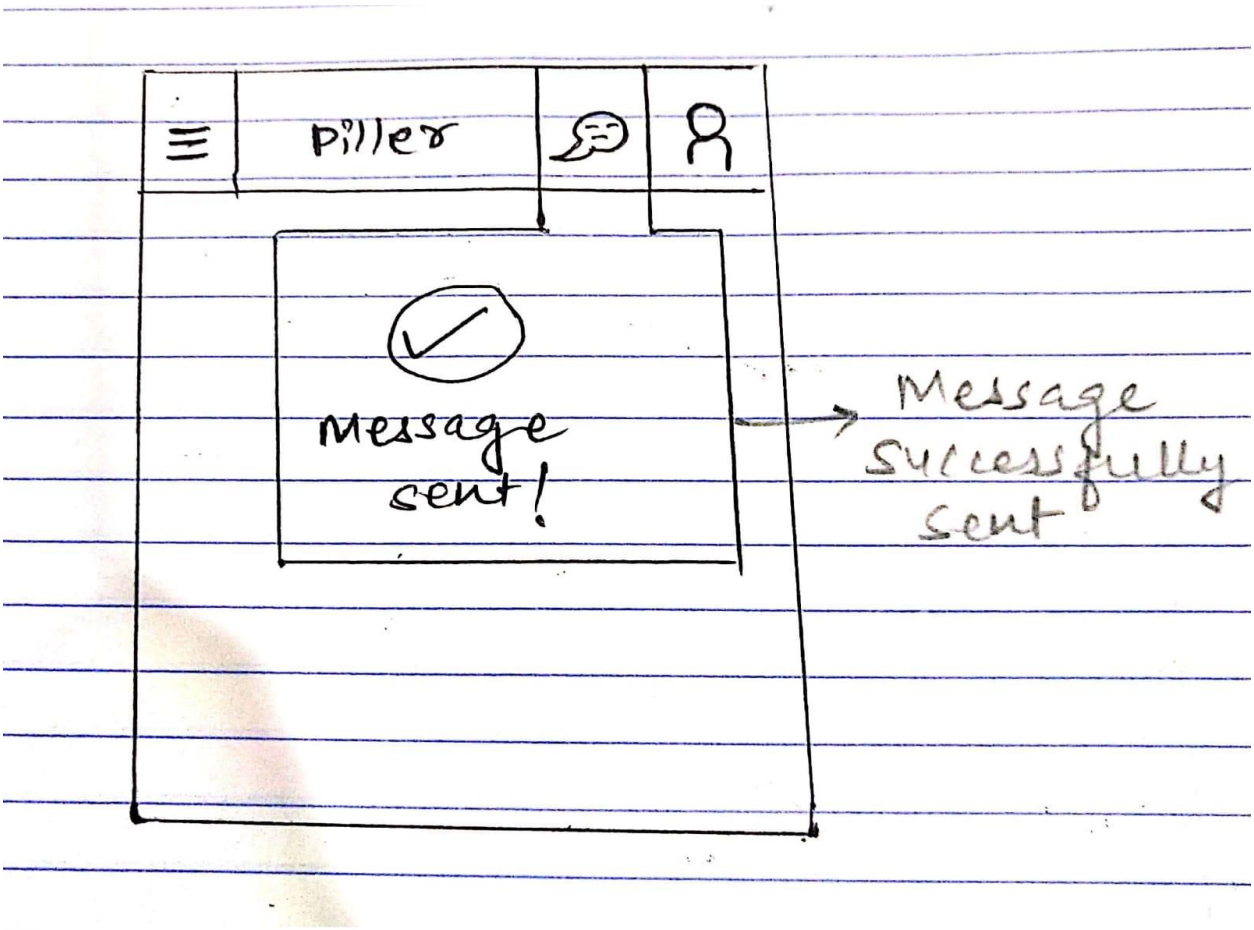


Figure 21: Alternative - 2 (part 4)

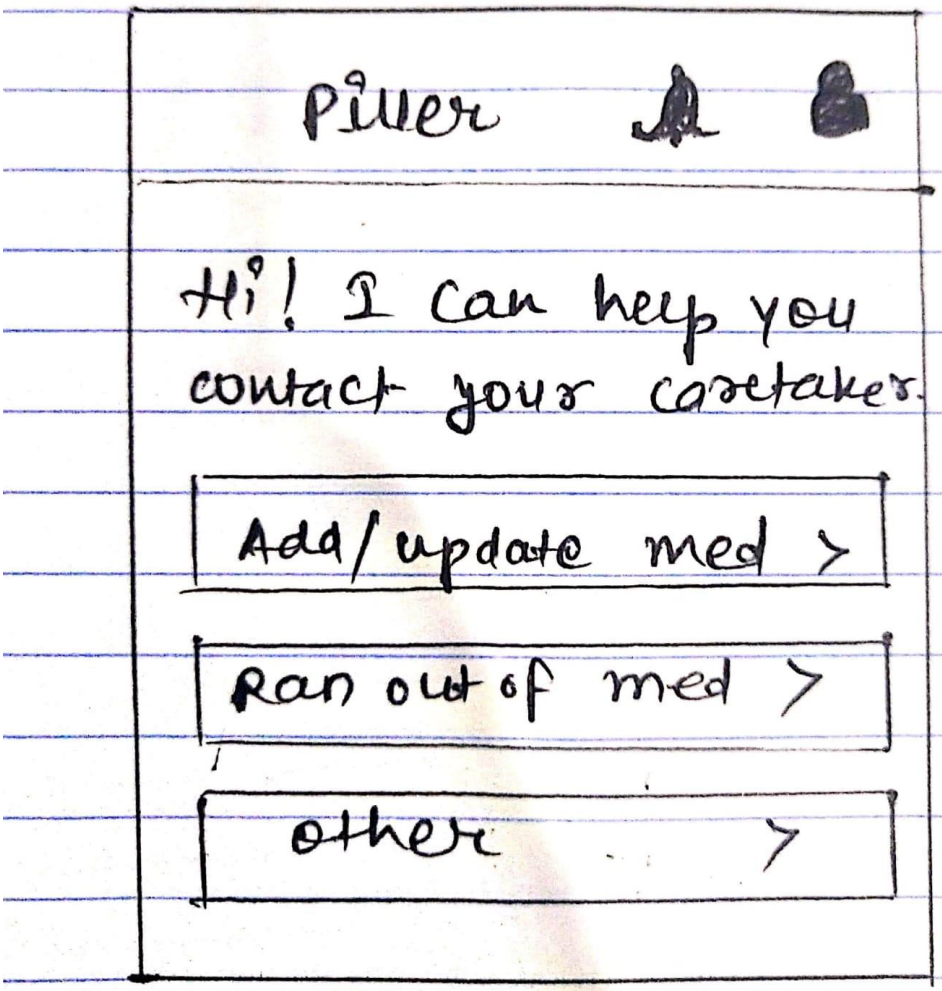


Figure 22: Alternative - 3 (part 1)

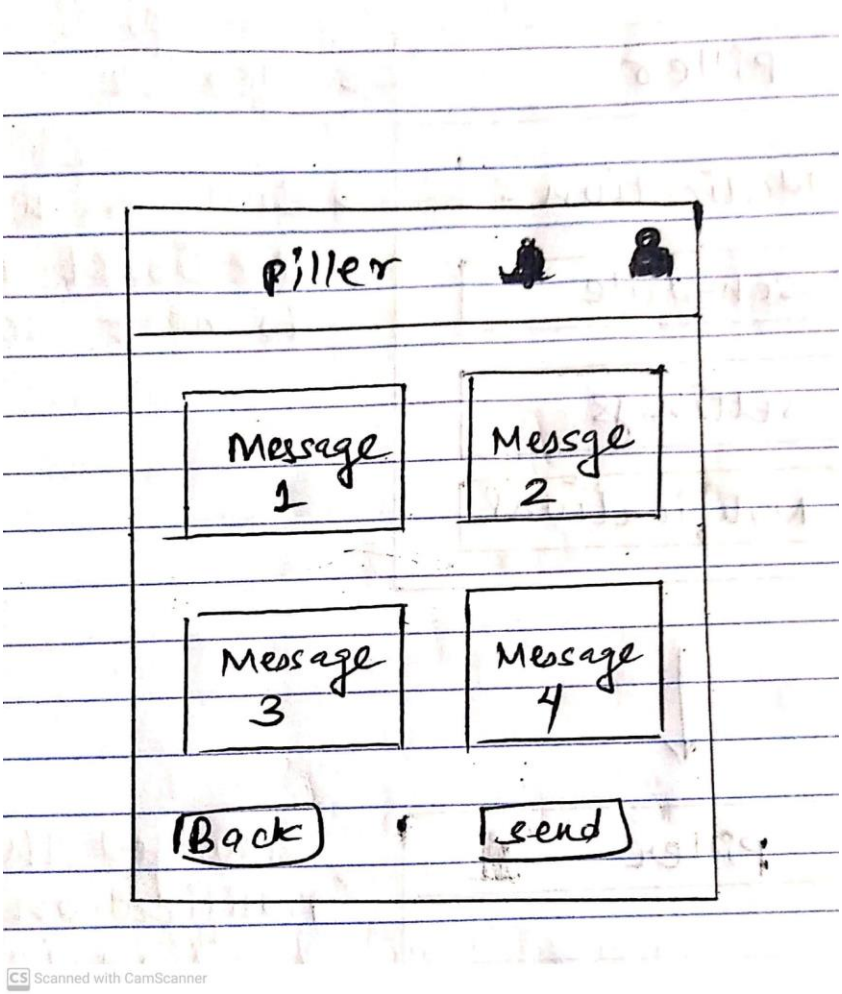


Figure 23: Alternative -3 (part 2)

Sketch commentary:

For communication with the secondary user, in alternative 1 we have come up with Microsoft's Clippy-like assistant Mr Piller. With the concept of Mr Piller intact, Alternative 3 is the best option for this design challenge and the one of the reasons for choosing it over alternative 1 and 2 is that it directly does not present the messages but rather presents it based on the category which the user selects thereby filtering the messages that will be displayed. So, it makes sure that only relevant messages are shown so as to avoid any confusion. Also, we can add the part 4 (message sent screen) of the 2nd alternative as it gives feedback to the user that message was sent.

Individual Contributions :

S.No.	Name	Contributions
1.	Bhuvana Sridhara	All design challenges and sketch commentary
2.	Irshad Badarpura	All design challenges and sketch commentary
3.	Shreya Shrivastava	All design challenges and sketch commentary

Narrative Reflection:

1. Irshad Badarpura:

One thing that I had in my mind when I started sketching was that I have to try and implement as many Nielsen's principles as I can. So, I started off implementing with a basic skeleton and at each iteration I thought of adding a new component that satisfies a particular principle. As I was doing this I noticed that it was not possible to accommodate everything and that I have to keep the audience of the application in mind and create a design which suits them the best and not a design which is the best. This was one thing which I learnt through sketching. The other thing which I learnt was that it is a good idea to take inspiration from resources which are already existing and have good design interfaces like Apple, Google, etc. This according to me helps to broaden the spectrum of ideas and opens up new possibilities.

