The A-Team: Instrumental

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GR 1

Problem Statement

Any musician who has had to travel to perform has either had their precious instrument broken, or heard horror stories from their friends about that time their instrument was thrown out of a truck and damaged, and they had to scramble to find a suitable instrument to perform on short notice. Usually this happens on national and international flights when performers are forced to check their baggage or pay for an extra seat on the flight because the instrument is bulky. It can also happen while driving long distances to perform, especially when loading and unloading their instruments.

On top of the potential damage to an irreplaceable instrument, the cost of repairing any damage can be very expensive, if not impossible. For some instruments this is on the order of thousands or even tens of thousands of dollars. In some cases, instruments that are damaged can never achieve the same tone and quality again. Musician's do not have many other options but to take their instruments with them and risk damage in transportation.

Interviews

(All names are made up to preserve the identity of the interviewees)

Interview Questions:

Note, a lot of these questions are applicable to pre-covid times since gigging has been relatively restricted.

- *What kinds of instrument(s) do you play?*
- *How heavy is your instrument?*
- *Have you ever been through an experience where your instrument was damaged in transit? (domestically or internationally)*
- *How often would you travel for a gig that is outside of the city you live in?*
- *What are your most frequent means of transportation for out of town gigs?*
- *Do you ever struggle to bring your instrument with you to another city?*
- *Would you feel comfortable renting an instrument in another city if it made transportation easier?*

- *How would you feel renting from an instrument owner as opposed to a company/business?*
- *How secure would you feel that the instrument rented from an instrument owner would have a good quality/tone, look presentable, hold its tune, etc.?*
- *Do you think having a rental for multiple days to practice would be beneficial on these out of town gigs?*
- *Would practice space be any interest to you on the out of town gigs?*
- *How important is price when looking at renting equipment/instruments in a foreign city.*
- *How important is reputation/reviews when renting instruments/gear?*
- *When searching for rental equipment, or equipment to purchase, what are characteristics and/or features you look out for? Ex. whammy bar on your guitar, amps go up to 11, drums have three toms instead of two (like on a jazz set).*
- *What are some challenges you face when traveling with and/or renting instruments?*
- *Would you be comfortable paying 100% of the rental fee for the instrument rental period up-front?*
    - *If not, what percentage of the rental fee would you be willing to pay up front?*
- *Would you be okay paying a security deposit that would be returned upon the instrument being safely returned to the lender?*
    - *If yes, what percentage would you be happy to pay; 10, 25, 50, 75%? (Please answer with highest percentage willing to pay)*

Interview 1:

Steve is a Cello player who travels locally around a 100 mile radius to different cities. He also travels by plane, but very rarely. His instrument weighs over 6 pounds on its own, and over 15 pounds including the case and various tools he needs to play. He has never had his instrument damaged himself, but has friends in his band who have.

When he has to fly to travel with his instrument, he is forced to purchase another entire seat to store his Cello. He has never thought of renting an instrument, but given the idea he is open to it. He is much more open to renting from an individual instrument owner than a business ***(GOAL 4)***.

Price is a very important factor, and for the right instrument from a seller with good reviews he is willing to pay 100% of the rental instrument fee up front, and a 25% additional fee as a security deposit ***(GOAL 3)***.

Interview 2:

John plays the violin for an orchestra. He travels frequently to different cities and even different nations to perform with the orchestra. His instrument and gear can weigh up to 15 pounds including the case and scores to be performed. He has never personally been through the experience of having his instrument damaged in transit. Because his instrument is small (violin) he can carry it with him on his back.

He is very specific about his instrument, and does not like the idea of renting an instrument ***(GOAL 1)***, but would feel more comfortable renting an instrument from an individual as opposed to a business since that would allow him to personally ask them detailed questions about the instrument ***(GOALS 4 &5)***. Because of the line of work he is in, the ability to rent a practice space is of more interest to John than renting an instrument would, but he would be open to renting an instrument in dire circumstances.

John would be willing to pay 100% of the rental fee up front, and would be okay with paying a 25% additional fee as a security deposit.

Interview 3:

Anslem is a piano keyboard player, and has to always travel to different locations domestically and internationally. Ideally he would always love it if his keyboard could somehow weigh less, since it weighs around 22 pounds for him. Not only that his keyboard requires a supporting stand which increases the dimensions of his instrument. He said he usually books an extra seat if travelling domestically, while he places the instrument with him on his seat for international travels.

Although Anslem is very possessive about his own instrument, he understands that carrying it all the time is not feasible and hence is positive about renting someone else's instrument, though he has never rented before due to the difficulties associated with it ***(GOAL 1)***. However, Anslem is not very keen to rent out his own instrument since he fears someone

(possibly an amateur) might break it ***(GOAL 2)***. He is comfortable in renting it out to a trained keyboard player.

Anslem is open to pay 20% of the rental fee before use, and is also ready for a 10% security deposit. He feels that he would increase his rental fee depending on the condition of the instrument ***(GOAL 3)***.

Observations:

From the interviews we have conducted there seems to be interest in an application that allows musicians to rent instruments and performers to rent practice space while they are travelling. There also seems to be a consensus for detailed specifications of the instrument along with a pre-association interaction with the renter or rentee. Overall, most of them are keen towards renting instruments as long as there isn't any harm from this rental towards their instrument.

User Classes

Class 1: Amateur and professional full-time musicians who also maybe travel to play music

Characteristics:

- Age range is 18 - 65 years, mostly dependent on gig/performance schedule.
- Comfortable with a varying range of price points from low ($100's) to high ($10,000's) from a range of per hour to per day.
- Trust individuals more than businesses/institutions, meaning they appreciate a personalized experience more.
- Are very meticulous about what instruments they rent out and rent for themselves, hence require accurate specifications of the instrument
- Usually busy during travels, hence prefer a quick and easy-to-use system
- Tend to be a bit more stricter while renting out an instrument versus renting in for themselves

User Goals

1. Ease of finding suitable instruments.
2. Trust in individuals renting out their instruments.
3. Some form of recourse if the instrument is not what is promised/expected.
4. Ability to communicate with an individual before renting their instrument to ask questions.
5. Very specific information about the instrument listed accurately.

GR 2

Scenario

Scenario From Borrower's Perspective:

Emma is the electric bassist for the Neon Tops. Her band just got a rare opportunity to play a set at Brooklyn Steel. The only problem? Neon Tops is from Chicago, well over 800 miles away. She agrees with her bandmates that this gig would really help to boost their band into stardom. Emma already has the Instrumental app and plans on uploading the information for her expensive flute to be rented out on the marketplace, so she opens the app and organizes the gear she needs.

After Emma finishes her class work for the week, she takes a quick uber to the airport, boards her plane, and flies to JFK International. Once she lands, she boards the subway and heads to her hotel in Queens. After she checks in, her phone buzzes, it's the contact with her rental. They meet in her hotel lobby and she takes the bass and amp.

After a short dinner, the band heads to Brooklyn Steel for their gig. Having the right gear and the ability to have it delivered to the hotel prepares Emma and the Neon Tops for their big show. After a killer performance, they would later become the hottest new indie band from the midwest.

Scenario From Lender's Perspective

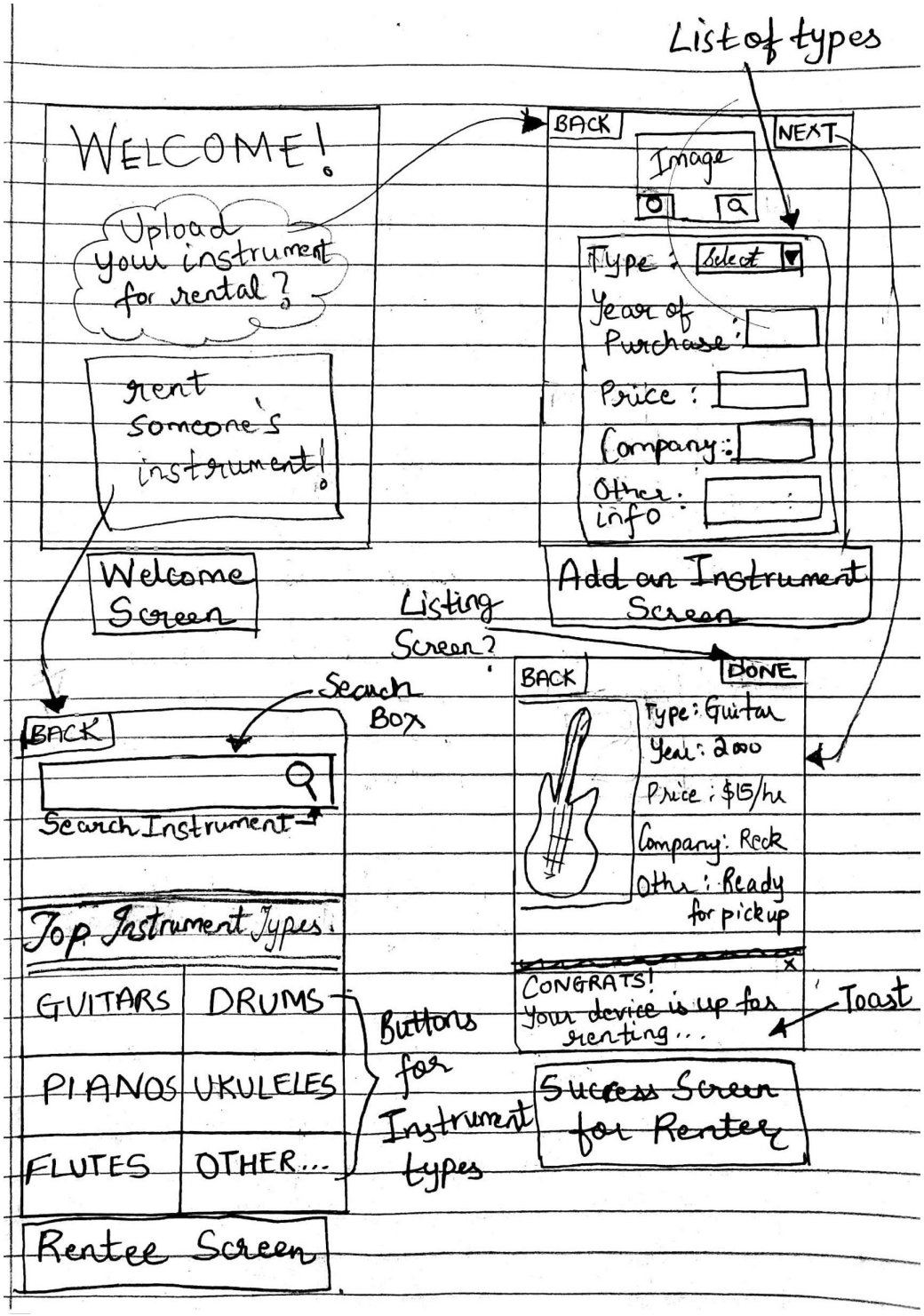
Ronaldo has been playing guitar since he was in primary school. Over time he has built up a collection of several electric guitars and amplifiers, which he has invested a lot of money in. He has several brands and styles of bass guitars that he does not use too often, but does not want to get rid of. He would like to utilize them in some way, and preferably make some money along the way.

He heard about an app called Instrumental where you can advertise and rent your instruments out to musician's in need, perfect! He downloads the free app, sets up an account, and takes some pictures of his guitars and amplifiers on his phone to rent out.

In just 2 days Ronaldo gets a message from Emma on the Instrumental app. They discuss the guitar and amplifier she needs, negotiate costs and agree on a neutral place to meet to exchange the gear.

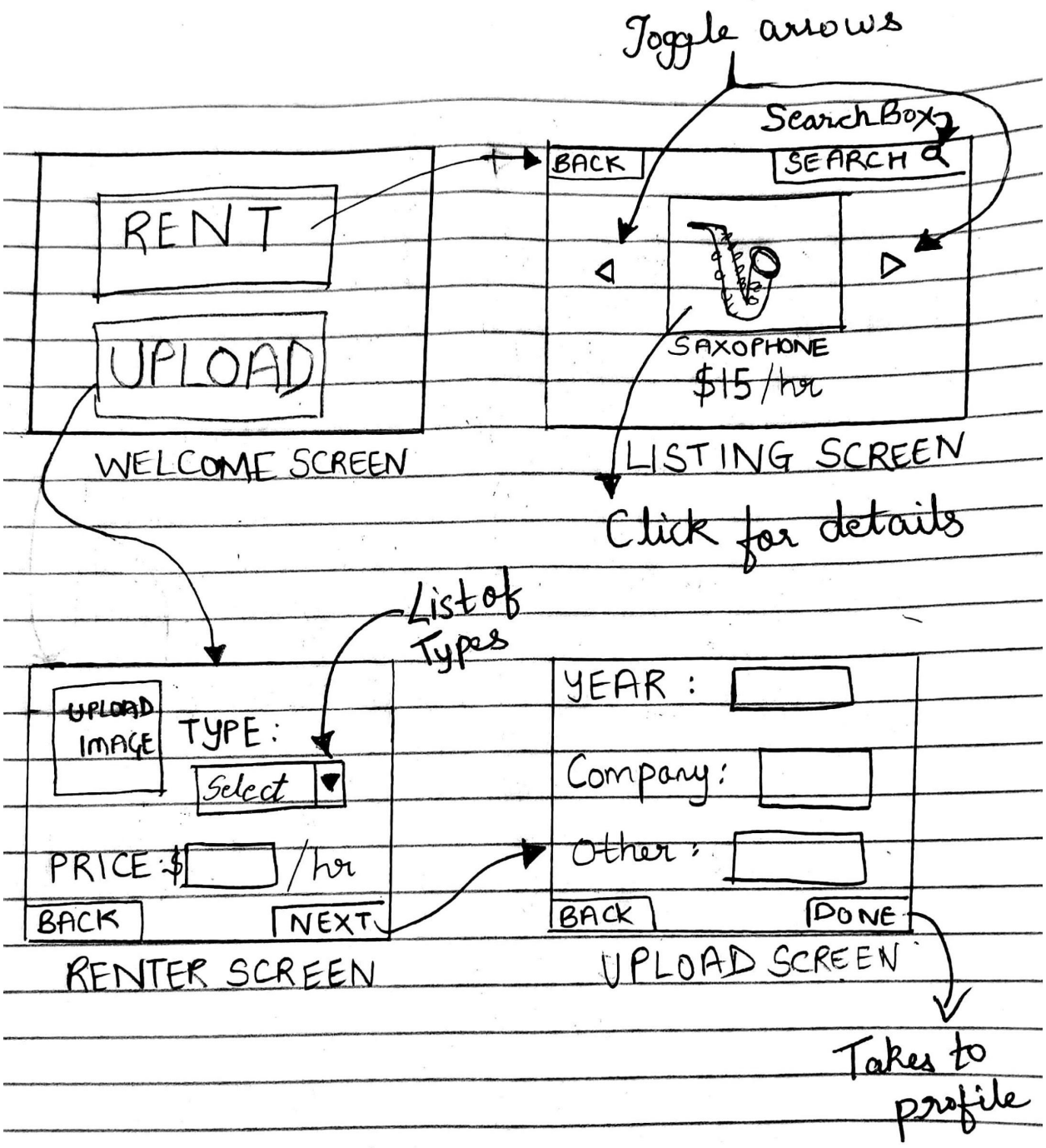
Design Sketches

Adwait's Sketches



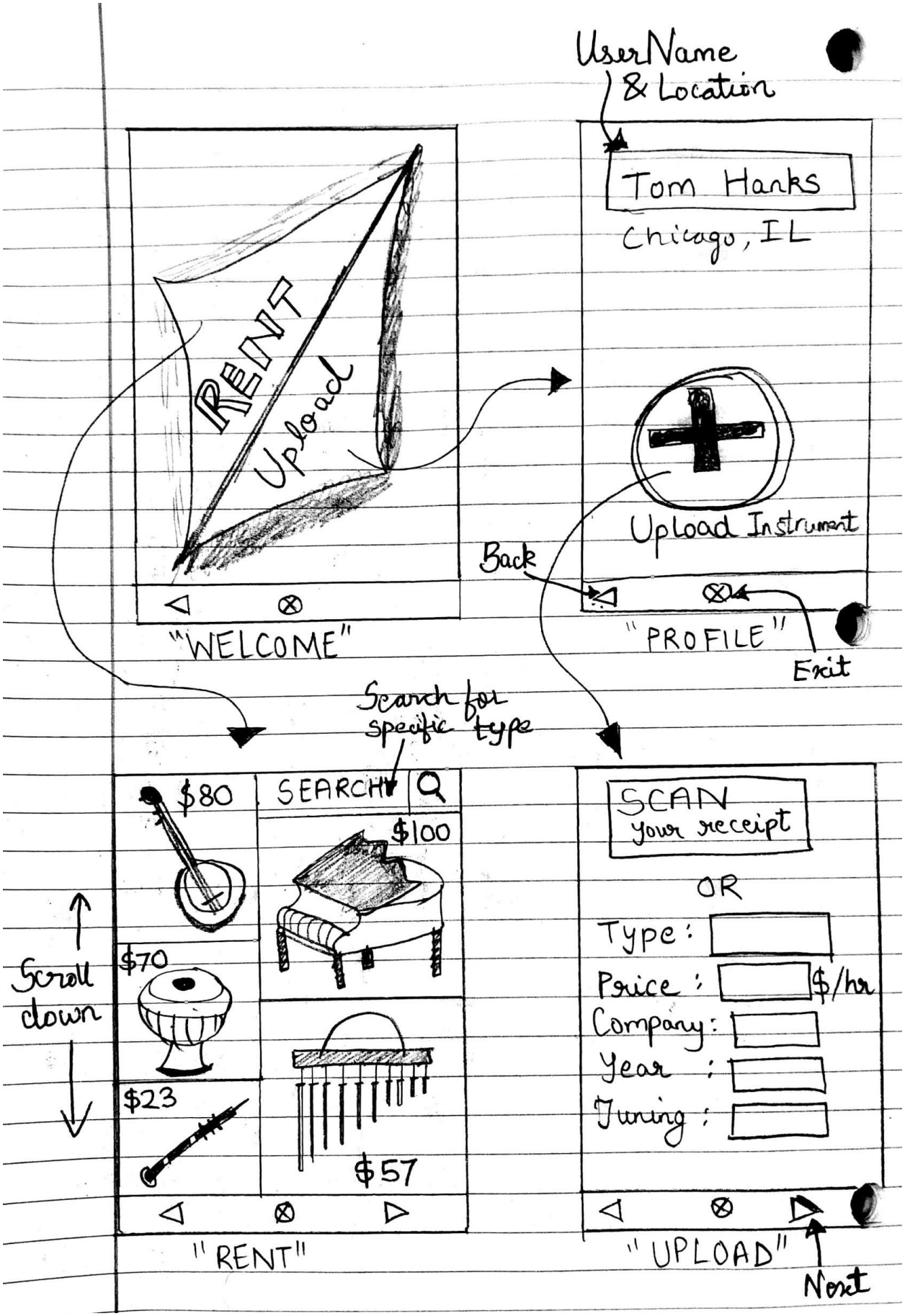
Sketch 1: This screen demonstrates the sketch which is targeted towards users who are mainly "elderly people". The "Welcome Screen" is kept very concise with large fonts making it easy to read. The users who wish to become a renter would go to the "Add an Instrument Screen" which captures the details of the instrument as simply as possible (without too many questions, since elderly usually are not comfortable with typing for too long, also they might lose their patience). The List of Types of instruments makes it easy to make a choice without making the user try to remember the name of the instrument type. Lastly, the "Success Screen for Renter" gives a little toast message when the instrument is successfully uploaded!

