UNIVERSITY OF TORONTO

# Assignment 8:

# ACCESSories the App

Manahil Masroor, WeiHsuan Lin, Mihail Cubata, TianYu Pan

1004351177, 1005094906, 1005392541, 1005339484

CCT308H5 PRA9201

Professor Cosmin Munteanu

2020-12-08

# Table Of Contents

## Executive Summary

**Observations:**

From our observations of various grocery stores across Canada, we found that customers were struggling to safely and efficiently pay at checkout lines. Users of mobile payment methods particularly struggled.

**Ideation & Design Requirements:**

We decided to create a mobile payment app that allowed users to authorize payments by scanning personal accessories. Our design requirements focused on ensuring our app was a suitable alternative to Apple Pay and WeChat Pay as well as traditional payment methods. We prioritized the intuitiveness and fluidity of the interface and established target times that we wanted our app to meet or surpass.

**Studios:**

Our first iteration of our script, testing protocols, and scenarios were used in Studio 1. We developed 5 different scenarios, representing 4 different functions of the app and 1 failure state. The prototype being tested was low-fidelity, drawn with pencil and paper. Based on feedback from user testing, we improved our feedback screens with text instructions, made our card information input screen more intuitive, added a help button to give users further instructions, and removed redundant buttons.

We added a new user registration task in Studio 2. Based on the testing we did, we eliminated the “X” button and kept the “tap screen to dismiss” to avoid confusion caused by having more than one option to exit the same screen. We also updated our failed payment screen for better clarity on our error messages. Finally, we added the screens for settings and the help button thanks to user feedback.

Studio 3 had us testing a medium-fidelity prototype. This time, we had multiple team members measuring times, allowing us to compare results to ensure maximum accuracy. We organized these time recordings into a table to better compare the speeds of users across various scenarios.Based on feedback and notes from user testing, we implemented a progress bar and improved the labelling of buttons to make it more intuitive.

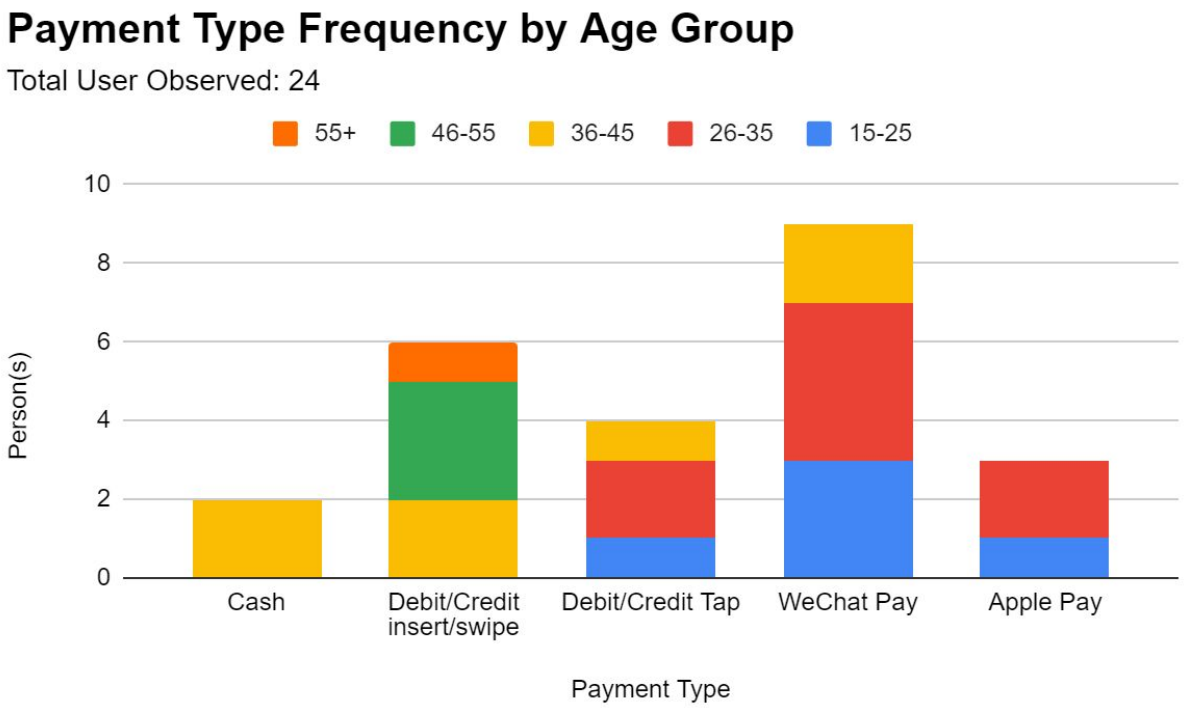
In studio 4, we tested our high fidelity prototype. We also modified our protocol to gain more insight on the behaviour of experienced users by having the same user go through the payment process repeatedly. We had the opportunity to test our prototype on older users.

## Observations

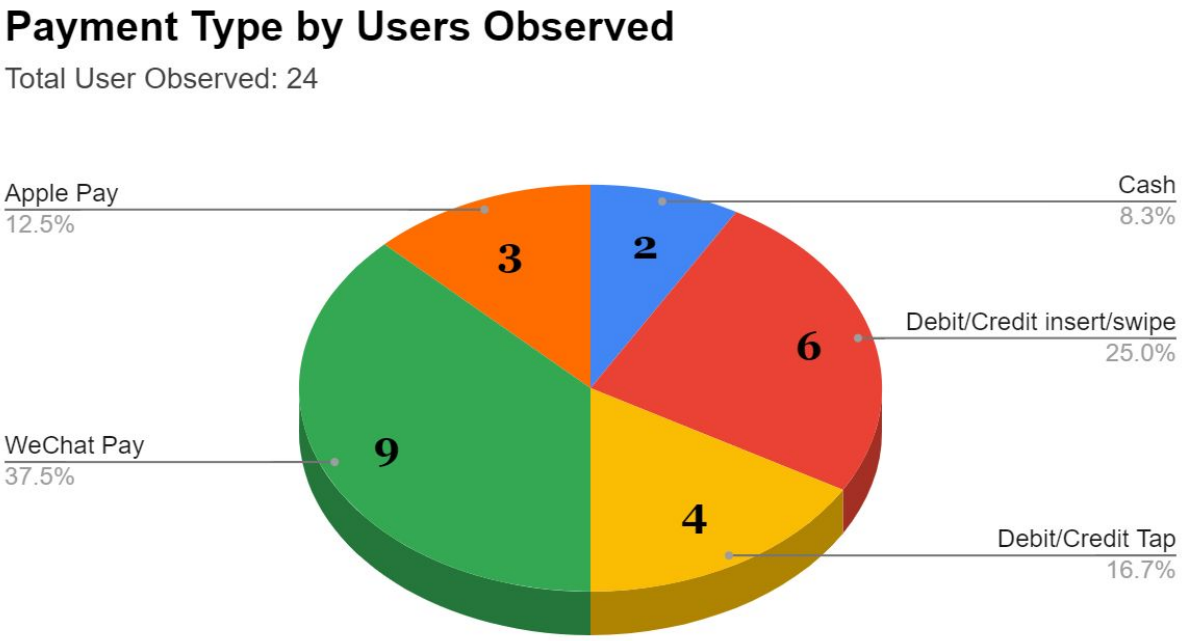
Our observations took place in a T&T Supermarket in Vancouver, BC, and a Nations Fresh Foods and Metro location in Mississauga, ON.

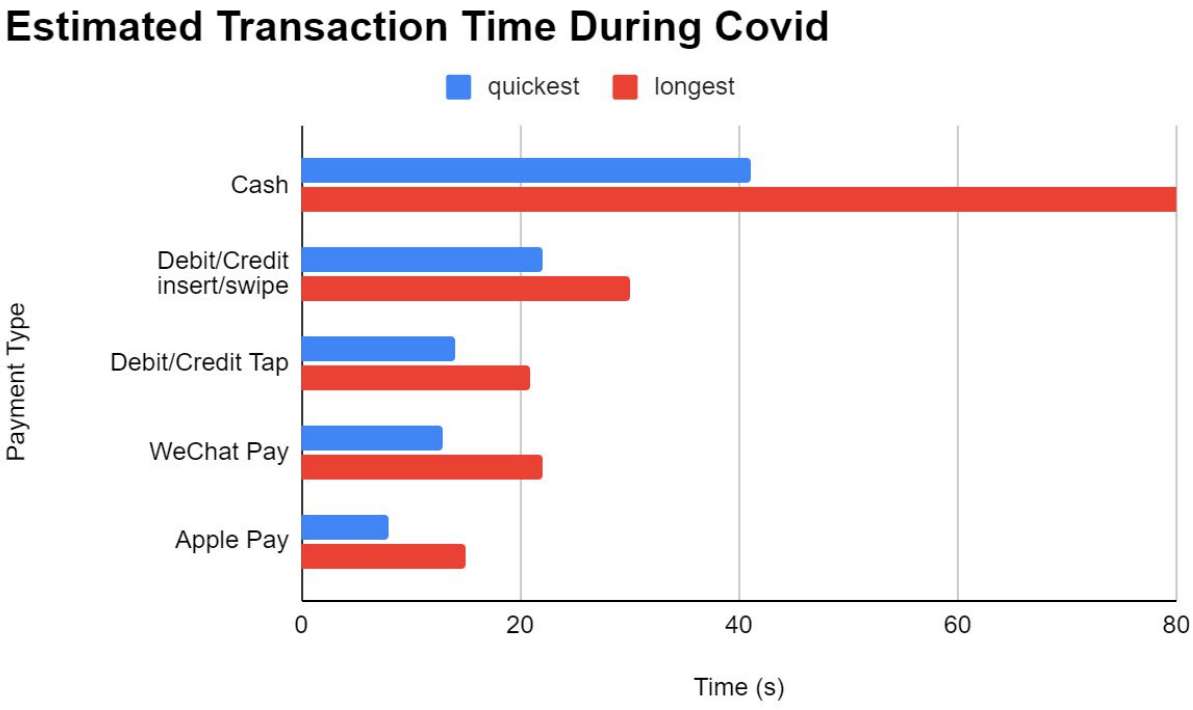
The week of September 15th, we spent 40 minutes observing customers in the check-out line at each location between 3:00 and 4:00 pm. Observations were done both from aside and from within the line itself. We paid specific attention to which method customers used to pay, their overall paying experience, and how COVID-19 affected the process.

## Findings:




The stacked bar chart above describes the payment type frequency by age group. As one can see, WeChat Pay was the most frequently observed payment type out of the 24 people observed, and it is very common amongst the younger users (ages 15-35). The payment types Debit/Credit Tap, Apple Pay and WeChat Pay are frequently used by people of ages 15-35 and are generally not preferred by the older age group.




The chart above showcases the estimated transaction time for different payment types during covid with cash taking the most time on average. The **quickest** time refers to the fastest

recorded time for the entire transaction process per payment type while the **longest** time refers to the slowest time it took for a user to complete a single transaction in that payment type category.

**Transaction Process:** We observed the process of each transaction method and compared it to how it differs from pre-covid times. The following is a description of the **transaction process** for each payment method:

For **cash payment** transactions before covid, users need to (1) take out wallet/where cash is stored, (2) find and hand the required amount of cash to the cashier, (3) wait for any change given back, (4) put change in wallet, (5) put wallet away. During the Covid era users need to take additional steps. They are as follows: (1) Take out wallet/where cash is stored, (2) find and hand amount of the required amount of cash to the cashier, (3) wait for any change given back, 4) sanitize any change given, 5) put in a wallet, 6) put wallet away 7) sanitize hands.

The **inserting/sliding credit or debit cards** method before covid, users must (1) take out their wallet/whatever stores their cards, (2) insert or slide their card in the POS terminal (card machine), (3) select the account they want to pay with, (4) enter security pin on POS screen, (5) wait until the machine processes the transaction and take out card if inserted, (7) place card back in wallet, and (8) put wallet away. During the Covid-19 era users need to (1) take out their wallet/whatever stores their cards, (2) insert or slide their card in the POS terminal (card machine), (3) select the account they want to pay with, (4) enter security pin on POS screen, (5) wait until the machine processes the transaction, (6) take out their card if inserted, (7) sanitize their cards, (8) place card back in wallet, (9) put wallet away, and (9) sanitize their hands.

The **credit/debit tap** method pre covid users had to (1) take out wallet/where card is stored, (2) tap or hold the card above the POS terminal (card machine) until the machine processes the transaction, (3) place card in wallet, and (4) put wallet away. For the covid transaction method users must (1) take out wallet/where card is stored, (2) tap or hold the card above the POS terminal (card machine) until the machine processes the transaction, (3) sanitize their card, (4) place card in wallet (5) put wallet away, and (6) sanitize their hands.

The **WeChat digital payment** method requires users to (1) input password to unlock the phone, (2) select the WeChat app, (3) input the WeChat Wallet password, and (4) have the merchant scan the barcode that the app provides (contactless). During COVID-19, the process requires additional steps as facial recognition fails because of face coverings and closes WeChat app. Users have to open the WeChat app again and re-enter their password to reach the payment screen (app wallet). People also have to hide their passcodes from others by angling their phone away or covering w/ their hands. Normally, face ID allows the user to skip the process of unlocking the phone and unlocking WeChat Pay, however, due to current COVID circumstances, it often fails. To proceed with the transaction, users are forced to manually input each password in public, resulting in certain individuals to hide or cover their phones until they leave.

The **Apple Pay digital payment** method requires users to (1) double tap their home button for the Apple Wallet to appear, displaying all payment/card accounts registered in the phone, (2) Select which card/account user wishes to use, (3) Phone scans user's face to allow transaction, (4) Hover phone over the card machine to allow transaction (this step is contactless as well). Normally, Apple Pay prompts users to use facial ID, however, face ID often fails during covid due to masks covering users' faces. As an alternative, the app interface asks the user to type in their passcode instead. Because of this, people have to hide their passcodes from others by angling their phone away or covering it with their hands.

## Summary of Findings:

We decided to focus on the struggles of digital payment method users and came to some overall observations.

1) There was a majority of people using digital payment methods due to COVID-19 (Allows for touchless method of payment to help reduce the spread of COVID).

2) Users who had to enter pin/passcodes after their Facial ID failed made efforts to hide their pin numbers by either covering it with their hands or physically turning the machine.

3) Users initially try to authorize digital payment methods with facial recognition, but it fails because of their face coverings, forcing them to go and unlock the payment apps. They presumably do this out of habit (from before the pandemic) or due to ApplePay prompting users for a face scan when opening the app without a pin option until after face ID fails.

4) WeChat users experienced a much longer process compared to Apple Pay users when facial recognition failed. The app shuts down if Face-ID fails and users have to open the WeChat app again and re-enter their password to reach the payment screen using a pin instead.

5) Generally, the payment process was longer than it would have been pre-COVID.

6) This confusion caused hold ups in lines and made lines take a lot more space as 6 foot distance regulations are still in place. (Went back on November 1st and counted an average of 8.4 people in each register/cash out lane).

7) Due to the aforementioned issues, users were visibly annoyed with the digital payment methods that involved facial ID.

## Observation Analysis

We decided to focus on digital payment users and their issues during the COVID-19 pandemic. During our observations, the majority of adolescents in the Mississauga and Vancouver areas prefered to use mobile payment. The Chinese population has adopted digital payment applications particularly quickly, with many grownups and elderly also switching to mobile payment methods. It is reported there are currently 900 million people using WeChat Pay in 2020, as well as 46.7% of older Chinese people and 97.3% young Chinese people using WeChat Pay in 2017 (Iqbal, 2020) It was also reported that Apple Pay has had (est) 441 million users as of 2019 (Clement, 2020). As the COVID-19 pandemic continues, mobile payment has seen increasing popularity as it is simple to use and provides a safe method of payment through a faster, contactless transaction.

When analyzing our observations, we took note of the different transaction methods we observed and noted the pros and cons of each one.

| Payment Types | Pros | Cons |
|---|---|---|
| Cash Payment | Better for budgeting purposes. It eliminates the chances of going into debt as users see a physical decrease in funds. | Unsafe during a pandemic (COVID-19 stays on bills for 28 days). Can also take the longest out of all methods, causing congestion in lines. Inconvenient due to having to physically carry bills and count money during payment. |

| | | |
|---|---|---|
| Credit/Debit/Card Payment (Insert/Slide Method) | More convenient compared to cash and an overall faster payment method. Slightly reduces human/surface contact during the pandemic. | Unsafe due to health concerns (have to make contact with POS to enter pin and insert/slide card), as well as security risks (someone seeing your pin). |
| Credit/Debit Card (Tap) | Reduces contact immensely compared to cash or insert. Faster than cash or sliding/inserting. Eliminates the chances of someone seeing your pin code. | Not completely contactless (card can still touch the machine). Inconvenient as you still have to carry a wallet or something to hold your card in. |
| Digital Payment (WeChat & ApplePay) | Faster and more convenient than all the other methods (everyone carries a phone around). Used by a large population (990M WeChat Pay users in 2020, 441M Apple Pay users in 2019). Minimizes contact to people/surfaces at POS almost to 0. | Very slow payment during COVID-19 where Face-ID fails (requires the user to launch the app again with certain mobile pays such as WeChat, if face id fails). This can cause a slight hold up in the line and frustration for the user. |

We decided we would mainly focus on issues faced by customers using digital payment methods such as Apple Pay and WeChat Pay as it was the most frequently observed payment method, is significantly safer than other methods, and affects a diverse age group and significant portion of the Chinese population.