We used metaphors in many places like help, settings, home, etc. The motivation behind using metaphors was that they help the user to match the functionalities with the real world so that they can navigate the application easily without having to resolve documentation.

The HCI principles which we discussed around the most were how can we help the users avoid human errors(slips, mistakes, lapses) and also how can we implement recognition over recall keeping in mind that our target audience are older adults.

So, from starting to create a design which was the best, by the time I reached the last iteration I had a design which was the best for my audience. Metaphors were introduced, labels and texts were made as clear and big as possible, big tasks were broken into small tasks, at each point feedback was provided so that that the user knows where they are into the system, also component were arranged parallelly rather than serially as so to make the system as reliable as possible.

2. Shreya Shrivastava:

I started off by reading the 10 Usability Heuristics for User Interface Design.

While thinking of the designs and sketching them, I learnt that the sketches need not be so personified but should be clear enough. It was so because the end users were primarily older adults, and the designs should be suitable for them, i.e. it should be understandable and easy to use. I kept a blank screen and the design challenge in my mind and started iterating over it and made sure I followed the principle of Aesthetic and minimalist design, where the relevant information is added to the sketches.

I tried to keep the gestures simple, more of horizontal and vertical movements, as the complex gestures like quick movements or difficult positioning could be confusing for the older adults

I started with a blank screen with no content because I thought that the center should be appealing, and the user should not be confused with the purpose of the screen, which goes along the principle of visibility of system status.

I also learnt that an easy navigation between the screens or functionalities helps the users to prevent the human errors, which consists of lapses, slips and mistakes. Also, our end goal is to create a mobile application, which restricts us in screen size. Thus, I added a scroll bar for that. The older adults may have an issue memorizing stuff, so navigating back and forth easily will be an advantage for them.

Another learning was that the older adults will remember/recognize a button's functionality easily by seeing the icons. Hence, I kept the notification icon as a bell, which makes it easily understandable, which goes along the principle of recognition over recall.

3. Bhuvana Sridhara:

The most challenging thing for me while designing was setting aside my personal biases. We are designing mainly for a target audience of 60+ year olds so I couldn't make the app look like something I'm generally exposed to. I had to think like our target audience and concentrate on how they are going to interact with our system. I was also cautious to not underestimate the users too- infantilizing them and just getting away with bigger fonts, buttons, overly simplified language etc. Every design decision needs to supplement the overall goal of providing an easy to use, non-boring, non-confusing interface.

Each clickable button is accompanied with a familiar icon that they might recognize- Cards, Help, Add, Settings. Mr Piller is a friendly addition to the design.

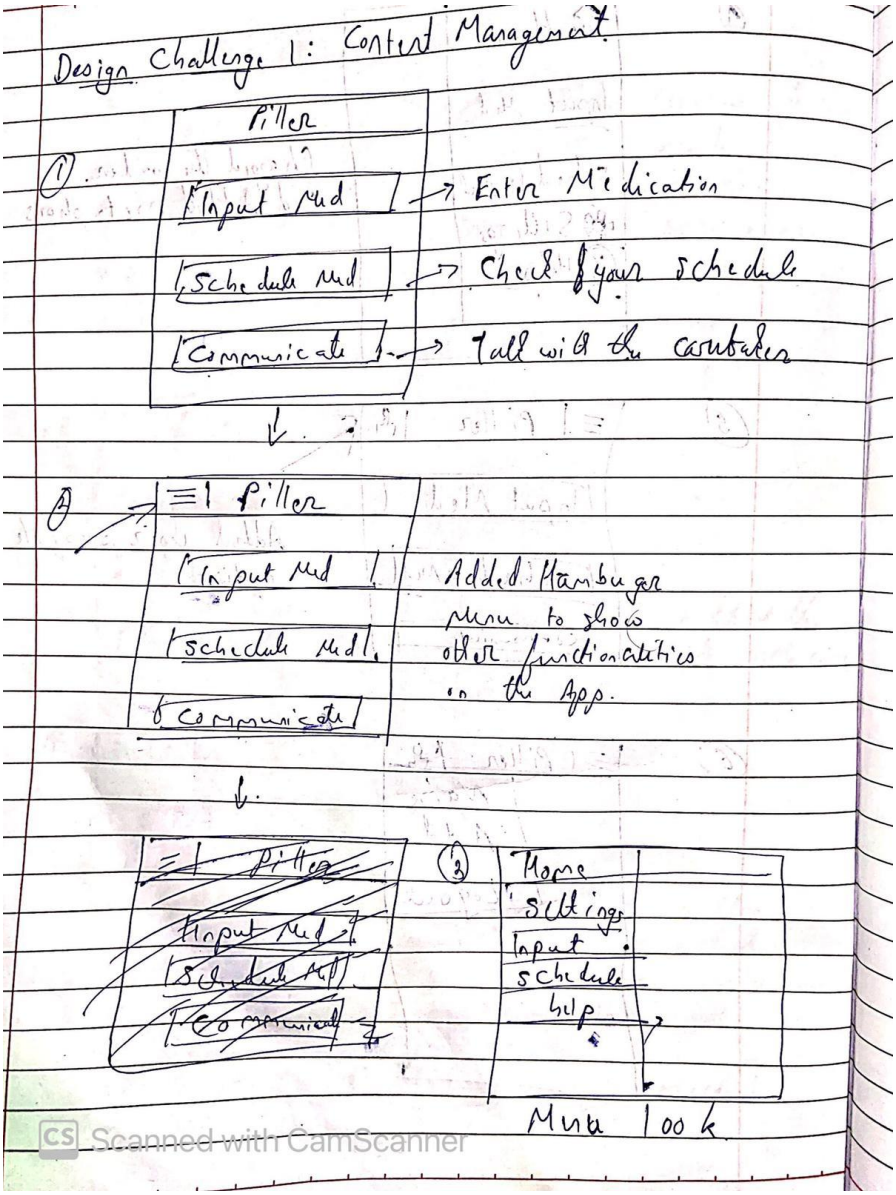
The Heuristics that were discussed the most- #5 Error prevention and #9 -Recovering from errors. We are working with sensitive data and an error in any stage can lead to real world implications. #6- Recognition over recall, #1 Visibility of system status also came up numerous times. The overarching goal was to reduce the gulf of evaluation and execution.

At times, it felt like we're compromising on the aesthetics and minimalism of the design in order to make way for usability. A hamburger menu is never used since it is very easy to miss. Exploration was traded-off to make way for more clarity in the system.

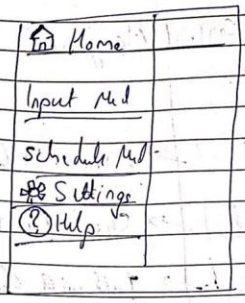
It was interesting to learn that older adults prefer tapping instead of scrolling. I made it a point to use more taps (even if it meant extra screens and interactions) instead of a scroll view. It was also interesting to observe what applications I fell back for inspiration. The progress bar for the input form was based on the TurboTax model. The tab menu in content management was based on the Instagram menu model, etc.

Appendix:

1. Irshad's Sketches:

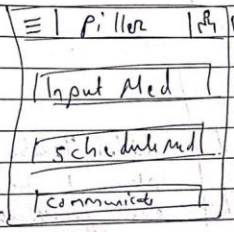


(4)



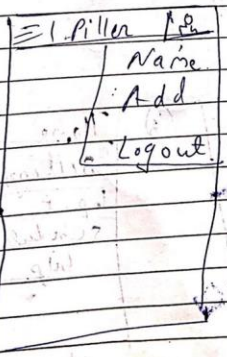
Changed the order and Added metaphors.

(5)



Added user profile option

(6)



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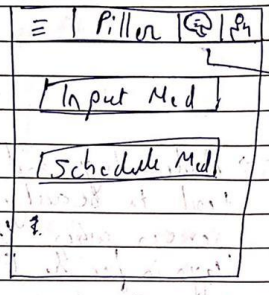
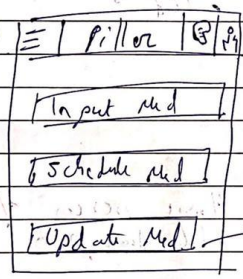
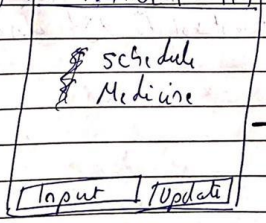
(7) 

→ Removed the communicate button and made it as a message icon. To free up some space

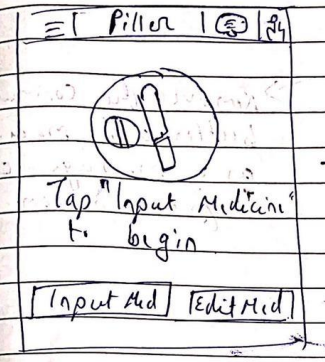
(8) 

→ Added update Med so that the user can edit/delete medicines

(9) 

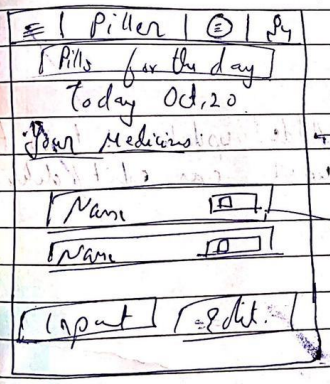
→ Removed the schedule button because it increased a click instead kept it on the main screen and took the input and update at the bottom.
[Reference: Google meet].

10.



→ Added logo and some text to beauty the screen when the user logs in for the 1st time or when they have no medicines added.

11.



→ Home screen after user adds some pills

Notification buttons on home screen only to give more control to the user.

→ Design Challenge 2:

① Pillar

Input Medicine

Enter Name

→

② Pillar

Input Medicine

Schedule:

Time of the day: ____

From Date: ____

To Date: ____

Repeat: ____

③ Pillar

Input Medicine

Time of the day: ____

From Date: ____

To Date: ____

Repeat: ____

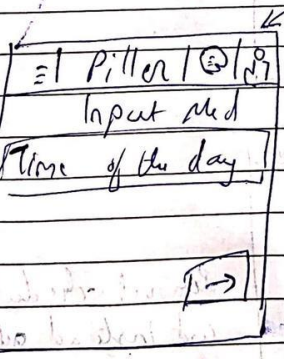
Save

- Removed schedule calendar and instead added calendar for start and end date. Also added the save button

④

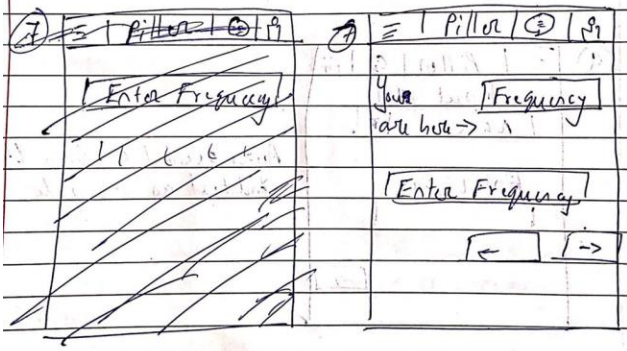
Added Dosage and Reminder as dropdown so user can select prefilled values not having to enter text.