If the user is a rentee, they're taken to the "Rentee Screen" containing a search box and also popular instrument types rented via the app. This makes it easier for elderly to quickly get going without wasting time on finding buttons, or traversing crowded and confusing listings on the screen.



Sketch 2: This sketch is specially designed for a tiny screen (like smart watches). The "Welcome Screen" directly begins with whether a user wants to rent an instrument, or upload their own instrument. For Rentees, it takes them to the "Listing screen" with toggle arrows where you can scroll back and forth to go through each instrument. There's also a search-box to look up for specific types.

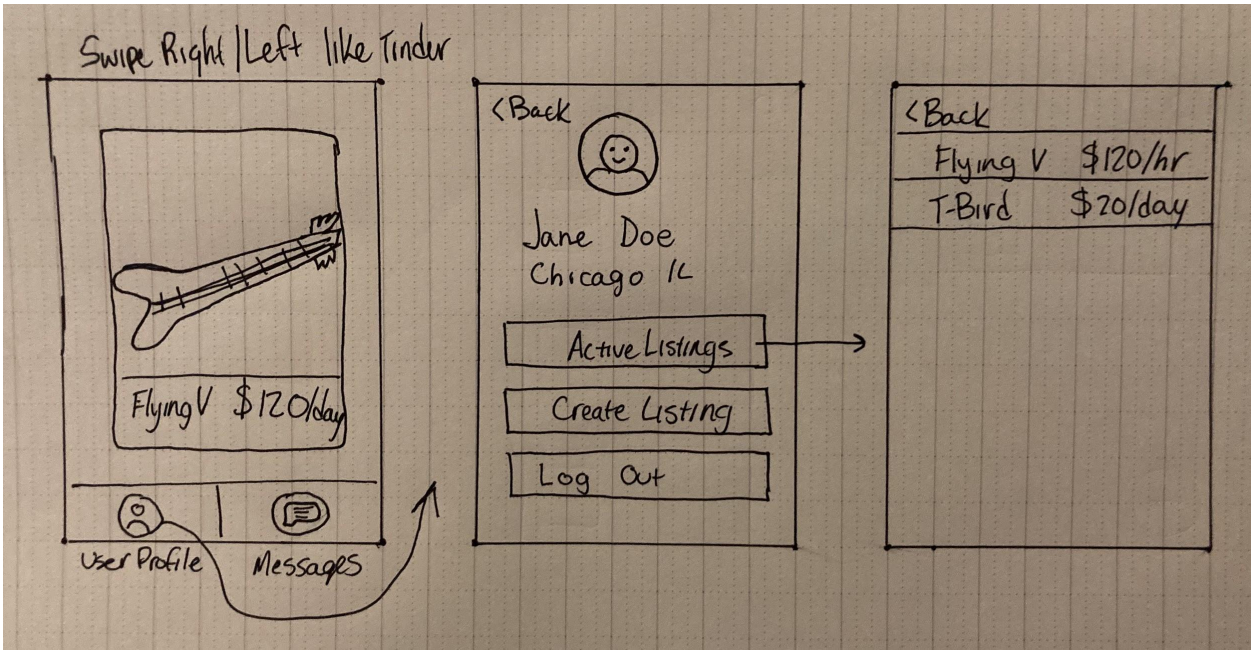
For Renters, they're taken to the "Renter Screen" to select a type from the list, upload an image (optional), and enter price. Lastly, they finish up the upload with a few more details in "Upload Screen" and are taken to their profile after pressing the Done button.


UserName & Location
Tom Hanks
Chicago, IL
RENT
Upload
Upload Instrument
Back
"WELCOME"
"PROFILE"
Exit
Search for specific type
SEARCH
$80
$100
$70
$23
$57
Scroll down
SCAN your receipt
OR
Type:
Price: $/hr
Company:
Year:
Tuning:
"RENT"
"UPLOAD"
Next

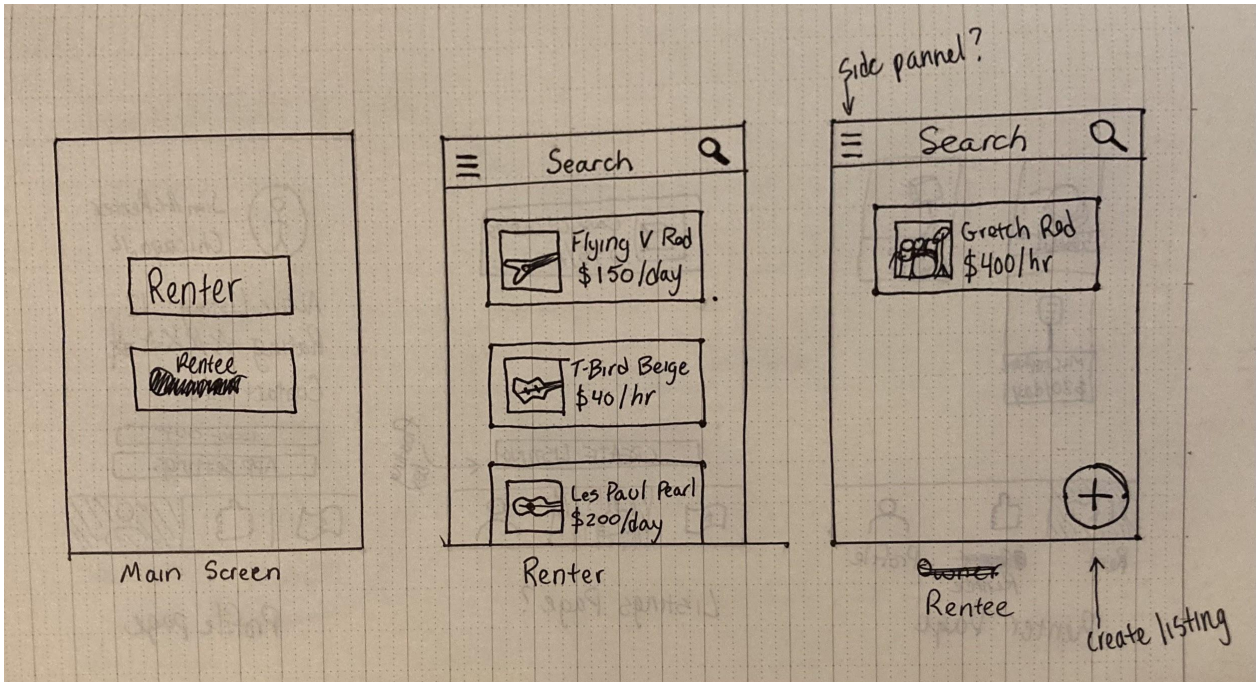
Sketch 3: This sketch is presenting an ultra-efficient design wherein the “Welcome Screen” takes a renter to the “Profile Screen” which displays the user’s name and location. It then allows users to add an instrument taking them to the “Upload Screen”, wherein user can either Scan their Purchase Receipt of Instrument (which contains all of the type, company, year, tuning and other specification information) OR they can quickly enter the fields given in the form below. This form auto-completes itself for type and company names thereby increasing efficiency. Also, in case the user scans their receipt, they will enter their Rental Price per hour after that.

For the rentees, they get to the “Rent Screen” from “Welcome Screen”. The “Rent Screen” displays a search box at the top right to look for specific instrument types. The entire screen displays different types of instrument images with their prices mentioned. The screen is to be scrolled up and down (vertically) for users to look at various “Top” and “Trendy” instruments being offered by the app right now.

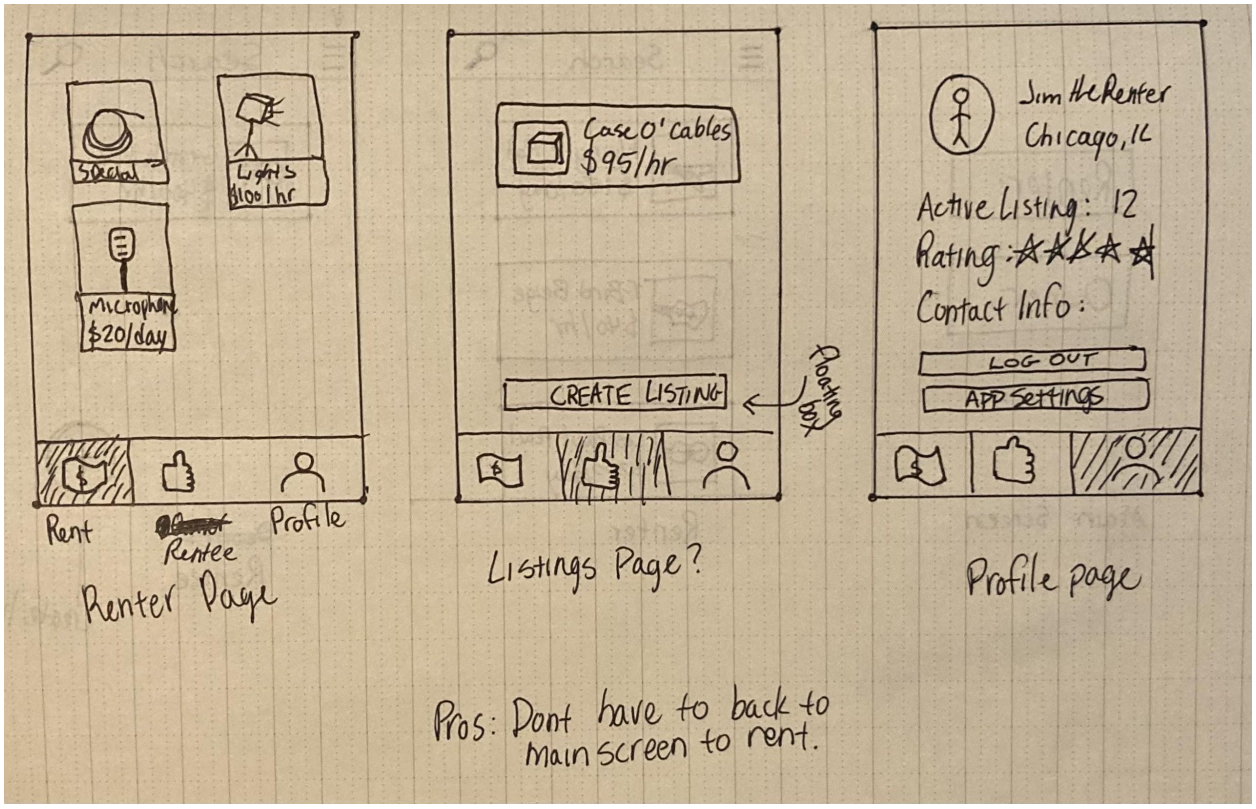
Ava's Sketches



Sketch 1: This design resembles Tinder's design pattern in which users can swipe right and left on instruments that pop into their feed. The main focus with this sketch is the ability to rent. This is why creating and managing a listing is done from the user's profile page.

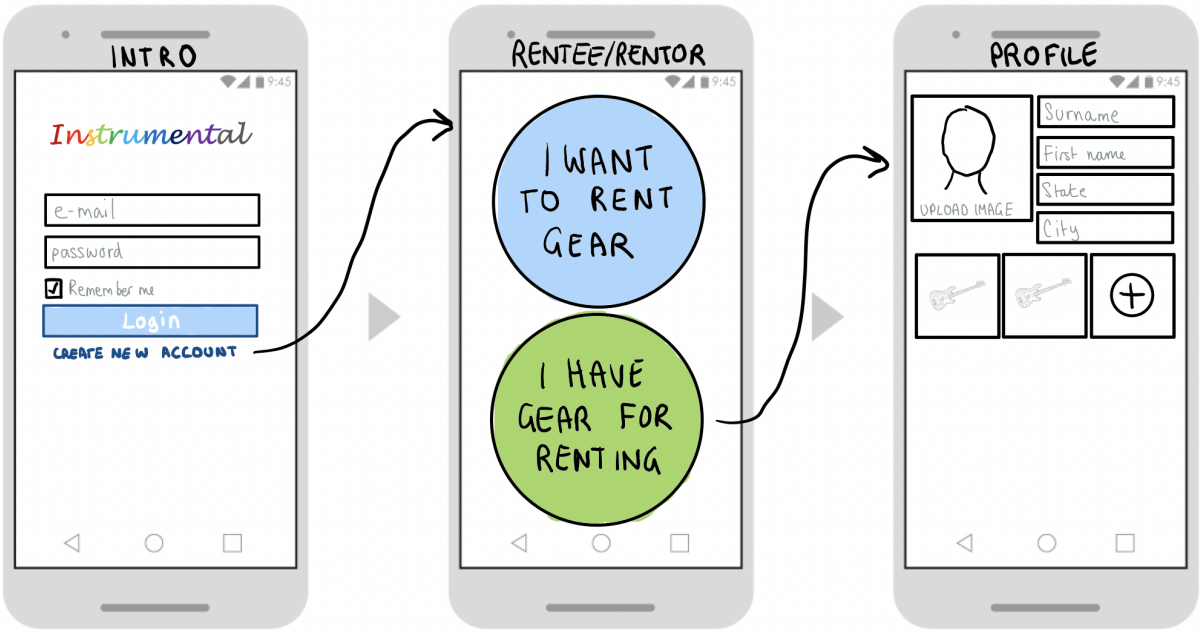


Sketch 2: This sketch separates the renter and owner sides of the app into two views. While this idea is good to keep each part as its own activity, we think that having to go all the way back to the main entry screen would be taxing to the users who want to both rent and have their instruments rented. Additionally, the use of the hamburger menu in the top left corner helps to hide the UI elements that aren't often used keeping clutter down.

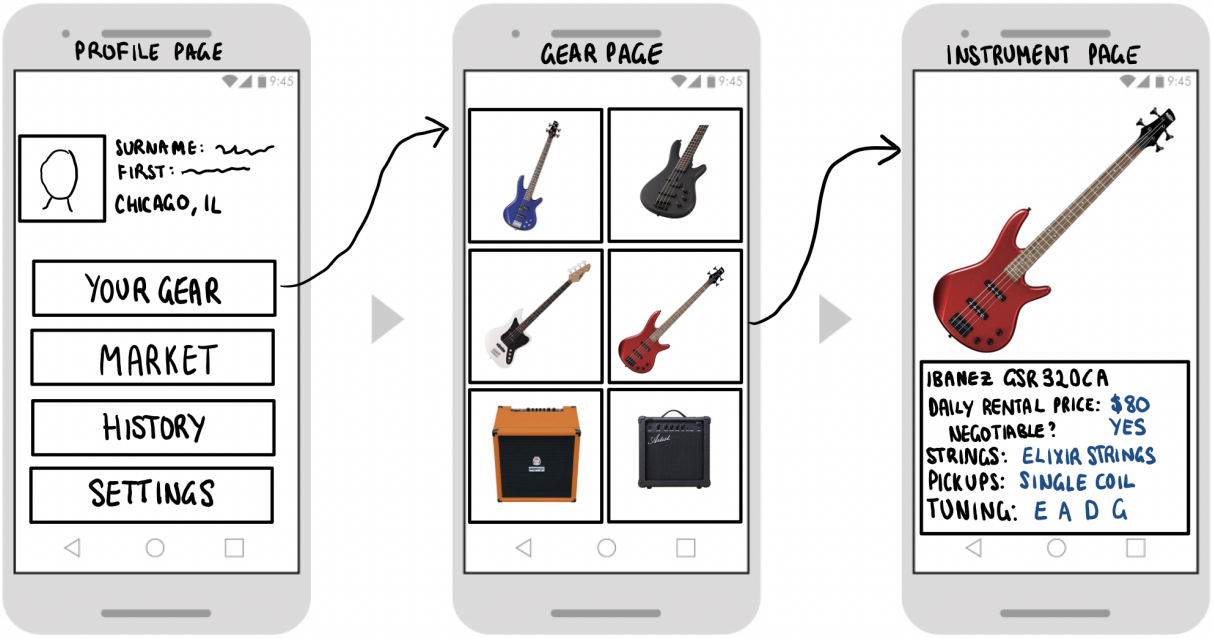


Sketch 3: This sketch attempts to simplify the UI by reducing the taskbar/toolbar to its main components, the ability to rent, the ability to list, and a user's profile. The benefit to this is that we do not have to go back to the main screen to switch between renting and listing your instrument.

Luke's Sketches

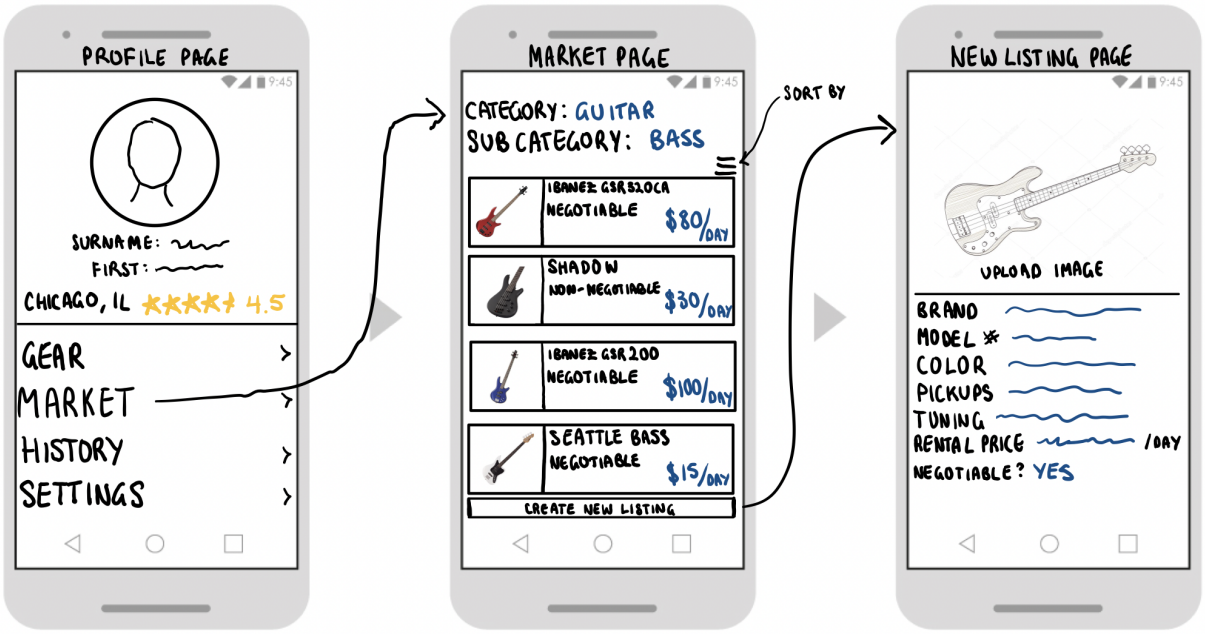


Sketch 1: This sketch demonstrates the login/signup process for users who first download the app. Once the user clicks on "create new account", they are presented with two distinct options. One for individuals who want to rent gear, and one for individuals who have gear for renting. In this example it shows the profile setup page for those who have gear for renting, which allows the user to upload a photo of themself (if they choose to do so), fill in some basic details about themselves, and upload their first piece of gear they want to rent out.