We observed privacy being an important issue for customers as they paid. Users of mobile payment methods demonstrated low confidence in the security of password and PIN authorization methods, partly due to the threat of a bystander looking over their shoulder. These methods also slow down the payment process because of payees taking extra effort to hide their inputs from surrounding people. Though Face ID-based payment previously circumvented this issue, the mask bylaws implemented by several governments in response to the COVID-19 pandemic have rendered it unusable. Many users accustomed to the convenience of Face ID are now struggling to quickly authorize payments; payees attempt to use Face ID out of habit or phone setting, are denied because of their face covering, and must then manually input an authorization code. This creates frustration for the user and slows down the payment process.

We have also observed that the increased use of lengthy payment processes has led to more congestion in stores and other commercial areas. There was an average of 8.4 people in

each register line at any given time. The COVID-19 pandemic and the social distancing measures (6 foot gap between people) implemented to counter it have highlighted the need for quick and simple transactions; it's hard to stay away from people in a crowded store. Thus, slow payment methods are not only an inconvenience, but also a significant health risk. A faster transaction would help keep lines moving faster and reduce the danger for store patrons.

Thus we propose the app, **ACCESSories™**.

## User Needs

- An alternative to paying cash due to certain stores not accepting cash during COVID-19
- The user needs to be able to pay digitally and without making physical contact
- The user needs to be aware of the reason the app fails to work as expected in the payment process
- The user needs to be able to authorize payments without revealing their security information to nearby people
- The user needs a payment process at least as fast as Face ID and tap payment

## Design Requirements

### Basic Needs:

1. The system should have a method that replaces cash as a payment method
2. The system shall have a system that allows digital and complete contactless payments

### Functionality:

3. The system should minimize the risk of security information being visible to bystanders
4. The system should provide a substitute for a facial recognition to be able to pay digitally
5. The system shouldn't ask for passcodes during the payment process
6. The system should let users pay within the same time frame or faster than facial recognition payment methods
7. The system should register up to 3 accessories at a time (allows more flexibility and ease to use)

### Interface:

8. The system should have simple payment instructions (with colour coding and symbols)
9. The system should have feedback indicating what part of the payment process user is at
    9.1. Screen shows payment success or failed
    9.2. Screen incorporates icons and symbols to indicate different stages in the process

### Interaction:

10. The system should not take longer than 8 seconds for the entire payment process (from launching of app to the payment going through) (faster than system in place right now)
11. The system should replace the need for a pin and FaceID to avoid prolonged interaction time and frustrations whilst engaging with the system
12. The system provides both front and back cameras to allow a diversified application; see appendix for more detail
13. The system suggest using back camera to register as it is able to capture more detail

## Ideation

**ACCESSories™** will use your device's camera to scan and register up to three unique personal items such as glasses, rings, or keychains. The scanned items will then function as physical passwords, with the app memorizing the unique aspects of your item's structure in order to ensure maximum security. To use the app, users will either select it from their phone's menu or use the shortcut function where they can double-tap their device's home button to bring up the payment options menu. After making a selection, they will scan their registered item to authorize their payment. This technology should be implemented to ensure the efficacy and safety of financial transactions during the COVID-19 pandemic.

The app would require users to launch the app by either double tapping the home button or selecting the app from the phone's menu. Upon launching the app for the first time, users would be prompted to register an item by focusing their phone's camera on it for several seconds. After completing the scan, users would then be able to register up to 2 more items or close the app and go shopping. When paying, users would launch the app using the aforementioned methods, scan a registered item to authorize the payment, then hover their phone over the payment machine. On-screen instructions would guide users through the process.

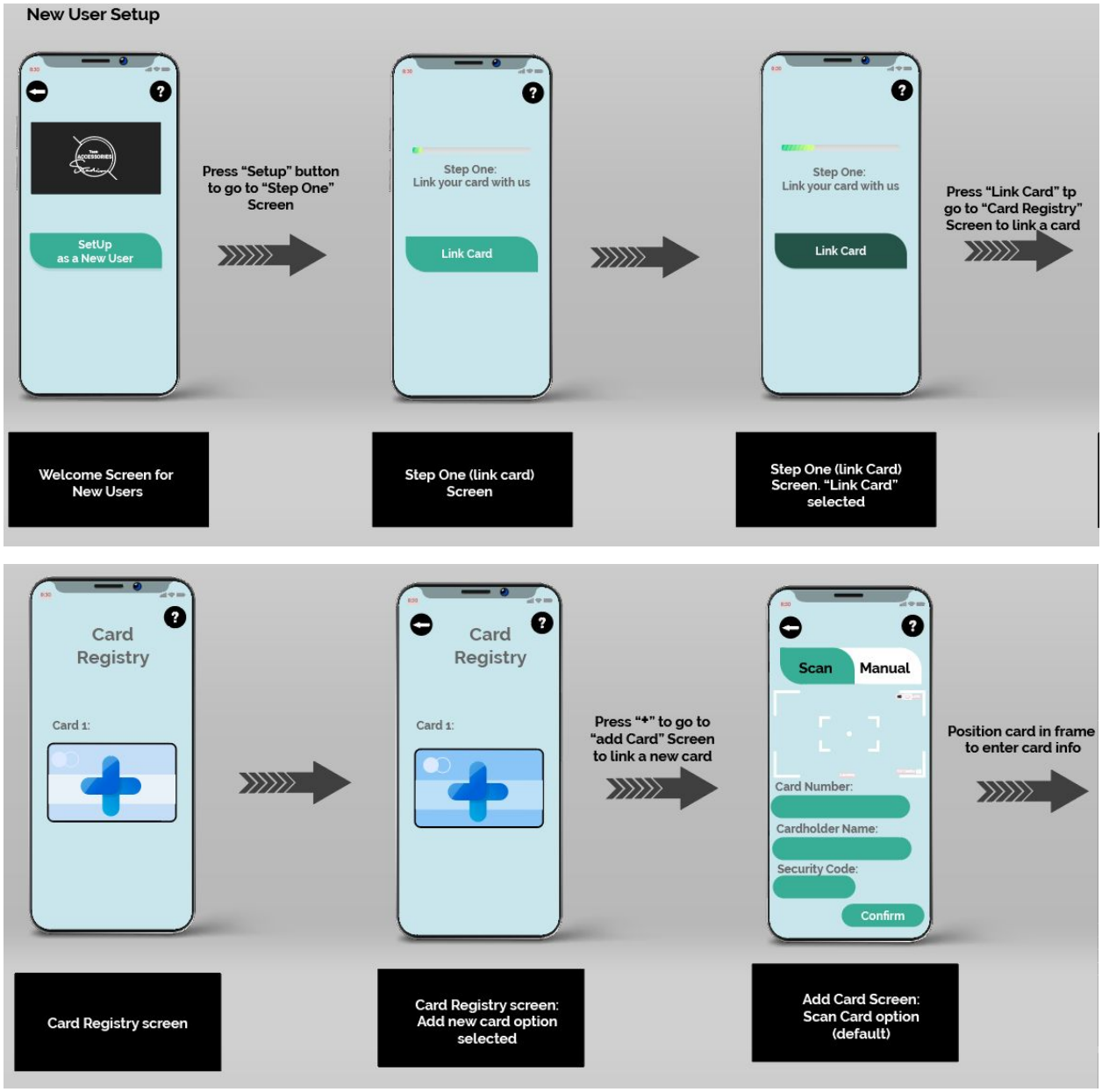
## Final Prototypes

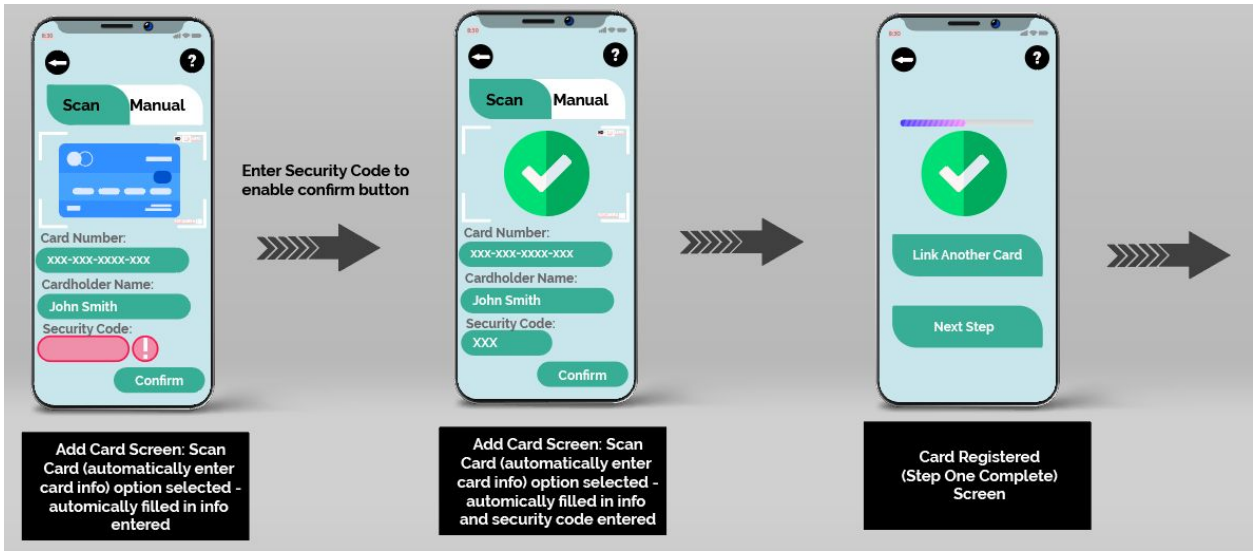
(See page Prototypes at the end of the document for all prototype versions)

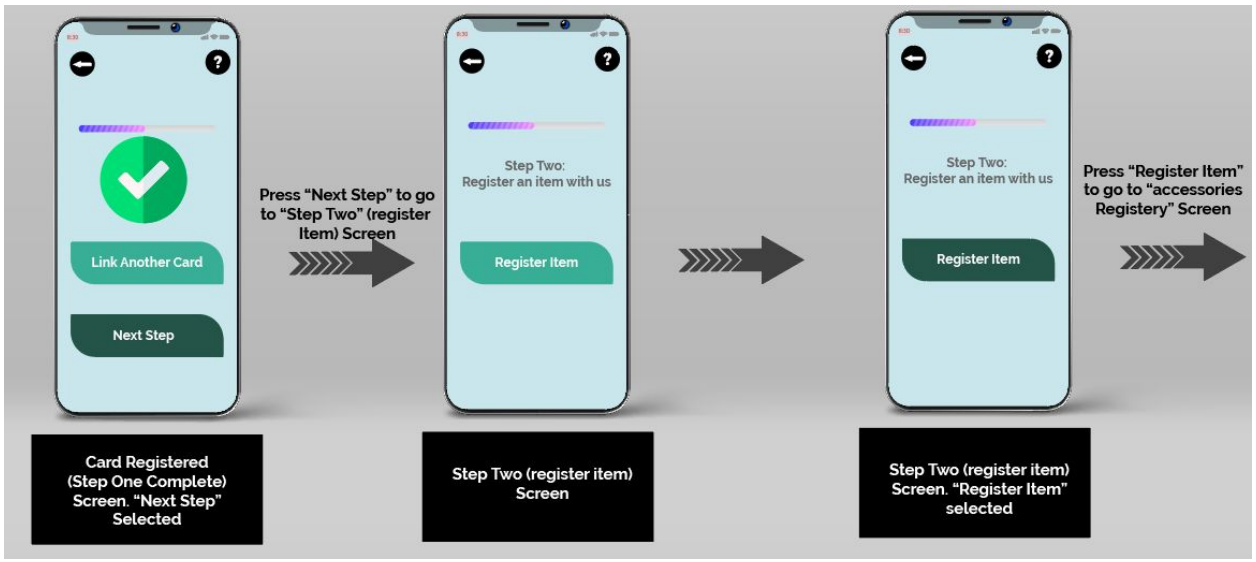
### Home/Sign Up

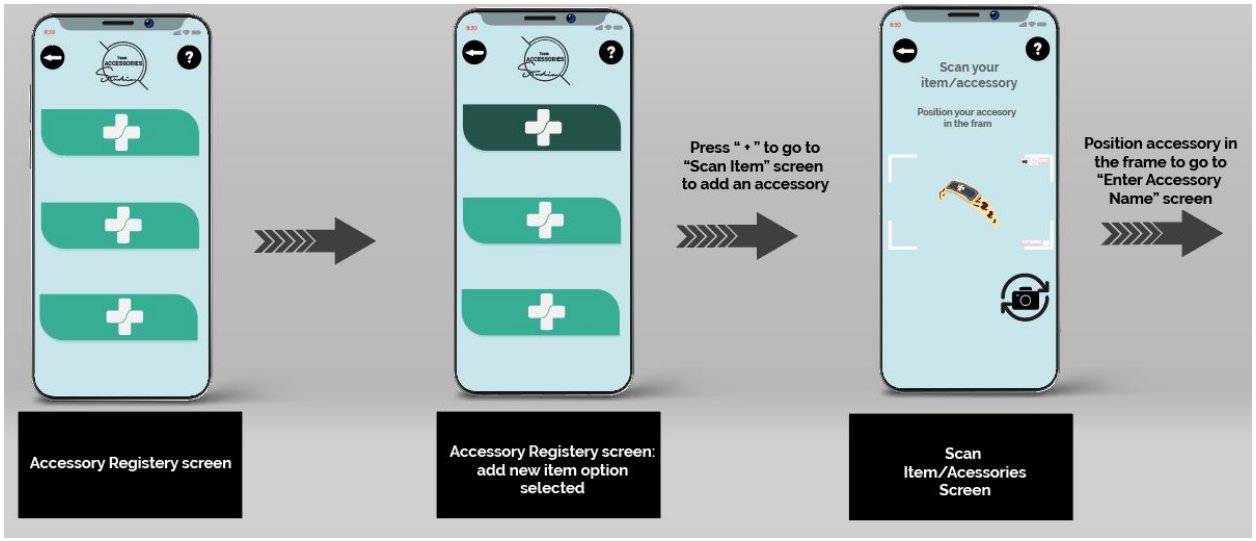
Upon launching the app for the first time, users will go through a ‘welcome’ sequence where they will be automatically guided through the card and item registration processes. After finishing the sequence, or launching the app afterwards, users will instead see the home screen with 3 options to pay, item registration or link card, depending on which button is pressed. A help button is also present in the top right corner throughout.