⑤.



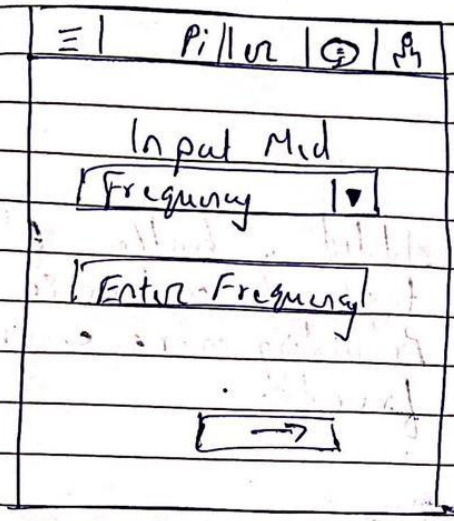
Decided to break the single form into multiple screens. And to make it less textual removed all labels and replaced them with place holders.

Addid a button of "←" to go back and make any changes. Providing more control and freedom.



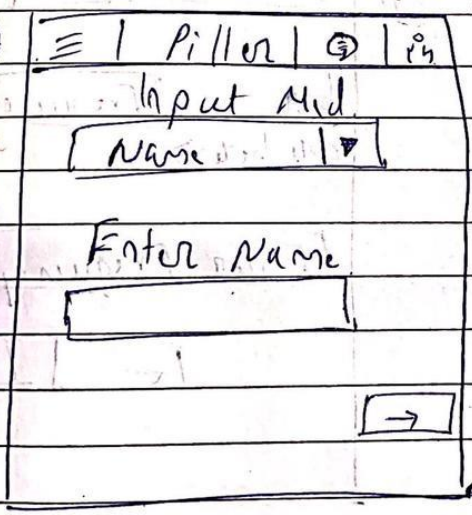
To provide feedback to the user of where they are in the system I used a you are here text to display the page they are on.

(8)



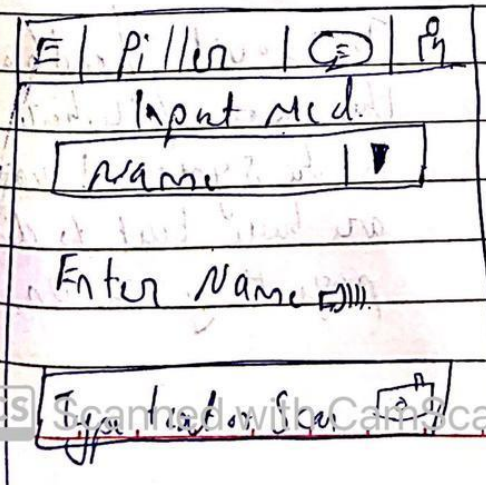
Removed the question mark text and back button. Instead added made the title as a drop-down so the user can now see and change where without having to multiple back clicks. Changed the ~~navigation~~ component arrangement from serial to parallel.

(9)



Again decided to keep the label and text as separate.

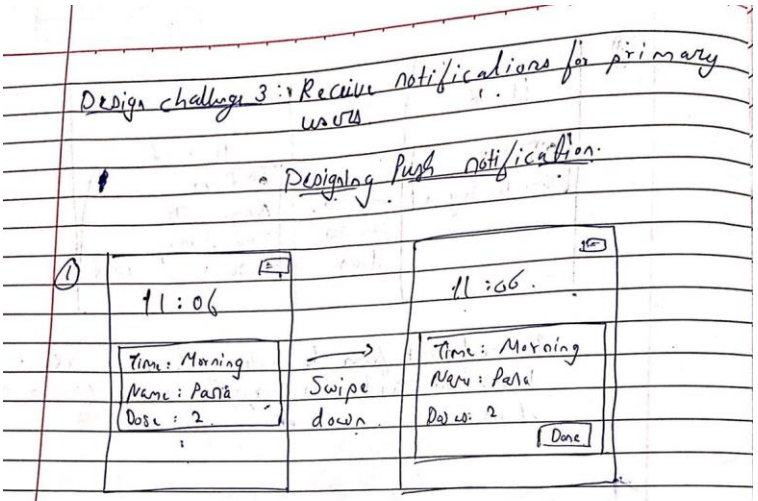
(10)

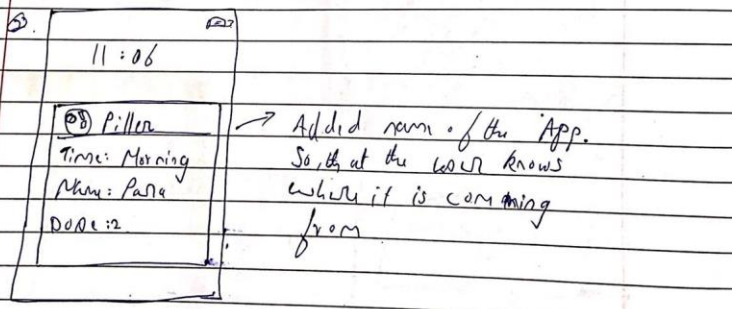


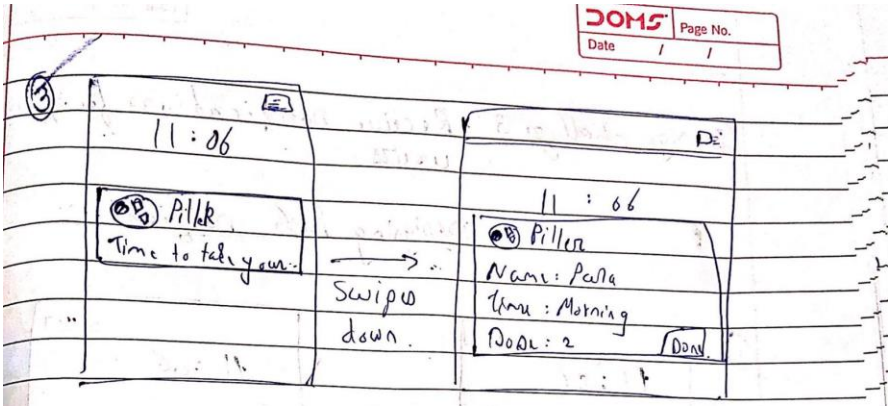
Used metaphors to highlight the audio output and scan input features.

Design challenge 3 : Receive notifications for primary users

- Designing Push notification.

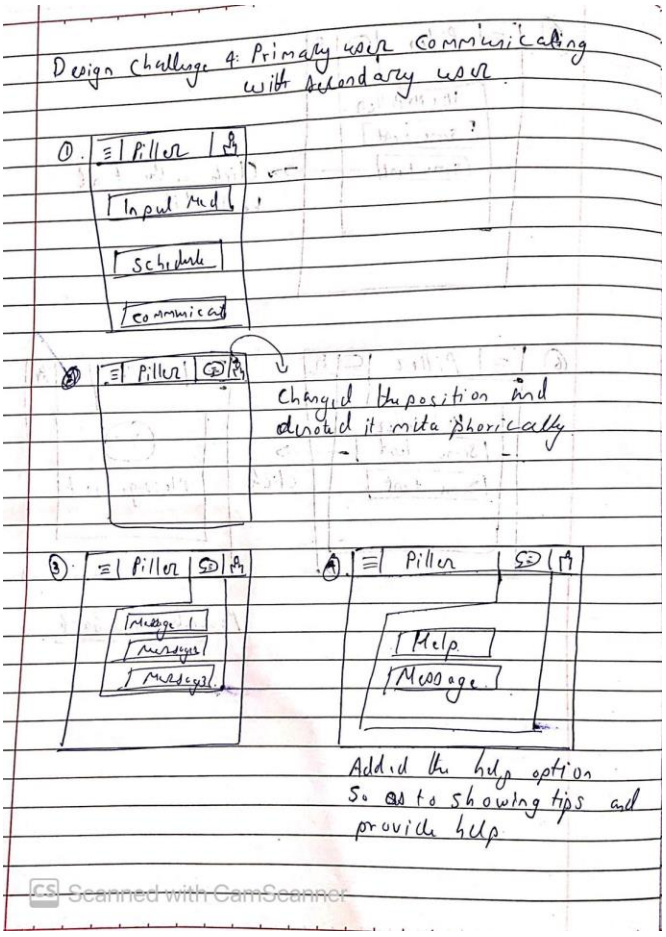






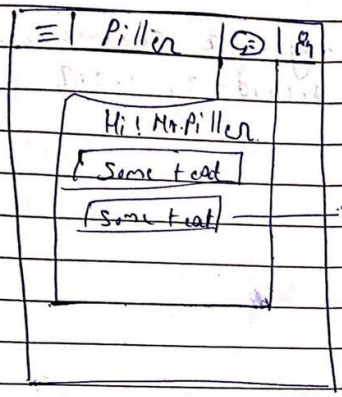
Removed that from the notification to make it look clean and then provide information on Swipe down.

Design challenge 4: Primary user communicating with secondary user



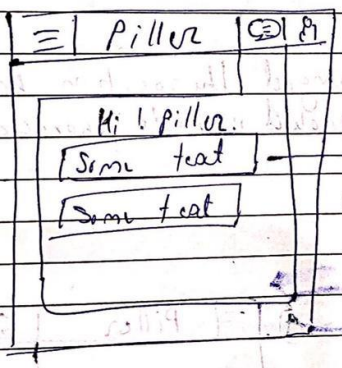
Date / /

⑤

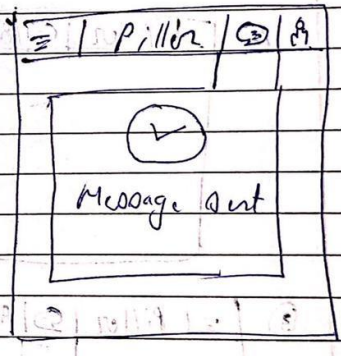


→ Click on the text to edit.