Sketch 2: This sketch shows an idea for a general layout for the app from the perspective of the person renting their own gear out to others. The first screen shows the profile page of the user with their basic information, and buttons linking to important areas within Instrumentally. If the user clicks on the “your gear” button, they are taken to the 2nd screen displaying gear they have uploaded to be rented out with images of the gear in squares to be selected. All of the fields and buttons are designed to be easily selectable with a finger or stylus.

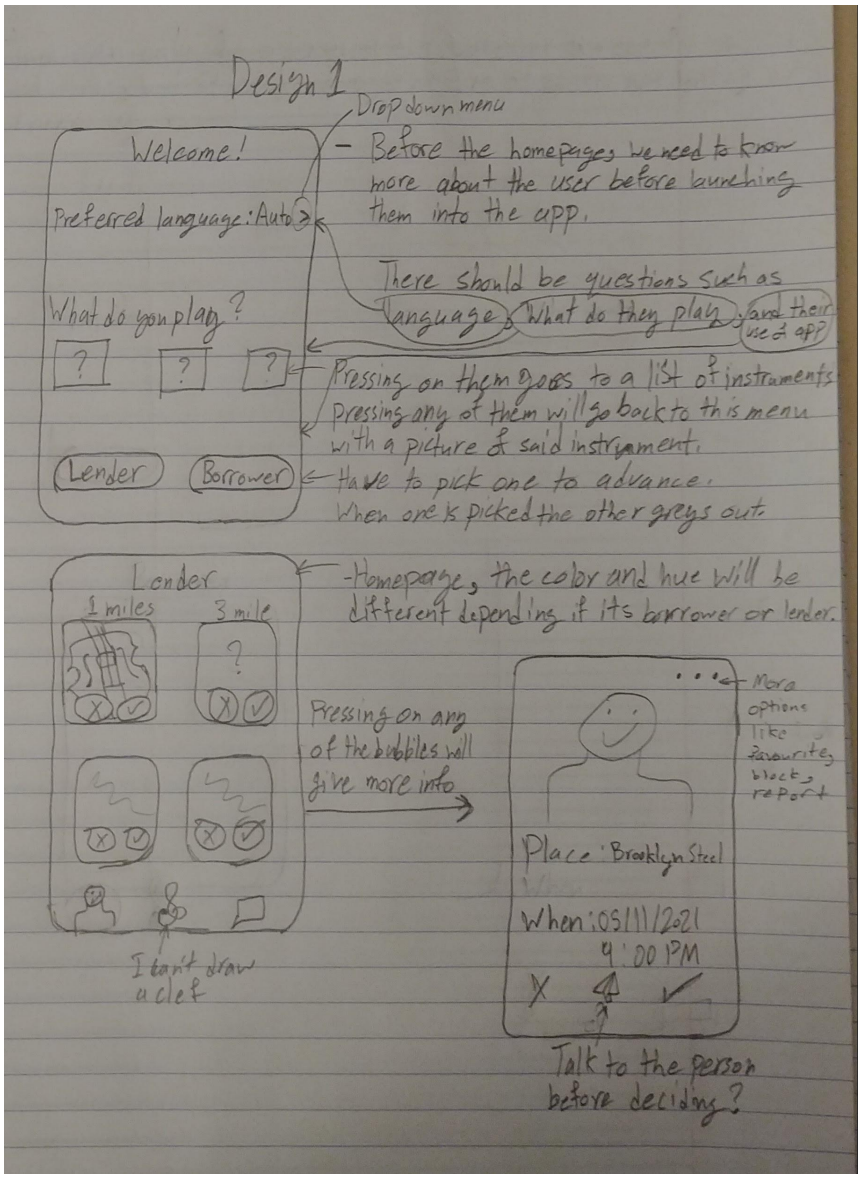
If the user clicks on any of the square buttons, they are taken to the information page for that piece of gear which displays the brand and model # of that item and more information. All of these fields are editable by the user



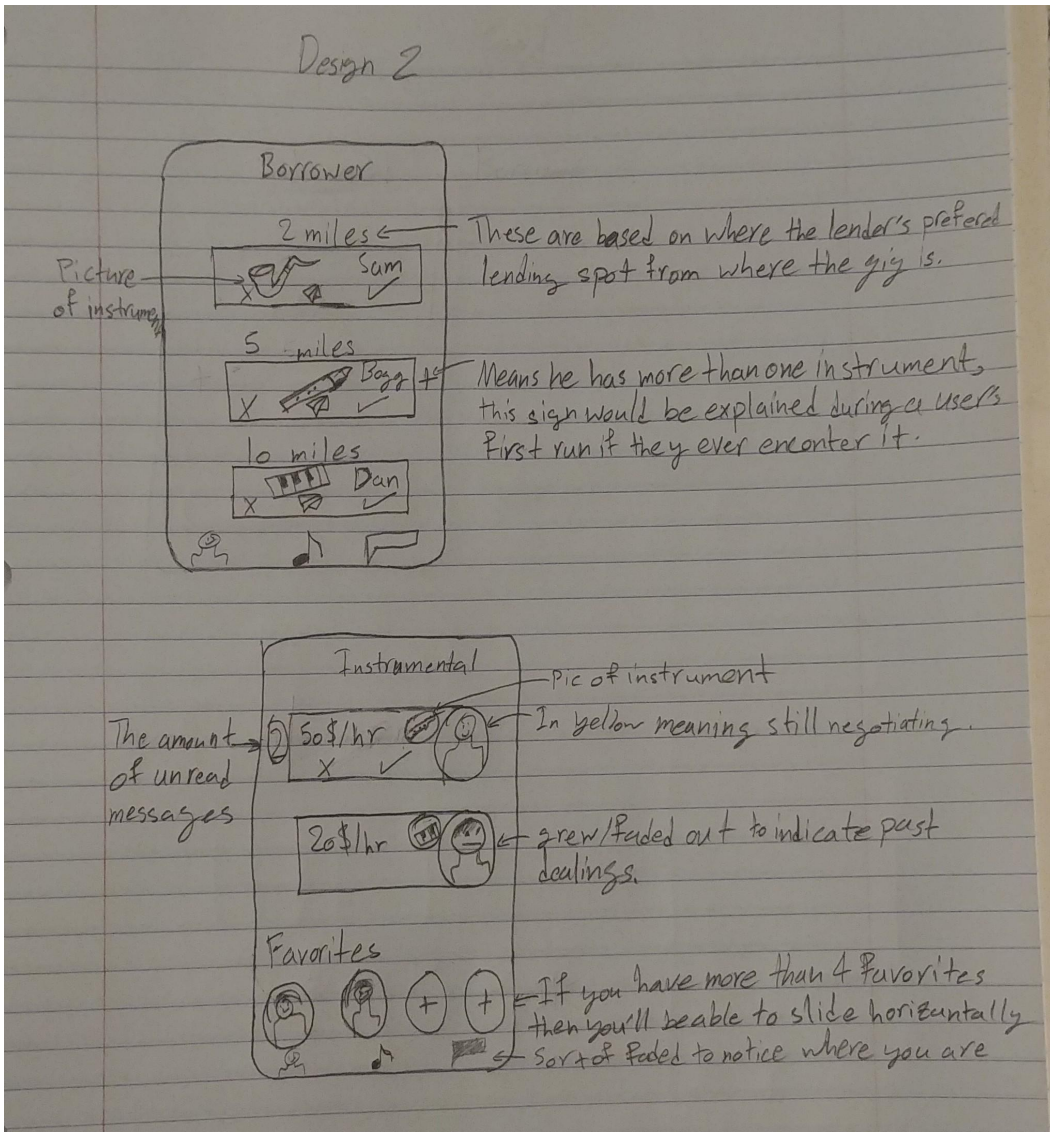
Sketch 3: This sketch shows a different version of the profile page, displaying the amount of stars a user has based on reviews from users who have rented out their gear. This time, the user has clicked on the Market button which has taken him to the market page. Here users can search for and filter for gear that they want to see.

There is also a sort button that allows users to sort by price, weight, color, tuning, and geographic area, among other things. If the user clicks on the “create new listing” button, they are taken to a default new listing page with information for them to fill out. This page will change the fields listed depending on the type of gear the user is adding. For a guitar, the fields above are displayed, but if the user is uploading information about an amplifier or another instrument, appropriate fields will populate for the user to input data into.

Sam's Sketches

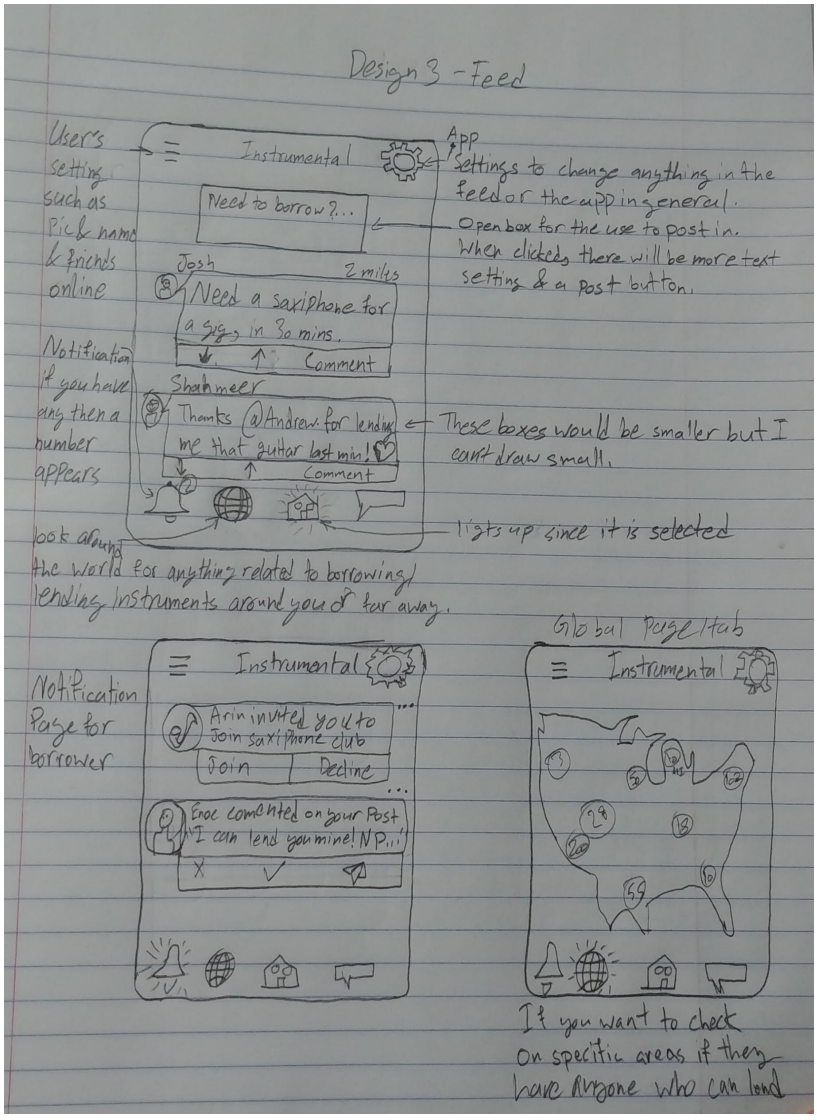


Sketch 1: This sketch is aimed at efficiency, as it is minimalism (to a degree), everything that looks like it is clickable, can be clicked. The homepage has many hints and visual aid as to where they are at, and what instruments do people need in a well spaced margin between the item boxes. The profile of any person is geared towards direct information, and anything more can be talked about in a direct message.



Sketch 2: This sketch is more for the hard-of-reading users as it focuses more on visuals, pictures that help them understand what to click or helps them in achieving their goal. The buttons are fleshed out clearly and the actions entailed by said buttons should be understood by an intermediate phone user but may take some learning for a new user.

Pressing on any of the boxes in the homepage moves to the messaging page drawn in the sketch image.

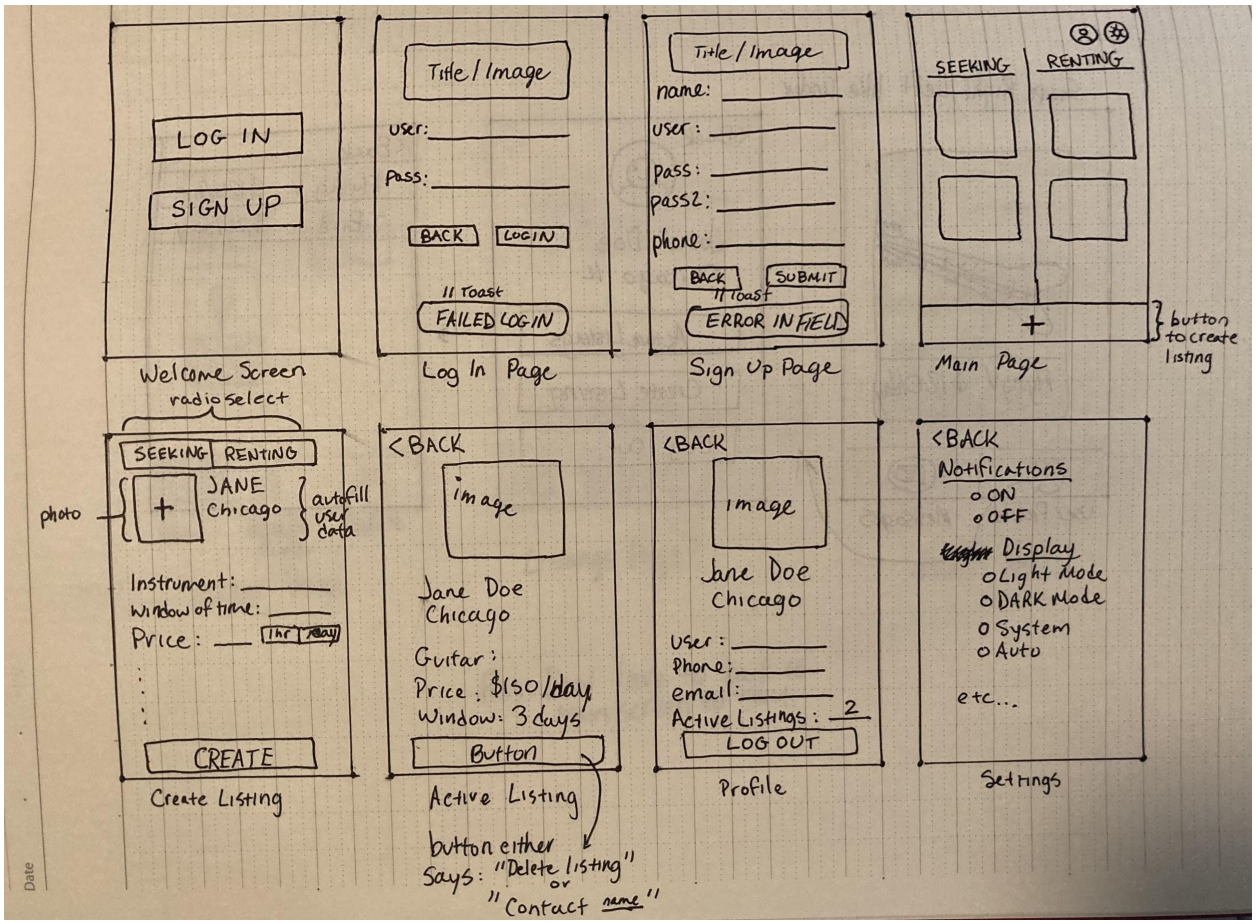


Sketch 3: This sketch focuses more on the social side in order for the app to fulfill its main goal, by having a feed and interactions, it can spawn business relationships and can give reputation to people which in turn, grows the business and make their work much more viewable, all of that helps the user find lenders/borrowers quickly and easily. It also includes a map to give a major boost in visual aid, for users who are new to certain places, can easily figure out where borrowers/lenders are.

The page buttons are easy to understand, and navigating through to fulfil certain actions will not be hard, so it decreases slips and any mistake will not be punished.

Group Designs

Design 1 & Analysis



Storyboard: The user goal is to upload flute for renting out, and check guitar listings for their upcoming concert using Dark Mode of the app. Also, the user does not have an account with the 'Instrumental' app. The user begins at the **Welcome Screen**, after which they click on the 'sign up' button, which takes them to the **Sign Up Page screen**. After filling in the required information, the user clicks the 'submit' button to be taken back to the **Welcome Screen.** Now they log in with the **Login Page screen** and click "log in". The user now comes to the **Main Page screen.** To add their Profile Picture, the user clicks on the profile icon at the top right of the **Main Page screen** which takes them to the **Profile screen**, where they add their Profile Picture and go back to the **Main Page screen**. To enable dark mode, the user clicks on the

settings icon at the top right of the **Main Page screen** which takes them to the **Settings screen**, where they enable the dark mode.

After coming back to the **Main Page screen,** the user clicks on the bottom '+' button to create a listing for the flute. This takes them to the **Create Listing screen** where they choose 'Renting' from the top radio button, fill in information and then click okay. After going back to the **Main Page screen**, the user can now see their instrument on the Renting (right hand side) half of the screen. If the user clicks on their instrument under the Renting side, they are taken to the **Active Listing screen** where they can review their instrument information and even delete it, if they want to, using the bottom 'Delete Listing' button.

Now, the user would like to seek (borrow/rent) a guitar for their concert. So they again click on the bottom '+' button to enter details in the search filter. The '+' button takes them to the **Create Listing screen** where they choose 'Seeking' from the top radio button, fill in information and then click okay. After going back to the **Main Page screen**, the user can now see different guitar listings on the Seeking (left hand side) half of the screen. After the user clicks on a guitar listing that interests them under the Seeking side, they are taken to the **Active Listing screen** where they can review this instrument information, along with checking the renter's name and information. Now, the user likes this listing and is comfortable with the price, so they would use the bottom 'Contact Renter' button to indicate their interest.