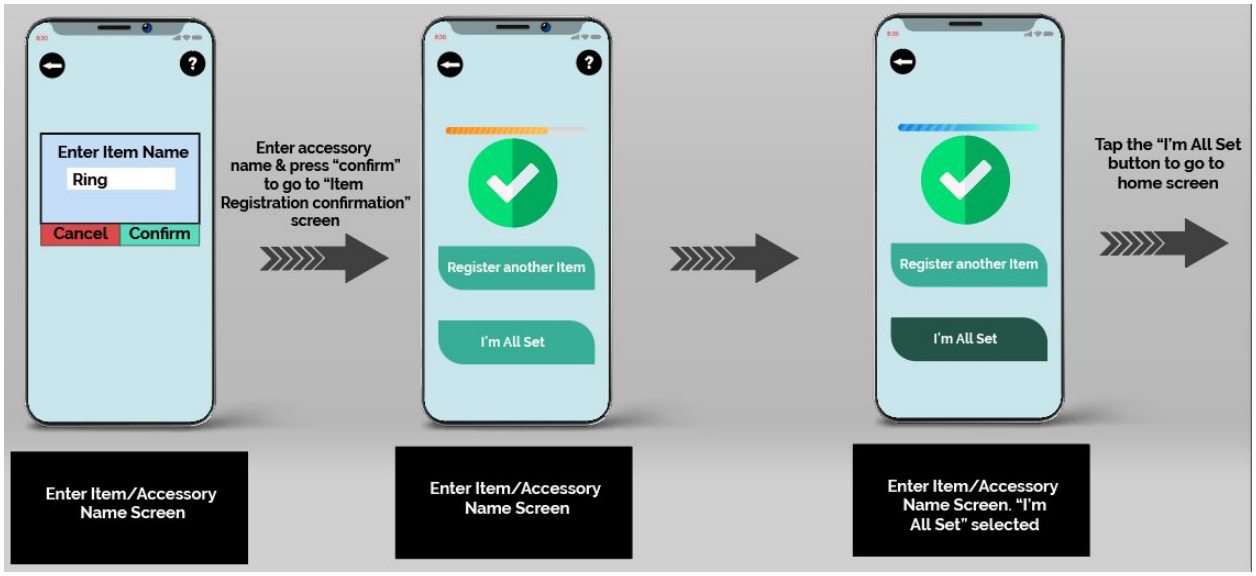
New User (Set Up):

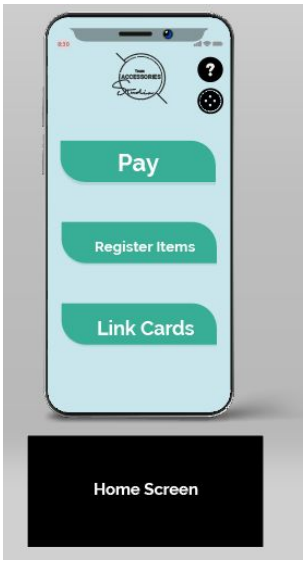

New User Setup
SetUp as a New User
Press "Setup" button to go to "Step One" Screen
Step One: Link your card with us
Link Card
Press "Link Card" tp go to "Card Registry" Screen to link a card
Welcome Screen for New Users
Step One (link card) Screen
Step One (link Card) Screen. "Link Card" selected
Card Registry
Card 1:
Press "+" to go to "add Card" Screen to link a new card
Scan
Manual
Card Number:
Cardholder Name:
Security Code:
Confirm
Position card in frame to enter card info
Card Registry screen
Card Registry screen: Add new card option selected
Add Card Screen: Scan Card option (default)


Scan
Manual
Card Number:
xxx-xxx-xxxx-xxx
Cardholder Name:
John Smith
Security Code:
Confirm
Enter Security Code to enable confirm button
Scan
Manual
Card Number:
xxx-xxx-xxxx-xxx
Cardholder Name:
John Smith
Security Code:
XXX
Confirm
Link Another Card
Next Step
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info entered
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info and security code entered
Card Registered (Step One Complete) Screen

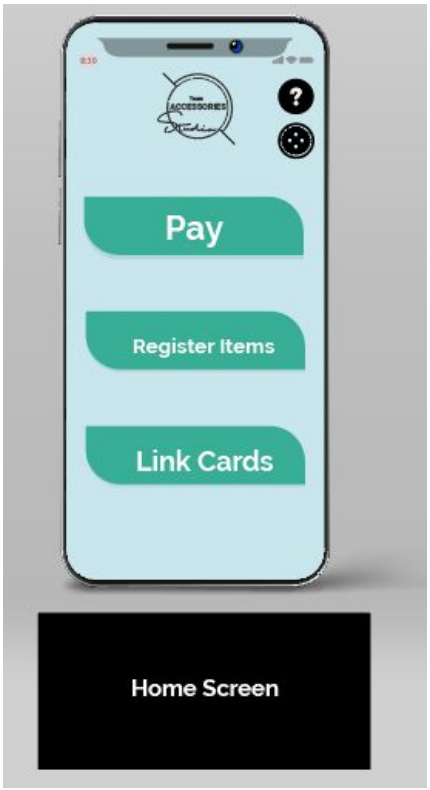

Link Another Card
Next Step
Press "Next Step" to go to "Step Two" (register Item) Screen
Step Two:
Register an item with us
Register Item
Step Two:
Register an item with us
Register Item
Press "Register Item" to go to "accessories Registery" Screen
Card Registered (Step One Complete) Screen. "Next Step" Selected
Step Two (register item) Screen
Step Two (register item) Screen. "Register Item" selected


Accessory Registery screen
Press " + " to go to "Scan Item" screen to add an accessory
Accessory Registery screen: add new item option selected
Scan your item/accessory
Position your accesory in the fram
Position accessory in the frame to go to "Enter Accessory Name" screen
Scan Item/Acessories Screen


Enter Item Name
Ring
Cancel
Confirm
Enter Item/Accessory Name Screen
Enter accessory name & press "confirm" to go to "Item Registration confirmation" screen
Register another Item
I'm All Set
Enter Item/Accessory Name Screen
Register another Item
I'm All Set
Enter Item/Accessory Name Screen. "I'm All Set" selected
Tap the "I'm All Set button to go to home screen




Returning User (Already set up):

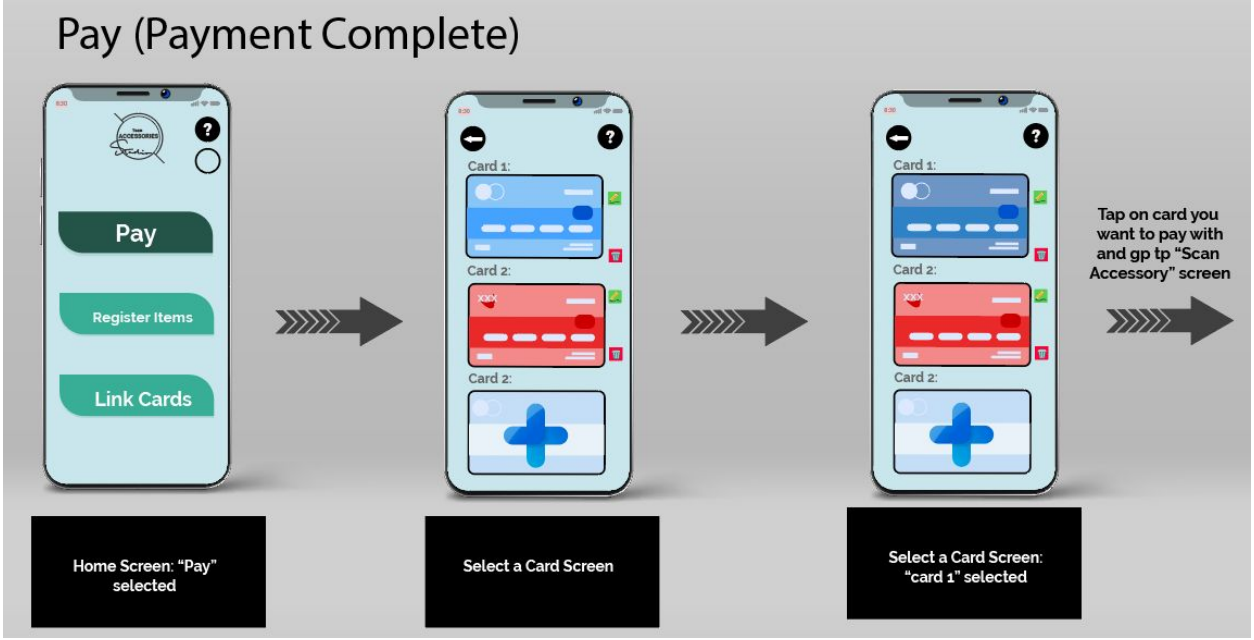


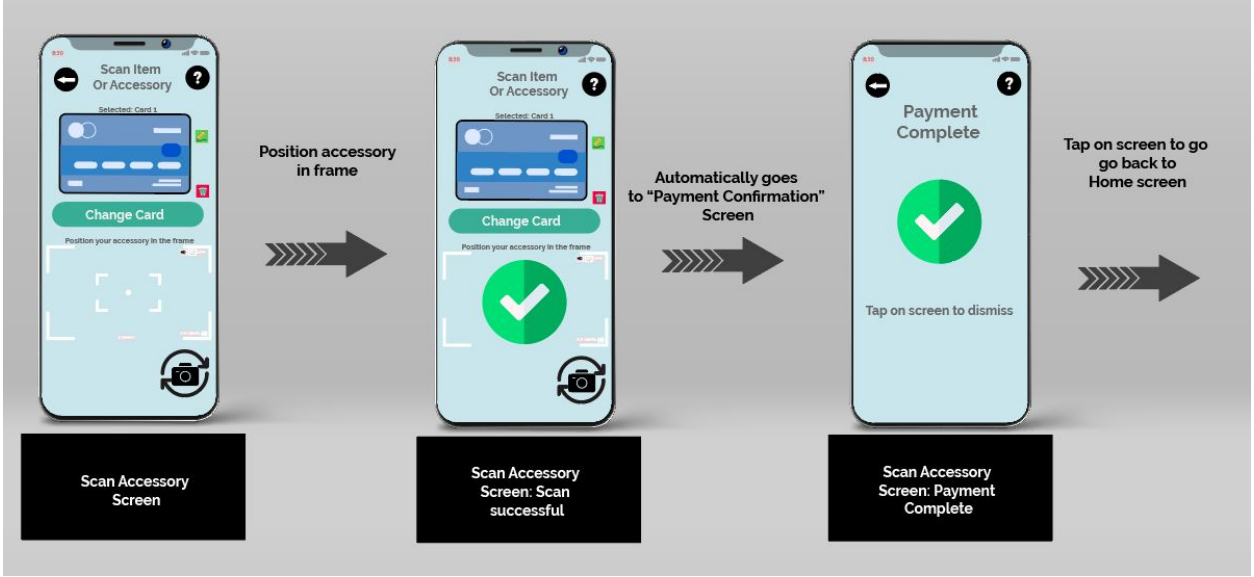
## Pay

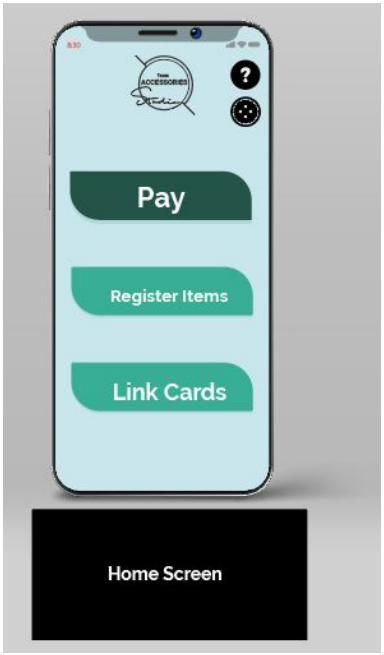
The pay process allows you to select one of the cards registered with your account to pay from. After you choose your card you will be prompted to scan one of your items/accessories to allow you to pay. It also displays which card you choose and offers an option to change the selected card. Instructions can be accessed through the button in the top right corner.

After payment the app will show one of two screens depending on if the transaction is complete, a payment complete or payment incomplete screen.

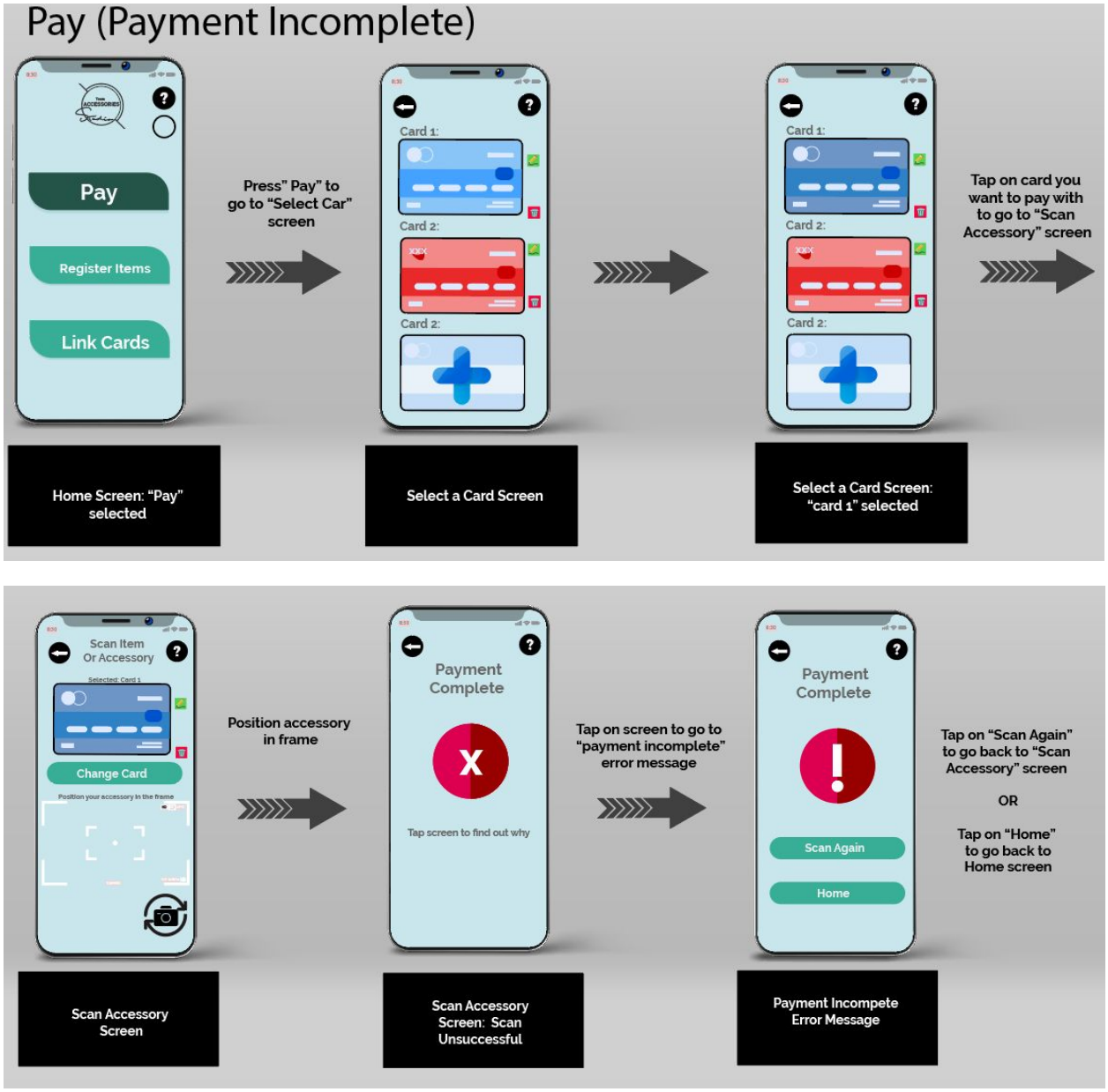
Payment complete:




Scan Item
Or Accessory
Change Card
Position your accessory in the frame
Scan Accessory
Screen
Position accessory
in frame
Scan Item
Or Accessory
Change Card
Position your accessory in the frame
Scan Accessory
Screen: Scan
successful
Automatically goes
to "Payment Confirmation"
Screen
Payment
Complete
Tap on screen to dismiss
Scan Accessory
Screen: Payment
Complete
Tap on screen to go
go back to
Home screen


Pay
Register Items
Link Cards
Home Screen

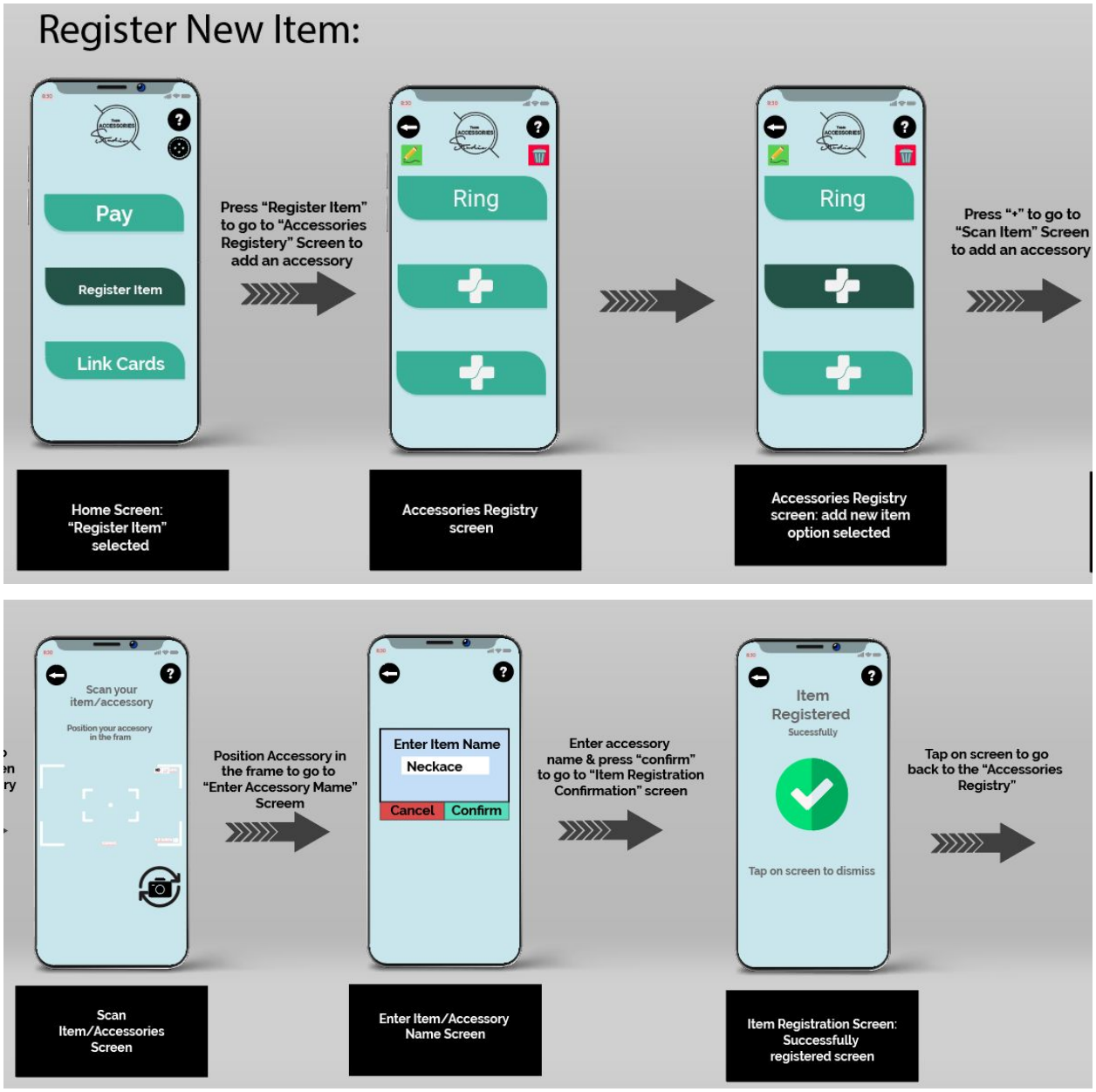
Payment Incomplete/Failure:



## Registering/Editing Items

By pressing “Register Item”, the app will lead you to the Accessories Registry. You can delete items, register new items, or change the name of items through this process. Instructions can be accessed through the button in the top right corner.