⑥

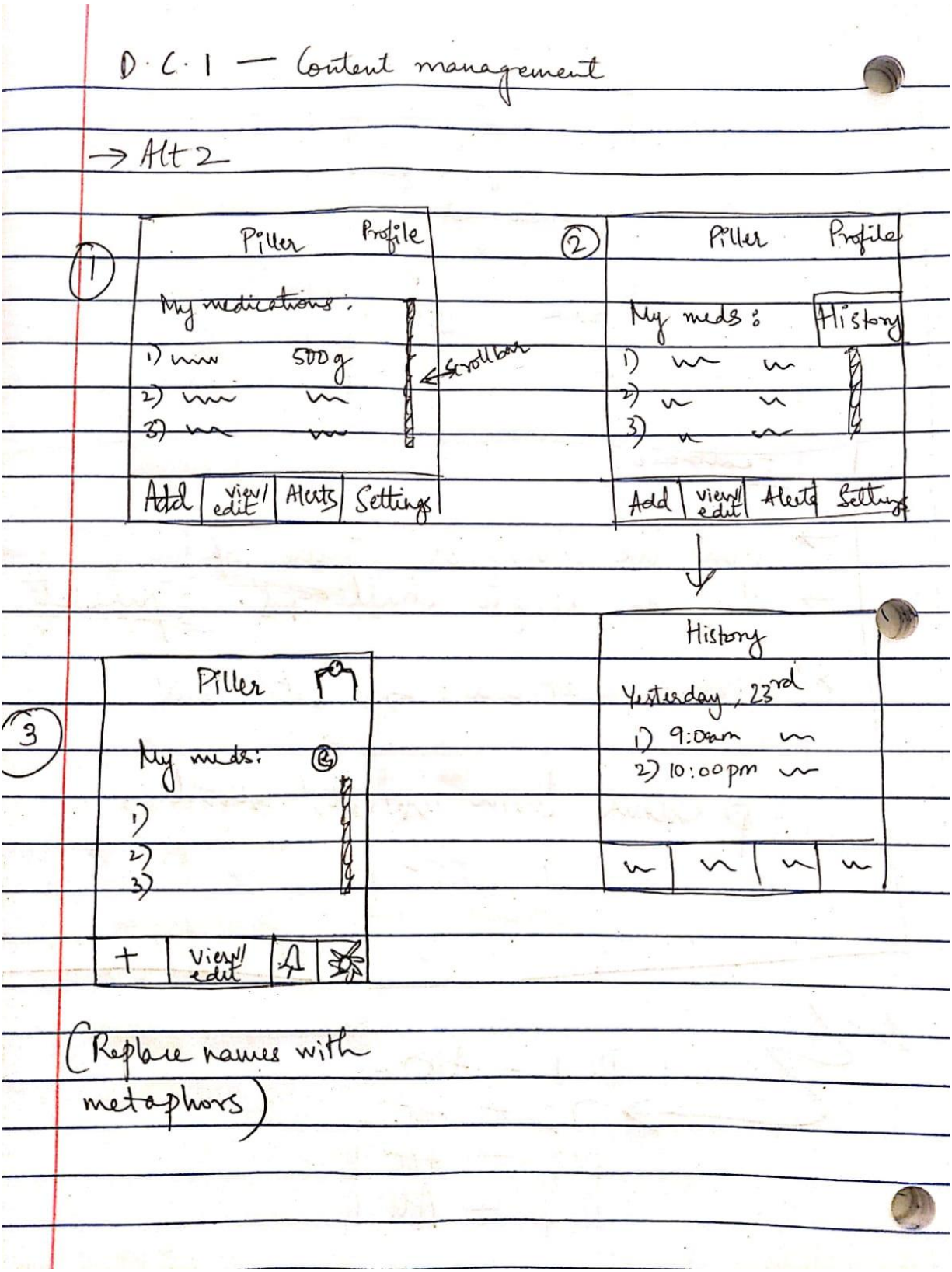


→ click.

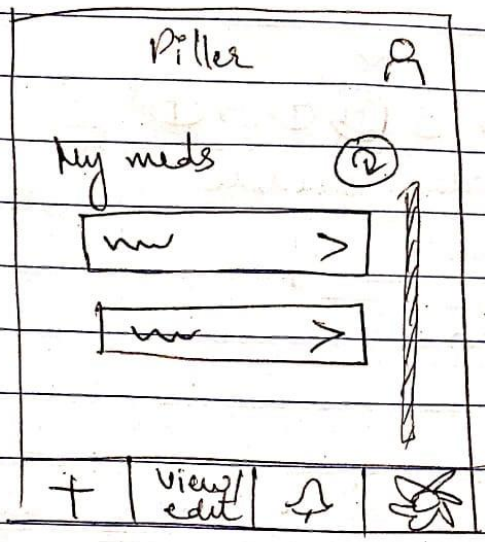


Provide feed back.

2. Bhuvana's sketches:

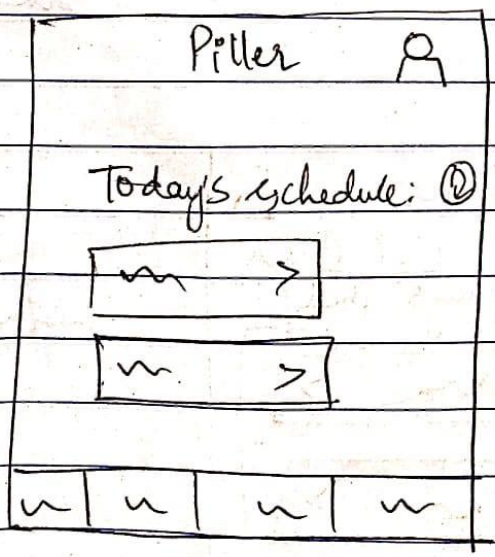


(4)



Display cards instead of lists + Add edit functionali here itself

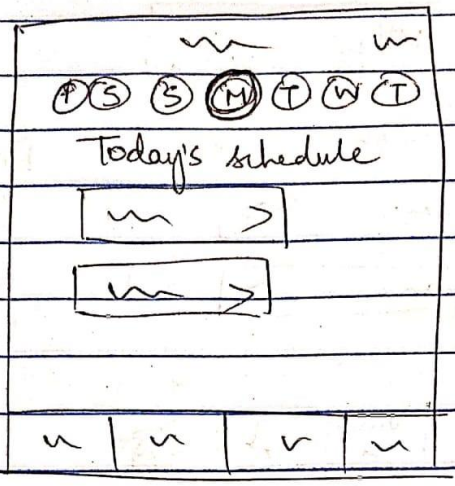
(5)



Getting rid of scrollbar

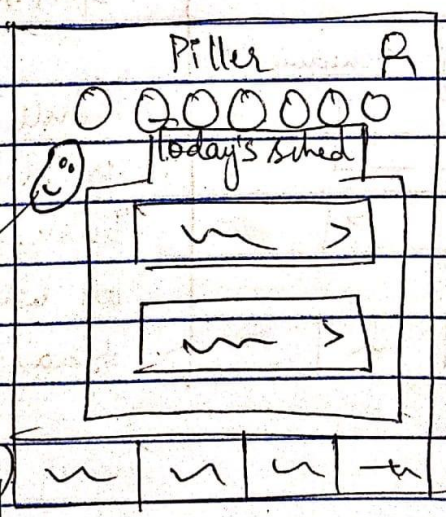
Scrolling is not intuitive to older adults.
Instead of displaying all list of meds, display today's list.

(6)



replace history button with this panel.
User can use to access past + upcoming med schedule.

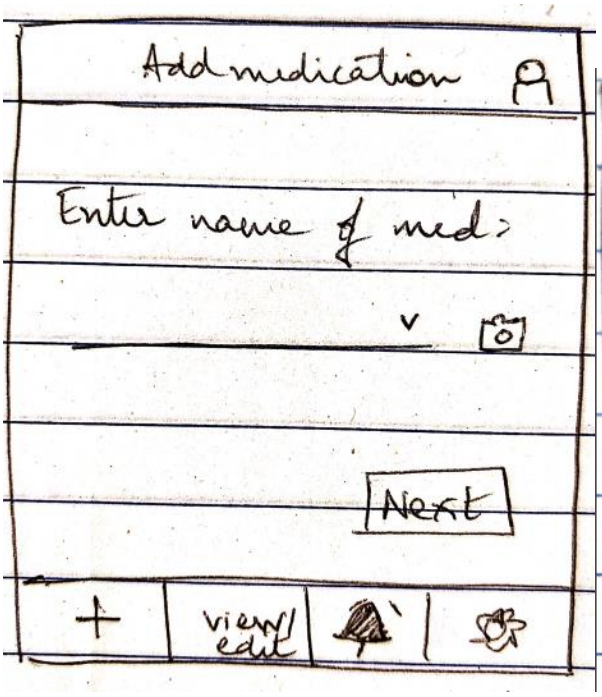
(7)

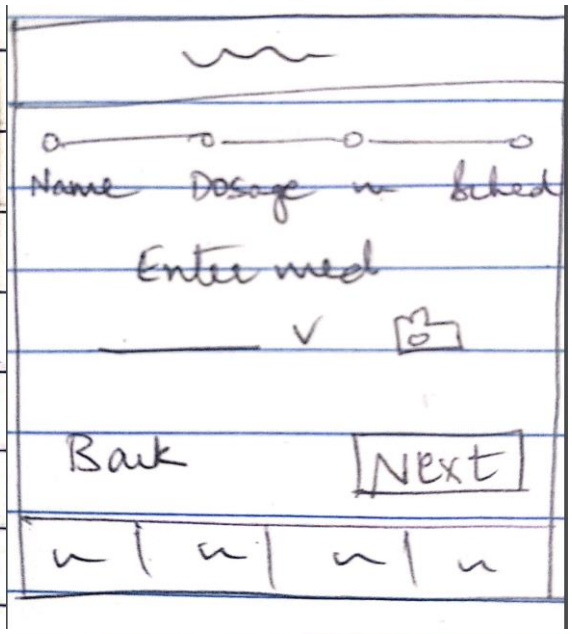


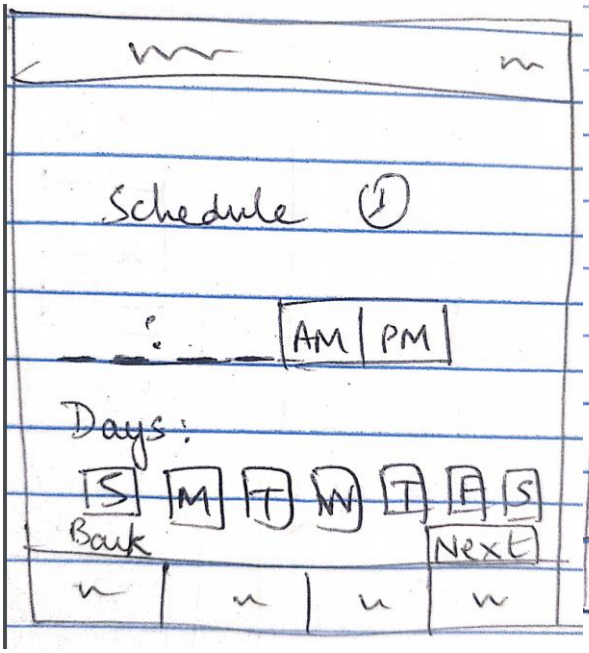
Add Mr. Piller (chat functionality)

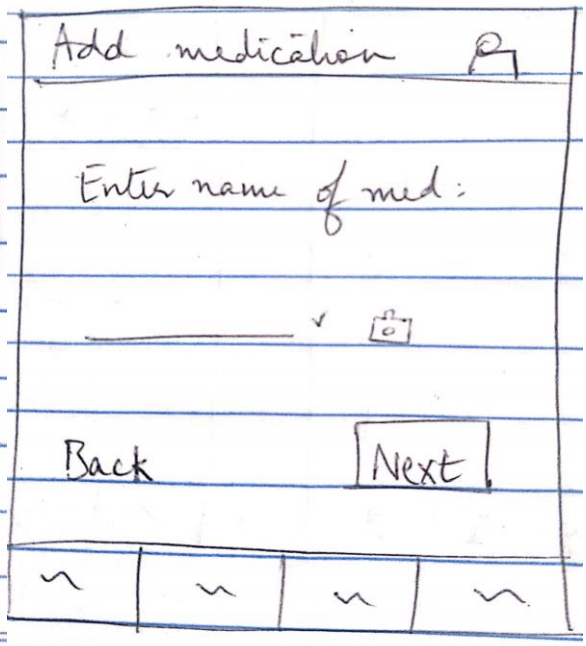
Refine.