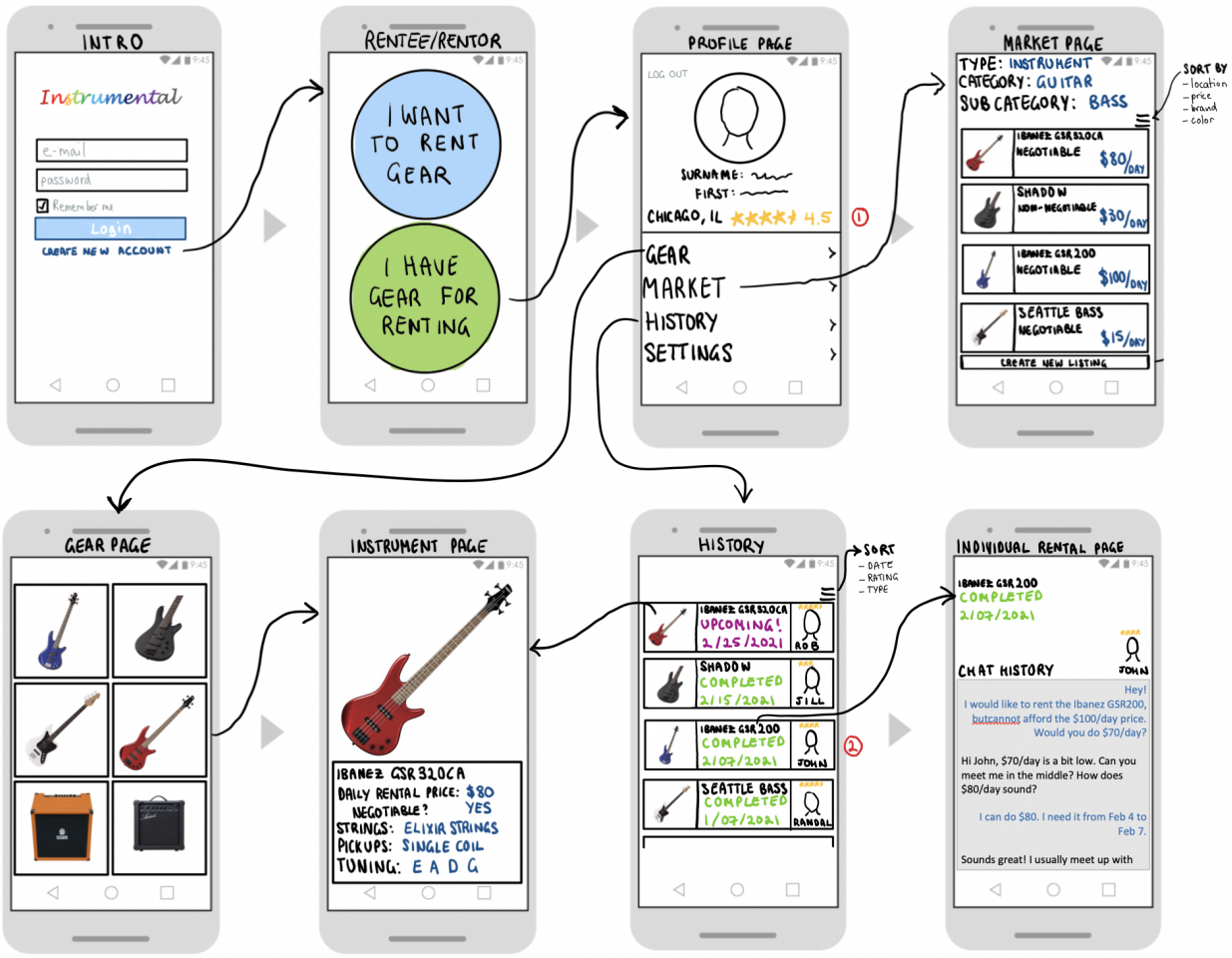
Analysis:

- The main page for this design consists of two columns, one for seeking an instrument, and the other for renting your instrument to others. This allows users to keep tabs on their own listings while keeping the ability to search for other instruments. Reducing the elements in the main page can help streamline a user's experience and reduce what they need to learn to get started. Additionally, having UI elements that are multi-function help to reduce this clutter. We can see that the bottom + button on the main page brings us to the create listing page. This allows a user to create a listing for either their own instrument or an instrument they want to rent. The way to toggle between those two options is presented in a radio select button at the top. Once a user enters their listing, the

application will try to pair their listing with other active listings. Hence, this design has a very easy learning curve with avoiding clutter on screen and keeping the design concise. One bad point is that it can get a bit tricky to initially get used to and learn the functions of different screens and buttons.

- For new users it can get a bit longer to fill in information, log in, add a profile picture but for existing users, this design is pretty efficient in achieving a goal. It requires on an average 3-4 screens to fulfil a functionality.
- A negative point is that the **Sign Up Page screen** contains too many buttons that are very close to each other, which can cause safety issues while account creation, and username and password formation. A positive point regarding safety is that a person is required to create an account before renting/seeking an instrument.

Design 2 & Analysis



Storyboard: The goal is that the user wants to look at the history of a transaction they had back in early February. Initially, they are greeted by the **Intro/welcome screen**, enter their details and then click on the "CREATE NEW ACCOUNT" text to create an account, or Login button to login.

After creating a new account or after logging in, the users are taken to the **Rentee/Renter screen** with two large buttons to help them navigate the app where they can specify why they are using the app. This user has gear for renting, so they tap on the big green button. They move on to the **Profile screen** where they fill out basic information about themselves, and where they can further navigate through the application. For demonstration purposes, this user has pre-filled information in their gear and history pages.

The user first clicks on the “MARKET” button to be taken to the **Market Page screen** to check out what gear is out in the local marketplace, then moves back to the **Profile screen** and clicks on “GEAR” button to be taken to the **Gear Page screen** to look at the information on the gear they have uploaded to ‘Instrumental’. They look at one of their individual instruments on the **Instrument Page screen**, the Ibanez GSR320CA in this case to make sure they have an accurate rental amount written down, and then return back to their **Profile screen**. Back at their **Profile screen**, they click on the “HISTORY” button, which takes them to their history of rentals on the **History screen**.

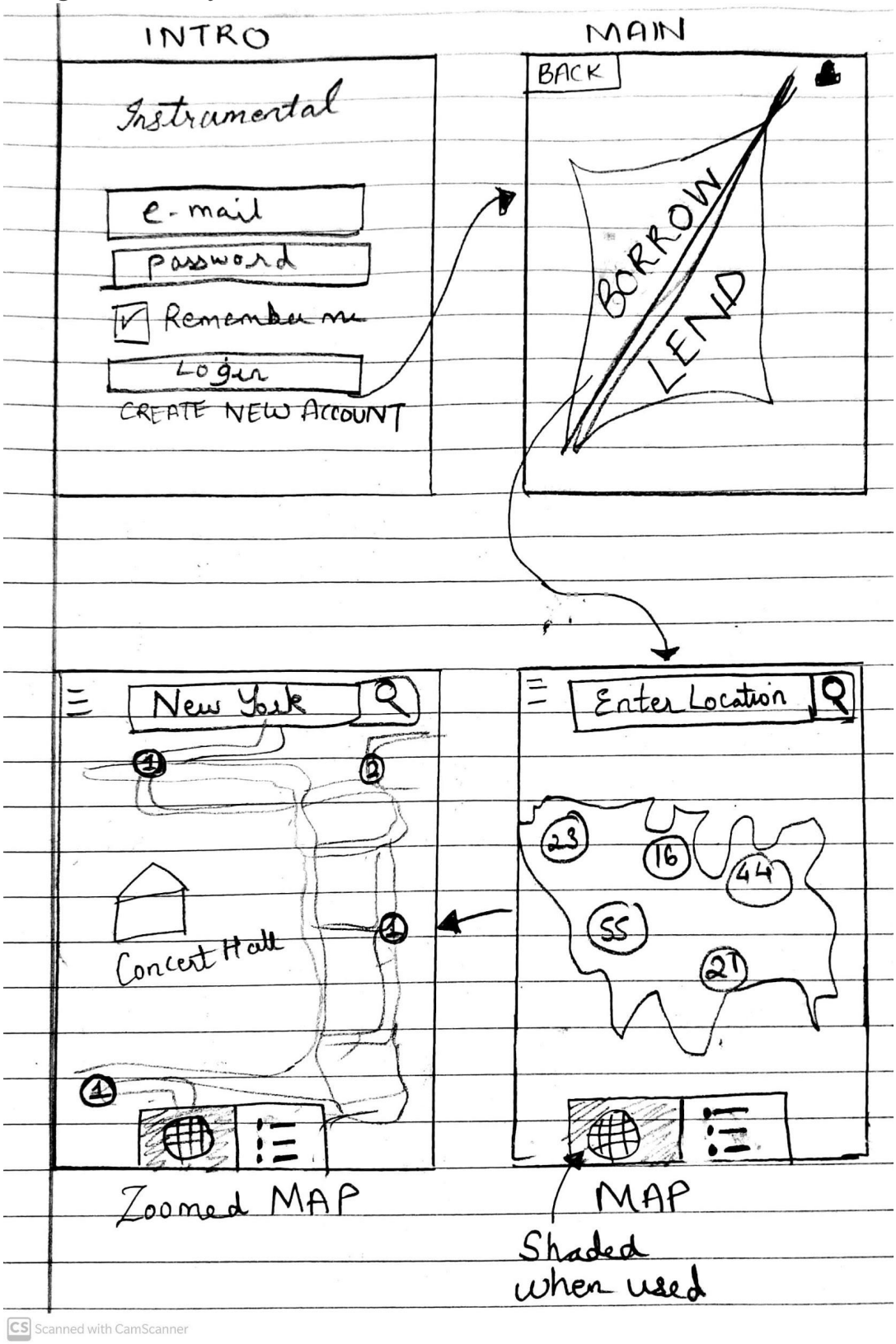
Within their history of rentals, they can click on the button for either the gear icon which will take them to the **Instrument Page screen**, the photo of the user they rented to on the right which will take them to that user’s **Profile screen**, or the text in the middle which will take them to the **Individual Rental Page screen** for that rental. In this page they can look at the chat history for the rental, and when the rental was completed.

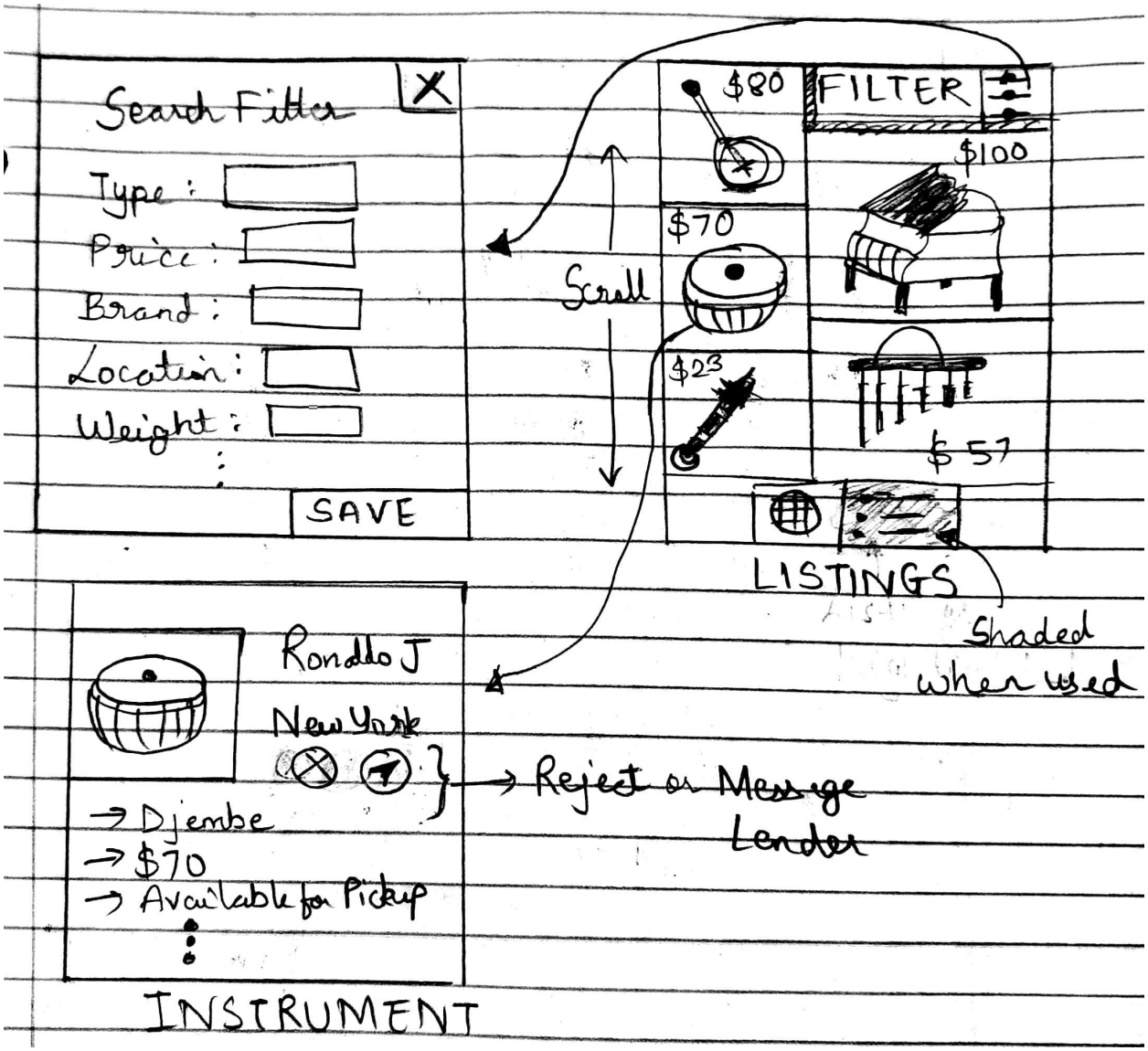
Analysis:

- This design demonstrated the signup process and interaction with the application from the view of an individual who wants to look at their rental history after renting their gear out to others. Buttons are big and obvious for ease of navigation and learnability, and everything that the user thinks they are able to interact with, they are able to interact with. This is both positive and negative, as it is not always immediately obvious to a new user what elements are clickable and where they will bring you, but the logic is intuitive and users will quickly learn what areas are clickable and where they take them. For example, at (1) on the **Profile screen,** the star rating in the profile page is clickable to look at the review history of the user. At (2) on the **History screen,** the profile picture of the user is clickable to go to that user’s profile. This design balances learnability, efficiency and safety so the app is easy to jump into, and also easy to navigate for advanced users.
- This design does not demand an elaborative rehearsal of steps in order to fulfil a goal, and hence is very efficient. Like the user is needed to pass through 4 screens in order to check the **Instrument Page screen.**

- A negative aspect regarding safety could be that any random person can send you spam/risky links via the message feature, which can be quite dangerous. A positive aspect regarding safety is that a person is required to create an account before sending any sort of information via message.

Design 3 & Analysis





Storyboard: The goal of the user is to rent a guitar for their gig in New York. The user already has an account with the application. Initially, the user starts with the **Intro screen** where they enter their email and password which takes to the **Main screen.** Here, they are greeted by the welcome screen where the user decides whether they are lending an item, or borrowing an item. They want to borrow a guitar for their gig, so they tap “BORROW”.

Once they click on borrow, they are taken to the **Map screen** which shows the user a map of the country they are currently in. The user can change the continent/country they are on, or click on a city with available listings shown by the circled numbers hovering over the cities on the map. The user clicks on New York, which takes them to a **zoomed-in view** of the city **(Zoomed Map**

screen). There they can navigate the map and search for the gear they need based on proximity to their hotel or their gig space. The bottom bar of **the Map screen** contains 2 icons for Map and Listings each. The one that is used is shaded/selected.

Clicking on the 'listings' icon, takes the user to the **'Listings screen'** where they can explore various instruments with their pictures and price per hour. Clicking the Filter button at the top right corner of the **Listings screen** takes the user to the **Search Filter box** where they enter the type, price, location, etc. of their preference and choice. Our user enters New York and Guitar here along with a price they are comfortable with. After they save these filters, the **Listings screen** updates itself with listings of guitars in New York based on the specified price range. Lastly, clicking on the guitar image takes the user to the **Instrument screen** where they get to see all the specifications of the instrument, along with the name of the Lender, whom the user messages using the button provided, in order to denote their interest.

Analysis:

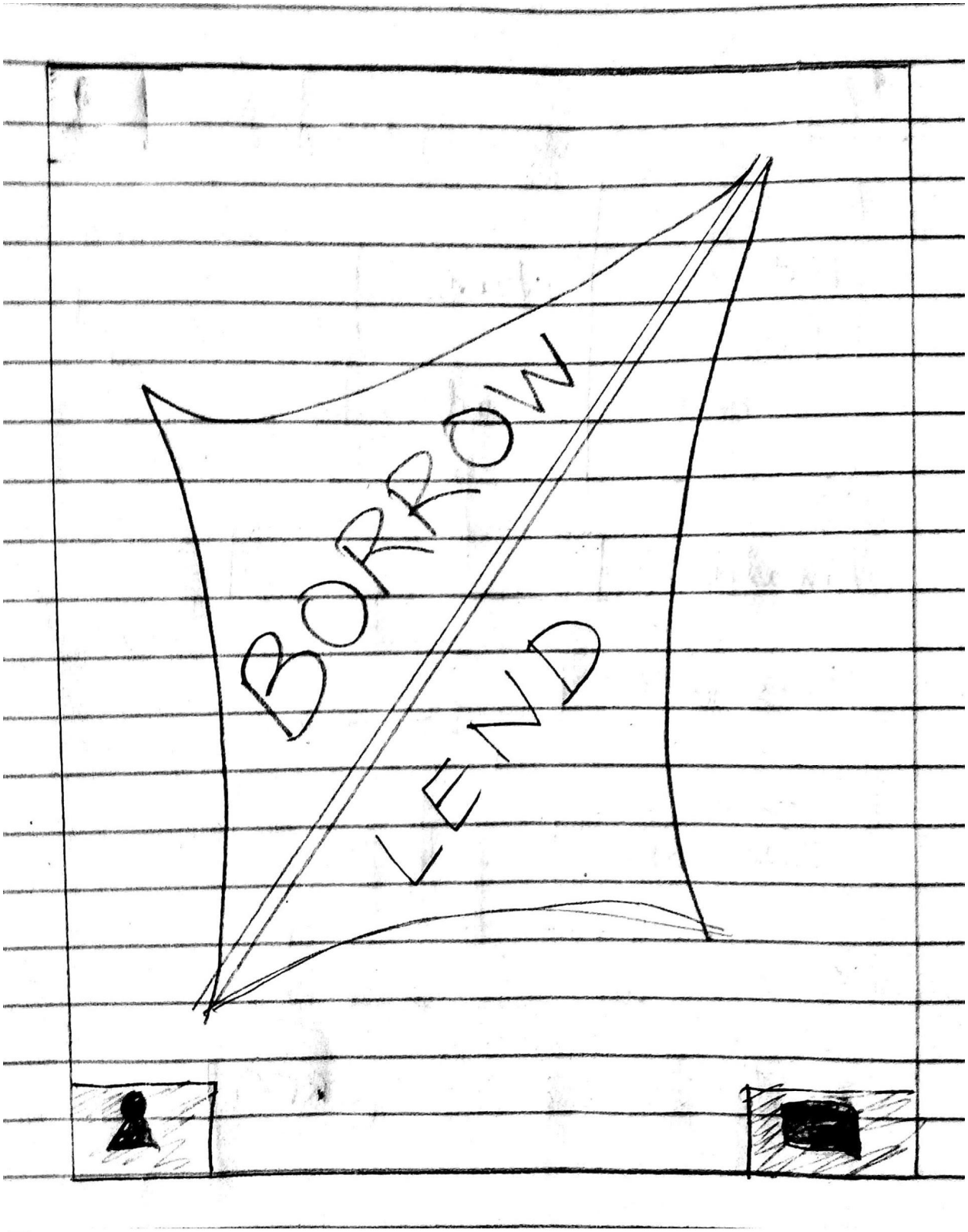
- This design is more focused on the visual aspect, as navigation is encouraged through maps of the country and city you are wanting to rent your gear from. This map is great for learnability, however using the design of a map for navigation increases the risk of mistakes and misclicks, which decreases the safety of the design for the sake of learnability.
- A downside to this design is the need to navigate back and forth to switch between borrowing and lending. However, this could be helpful in separating the users' experience.
- The ability to filter searches for instruments is helpful in streamlining users' experience. This also helps to reduce the load of the server (or what we use to return results) as it would have to return a significantly smaller amount of data. This makes this design much more efficient as well.
- The overall learnability of this design is easy because of the visual cues present throughout the design. Anything that seems like it can be clicked, can actually be clicked.