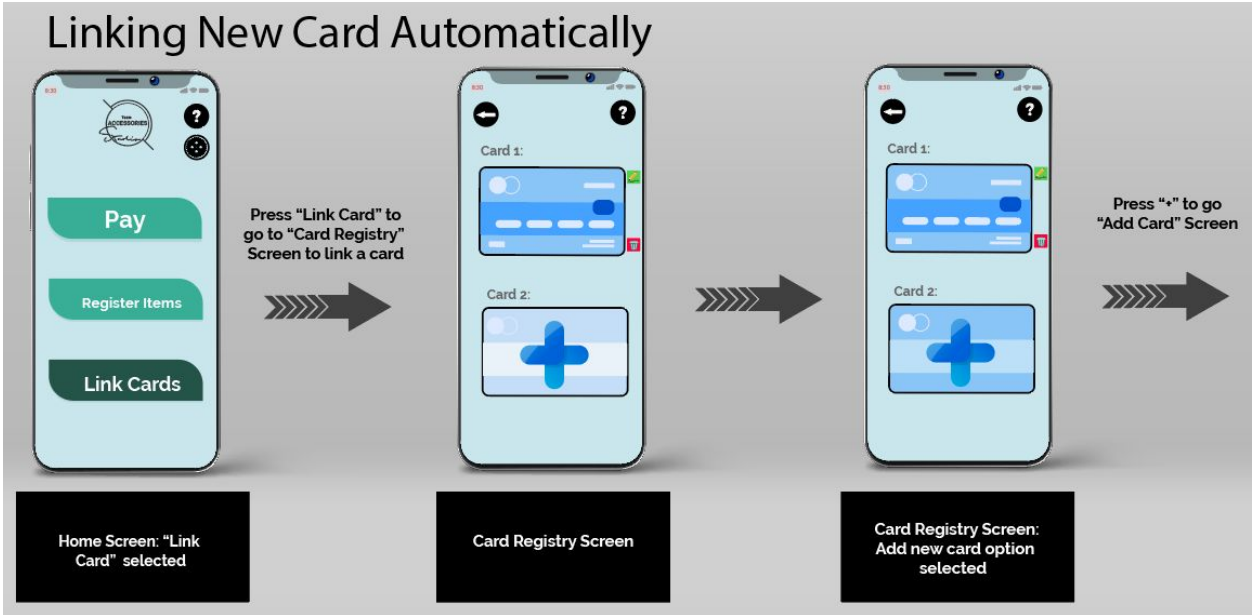
Registering Items Screen:

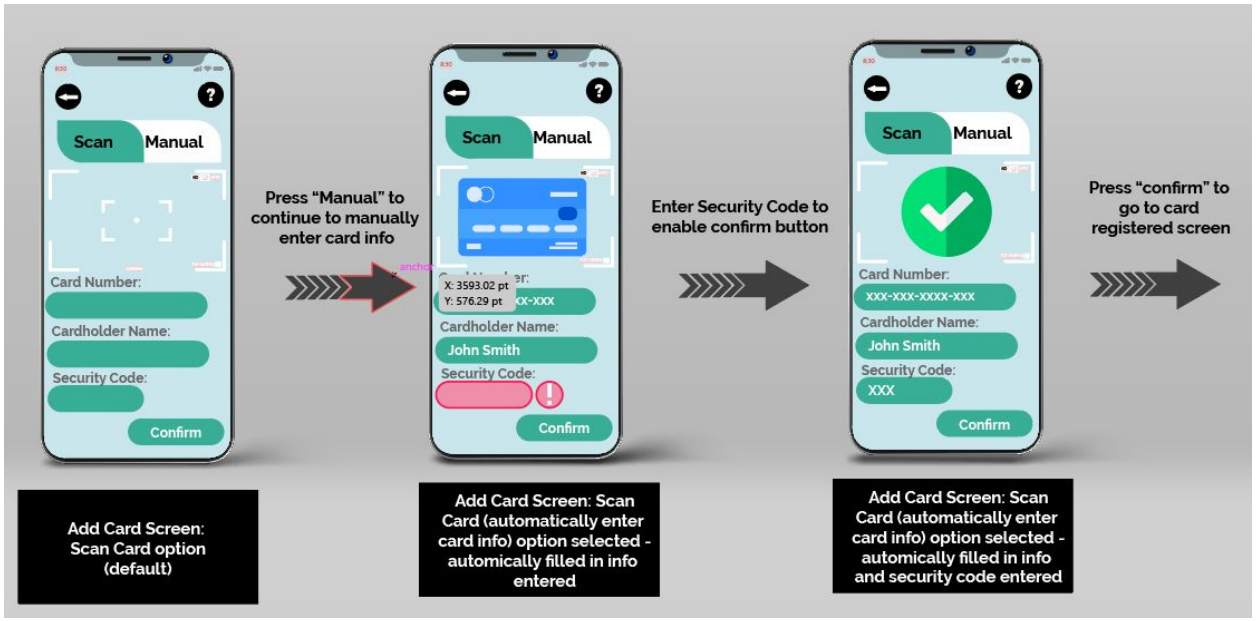


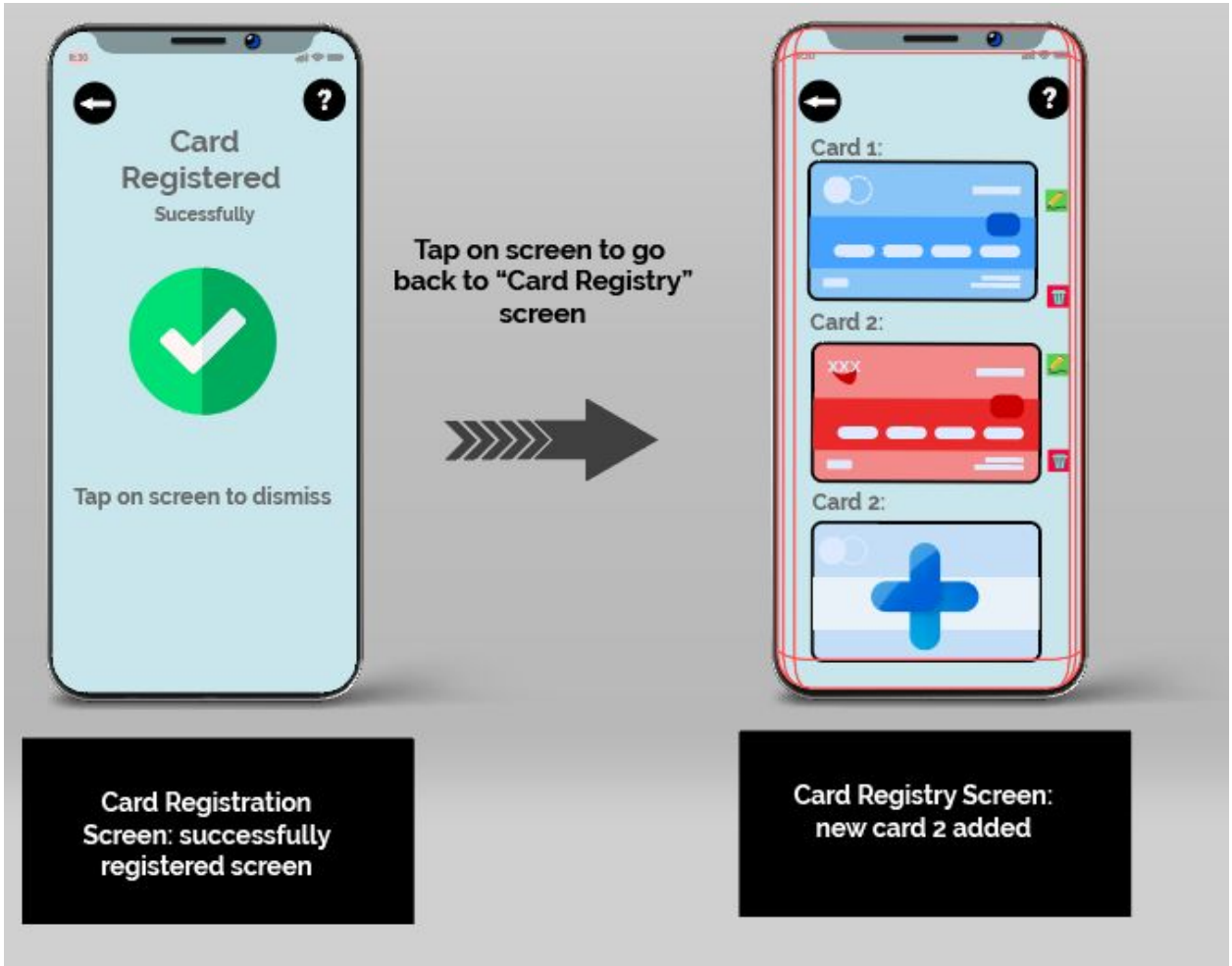

**Linking/Editing different cards/bank accounts**

From the “Link Card” option, the app will display your Card Registry where you can delete set up bank accounts/cards or link new accounts from this process. You can enter your card details automatically by scanning the card from your camera or manually by inputting your card information in. Instructions can be accessed through the button in the top right corner.

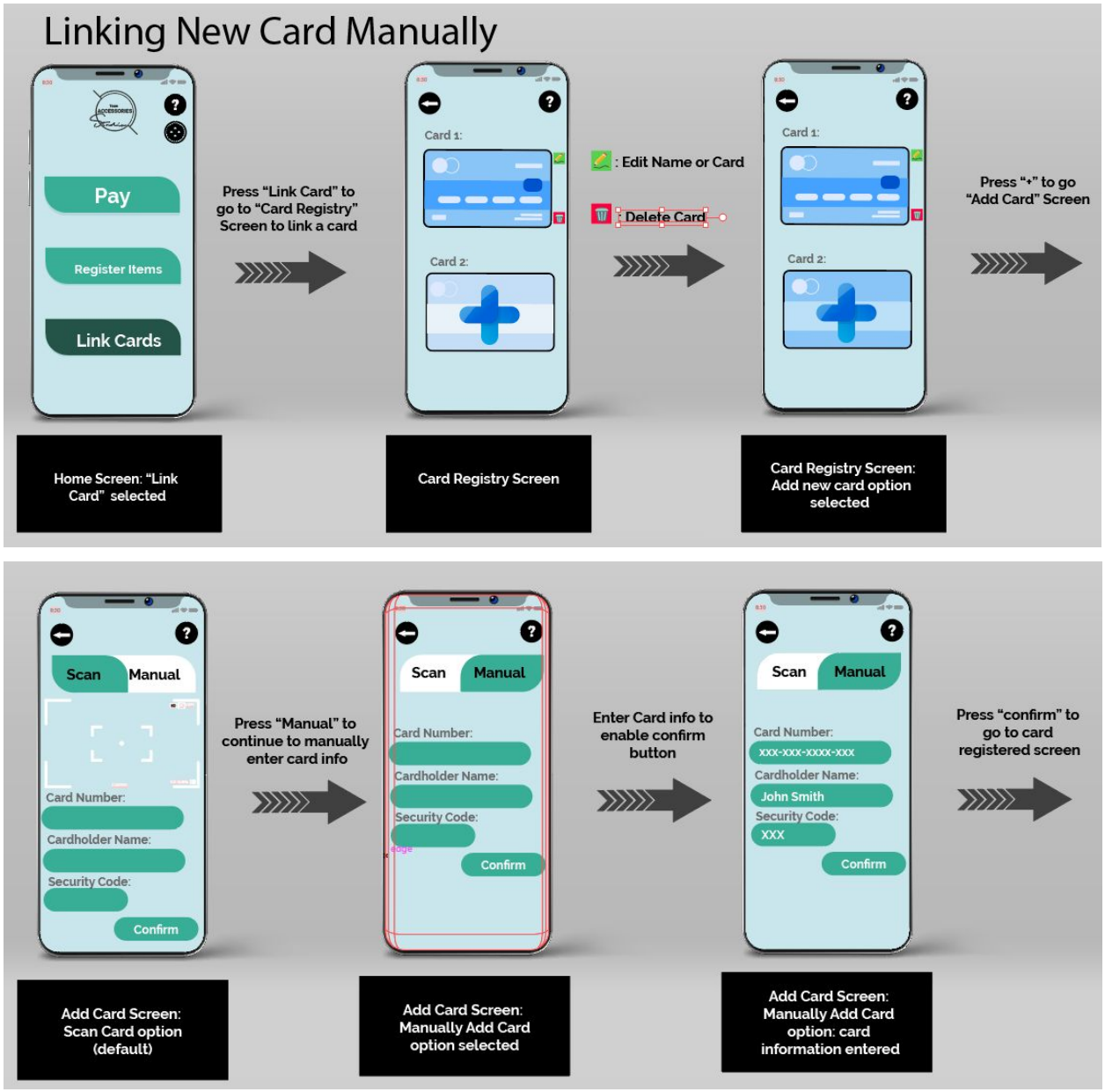
Automatically:

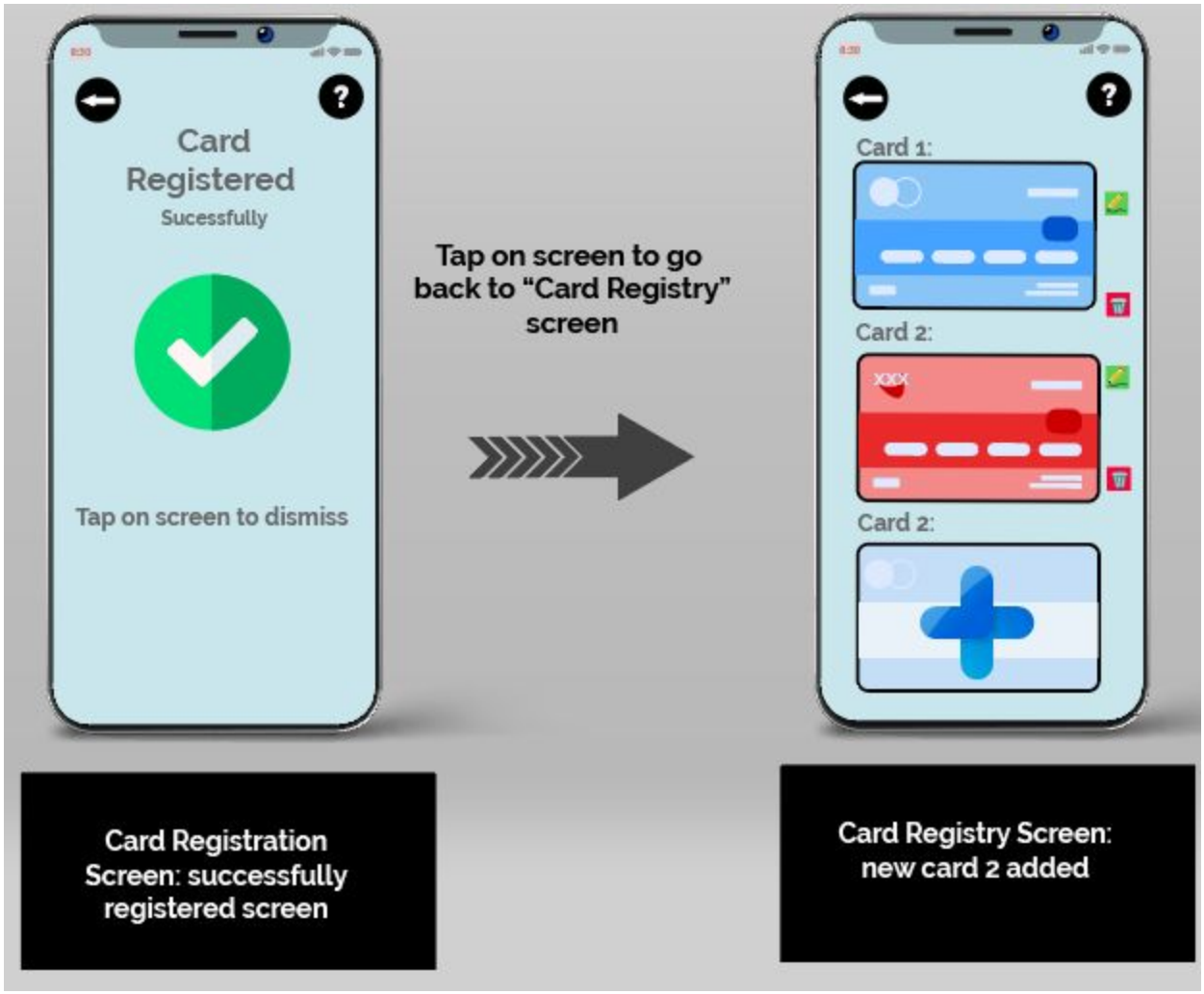



Scan
Manual
Card Number:
Cardholder Name:
Security Code:
Confirm
Press "Manual" to continue to manually enter card info
Enter Security Code to enable confirm button
Press "confirm" to go to card registered screen
John Smith
XXX
XXX-XXX-XXXX-XXX
Add Card Screen: Scan Card option (default)
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info entered
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info and security code entered