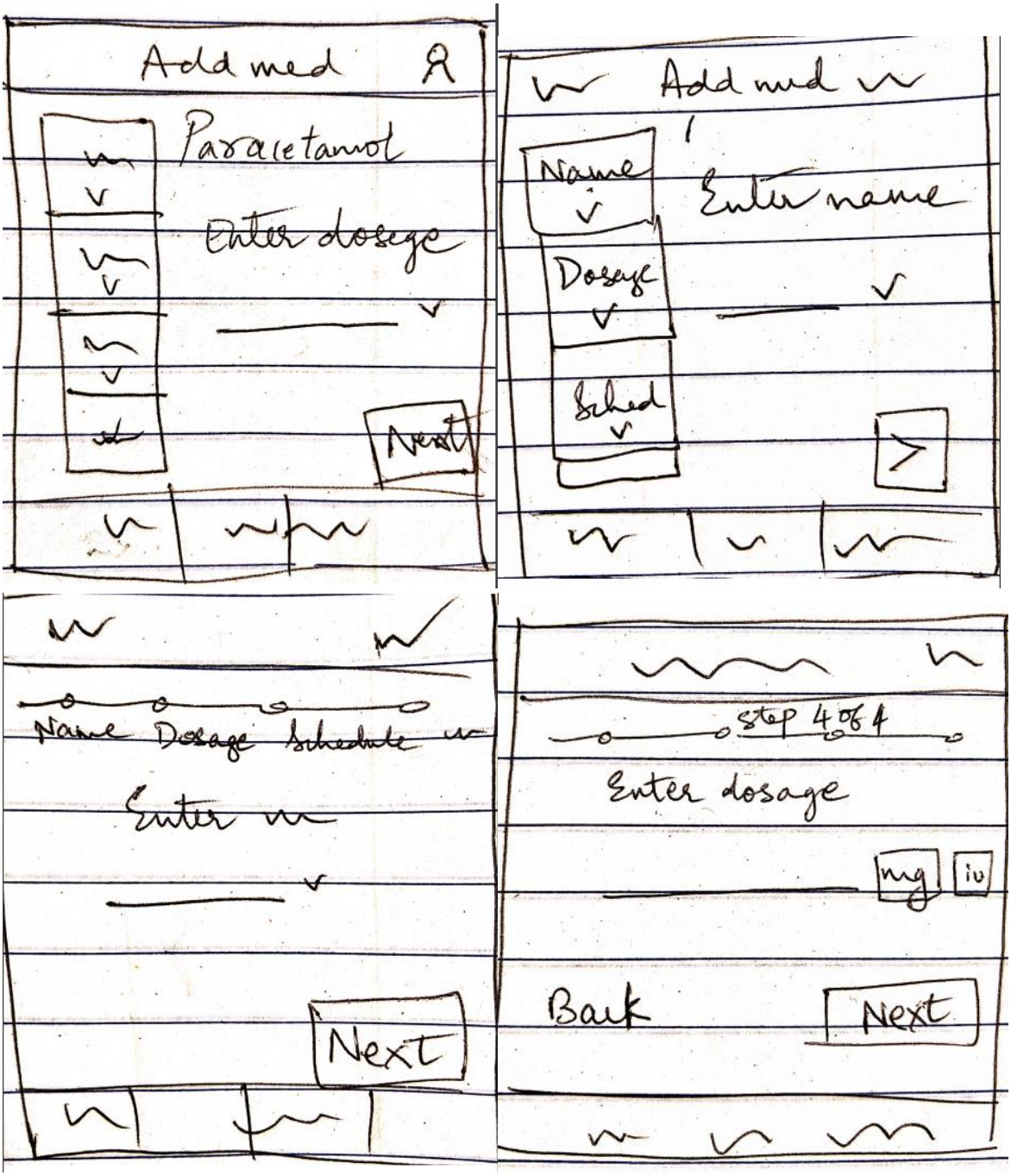
Design challenge 2: Alternative 2 Iterations:

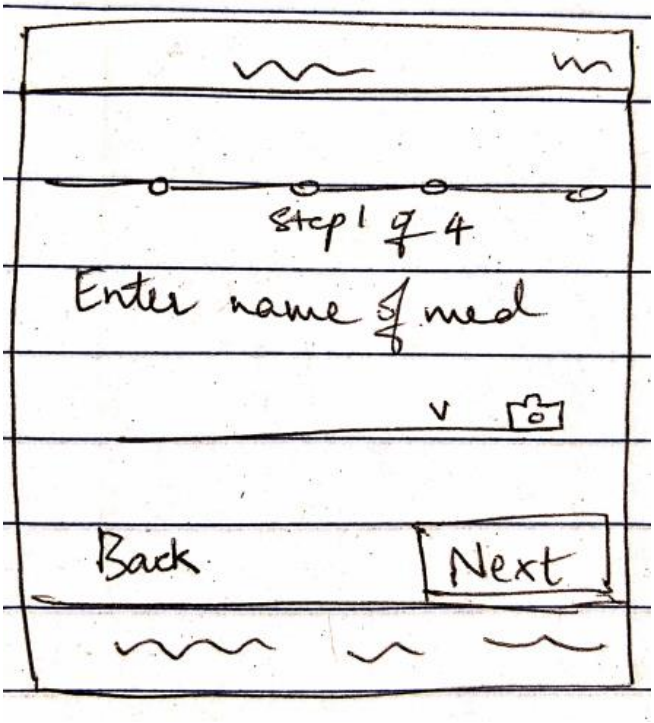








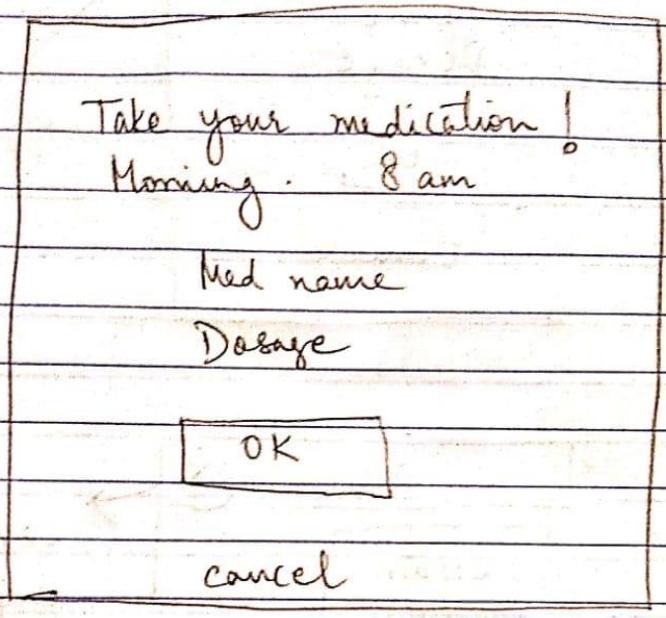

Add med
Paracetamol
Enter dosage
Next
Add med
Name
Enter name
Dosage
Sched
Name Dosage Schedule
Enter
Next
step 4 of 4
Enter dosage
mg
iu
Back
Next


Step 1 of 4
Enter name of med
Back
Next

Design challenge 3:

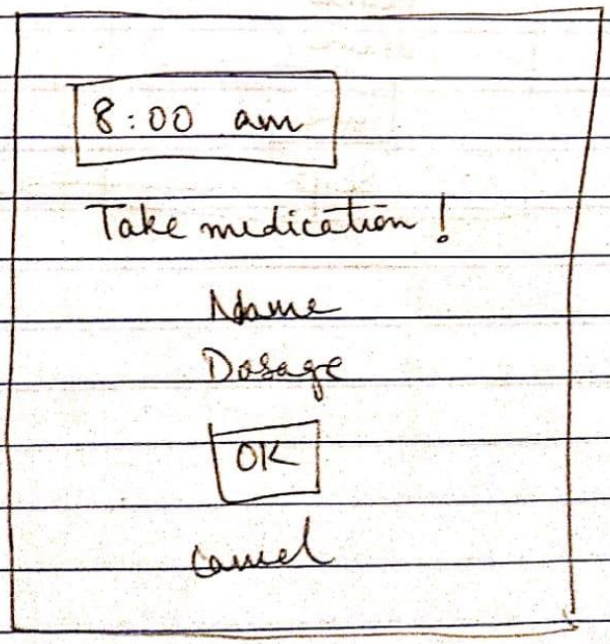
Alternative 1: Iteration: —

(1)



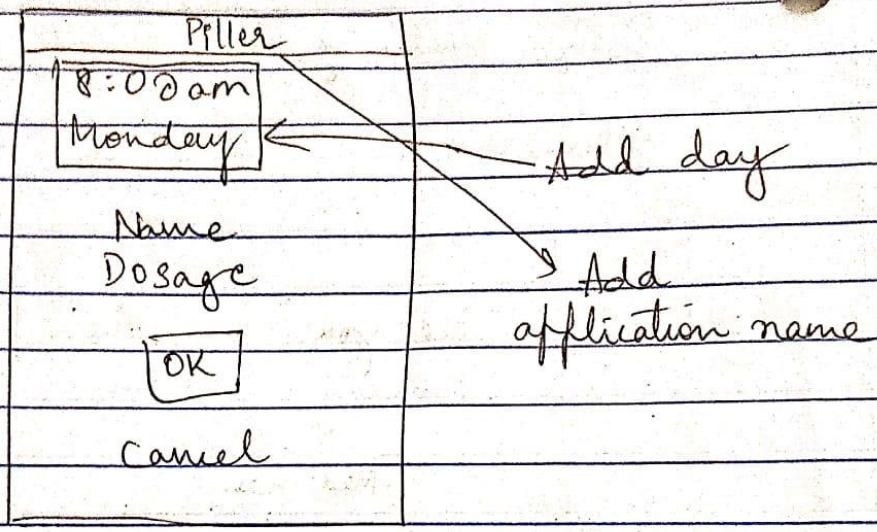
Blocks notification

(2)