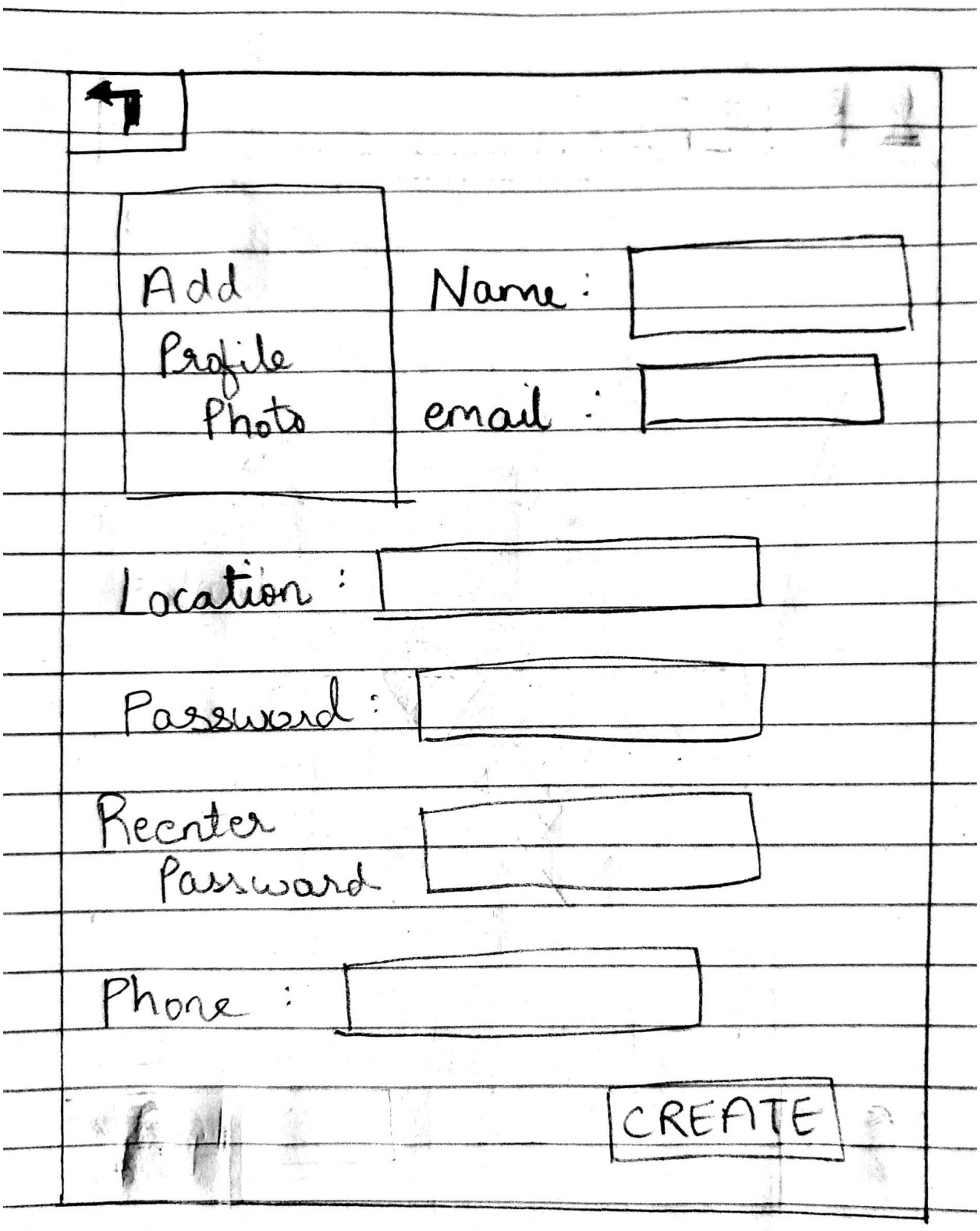
Initially though, there is a learning curve to understand the functionality of icons for a new user.

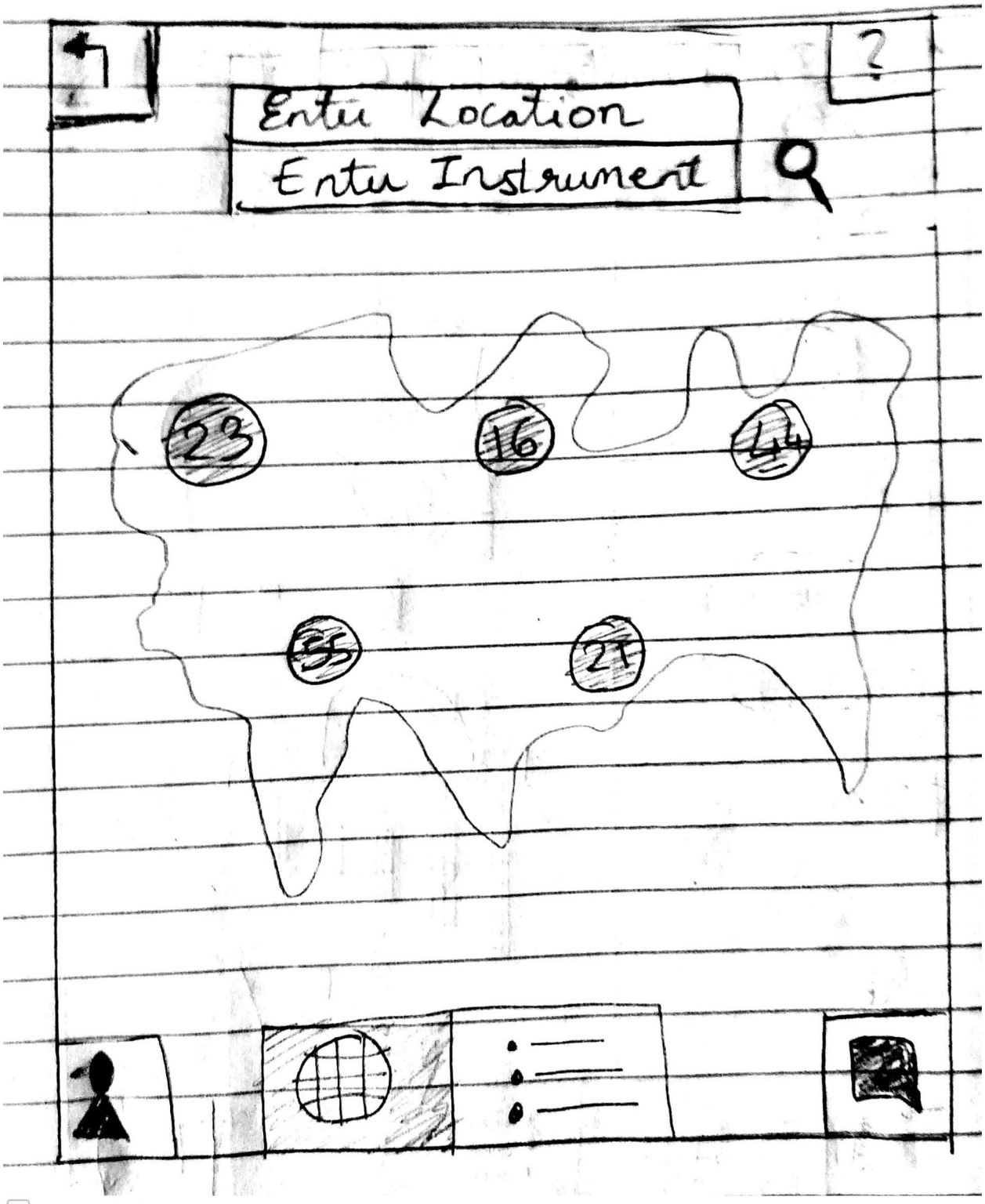
- We do not require an elaborate rehearsal of steps to fulfil a goal, and the transition buttons are pretty efficient as well.
- A negative aspect of safety is that the privacy of lenders is compromised as their location is pretty much visible to all of the users searching for a particular location.
- A positive aspect regarding safety is that a person is required to create an account before sending any sort of information via message.