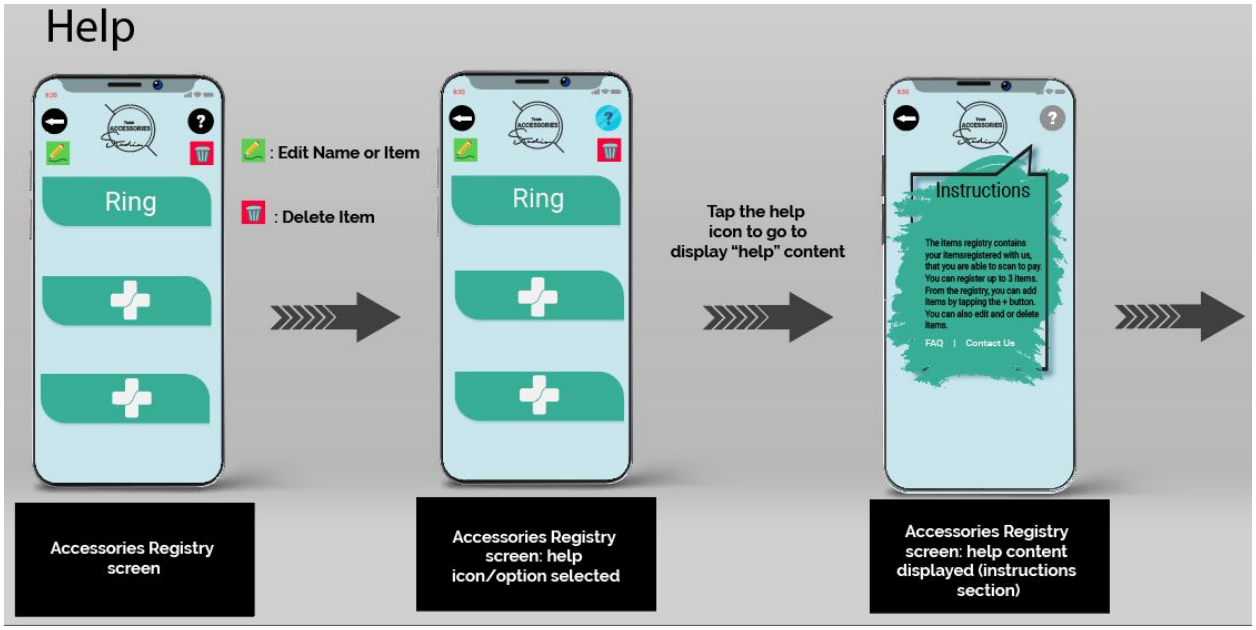

Card Registered
Sucessfully
Tap on screen to dismiss
Tap on screen to go back to "Card Registry" screen
Card 1:
Card 2:
XXX
Card 2:
Card Registration Screen: successfully registered screen
Card Registry Screen: new card 2 added

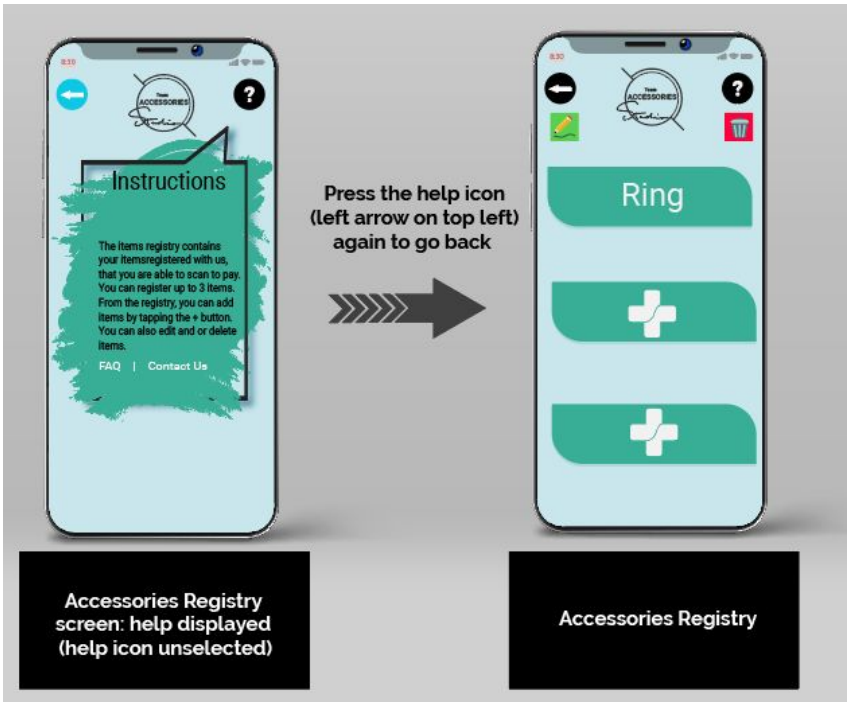
Manually:


Linking New Card Manually
Pay
Register Items
Link Cards
Press "Link Card" to go to "Card Registry" Screen to link a card
Card 1:
Card 2:
: Edit Name or Card
: Delete Card
Press "+" to go "Add Card" Screen
Home Screen: "Link Card" selected
Card Registry Screen
Card Registry Screen: Add new card option selected
Scan
Manual
Card Number:
Cardholder Name:
Security Code:
Confirm
Press "Manual" to continue to manually enter card info
Enter Card info to enable confirm button
xxx-xxx-xxxx-xxx
John Smith
XXX
Press "confirm" to go to card registered screen
Add Card Screen: Scan Card option (default)
Add Card Screen: Manually Add Card option selected
Add Card Screen: Manually Add Card option: card information entered

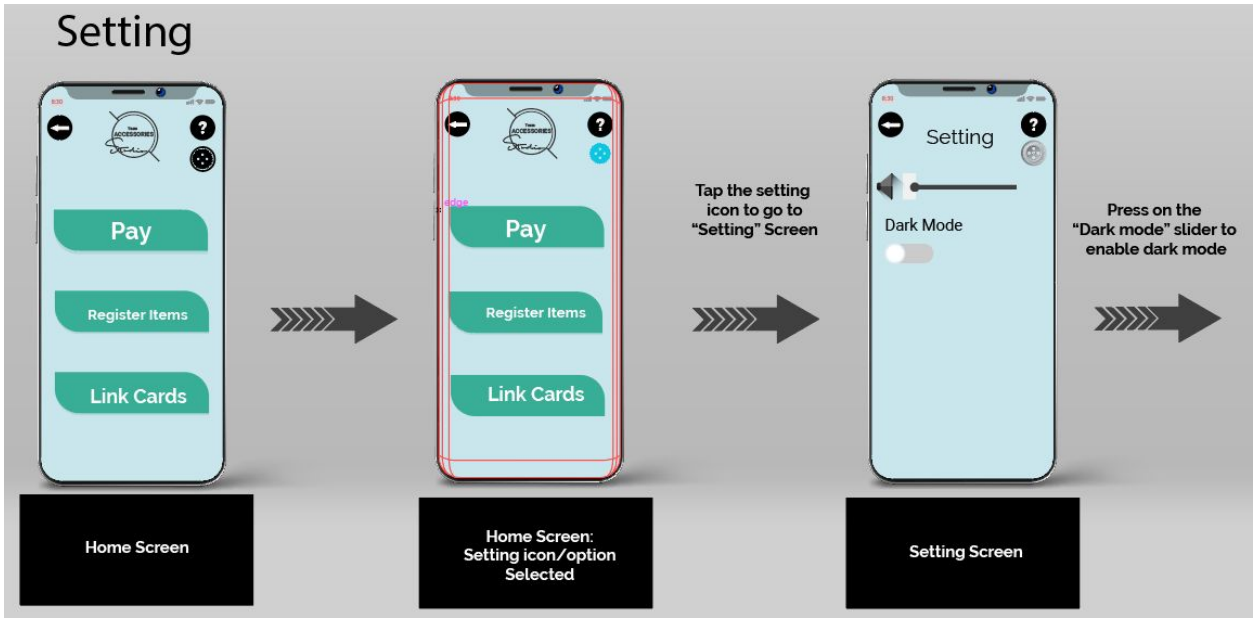

Card
Registered
Sucessfully
Tap on screen to dismiss
Tap on screen to go back to "Card Registry" screen
Card 1:
Card 2:
Card 2:
Card Registration Screen: successfully registered screen
Card Registry Screen: new card 2 added

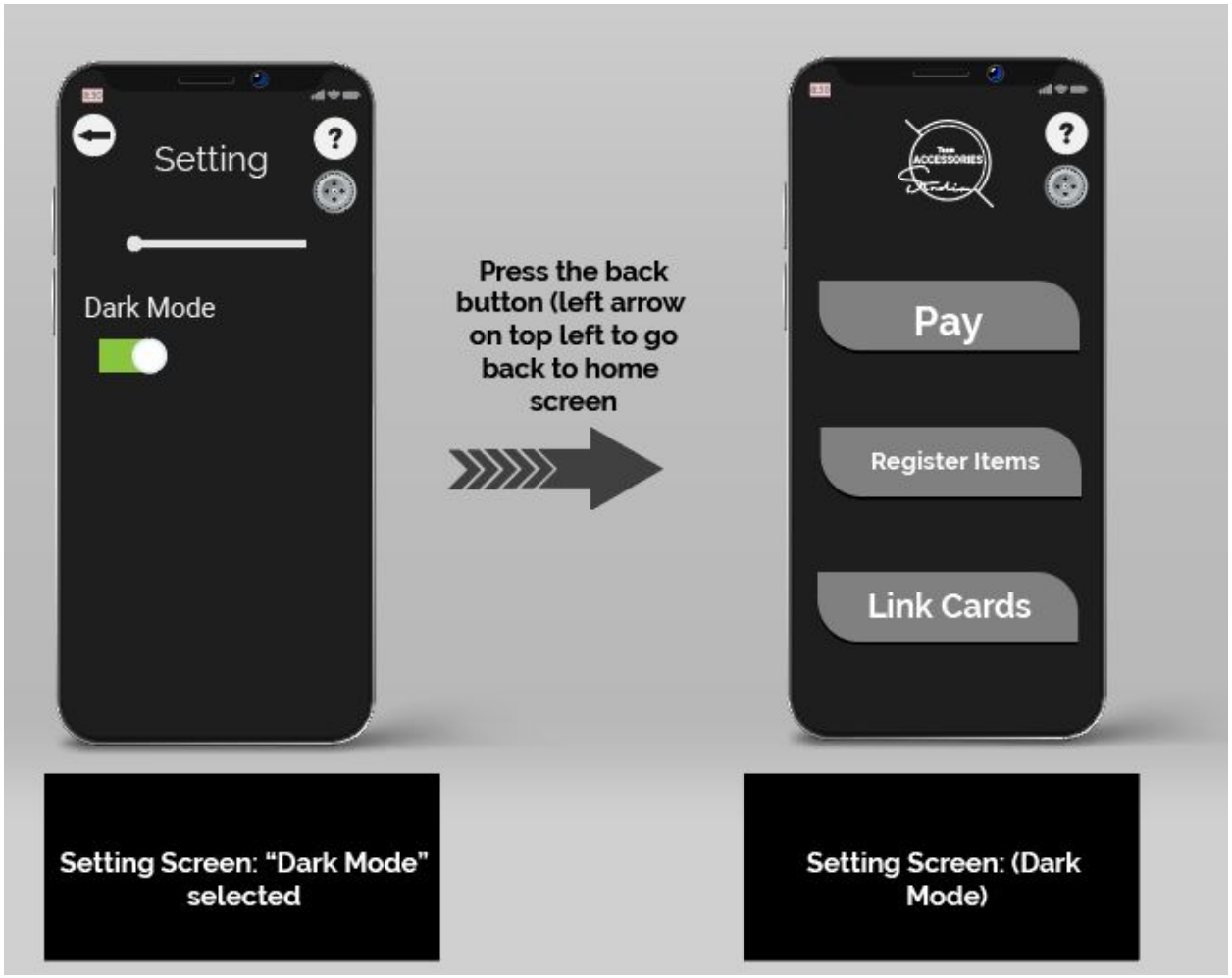
## Help:


Help
Ring
: Edit Name or Item
: Delete Item
Accessories Registry screen
Ring
Accessories Registry screen: help icon/option selected
Tap the help icon to go to display "help" content
Instructions
The items registry contains your itemsregistered with us, that you are able to scan to pay. You can register up to 3 items. From the registry, you can add items by tapping the + button. You can also edit and or delete items.
FAQ | Contact Us
Accessories Registry screen: help content displayed (instructions section)


Instructions
The items registry contains your itemsregistered with us, that you are able to scan to pay. You can register up to 3 items. From the registry, you can add items by tapping the + button. You can also edit and or delete items.
FAQ | Contact Us
Accessories Registry screen: help displayed (help icon unselected)
Press the help icon (left arrow on top left) again to go back
Ring
Accessories Registry

## Settings:


Setting
Pay
Register Items
Link Cards
Home Screen
Pay
Register Items
Link Cards
Home Screen: Setting icon/option Selected
Tap the setting icon to go to "Setting" Screen
Setting
Dark Mode
Setting Screen
Press on the "Dark mode" slider to enable dark mode


Setting
Dark Mode
Setting Screen: "Dark Mode" selected
Press the back button (left arrow on top left to go back to home screen
Pay
Register Items
Link Cards
Setting Screen: (Dark Mode)

# Studio 1:

## Usability Evaluation Protocol

**Script:**

The Facilitator followed a script in the beginning of each usability test in which they would introduce the issue that our app is trying to address, what our app is and what it does, and then we would introduce the scenarios and tasks we want our users to accomplish.

Introduction:

"Hi there, We are team 4 and our app is called ACCESS-ories. If you are familiar with digital payment apps like WeChat Pay and Apple Pay, you know that they basically use face ID to allow you to pay from your phone." *Wait for confirmation from user*

"So because of face masks and facial coverings face ID is not working for these apps and they have to use passwords instead which has security risks. So to fix that we came up with our own app which lets you pay through your phone by linking your credit cards to our app and letting you pay by scanning items or accessories such as necklaces or rings or keychains that you have registered in our app."

*Introduce the Scenarios and Tasks*

Guiding Questions if user is not talking or stuck:

- *repeat task or scenario*
- "What do you think the buttons on the screen should do?"
- "You seem to be stuck on this screen, could you walk us through what you are seeing?"
- "What do you expect to happen if you click any of the buttons?"

**Scenarios and Tasks:**

| |
|---|
| **Scenario #1:** You are a user of our app at the checkout line of a grocery store.<br><br>**Task:** Pay for your groceries at the checkout line using the app |
| **Scenario #2:** You just got a new necklace that you love and always wear that is not already registered in our system.<br><br>**Task:** Register the necklace as a new item to your list of items registered in the system. |

| |
|---|
| **Scenario #3**: You just received a new credit card from the bank today and would love to use this card to pay for your groceries next time.<br><br>**Task**: Link a new credit card to the system (user has the freedom to choose if they want to automatically scan their cards or manually input them in) |
| **Scenario #4**: You are in line at the checkout line of a grocery store.<br><br>**Task:** Pay and navigate after prompted with a "failed payment" screen |
| **Scenario #5**: You received a new credit card from the bank today and would like to use it to pay for your groceries next time. However, you are currently walking in public and you cannot stop and scan your credit card.<br><br>**Task:** Link a new card to your list of cards on the app using the manual input option. |

**Methods for Collecting Data:**

We had two people (WeiHsuan (Jacob) Lin, TianYu (Leo) Pan) take notes of each user's scenarios/tasks and their progress. The note takers also recorded any feedback provided to us at the end or during the tests, as well as any places the user struggled with. The note takers used the Notetaker's guide and the UXTOOL Testing Session Notes template provided to us by Professor Cosmin.

**Templates for Usability Report:**

For our usability report, we used the Rainbow spreadsheet_1, POEMS, and UXTOOLS Usability Testing Plan Checklist templates provided by Professor Munteanu.

## Updates to Protocol

After some discussions during our regular group meeting, we decided to keep our script, the methods for collecting data, and the templates for usability report the same for the next studio session as it worked out quite well for us in the last one.

For the upcoming studio session, we will be focusing on improvements (tap on screen, help icon etc.) that we have done based on the suggestions made by our users last week (refer to the studio results section). This will be brought out along with improved scenarios and tasks that are catered towards these adjustments. Our goal for this revision is to help us understand if more users prefer the new interface or the old one as most tasks were carried out successfully, just with some slight issues here and there.

Additionally, we will finally be testing out our set-up process for first-time users. Even though the first time set-up screens will be one of the least used features for our app, it is incredibly crucial as this is where the user will really learn how to use our app for all future uses.