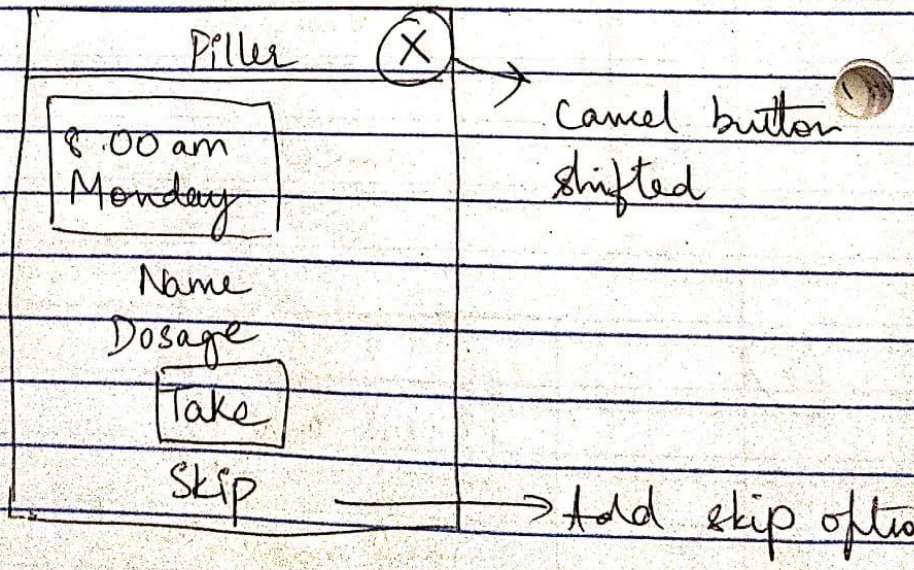


Highlight time because it is important

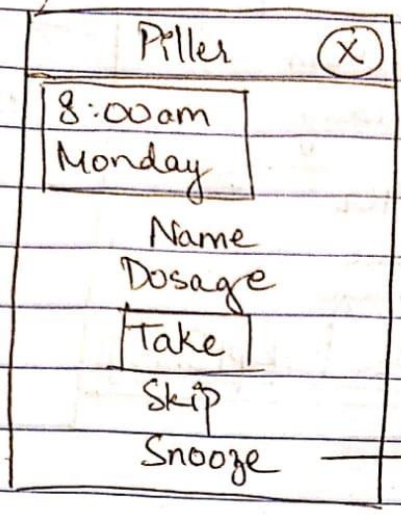
(3)


Piller
8:00 am
Monday
Name
Dosage
OK
Cancel
Add day
Add application name

(4)

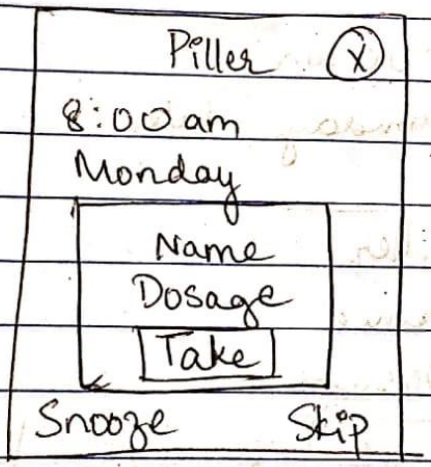

Piller
X
8.00 am
Monday
Name
Dosage
Take
Skip
Cancel button shifted
Add skip option.

(5)



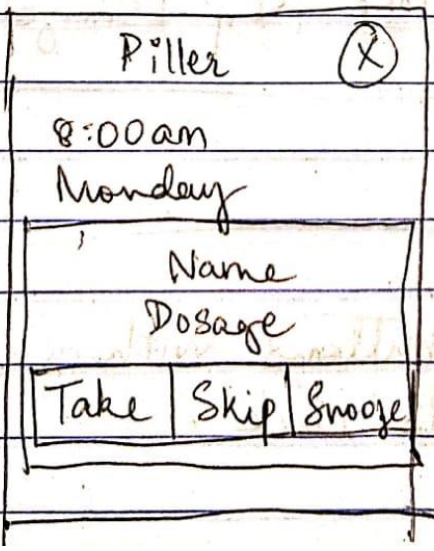
→ Add snooze option

(6)



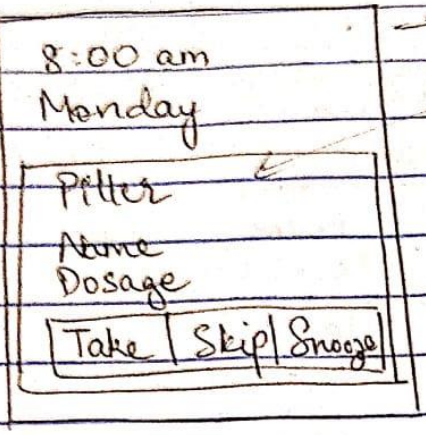
Reorganize to reduce clutter, reframe important details.

(7)



Reformat

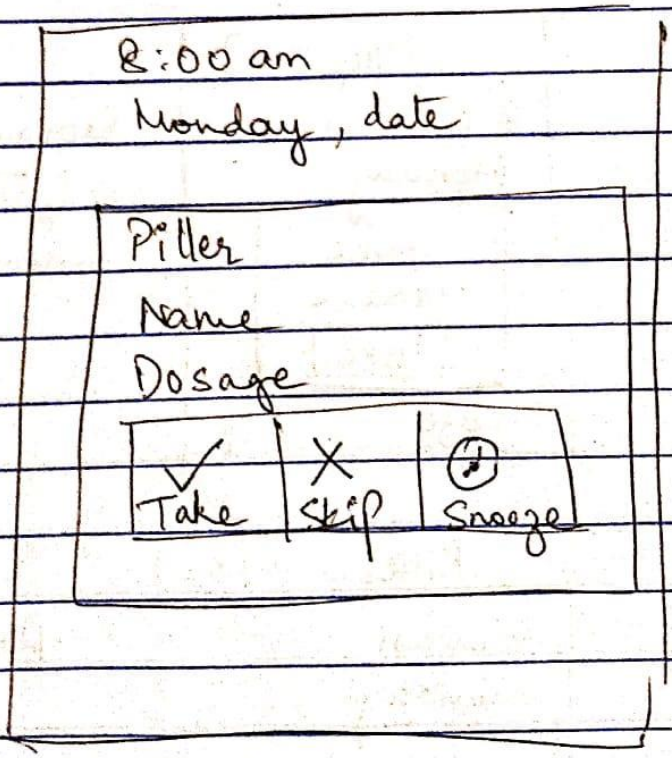
(8)



→ remove cancel

Reformat. ↳ didn't serve purpose

(9)



Bigger buttons with metaphors → easier to click.

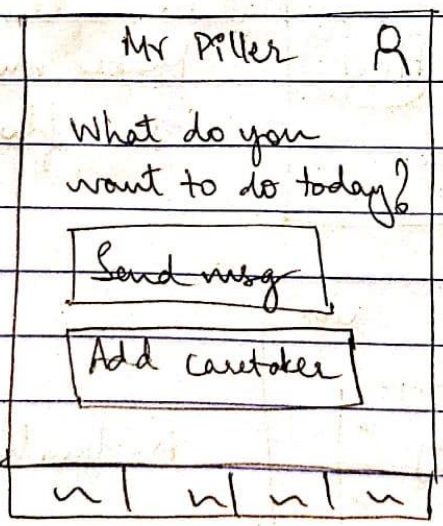
Design challenge 4

Alternative 1 . Iterations :-

(Mr Piller)

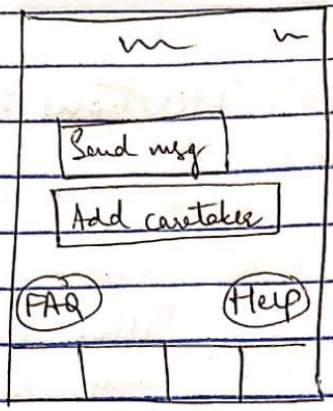
1

Hovering over Mr Piller icon in home screen.



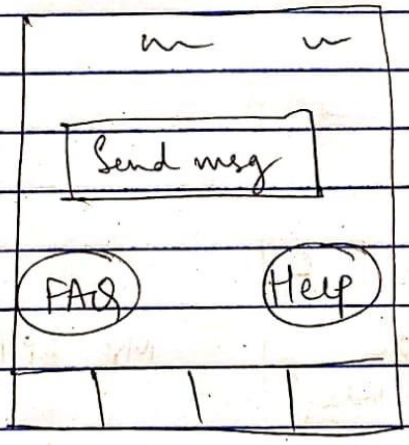
Mr Piller screen.

(2)



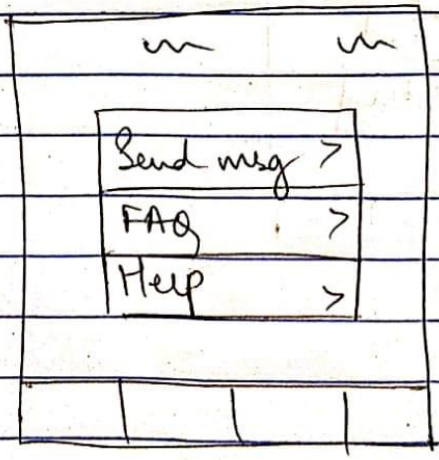
Adding FAQ & Help section in Mr Piller.

(3)



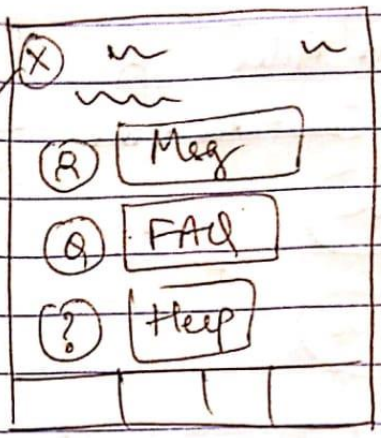
Remove 'Add caretaker' will add function in settings. Make more sense to the flow.

(4)



Restructure.

(5)

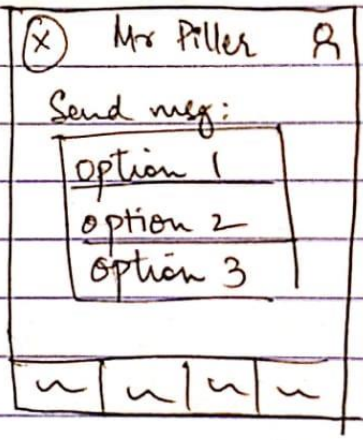


close button

Add metaphors + icons.