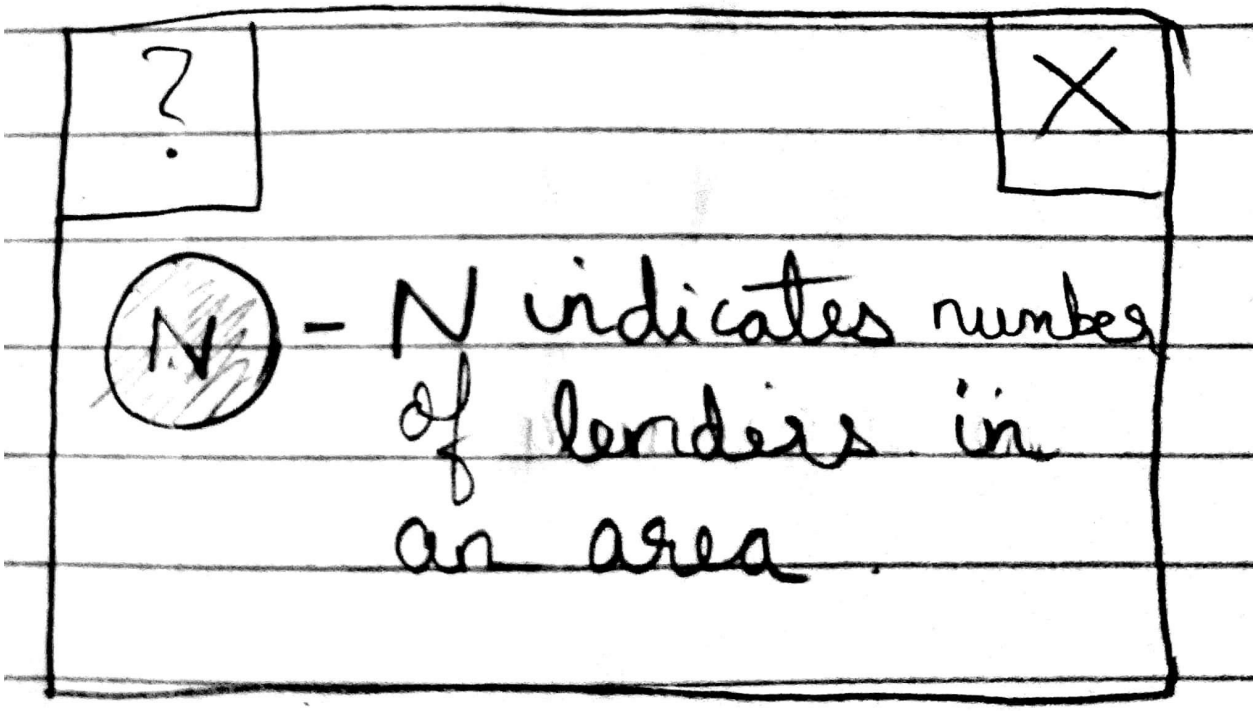
GR 3

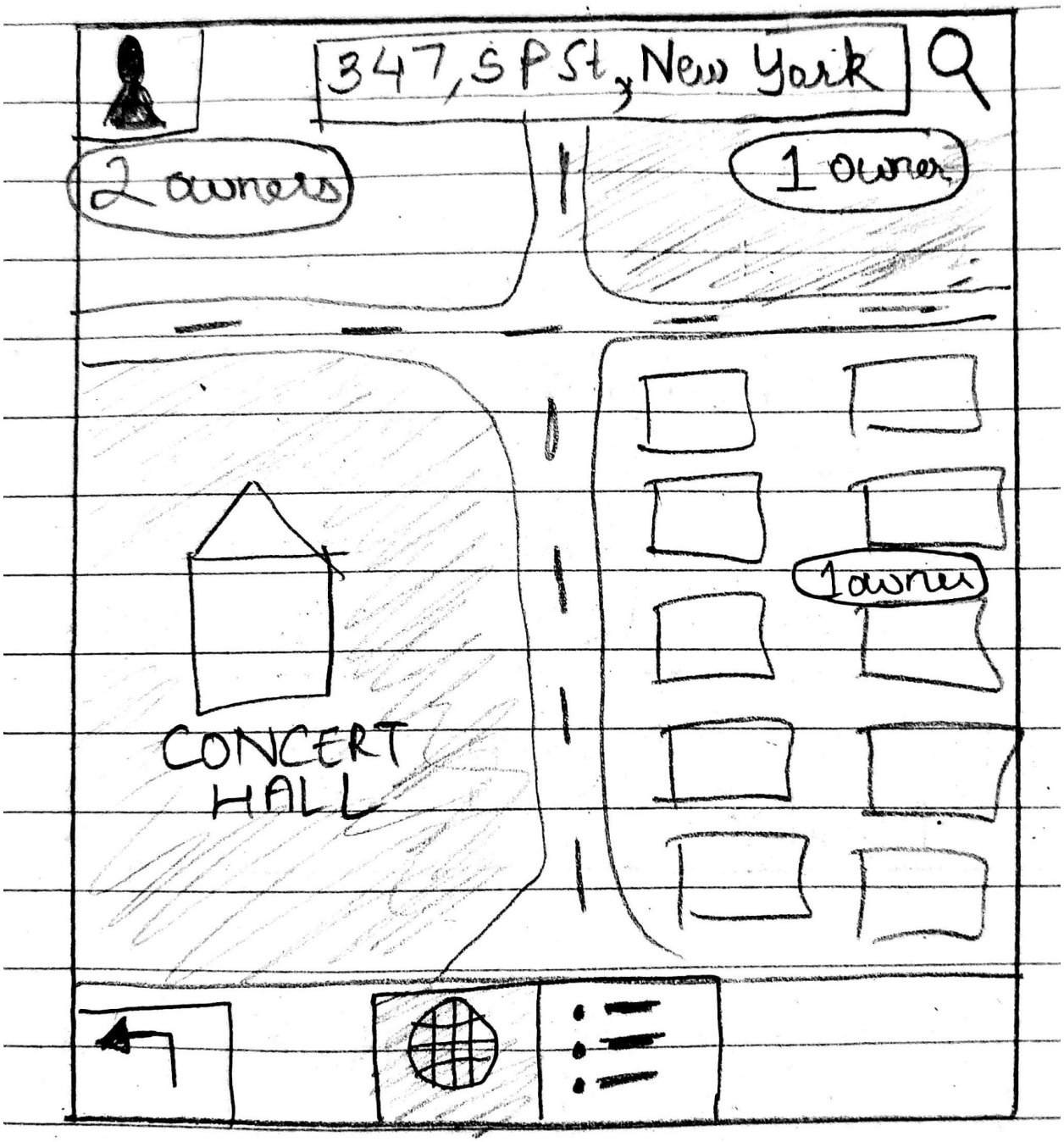
Images of Prototype

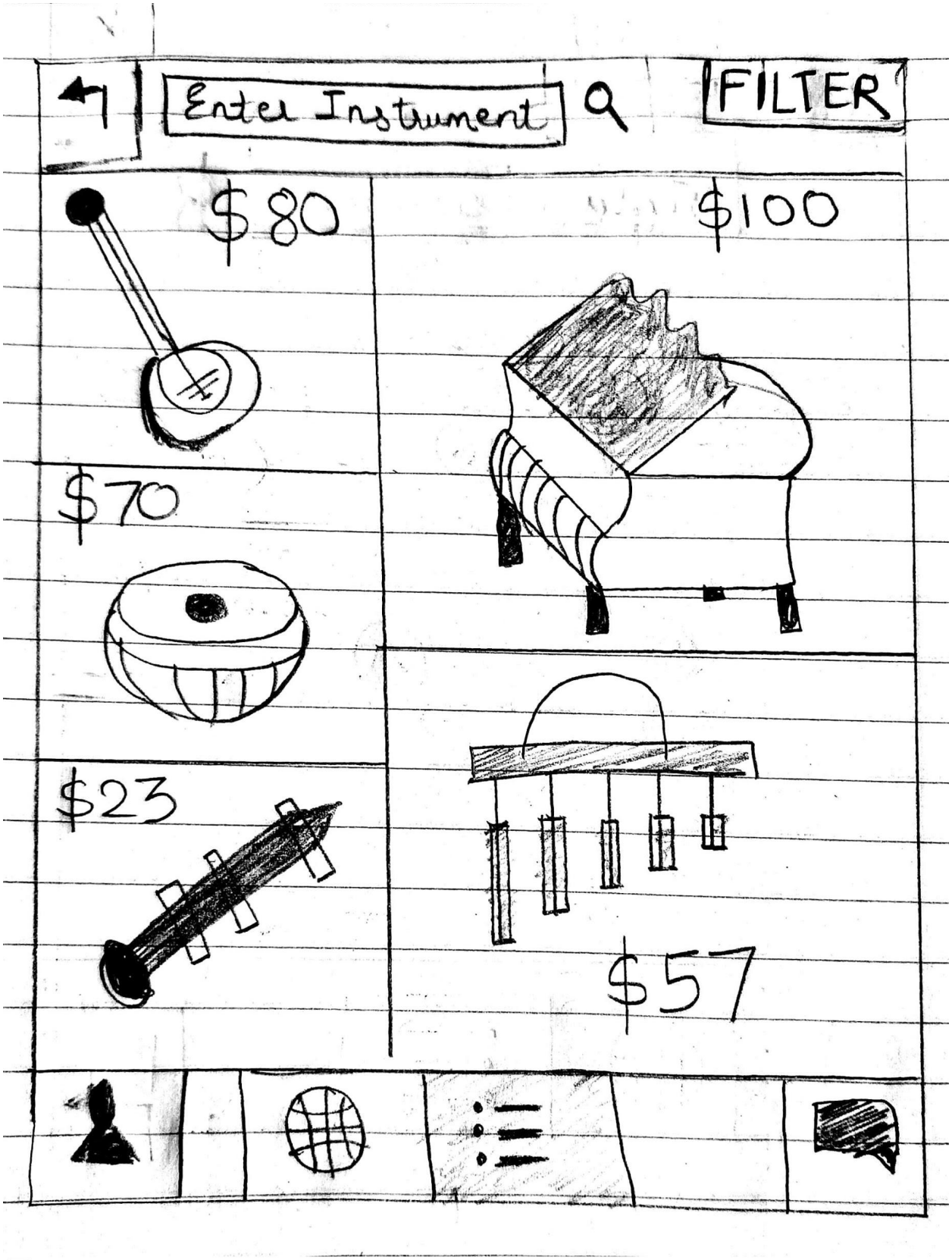


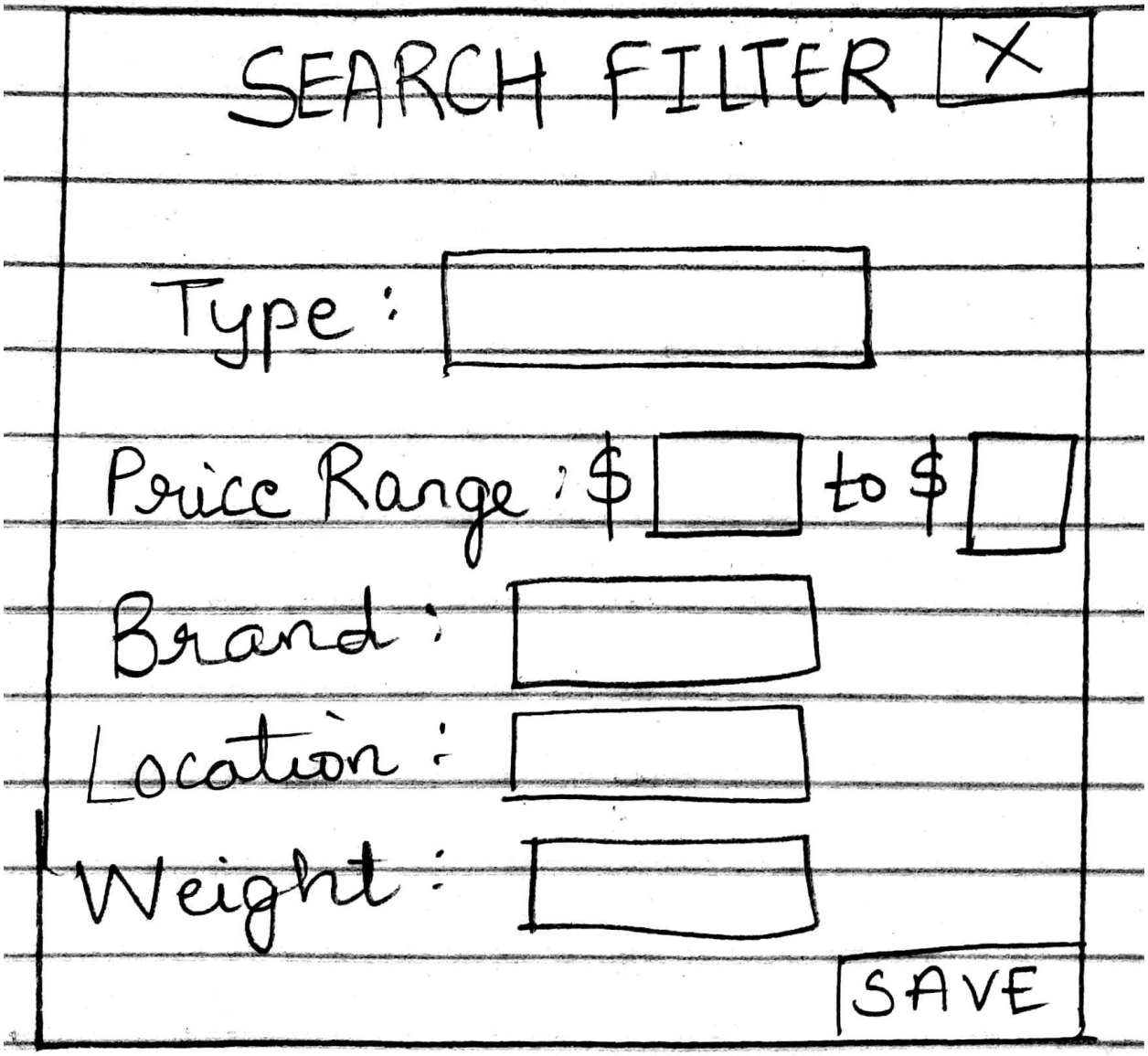


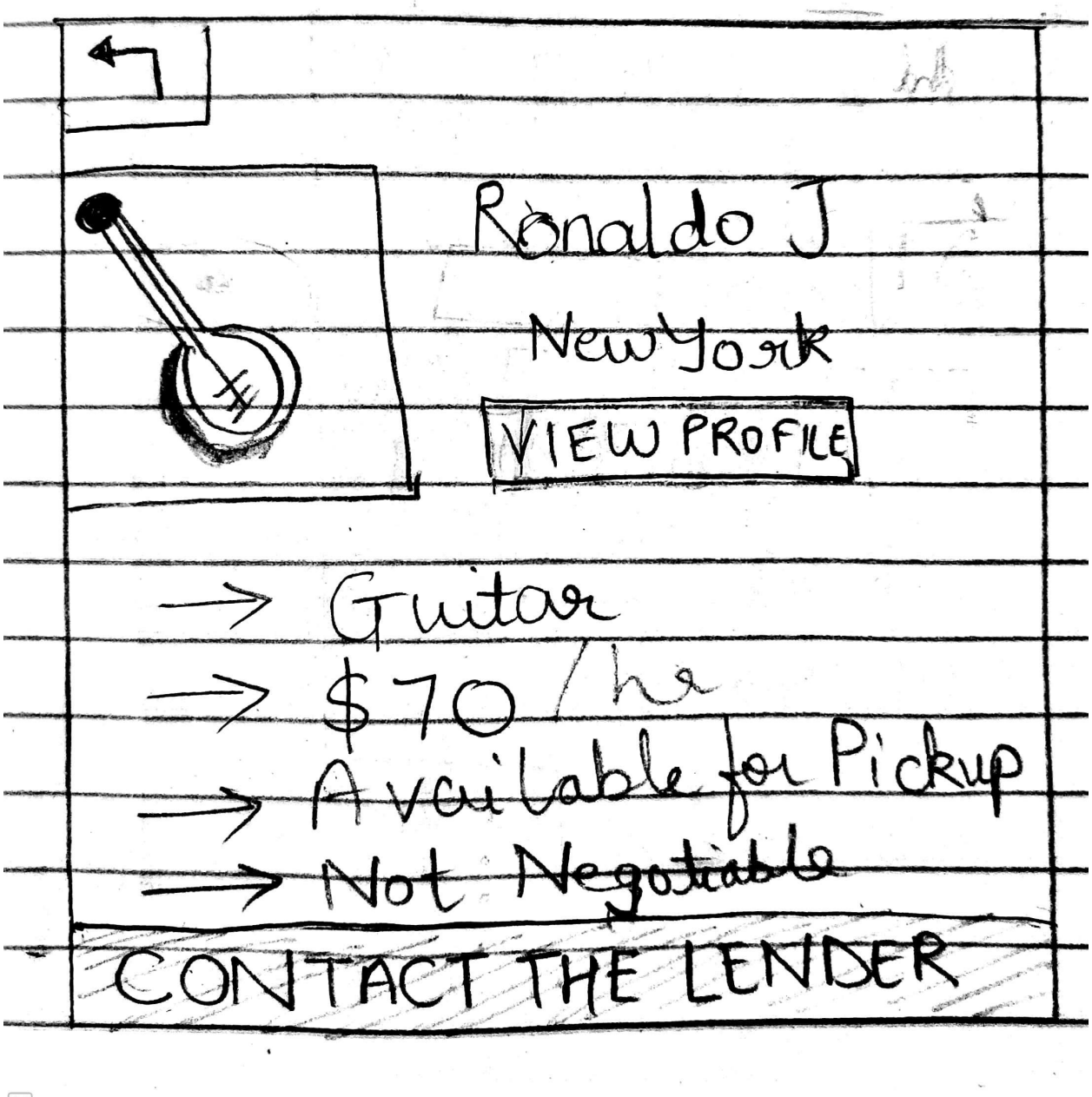


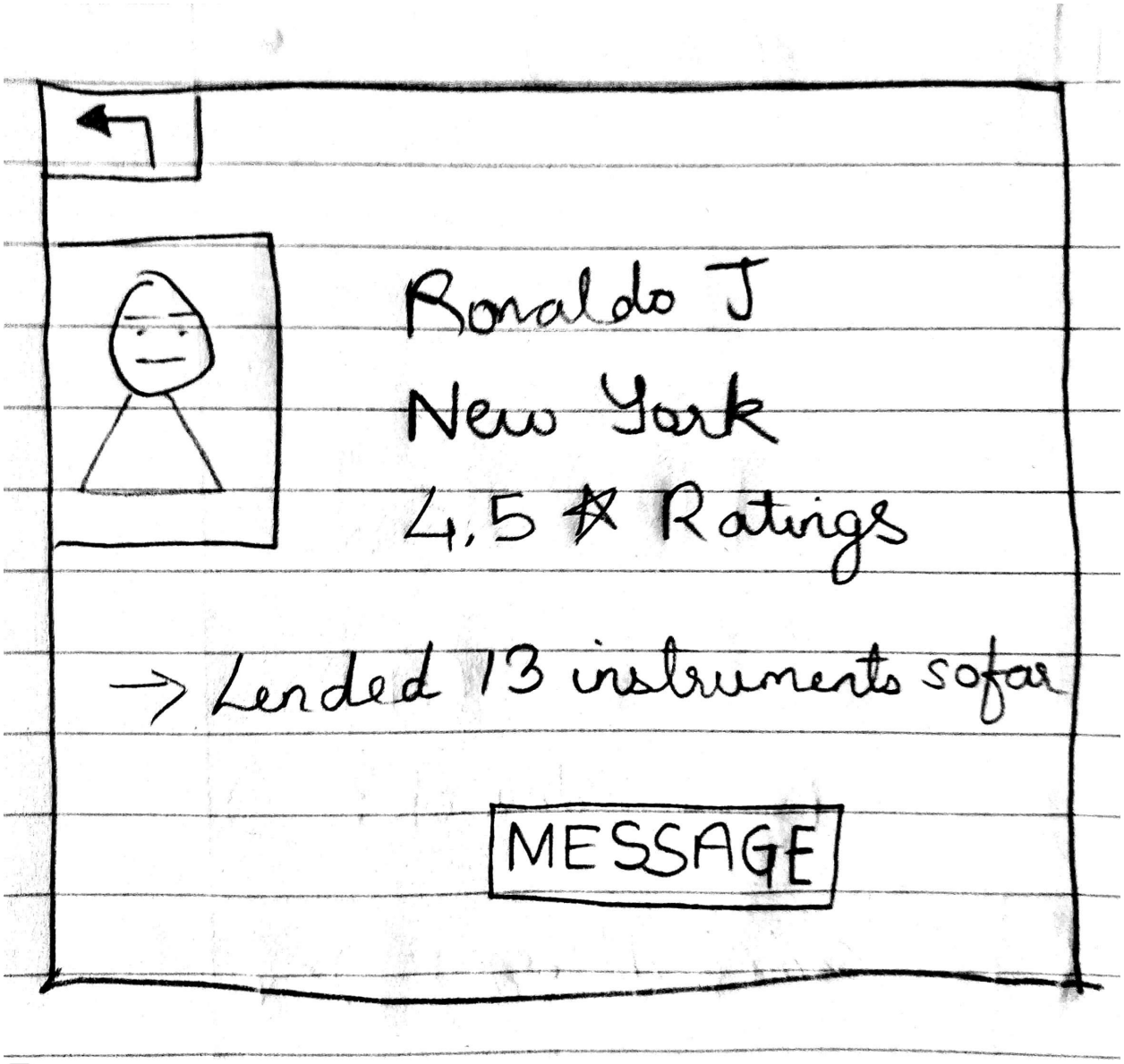


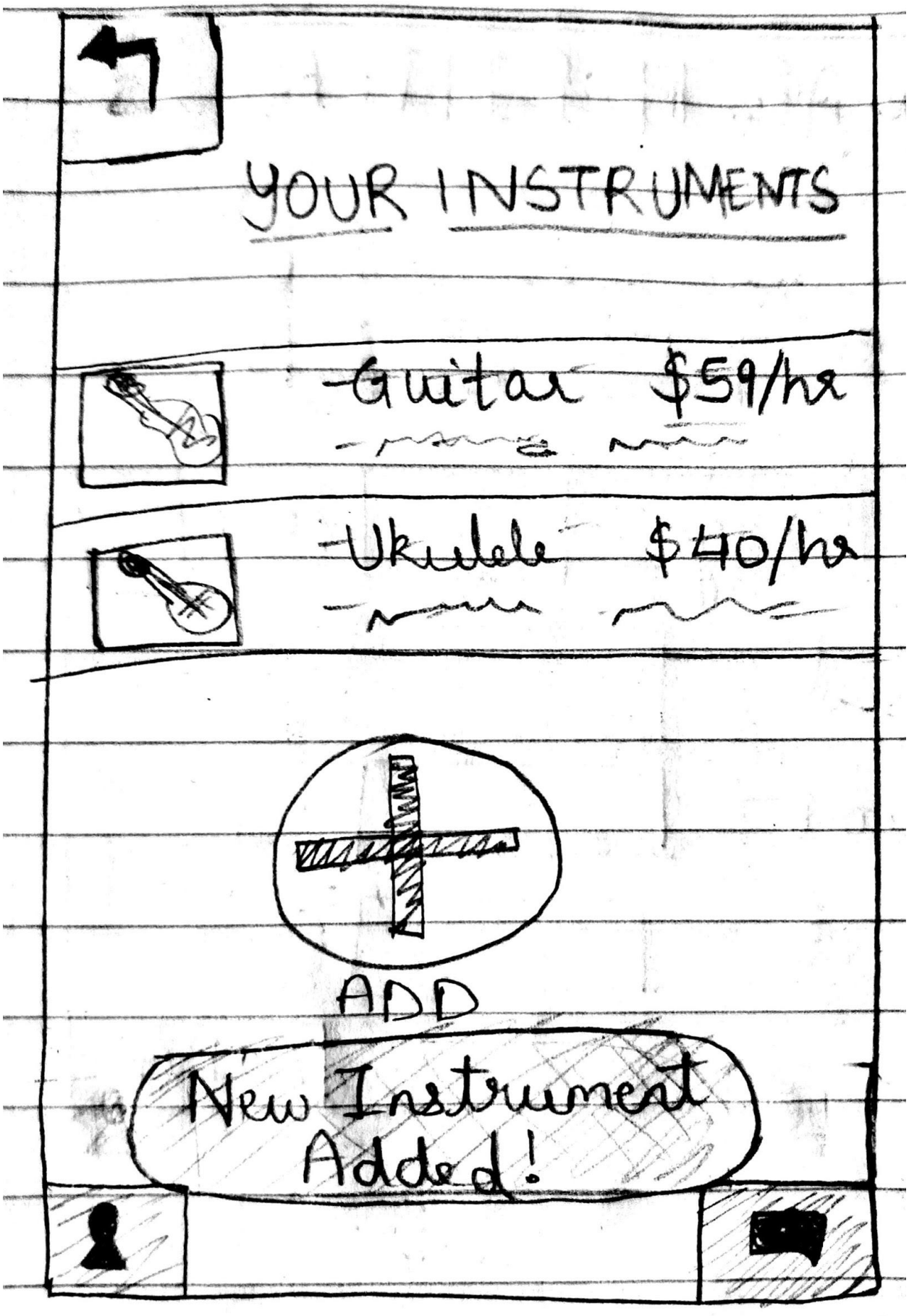


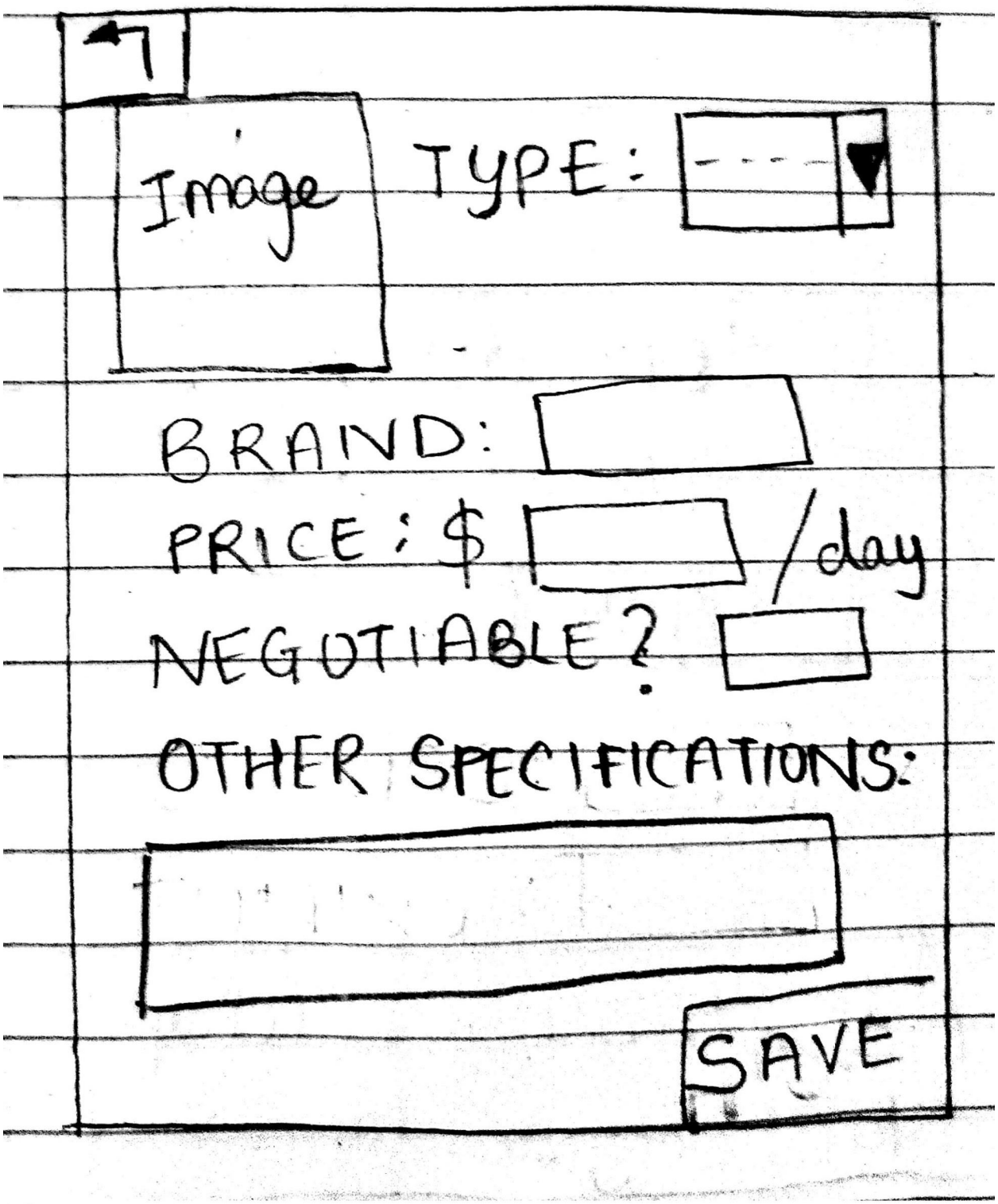


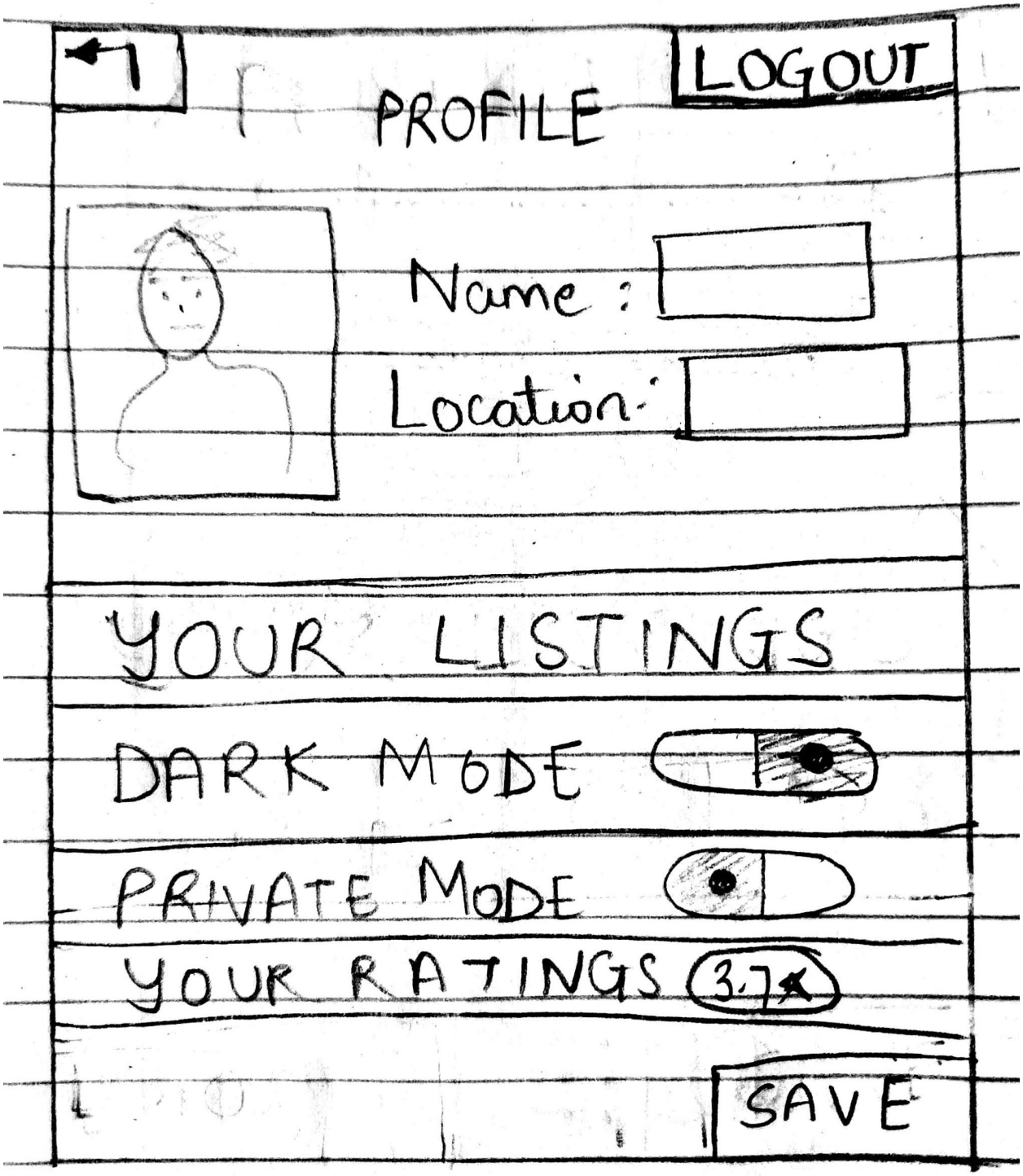


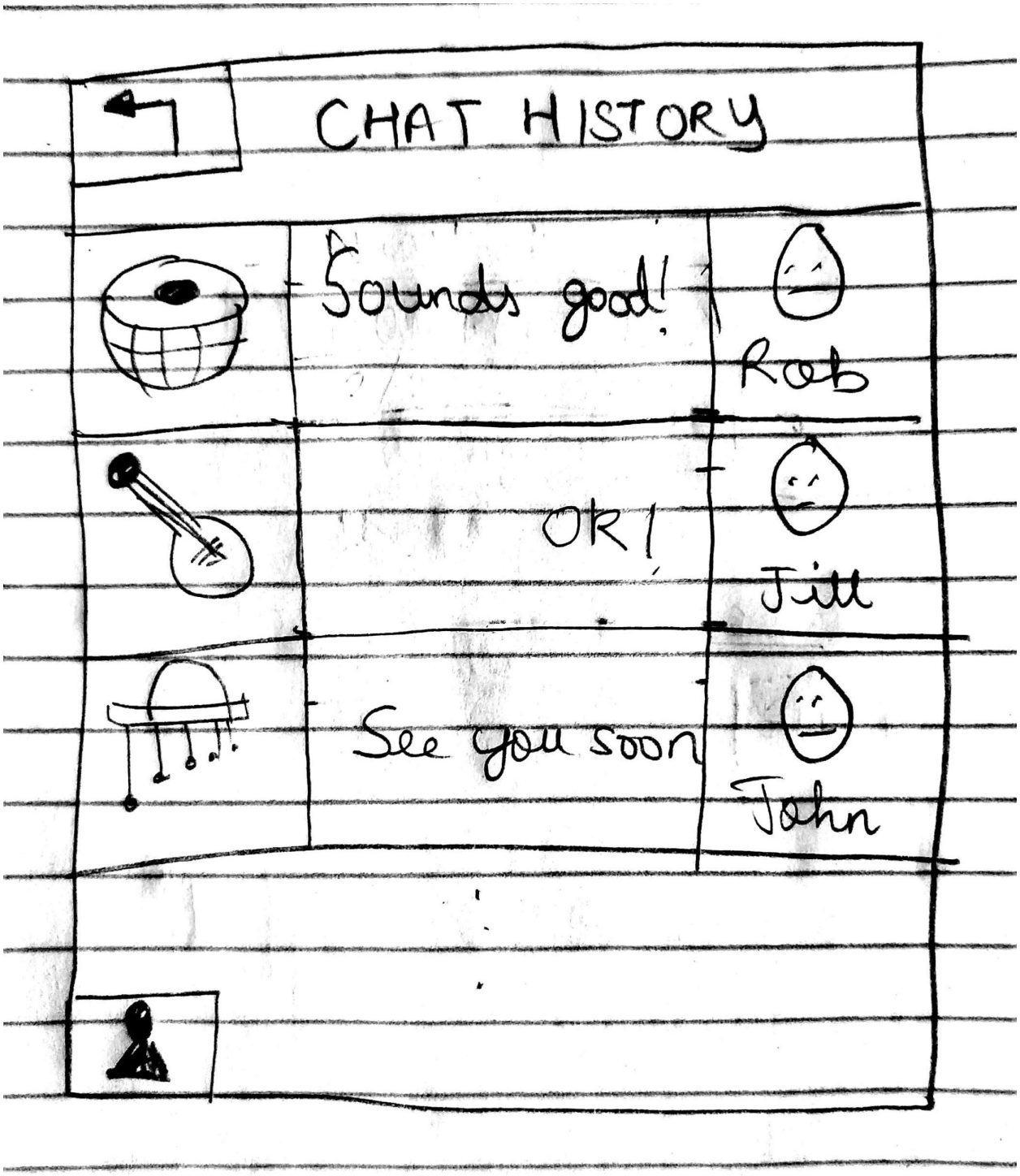


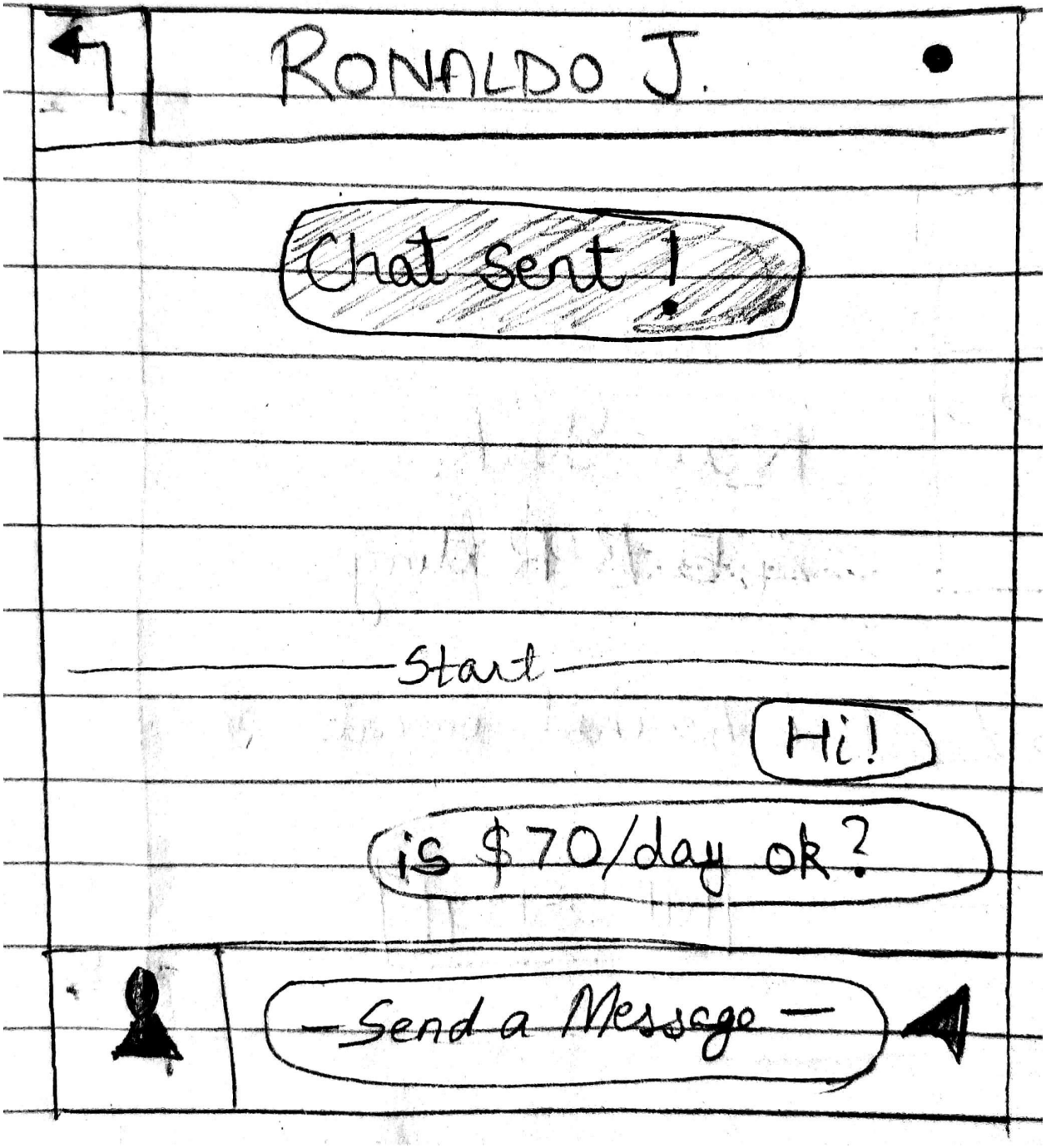

Ronaldo J
New York
4,5 ★ Ratings
→ Lended 13 instruments so far
MESSAGE
Scanned with CamScanner











Briefing

The name of our app is Instrumental. The basis for our app is to allow musicians to easily find instruments to rent and be able to rent their instruments to other users. Additionally, users will be able to rent instruments from other locations in their country to avoid travelling with heavy instruments or shipping them. The app is broken down into two main components, the lender side and the borrower side.

The borrower side will consist of listings for instruments. The option to filter instruments based on user preferences is provided by the system. The user preferences could be based on instrument type (guitar vs piano), instrument weight, price range, and more. Once a borrower finds an instrument that they like, the system allows them to contact the lender to set up a time, place, and price for the instrument.

The lender side of the systems provides all of the user's active listings. In this view users will be given an option by the system to create a listing. The system allows the lender to enter supplemental specifications about their instrument. Supplemental information will be helpful in finding a borrower for a user's listing. Additionally, the system shares the user's contact information, location, and profile image based on their privacy settings with each subsequent listing posted.

Tasks

1. Assume you don't have an account, set your location to New York and upload your guitars and amplifiers.
2. Change your name, location and profile picture for your account.
3. Log out from the account after logging in.
4. Try to rent a drum set and a flute near your default location for any price.
5. Try to rent a guitar for a price range of $50/hr to $200/hr near New York.
6. Update one of the specifications of one of your listings.

Observations

For our initial prototype, users felt that the map view was confusing, but this could be because the interface wasn't intuitive enough for them to understand. Additionally, users felt that there was a lack of back buttons and buttons to submit/save changes made to profile or instruments. One of the users suggested adding a separate notes section on instrument listing. Not all instruments would have the need for notes on tuning/strings. This would also allow for potential users to add their own descriptions and comments.