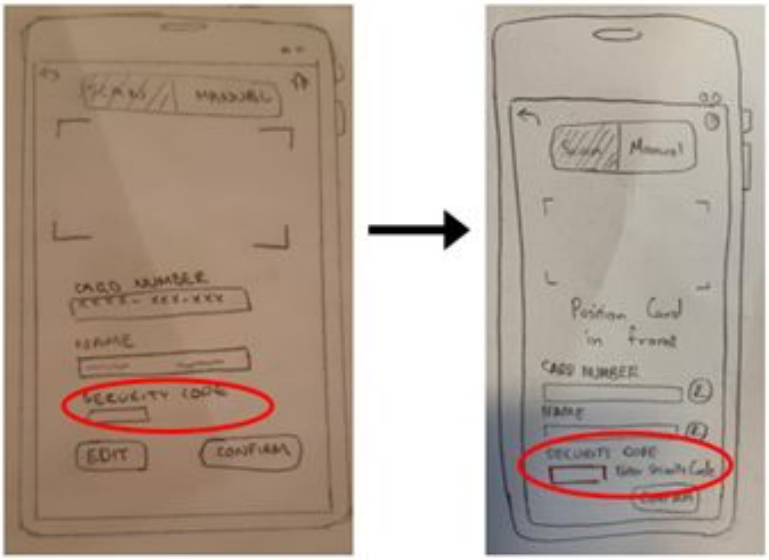
## Studio Results

Our observations from our studio usability tests included user struggles and suggestions made to us. We have incorporated some of these changes to our designs from A5 and have updated our  illustrations. The main struggles are described below.

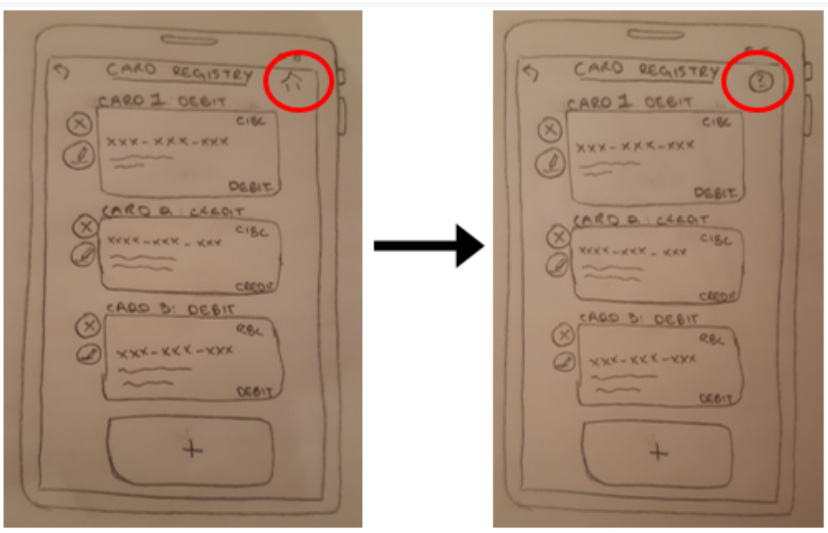
- **Confirmation Dismissals**
    - Users 1, 2 and 4 struggled with exiting the payment confirmation screen and successful card/item confirmation screens. They either did not see the “X” button or wanted to be able to tap on the screen to dismiss the screen instead. The latter functionality was present in our A5 prototype, but was removed in favor of the “X” button due to users not realizing they needed to tap on the screen. To help users better navigate the feedback screens, our team decided to add text prompts to each of them that tell the users to tap on the screen to continue.


- **Separate Screen for Choosing Card When Registering Card**
    - User 2 suggested a screen before the card registration process that asks if they want to scan their card information or manually input it. Due to this issue requiring larger changes to the app’s structure, we conducted more testing (see Studio 2). We found that every user we tested (from Studio 2) did not have any issues/confusion with manual vs automatic input for card information being on the same screen. Therefore, we did not include this change in our app.

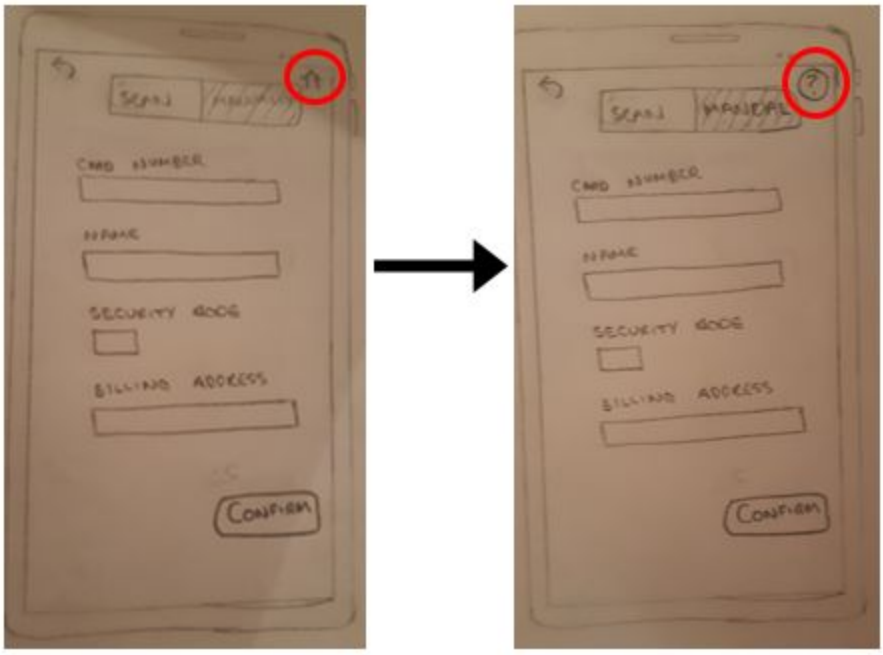
- **Security Code Indication**
    - User 4 was unfamiliar with scanning cards and did not know that you have to input security codes manually (they are not automatically added when scanning a card). She expressed some confusion as how to put the security code in as our team did not have an error message when she confirmed her card. The team was under the impression that people would have the prior experience to know they need to put in the security code manually. To address this issue we highlighted the security code red and had a message prompting the users to enter security code to be able to confirm their card details.




- **Help Function**
    - Users 2 and 4 would sometimes forget what to do and therefore were unable to decide what next steps were appropriate. The facilitator then repeated the tasks and the user got through the task with less difficulty. This provided insight on how some steps may not be clear for a user with a specific task in mind. The user then expressed the need for an instructions button throughout the screens of a specific topic. The team incorporated this by adding a help button on the top corner of the screen (replacing the home button) that would display instructions and what step the user was on. (see image continued on next page)




- **Home and Back Buttons**
  - Users 3 and 4 expressed that the presence of both home and back buttons was redundant as there were too many scenarios where home and back led to the same screen. Users mainly used the home button, not to reach the home screen itself, but to access the help screen that was only accessible there. The elimination of the home button in favor of an omnipresent help button solves this issue.




## Links and References to Studio 1 Materials

**Link to Notes from S5 for reference:**

https://docs.google.com/document/d/1m4SH1OgbfFfGE3fRXq8qpu4zXL8-KR4O9-4scAfB4Kc/edit

**Link to Prototype used in S5 for reference:**
https://docs.google.com/presentation/d/1FcfSBV9GkTE2e4h7N9HEynzxtQDKmczGXj9Ol4Sh8Hg/edit#slide=id.p

**Link to Scenario used in S5 for reference:**
https://docs.google.com/document/d/1BIMKUZSPww017vjih9q1V55q8HtuX5PHynHZRhrkWeg/edit?usp=sharing

## Studio 2:

## Updates to Evaluation Protocol

When conducting testing for A6, our group did not have proper timing protocols in place; while we did attempt to do some timing, we lacked definite start and end points and target times. Our timing process also suffered from us only having three people to run the test. Our A7 testing will have **proper timing protocols**: agreed-upon **start and end points** for each scenario, a **designated person** to do and record the results of the timing, and **target times** that we will seek to reach: we aim to have the users be able to complete the initial registration process in ninety seconds and any of the individual tasks (paying, registering a card, or registering an item) in thirty seconds.

When reviewing the results of our tests, we realized that the organization of our scenarios did not reflect how our users would realistically use the app. In our scenarios, new users, our testers, were told to go through the individual functions of the app without going through the welcome process. An actual user of the app would always go through the welcome process due to it being present upon the app's first launch. We updated our scenario protocols to reflect this: **each user will now go through the welcome process**, before the other scenarios intended to reflect the activities of a regular user.

Since the last studio session, we have decided on using a **shared Google document for note taking.** We found that it is much more efficient and organized for our note takers and with two members working on the same template, data and user observations can be recorded simultaneously as the scenarios take place. For our upcoming studio session, we will be adding a new category "time taken to complete tasks" to generate more quantitative data to help us understand user pain and needs.

**Added Scenario and Task:**

**Scenario #6:** You are a new user to our app

**Task:** Sign up as a first time user with our app

## Links and References to Studio 2 Materials

**Link to blank notes and templates used for usability report for reference:**

POEMS:
https://docs.google.com/document/d/1ivpU-LiB8vwBYe3oDdnAvjX_ggPOv6qWS14yL9gIM1I/edit?usp=sharing

Notetaker-guide:

https://drive.google.com/file/d/1l6opxo82gMguZx0RB2lvfalEAaG3jmQr/view?usp=sharing

Blank usability document used during studio session:

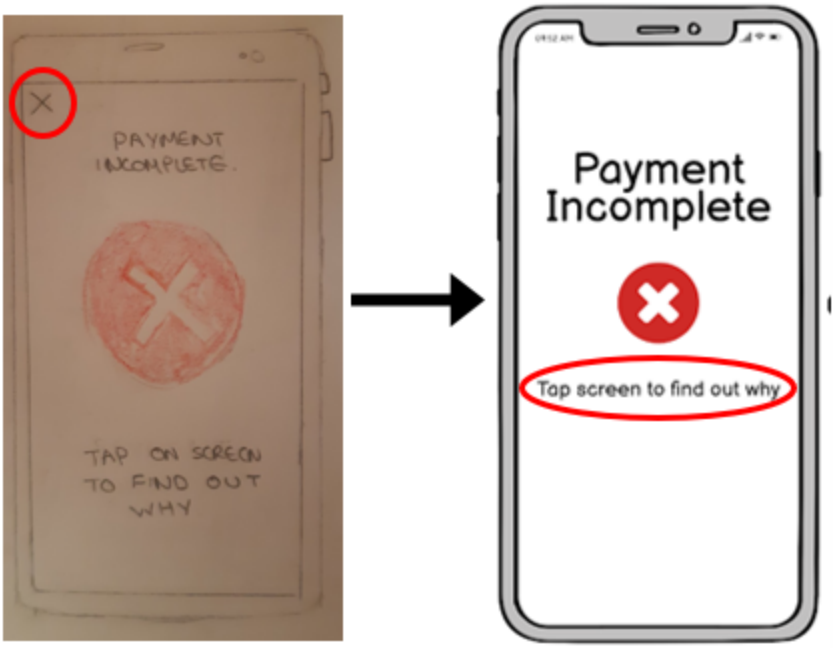
https://docs.google.com/document/d/1OnBiHu8VET4CSdQqtPdH4dfcRCAcWo6Qhra8_WDFy3U/edit?usp=sharing

**Link to filled notes and templates for reference:**

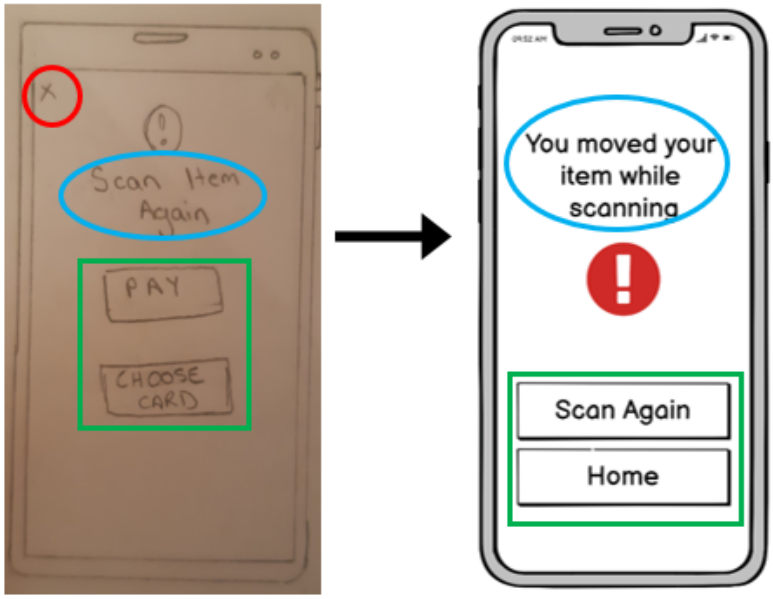
https://docs.google.com/document/d/1N_Lp9NiEzg7neJDq6LlBf0aVenN6Jt1rDf6XhhUGnoM/edit

## Updates to Usability Evaluations Results and Lo-Fi Design for Studio 2

- **Confirmation Screen Dismissals**
    - **Payment Incomplete:** We took out the “X” button on the top as all 6 users did not use it and preferred to tap on the screen to dismiss the message and continue. One user also suggested that the “X” button seemed unnecessary and only adds more confusion as to what specific action to take in this scenario. (see image continued on next page)

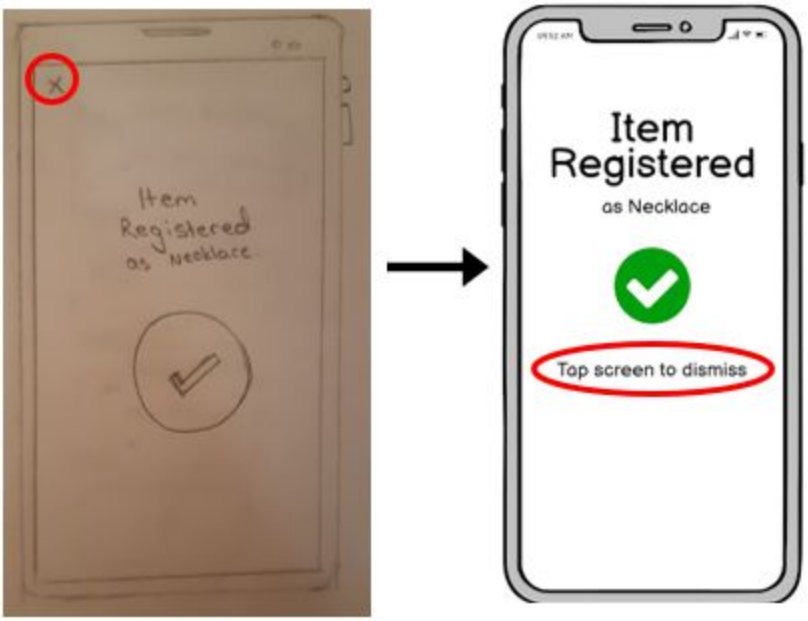



- **Error Message:** We took out the “X” button on the top as all users did not use it and preferred to tap on the screen to dismiss the message and continue. Based on the observations we made about the users 1 and 3 who were prompted with a failed payment screen, user 3 thought their card had been declined despite the screen displaying “scan item again,” which happened as well during our last studio session. To combat this confusion, we replaced the pay and choose card buttons to display the specific reason the payment failed and provide an option specifically to the problem (such as the scan again option because the item/accessory was not scanned properly) or just a return home option.



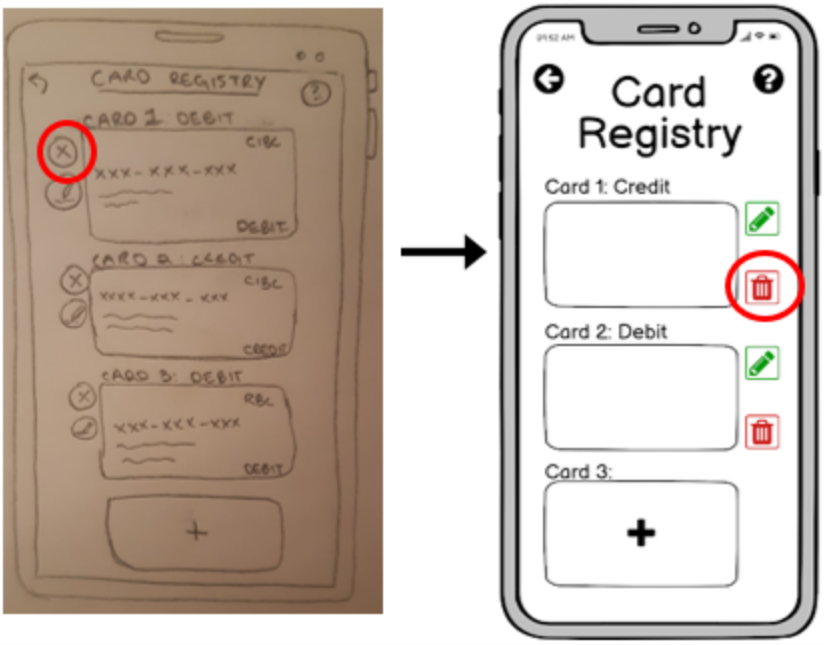
- **Card Successfully Registered:** We took out the “X” button on the top and added a “tap to continue” prompt on the screen as all 6 users did not use it and chose to tap on the screen to continue. Instead we replaced it


- **Item Registered:** We took out the “X” button on the top and added a “tap to continue” prompt on the screen as all users chose to tap on the screen to continue.