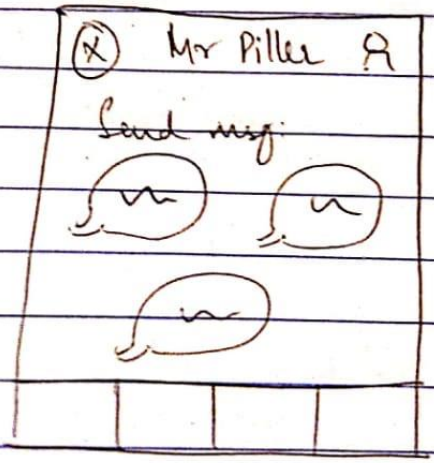
Message screen :—

(6)



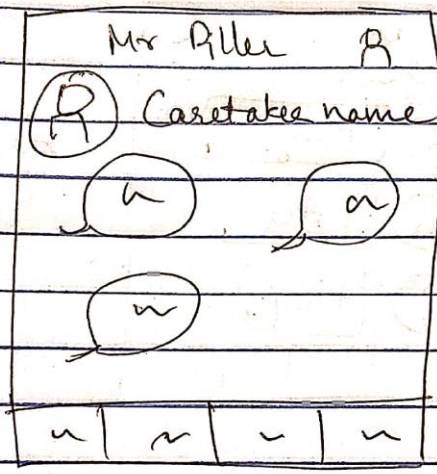
Set of options for user to choose from

(7)



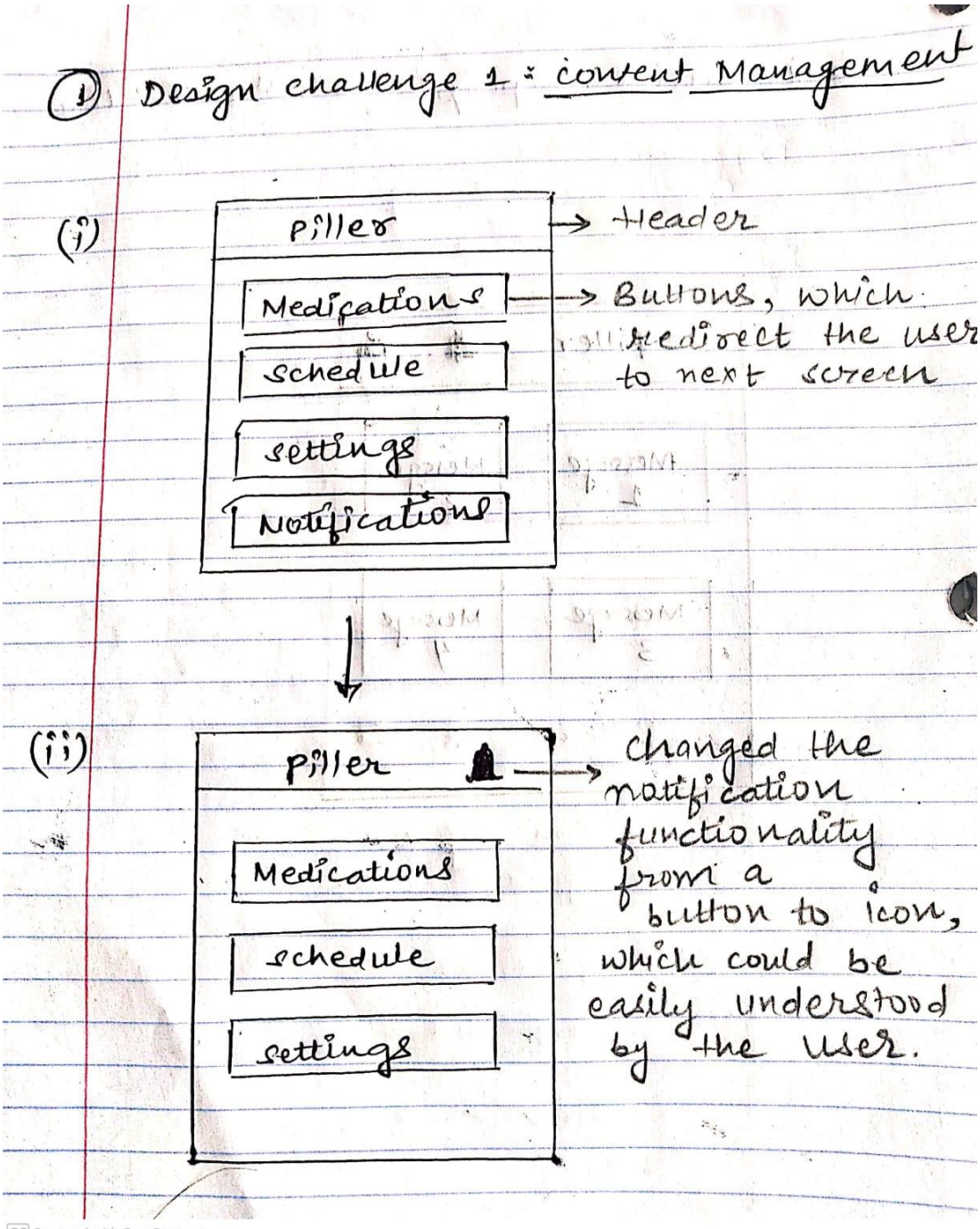
Options shown in bubbles. to avoid confusion + add usability.

(8)

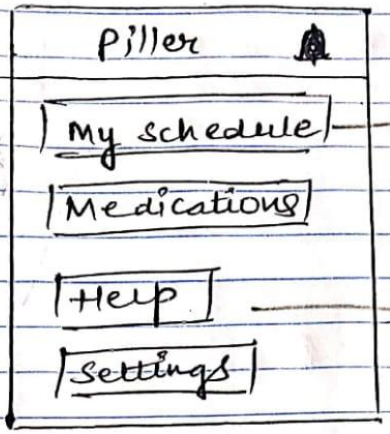


→ Add caretaker name so user knows who they're sending msg to.

3. Shreya's sketches :



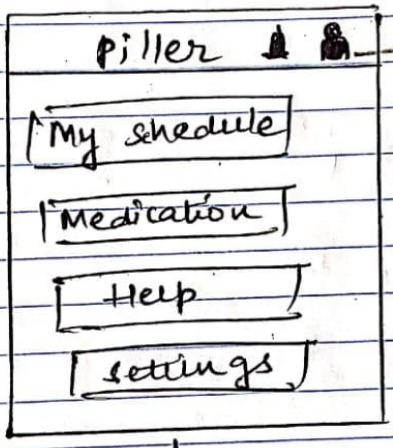
(iii)



→ Put the my schedule button on the top as it will be used most frequently

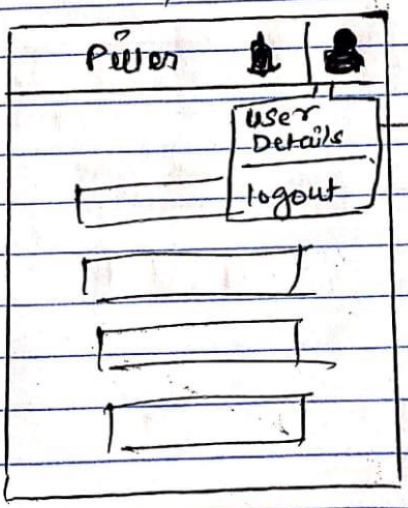
→ Added help button that will help users to navigate the app.

(iv)



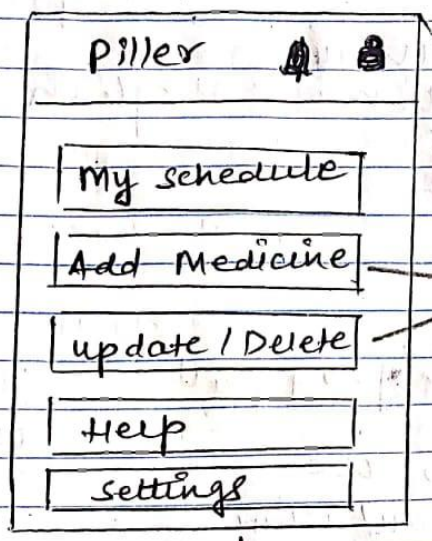
→ Added the user profile option

(v)



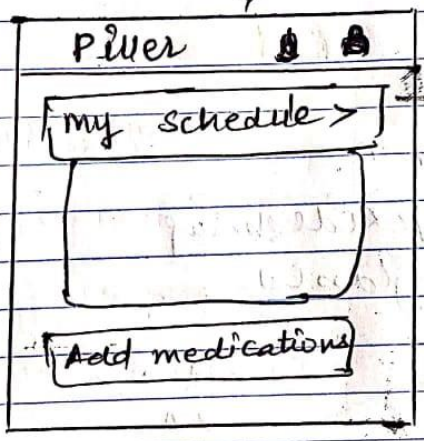
→ Added extension for user profile button.

(vi)



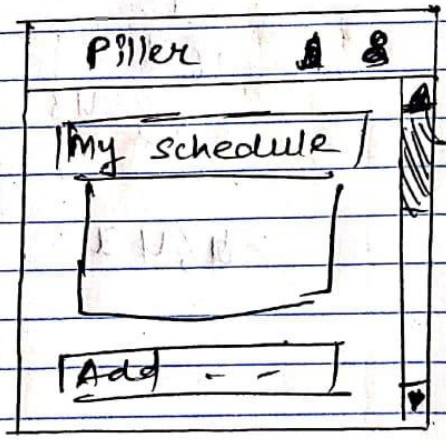
splitted the medication section into add and update / delete

(vii)



changed buttons to Accordion menu so as to decrease the navigation b/w pages.

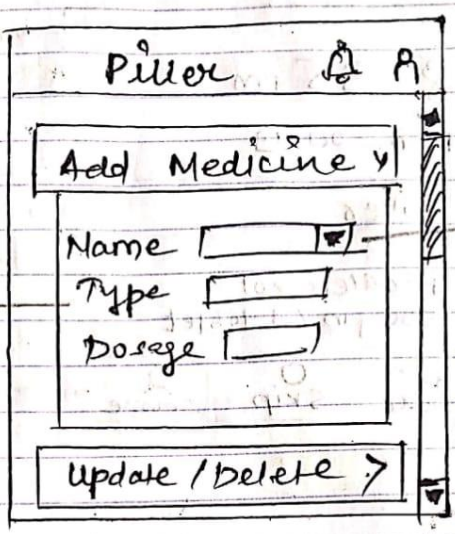
(viii)



Added a scroll bar so that user can see the other options & scroll throughout the page.

(2) Design challenge 2 : Enter Medication details

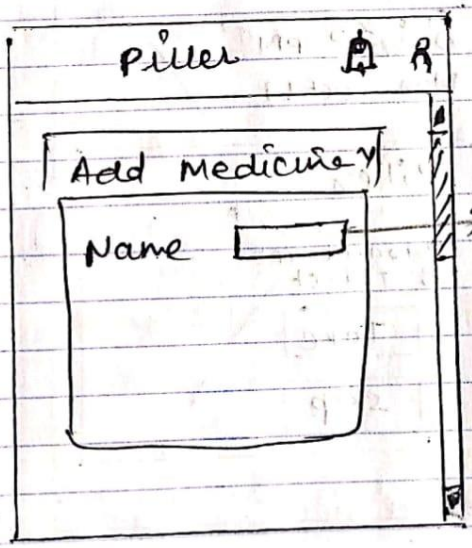
(i)



Text box Entry for other details

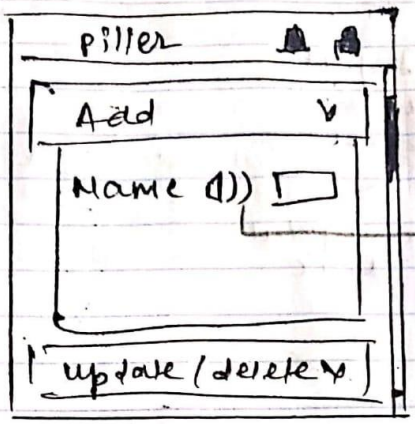
Drop down to add names of the medications for ease

(ii) or



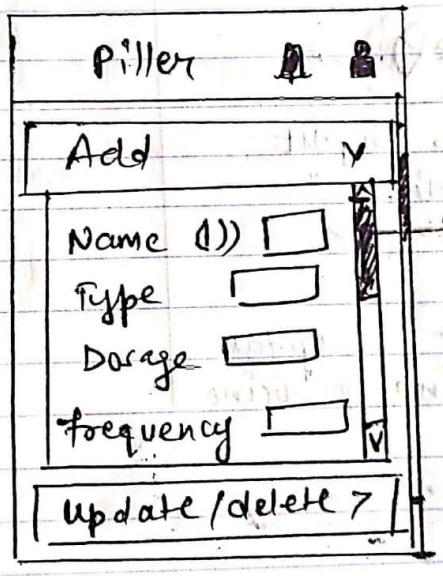
changed it to text box as the drop down may not contain options required by the user.