There were further issues with the map view and some confusion about how zooming in operated. At this point we came to the conclusion that these users all had learnability issues with the map view. It was confusing on how to go from the map to the listing of available instruments for rent. Additionally, bridging the gap between the map and listings was made harder via the task of renting an instrument in an alternate city. To fix this learnability issue, we opted to start users on the list view as opposed to the map view. The user is now presented with the list of available instruments with the map and ability to filter by location as a secondary option. This helped to streamline tasks and allowed users to get to the rent end goal much quicker. Taking into consideration these suggestions we created the next prototype for round 2.

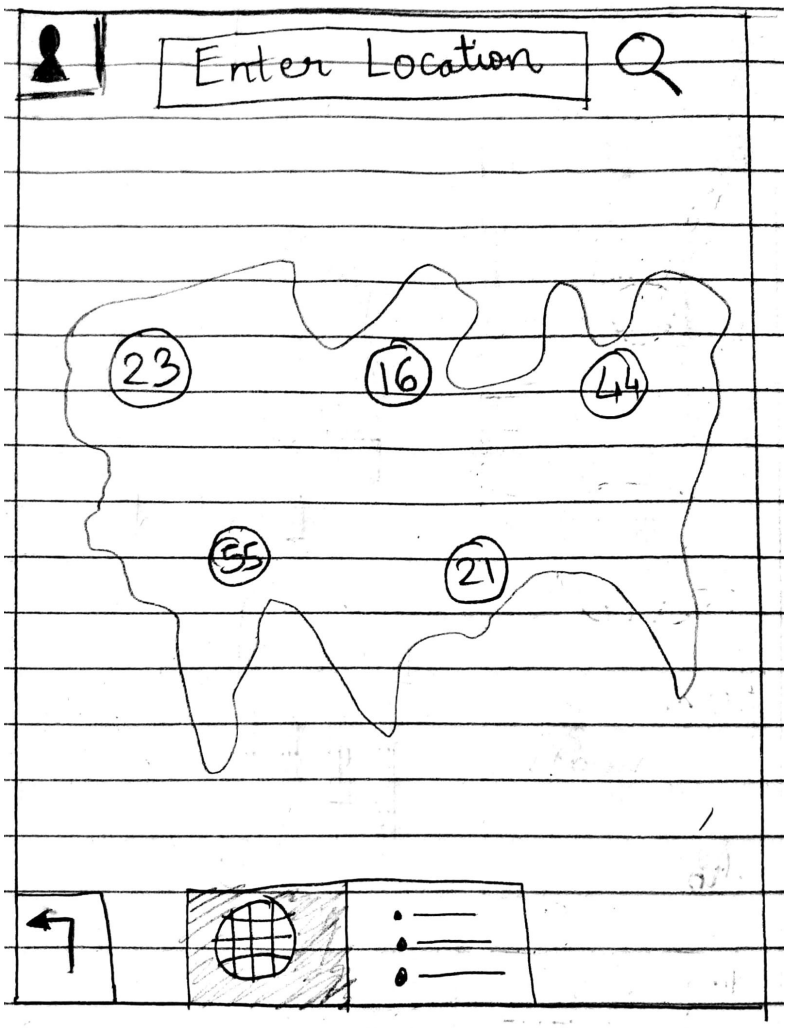
In the Individual Profile page the 'x' button in the middle of the screen was ambiguous, suggesting we reorganize the page to make it more learnable. It was mentioned that there should be a page displaying the chat history of previous rentals and communications with individuals, instead of having to navigate to the Instrument page and then go to the individual chat for that Instrument, thereby denoting an efficiency issue. In the Add Instruments page, we observed that changing the text from "Type" to "Instrument Type" would make it learnable and easier to understand for the users. We deliberated on this, but upon further thought, the app allows the rental of more than just instruments, so "Type" is sufficient. The profile button is in the same position as the "logout" button once the profile is entered, this should be changed for increased safety as this might cause accidents for users due to habitual clicking of buttons at the bottom-left of the screen.

Prototype Iterations

Iteration 1:

Number of users tested: 3

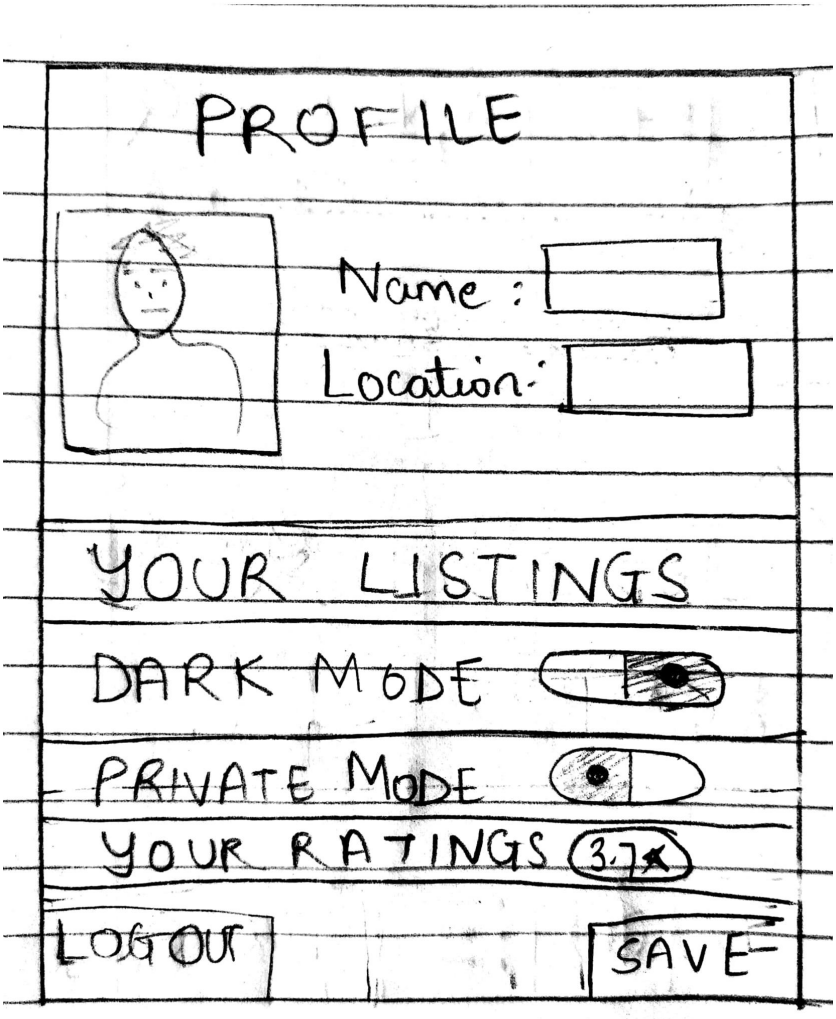
Outcome: For our first iteration, some users had problems with navigation as there was a lack of "back" buttons (especially for users using iOS, since Android has a built-in back button). There were also some unclear navigation methods like "exiting a screen" and "saving", which were causing learnability issues. We also observed that when users were brought to the "map screen" when they clicked on the borrow button, they were very confused. This learnability issue was non-existent when they went to the list view showing listings of instruments available for borrowing.



Iteration 2:

Number of users tested: 3

Outcome: There were some safety issues that we had to address in this iteration, for example the profile button and then the log out button once the user had entered the profile page were in the same position, leading to the potential for the user to accidentally log out of the app. Another important point that was addressed was to have a chat history in order to make it efficient for users to quickly glance through their history and figure out the amount of users that they have contacted before. Lastly, the circles on the map in Map view turned out to be difficult for users to interpret and learn. One of the users also suggested that a rating system for lenders would prove to be helpful.



Descriptions of Changes between Iterations:

- Added “back” button functionality to various screens that needed it in order to make the app easy to use on both the Android and iOS platforms.
- Changed default view of instruments to list view instead of map view.
- Buttons and menus were moved to improve safety and also efficiency by placing similar buttons together.
- Added and placed “save” and “exit” buttons more explicitly for making it easier for users to learn their purpose.
- Implemented 5-star rating system for quick review of users.
- Added “chat history” option to allow the users to take a quick glance of who all they have interacted with so far.
- Added a private mode toggle in the profile settings page for increased user privacy.
- After our final iteration we made changes to the instrument listing page to allow users to directly contact the owner. This helped to solve an efficiency issue in which users had needed to first click to the owner’s profile before going to the contact page.
- Additionally, in this final iteration we moved the location of the back button to always be in the top left corner.
- We also moved the “profile” button to the bottom left corner and the “chat history” button in the bottom right corner. Moving the UI elements to these corners help users with efficiency as they will be able to access their profile and messages from any screen in the application.
- Added an “Enter Instrument” search box in the map view, as users suggested that would be more useful than just having the “Enter Location” search box.
- Added a “help (?)” option in map view to explain the purpose of circles with numbers on the map.
- Added an “Enter Instrument” search box in the list view, as users suggested that would be more useful than just having the “Filter” search box.
- Instead of having the users enter specific details of a particular type of instrument, we added a generic “Other Specifications” field in the ‘Add a new Listing’ screen, which

would allow users to enter a variety of diverse specifications based on their preferences and type of instrument.

- Lastly, some small usability issues were also brought to our attention, but upon deliberation by the team, we decided to keep our original text

PR 1

Link to the video

Link to the presentation slides

GR 4

Platform details

Our prototype is made using HTML, CSS, and Javascript and can be displayed using the **Mozilla Firefox** web browser.

One important point to note is that the prototype is designed to fit the scope of mobile phones. This prototype is for demonstration purposes for the implementation of the UI and UX design. The final implementation will be an android application. This is why the webpage is limited in width and height -- we are simulating the constraints of the size and resolution of a mobile device.

We just have a blank white screen as the background as this app is supposed to be for Android and having a background image can cause problems on phones of different sizes.

Instructions

To start our prototype, please click on the following link using **Mozilla Firefox**. This will take you to the prototype page which is hosted on github.

To enter the application at the login screen, please enter:
username: **admin**
password: **password**

Note, if you would like to clone our github repository to run the site locally, you will need to insert your own API key for the Google Maps API. Currently our API key is restricted to the website url.

Shallow Parts

Our prototype is concentrated on the look and feel of the application. As such some features are limited in implementation to demonstrate their future use case.

The **Register** button is not implemented so the user would have to **Login using information provided above.**

In the "**Borrower**" page:

- The search box allows input but does not search the instruments
- The filter allows input but does not filter the instruments

In the "**Chat History**" page:

- Only one conversation at the top of the conversation list -- “Randaldo” -- is able to be selected. This is intentional.
- The search box allows input but does not search or filter the conversations.

In the “**Individual Chat**” page with Randaldo the text input for chatting allows input, but that input is not able to be sent. Thus you cannot receive or send any new chats.

In the “**Lender**” page pressing on the individual Instrument listings does not take you to the individual instrument pages as they will in the final design.

In the “**Add Instrument**” page filling in the details of a new instrument and pressing the tick will not actually add a new instrument to your Instrument page

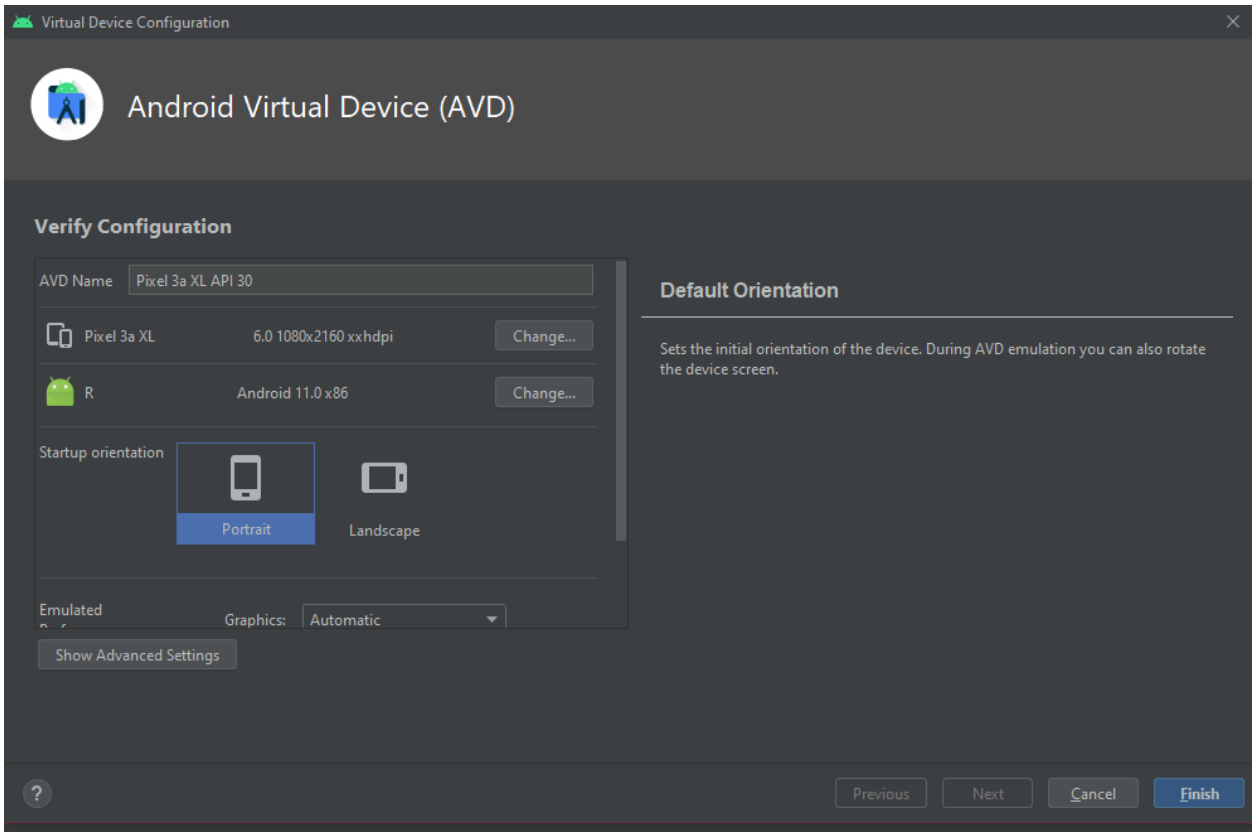
The “**Map**” page in the borrower section is for display purposes only right now and does not display the Instruments at their approximate location using bubbles like it will in the final implementation. Also, the help button for maps is not implemented in the prototype

The “**Lender”** side does not have implementation of functionalities of dark mode, log out and rating as a part of its settings.

GR 5

Platform details

Our application is made using Java, and XML, and can be displayed using the **Android Studio 10 IDE** with the virtual device in AVD emulator having the following properties:



Basically, we use **Pixel_3a XL API_30** in the AVD Emulator and **run** the application. The implementation has been tested on both Windows and Macintosh environments running Android Studio 10 IDE.

Instructions

To start our prototype, please click on the following link. This will take you to the prototype page which is hosted on github.

Note: if you require access to the github link, please email Sam Alammar (halamm2@uic.edu) to give you a request permission!

To enter the application at the login screen, please enter:
username: **admin**
password: **password**

~~*Note, if you would like to clone our github repository to run the site locally, you will need to insert your own API key for the Google Maps API. Currently our API key is restricted to the website url.*~~ Currently the API key is unrestricted so enjoy!

Heuristic Evaluation

A lot of the evaluations talked about the back button not going to their intended page, that was fixed immediately. We also had comments about the aesthetics, since we changed it to Android, we were able to have more control on the aesthetic and theme to make it more complementary.

As well as the general aesthetics, the specific aesthetics of the project was mentioned a few times by multiple reviewers. We endeavored to consolidate both the macro and micro aesthetics, keeping individual areas consistent (Such as the borrower vs Lender), and the entire project as a whole.

A number of the individuals reviewing our heuristics mentioned a lack of hover mechanisms, which made sense in the context of a web application, but on an android application where the hover functionality is not needed, we chose not to implement these changes, as a mouse and pointer navigation system is not used.

We also had some comments regarding some of the buttons in general, that were all fixed by the completion of our application.

Flexibility of the implementation was also mentioned, and this was in the context of a web application. As our implementation has moved to exclusively be an android application, the flexibility is no longer a concern, as the layout is a fixed (relative) width and height for android phones.

A number of issues raised were also explicitly stated as not working in our GR4 writeup, with no intention of us implementing those features, as this project is focused on UI design, and not backend implementation. These shallow implementations of features still stand in GR5 for the most part, and the user can reference “Shallow Parts” in the GR4 section above to see which parts were and were not implemented.

Some heuristic evaluators suggested adding additional features that would have required a backend implementation to achieve, and so we did not implement those suggestions, we did

however simplify the navigational system (which was easier because of Android's built-in back, home, and multitasking button) which was helpful for our applications ease of use.

Member Contributions

Adwait: Layout of Lender Side, Add Instruments Page, Individual Instruments on Lender and Borrower side, Search Filter Page, Main Profile Page, and setting up the event handlers.

Luke: Layout of chat history, individual message, and Individual Instruments on Borrower side and wrote regarding heuristic evaluation.

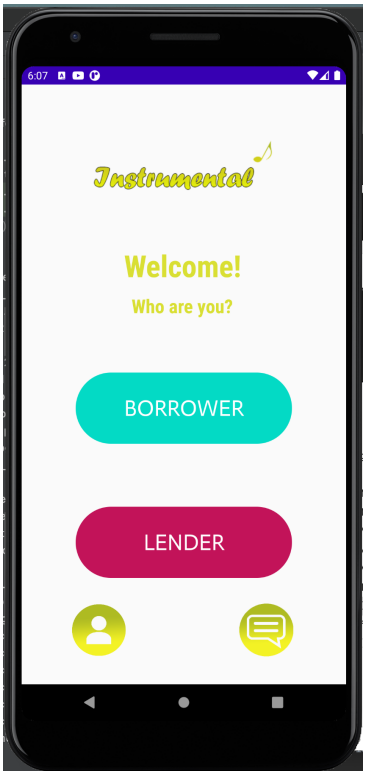
Ava: Layout of borrower main and alternate, Google Maps API implementation, developing structure for event handlers.

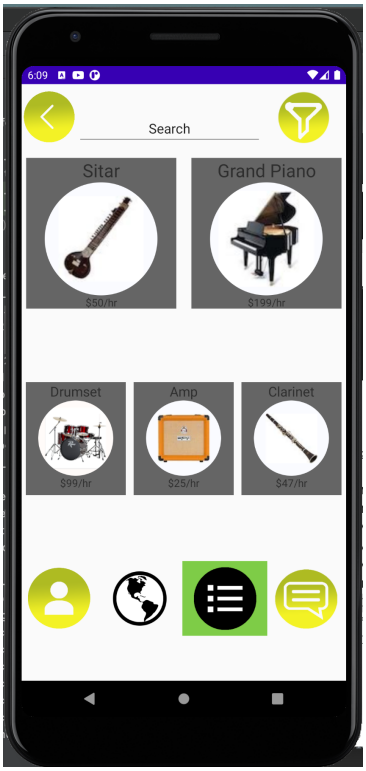
Husham: Layout of Login, registration, lender profile. I also managed most of the coloration and aesthetics as well as setting up some of the event handlers.

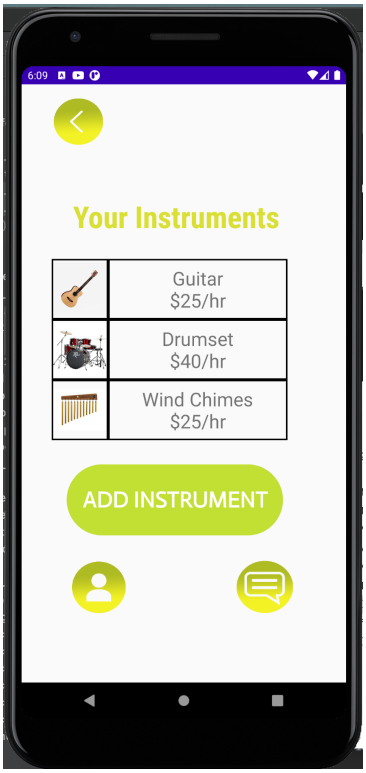
GR 6

Design

For our final app iteration we opted to develop in Java based Android. Our design resembles our prototype opting for custom buttons and colors instead of Bootstrap element styles. Keeping with the paper and html prototype design choices, we provide users with two main choices upon entry depending on their use case. As seen in the first screenshot below, we have the Borrower and Lender side buttons.



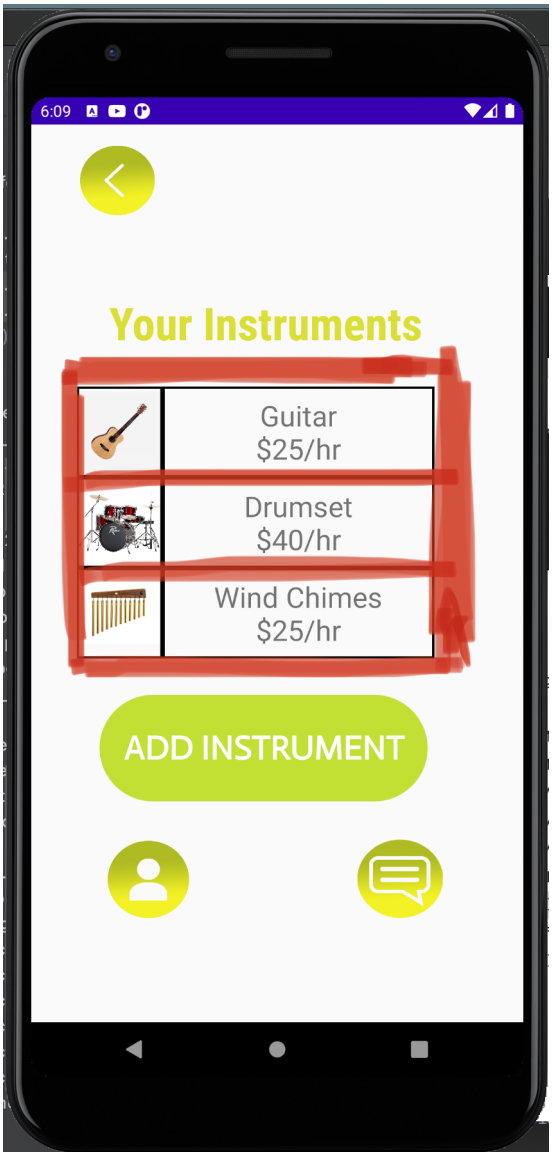




The Borrower button takes us to the second screen where the user is shown a list of instruments located around their location. We originally had the map as the default display on the Borrower side of the app, but this had confused some users when testing. To help with learnability, we instead opted to have the map as a secondary feature and shift the focus to the list view.

The Lender button takes the user to the third screen where the user is shown the list of instruments they currently have listed. Additionally, the user is presented with an option to add an instrument. This allows the user to enter information about their instrument, upload a photo, and set a price range for their listing. The instrument would then be listed at their current location.

Another important feature of our app was the decision to add the chat button on the main views. The button isn't present on sub menus such as the add instrument, filter searches, or profile management since this would distract the user and take away from the flow. Also, to avoid redundancy, we do not have a chat button within the chat list view or individual chats. This decision was made to help improve app efficiency to allow for quick access to messages.



Lastly is the highlighted section in the image above. This section highlighted is the individual listings a user has added to their profile. Each section in red represents the bounding box designated as a row on the tableLayout. As we will discuss a bit later in implementation, this section has been made clickable and provides the user a view change when selected.

Implementation

Our final design was developed using Java based Android. Our original intention was to develop a mobile application. Despite our prototype for GR4 being based in HTML/JS, we wanted our final design to uphold our original design choices. Our code within Android implements onClickListeners to handle button and UI element selections. We first set the contentView for the screen to be displayed, followed by establishing the handlers for elements within the view. The event handlers, in a sort of recursive sense, contain the code to set up the next selected screen in a similar fashion. First it sets the contentView and then has a call to a function that sets up the new event handlers. This part was a bit tricky.

To set up a button's event handler we must fetch the view by calling the function findViewById. However, when a button's event handler is being generated we found that if the contentView was not set outside of the event handler's code, the findViewById would not be able to find the correct id. By instead allowing the event handler to call a function to set up the new contentView's buttons, we can guarantee that the view is properly set and allow the findViewById to correctly find the ids.

Our main struggle when developing the application was the restriction on a backend. Our application's design heavily relies on accessing a database to store user information, instrument listings, and chat history. We would have loved to see a more dynamic search feature but instead we opted to have static results for our demonstration.

Without a set of users to be testing our implementation on as we went, there were however a few key flaws in our design that were revealed by our user testers once the prototype was finalised as detailed in the Evaluation section below.

Evaluation

We conducted our user test similar to how we conducted our paper prototype test. We identified users who were musicians or had experience with rental apps previously (such as AirBnB or Uber) so that we knew they had a good baseline of knowledge on what to expect from our app.

We started by having the user install the proper software for running our latest build. This involved installing Android Studio in addition to setting up a Pixel 3a XL (with the Android API 30) VM for emulating. The user then launched the build and started their tests. They went through similar tasks such as creating a listing, finding a drum set and messaging the owner, changing current location, and more.

The majority of our user tasks went off without a hitch. However one large usability problem that we did not expect was inside the lender page referenced above. We had made the instruments in the inner tableLayout section clickable, allowing the user to be brought to that instrument's individual page. However, both users did not know that this section was clickable and either had to randomly click through everything to find it, or had to receive guidance to find it. To help solve this problem, we have considered an approach involving segmenting the list and restructuring the container to appear more like a button and/or clickable object. This could also involve adding a shadow behind the object to appear raised.

A user also suggested that at the screen directly after the login screen, we should have a logout button up the top right of that screen, in case the user wants to log back out straight away. Upon reflection and investigation, this is a common element in a lot of applications (marketplaces, banking etc) and is a good suggestion for further enhancements to our application.

Reflection

We learned that designing and planning out an application requires a dedicated approach along with continuous user feedback and engagement.

If we were to do the app again, we would maybe focus on programming it so that it is cross platform in a framework such as electron rather than a mobile application so that it is more easily accessible for all users.

Our risk assessment has been extremely influential in planning out this application. We may have taken on too broad of a scope for a semester-long project. Applications in the realm of Instrumental are similar to those such as Uber or AirBnB, and can take a lot of time and effort and thought to implement successfully. However, the challenge we faced when building the app pushed us to further our skills in areas we had not previously explored, which was a very big plus of attempting an application with such a large scope.

We chose features such as a global map view, listing views with lots of pictures were very important right from our prototype since our users are mostly musicians and their main part of life is being creative and artistic, hence we made sure our app serves them that.

We believe that if we were to do this again, we would choose sketching and images as our technique to create paper prototypes, since it allows us freedom. Because of the current covid-19 situation, meeting up with our group partners and scheduling calls made collaboration more difficult than it would have been if we were able to meet on campus. Though this did provide us with a good opportunity for practicing our remote work and communication skills in preparation for our future jobs.

PR 2

Link to the video

Link to the presentation slides