(iii)



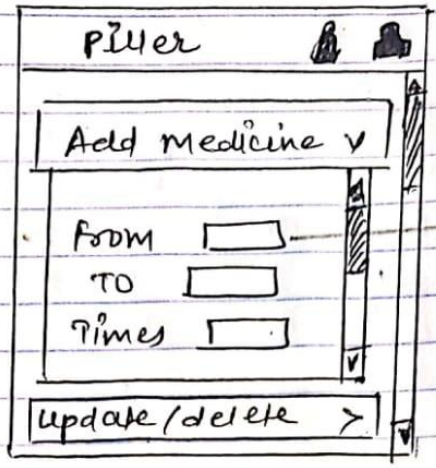
Added a audio output for medication name

(iv)



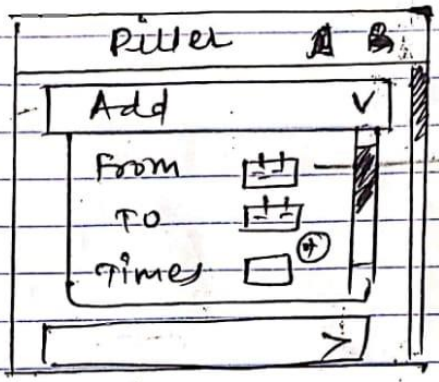
Added a scroll bar as inputs will be more & user will be navigating easily

(v)



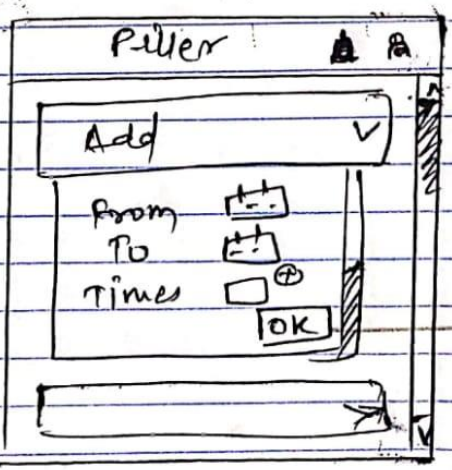
→ Added more detailed inputs for the user

(vi)



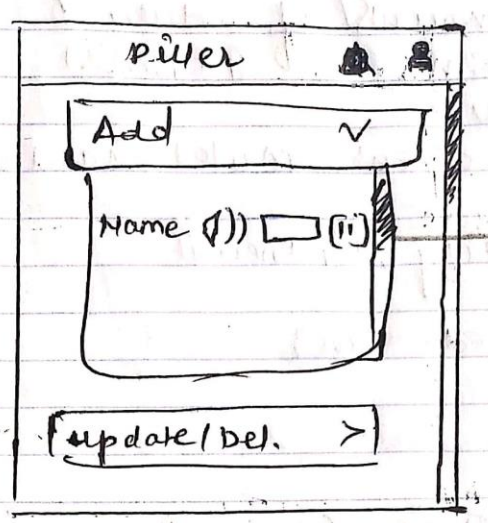
→ changed text view to calender view for ease in choosing dates

vii)



→ Added "ok" button when user has finished inputs.

(viii)

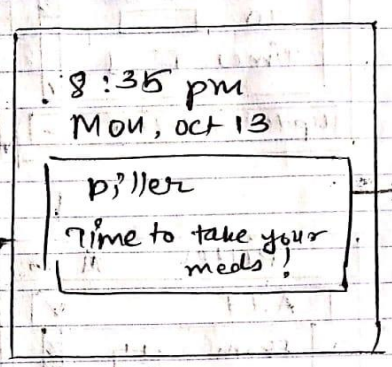


Added a scan functionality for the user to scan the image of the medication

(3) Design challenge 3 :

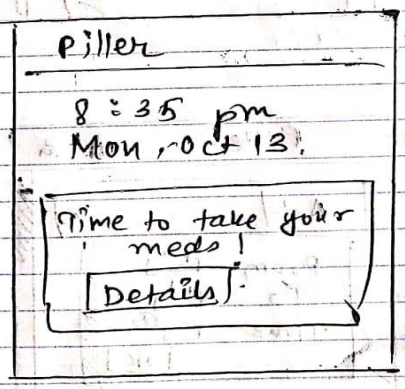
Receive notifications for primary users.

(i)



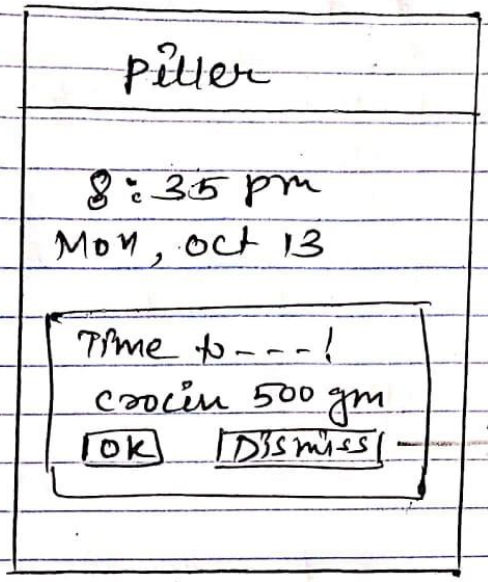
→ Notification on lock screen

(ii)



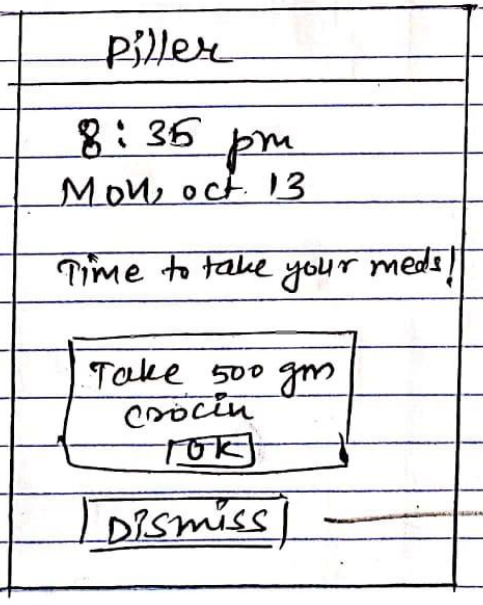
← Name of the app on the top to grab user's Attention

(iii)



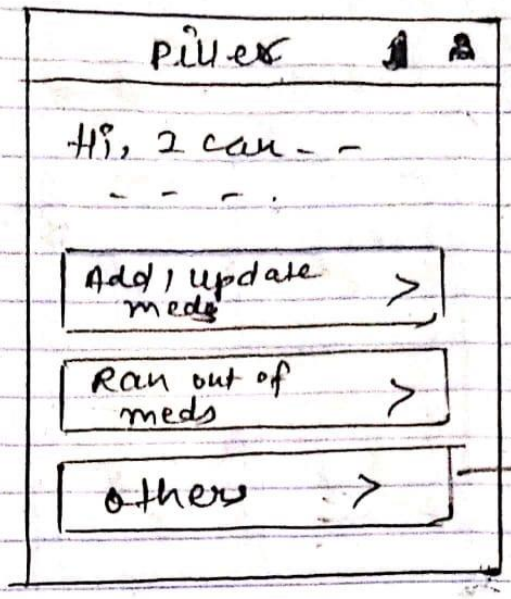
Added 2 buttons
→ ok and Dismiss

(iv)



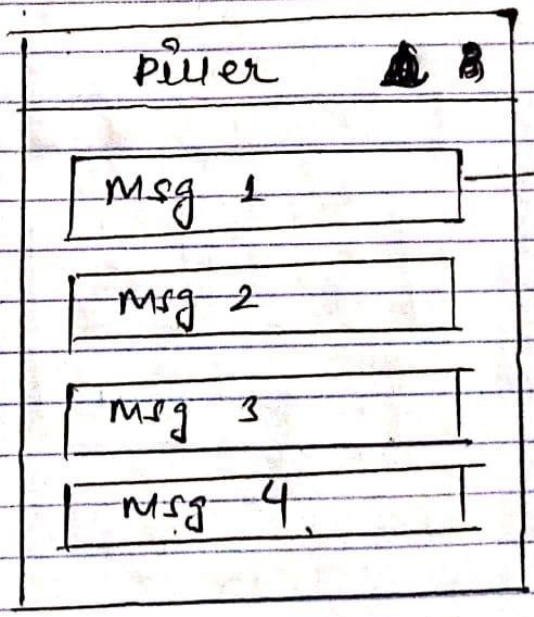
Separated the two buttons for the user's ease and understanding

(iii)



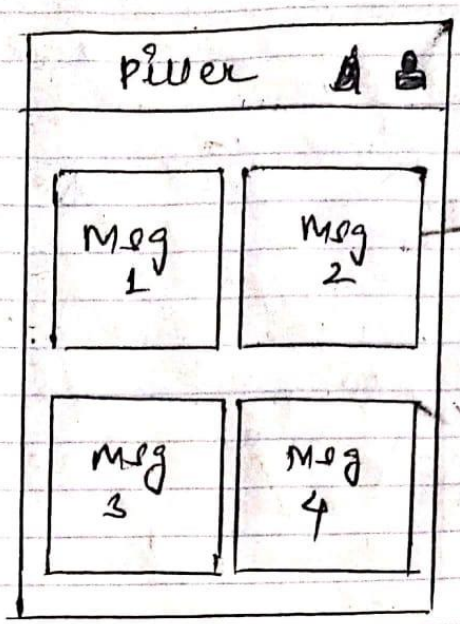
Added one more button, if the user wants to communicate anything else than medication

(iv)



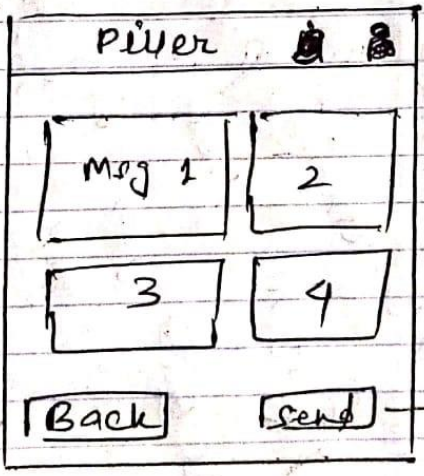
The autofilled messages on the next screen

(v)



→ changed msg from vertical view to grid view

(vi)



- Added Back button to go back ←

→ Add send button to send selected message