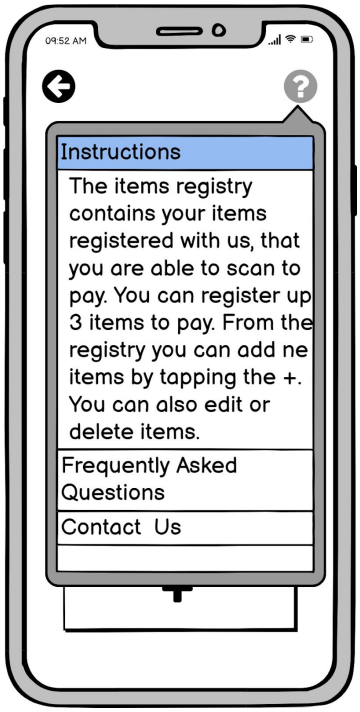



- **Card Registry Delete:**
  - Out of the 6 users we tested, user 2 expressed their concern that they didn’t think the “X” was clear enough to denote a delete button. Thus, we replaced the “X” to delete the card and replaced it with a trash can (as suggested by this user) to delete

the card instead. We also changed the colours of the buttons based on the semantic meaning of the colours, red for delete and green for edit.




- **Help:**
  - We added features to our help button. User 3 experienced confusion in what steps to take during our previous usability lab (mentioned in A6 page 38) so our team added a help icon in our pages. For this assignment we focused on features users would advantage from. During our question session after each usability test we asked users what features would they like to see added to our help section. 4 out of 7 users (users 3-6) suggested we have frequently asked questions to our app, users 4 and 6 suggested instructions be added (which was already planned to be added), user 6 suggested to add contact info if a user was in need of assistance. We took these features and added them to our help button pop up. Users can exit the help pop up by tapping again on the help icon. (see image on next page).




- **Settings:**
    - Since we didn't have our screens drawn out for the settings page, we asked each user to describe what they anticipated to see if they clicked on the gear icon. User 1 said he doesn't see the point of including settings and an ask for help button. Out of the remaining 5 users, users 3 and 4 suggested the option to adjust volume level for notifications such as feedback for payment completion and users 3, 5, and 6 suggested the addition of a light/dark mode that most smartphones these days offer. We adopted their recommendations and incorporated them into our settings screens.

## Studio 3:

## Updates to Protocol:

We chose to not implement a specific scenario for testing the help button, as it was a simple one-touch two-screen process. We instead left it as an additional functionality for users who were curious about the button or genuinely needed additional instructions.

One of the key data we decided to measure studio 3 in was time it took to complete each task. The times were recorded by the facilitator and were measured from the beginning of a task till whenever the facilitator announced that the scenario was over. We r**ecorded each user's completion times** for their assigned tasks into a table for ease of analysis and comparison. This allowed us to better determine outliers and issues by checking the notes on the outlying user's experiences.

## Links and References to Studio 3 Materials

**Link to blank notes and templates used for usability report for reference:**

POEMS:
https://docs.google.com/document/d/1ivpU-LiB8vwBYe3oDdnAvjX_ggPOv6qWS14yL9gIM1I/edit?usp=sharing

Notetaker-guide:

https://drive.google.com/file/d/1l6opxo82gMguZx0RB2lvfalEAaG3jmQr/view?usp=sharing

Blank usability document used during studio session:

https://docs.google.com/document/d/1OnBiHu8VET4CSdQqtPdH4dfcRCAcWo6Qhra8_WDFy3U/edit?usp=sharing

**Link to filled notes and templates for reference:**

https://docs.google.com/document/d/1_1eJrKIXbNIXjaYVL_9IdAFwpko_CNamj9oOgyzjfpo/edit?usp=sharing

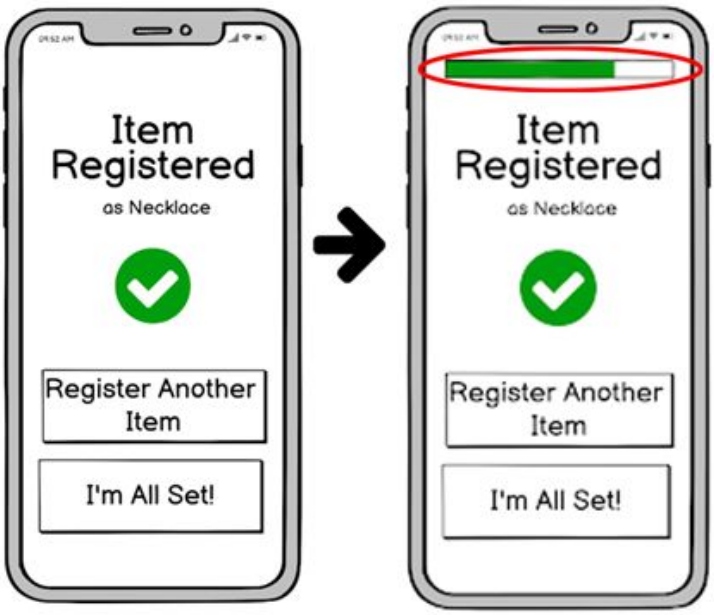
## Studio Results and Updates to Hi-Fi Prototype:

**Table of Time (seconds) Taken to Complete Tasks**

| Tasks | User 1 | User 2 | User 3 | User 4 | User 5 |
|---|---|---|---|---|---|
| Set up as New User | 58 | 72 (1 min 12 sec) | 60 | 91 (1 min 31 sec) | 68 (1 min 8 sec) |
| Pay (Payment Successful) | 14 | | | 21 | 20 |
| Pay (Payment Failed) | | 32 | 67 (1 min 7 sec) | | |
| Register a New Item | 25 | 18 | | 23 | 29 |
| Link a New Card (scan in card info) | | 31 | | | |
| Link a New Card (manually enter card info) | | | 28 | | 18 |

We discovered that times taken to complete scenarios could be improved further since all users were asked to go through the tasks using the Think Aloud Protocol and times shown above may not accurately reflect the actual time it would take for users to complete each individual task. To prevent our data from being skewed, we decided to rule the ones that took an abundant amount of time as outliers. Additionally, we noted that because all users we tested on were new to our app and its functions, the time it takes to complete each task could potentially lower if they completed the same tasks again after familiarizing themselves with the app. The exact differences and relationship between new users vs. novice users would be further explored in studio 4.

**Progress Bar:** Users 4 and 5 had minor issues with the app's 'welcome' process (scenario 6), where they stumbled due to not realizing that the multiple tasks they were given were part of one cohesive process. To better convey that the 'welcome' process consists of multiple tasks, we added a progress bar that's persistent between the multiple phases of the process.




User 3 had some confusion when they were prompted with the screen "scan item again," they thought scan item meant scanning grocery items instead of scanning the item they had registered with the app. Though they suggested a change to the name from "scan item again" to "scan accessory", we decided to not make the change as the other 14 users we had tested did not run into the same issue.

## Studio 4

### Updates to Protocol

This studio had us testing our high-fidelity prototype for the first time. Our focus was on making sure the new prototype images did not introduce any new issues. We also wanted to ensure that we caught any possible pain points for users that we missed in the previous 3 studios.

To replicate the skill and speed of an expert user, we had 2 of our 4 users (users 1 and 2) go through a payment scenario 3 times: twice through the standard payment process (scenario 1) and once through the payment failure process (scenario 4).

While our previous 3 studios had a demographic entirely of university students aged 20-22, our participants for studio 4 were more diverse, consisting of individuals aged 15, 53, 46, and 22. This was to be inclusive and mimic a realistic audience of our app, who would be a diverse range of ages.

## Links and References to Studio 4 Materials

**Link to blank notes and templates used for usability report for reference:**

POEMS:
https://docs.google.com/document/d/1ivpU-LiB8vwBYe3oDdnAvjX_ggPOv6qWS14yL9gIM1I/edit?usp=sharing

Notetaker-guide:

https://drive.google.com/file/d/1l6opxo82gMguZx0RB2lvfalEAaG3jmQr/view?usp=sharing

Blank usability document used during studio session:

https://docs.google.com/document/d/1OnBiHu8VET4CSdQqtPdH4dfcRCAcWo6Qhra8_WDFy3U/edit?usp=sharing

**Link to filled notes and templates for reference:**

https://docs.google.com/document/d/1OaP_hsyWOY8tSPUvpHUL1TSmtXtsAgniNfwfqXpa2Vo/edit

## Studio Results and Updates to Hi-fi Prototype

| Tasks | User 1 | User 2 | User 3 | User 4 |
|---|---|---|---|---|
| Set up as New User | 63<br>(1 min 3 sec) | 87<br>(1 min 27 sec) | 71<br>(1 min 11 sec) | 76<br>(1 min 16 sec) |
| Pay (Payment Successful) | **1st pay:**<br>13<br>**2nd pay:**<br>9 | **1st pay:**<br>19<br>**2nd pay:**<br>11 | **1st pay:**<br>22 | |
| Pay (Payment Failed) | **3rd pay:**<br>34 | **3rd pay:**<br>37 | | **1st pay:**<br>41 |

| | | | | |
|---|---|---|---|---|
| Register a New Item | 18 | | 29 | 23 |
| Link a New Card (scan in card info) | | | 26 | 39 |
| Link a New Card (manually enter card info) | | | 19 | 31 |

Although we found that users of an older age (user 2, age 46, and user 3, age 53) had a slower time setting up due to being less experienced with mobile app design conventions, our users did not have many frustrations. It is to be noted that User 2 uses Apple Pay regularly.

User 4 during the "Link a New Card: automatically" task needed us to repeat the task while they were on the home page, as they had forgotten what they were supposed to do.

## Linking Results to Design Requirements

### Basic Needs:

14. Accessories allows users to register credit and debit cards to avoid paying with cash.
15. Accessories allows payments to be made without any physical contact via camera-based authorization.

### Functionality:

16. The Accessories App minimizes the amount of security information visible to bystanders by allowing users to enter sensitive information far in advance of payment (when they register their card).
17. The Accessories App effectively replaces facial recognition's visual authorization process by allowing users to scan personal items instead.
18. The Accessories App doesn't ask for PINs or passcodes during payment.
19. Accessories lets users pay within a similar time frame as existing digital payment methods (average of 15 seconds compared to the averages of 11.5 seconds of Apple Pay,

17.5 seconds of WeChat, 17.5 seconds of card tapping, 32 seconds of card insertion, and 62 seconds of cash, based on our observations).

20. The Accessories App lets users register up to 3 different accessories for ease of use; users don't have to constantly carry the same item with them to pay and won't lose the ability to pay if they lose an item.

### Interface:

21. The Accessories App has simple, easy to understand payment instructions and labelled buttons with clear functionality. Our testing demonstrated that the app is easy to learn and intuitive to use.
22. The Accessories App has multiple forms of feedback to inform users of how far they are into the payment process, including short text instructions and a progress bar.
    22.1. Feedback screens that indicate whether a process succeeded or failed are present. In the case of failure, the cause of the issue is clearly stated.
    22.2. The Accessories app indicates different stages in the process through a dynamic progress bar.

### Interaction:

23. The Accessories App takes longer than 8 seconds to complete the payment process due to its slightly increased complexity, but the results are promising (average of 14.8 seconds).
24. Accessories replaces PIN and FaceID transaction methods through its similar functionality (some form of authorization for payment) while avoiding the frustration points of the other methods identified in our observations (usable even with face coverings, no security risks).
25. The Accessories app has a 'switch camera' button when scanning a card or accessory to allow users to use the app however is most comfortable for them.
26. The Accessories app defaults to the device's back camera, as it is usually better quality and more likely to provide a successful scan.

## Conclusions

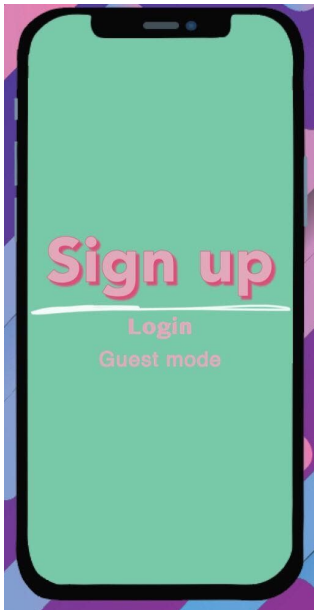
Through several sessions of user testing, we have steadily improved the usability of the ACCESSories app. We met almost all of our initial design goals of ensuring user privacy by

allowing them to input sensitive information far in advance of payment, and also of enabling contactless payment authorization through the scanning of personal items. The only goal unaccounted for was the one of an 8 second payment process. Our app shows very promising results, taking only an average of 14.8 seconds. We believe further user testing with a focus on eliminating points of time loss is the proper next step for ACCESSories to reach this goal and become a safe and efficient alternative to existing mobile payment methods.

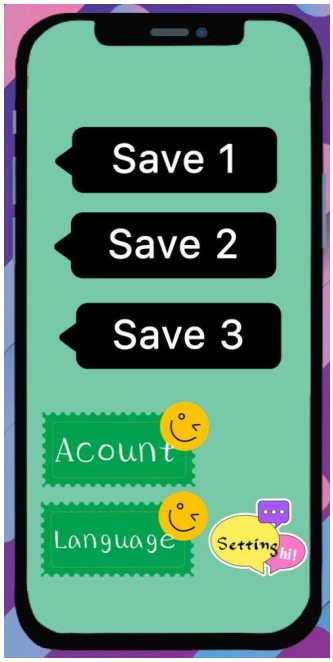
# Prototypes

## Version 1

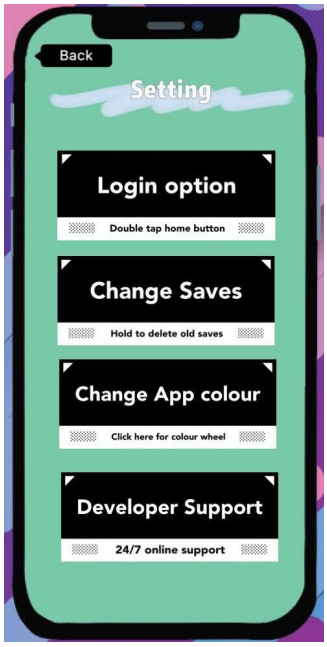
**New User:**




Item Registry:



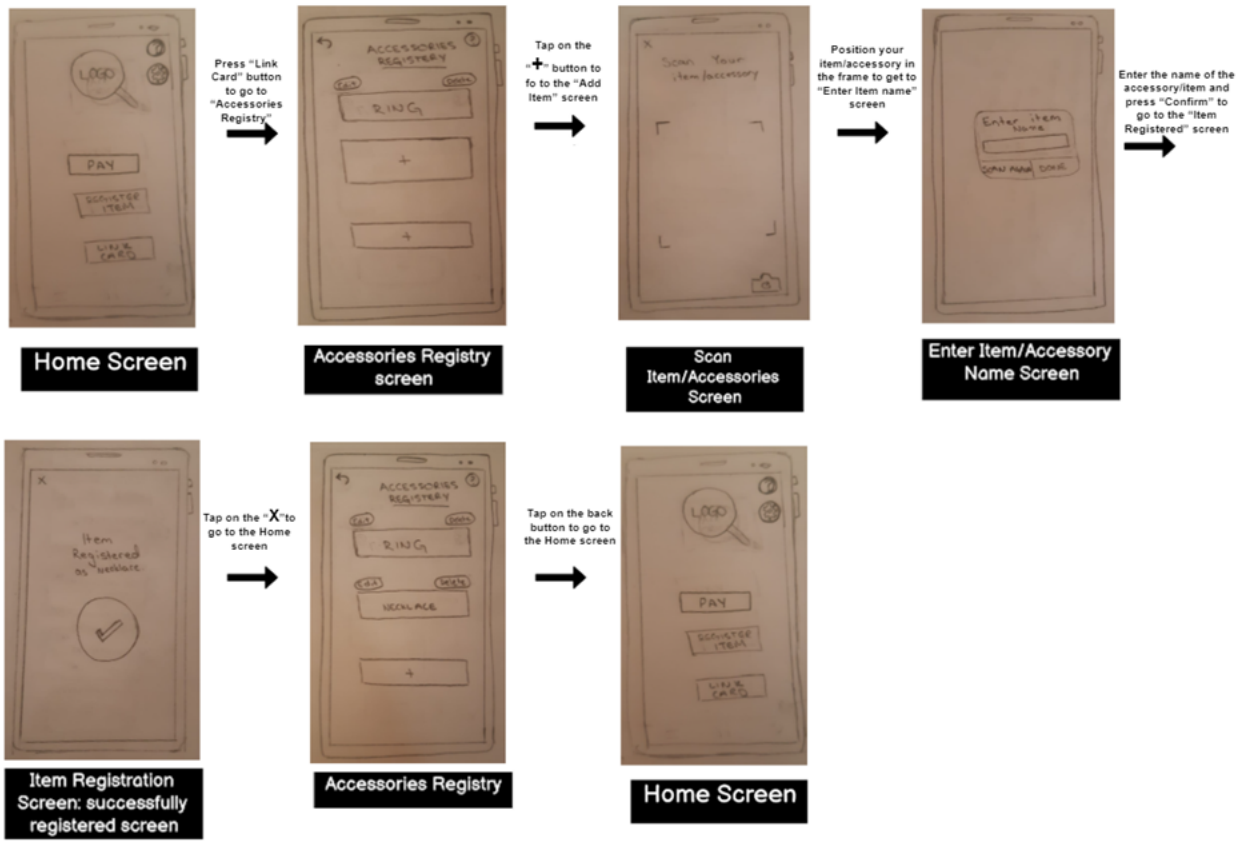
Settings:


Back
Setting
Login option
Double tap home button
Change Saves
Hold to delete old saves
Change App colour
Click here for colour wheel
Developer Support
24/7 online support

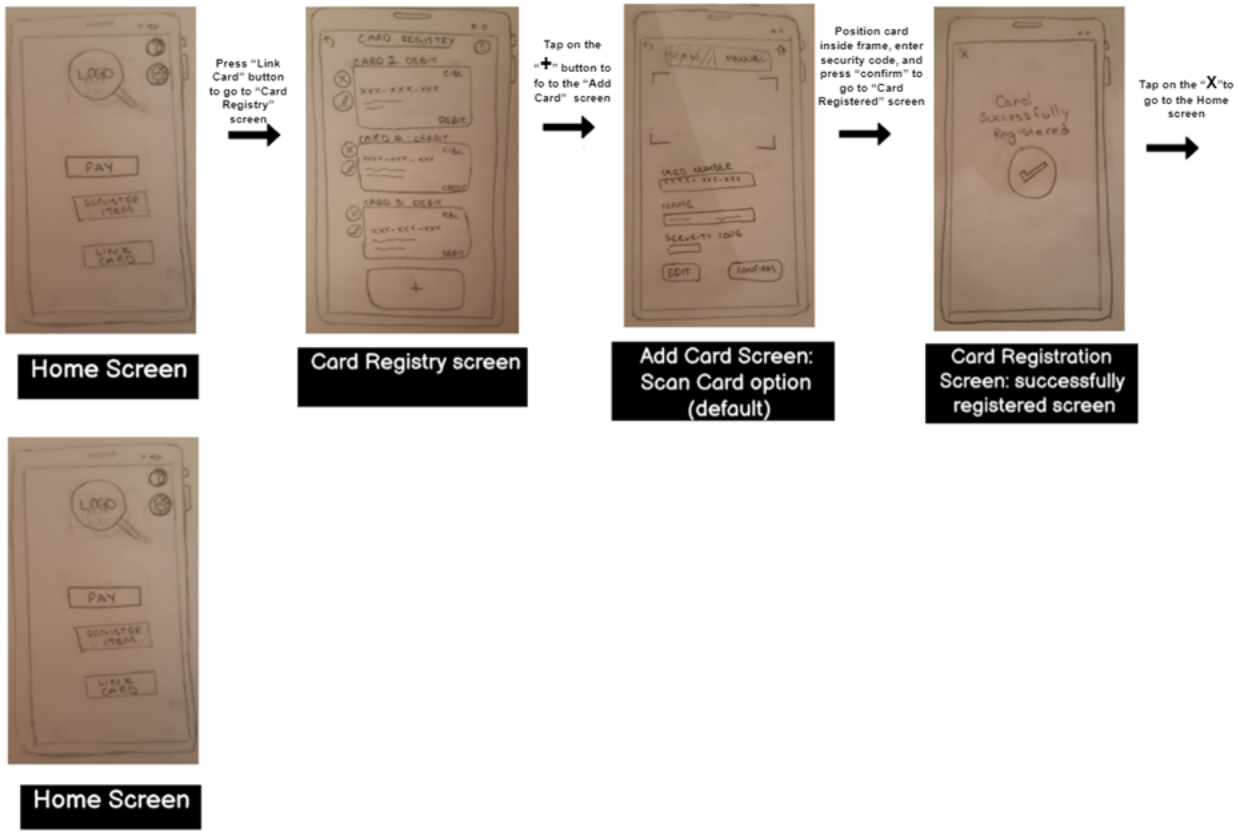
## Version 2(Lo-Fi)

## New User Setup:

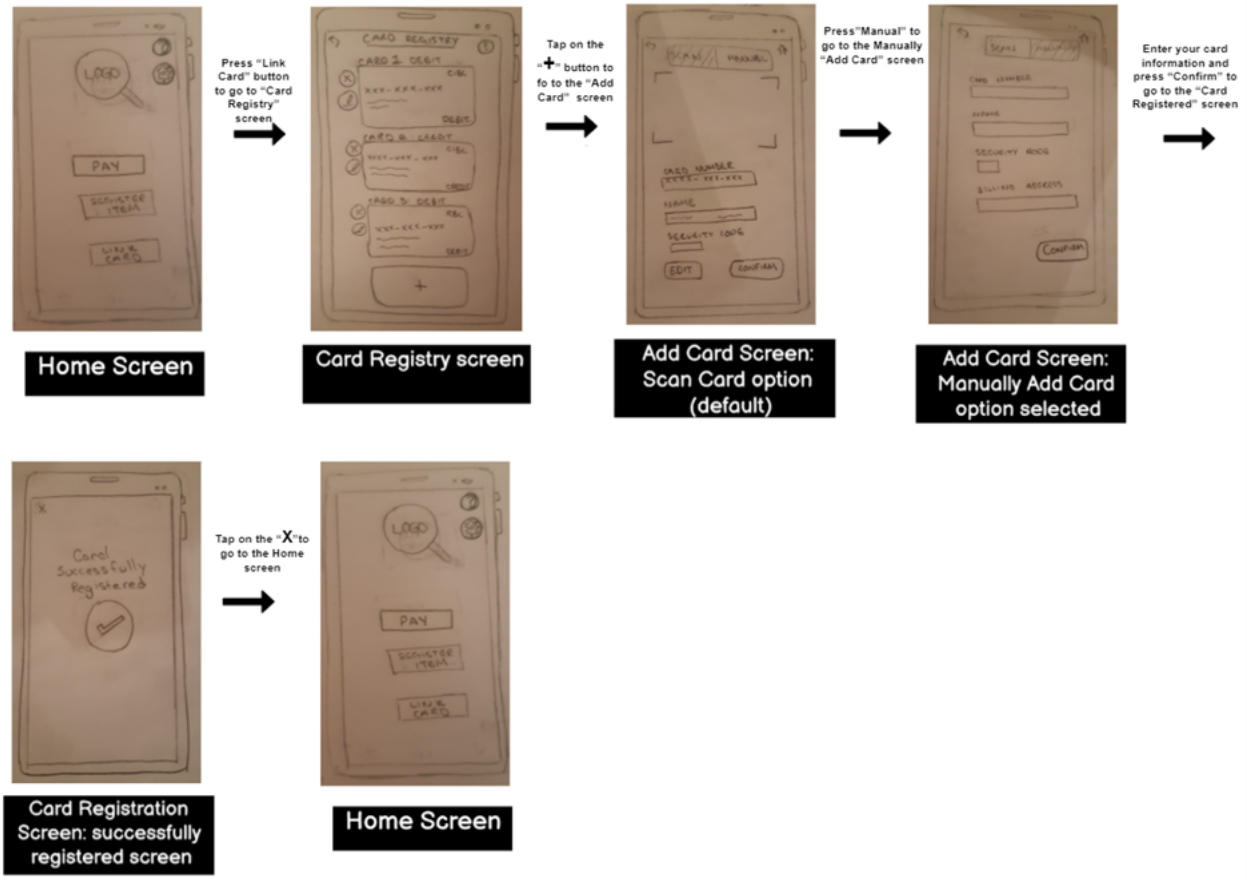
## Register New Accessory:



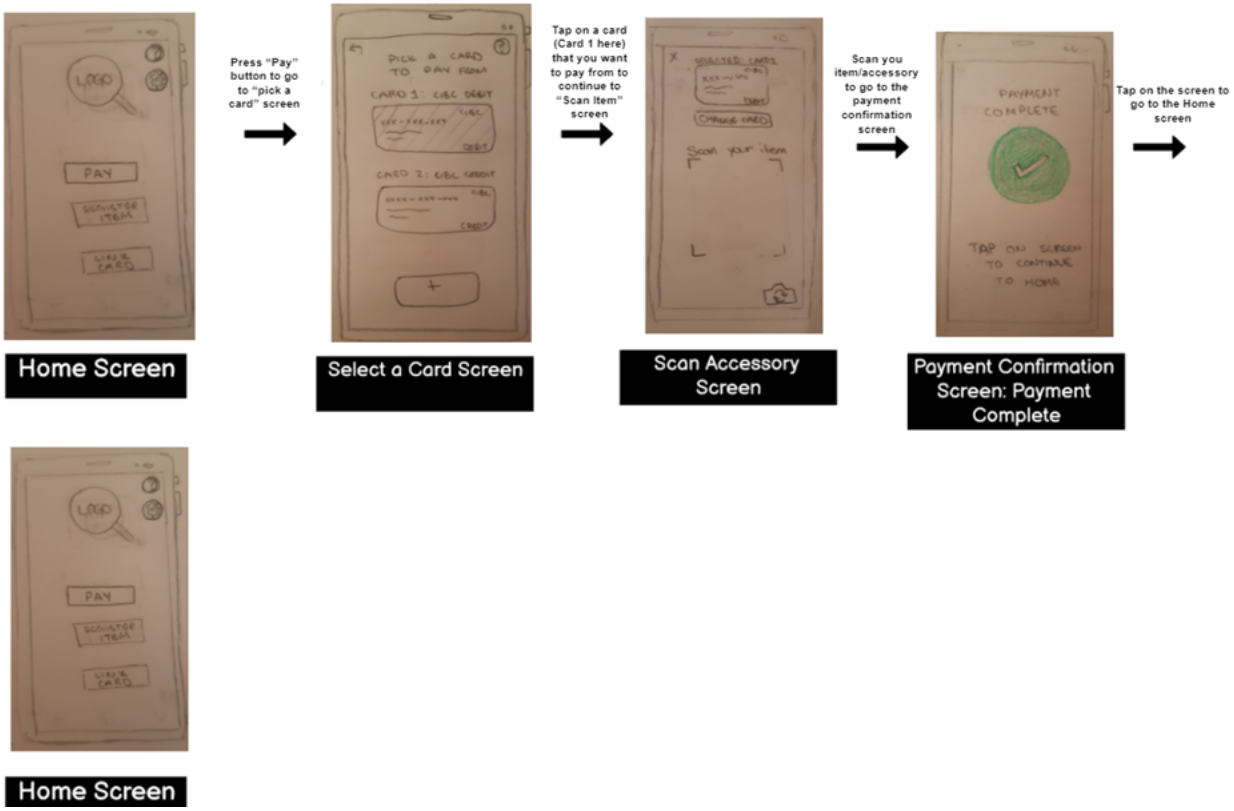
## Link Card (Automatically by scanning card):



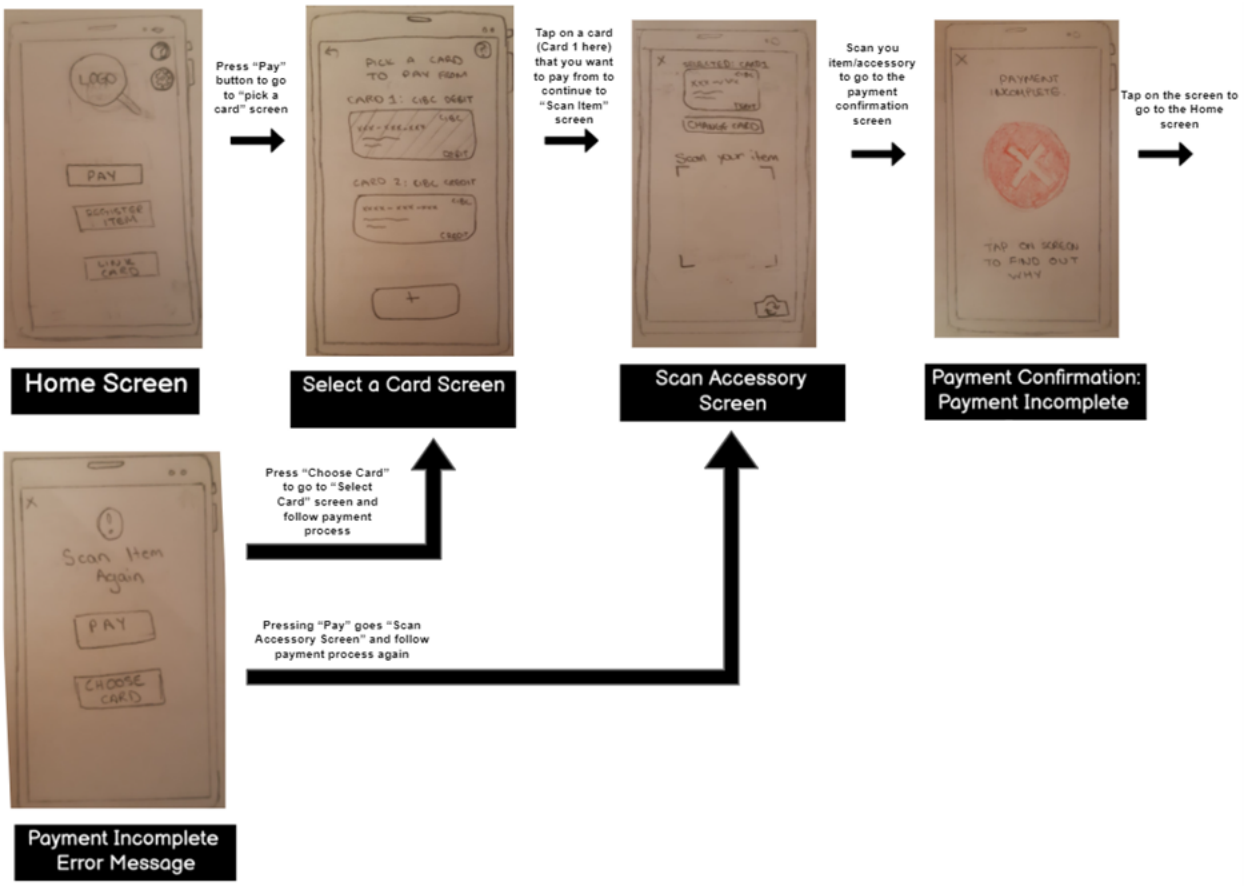
## Link Card (Manually entering information):



## Payment (Payment Successful):



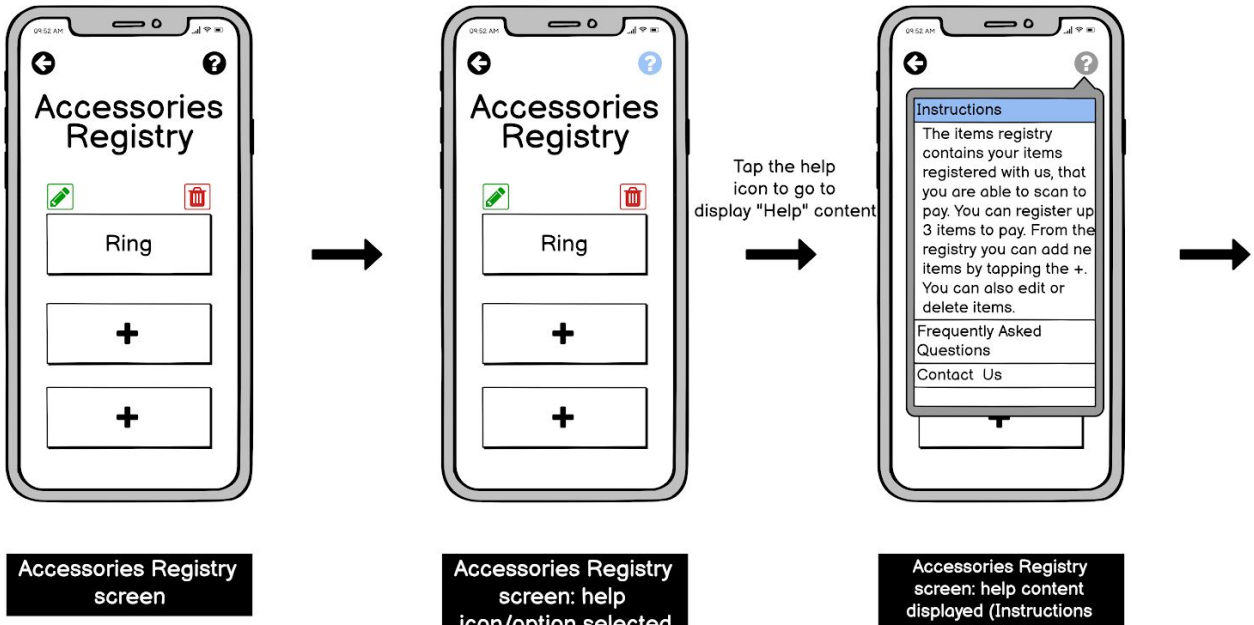
## Payment (Payment Failed):

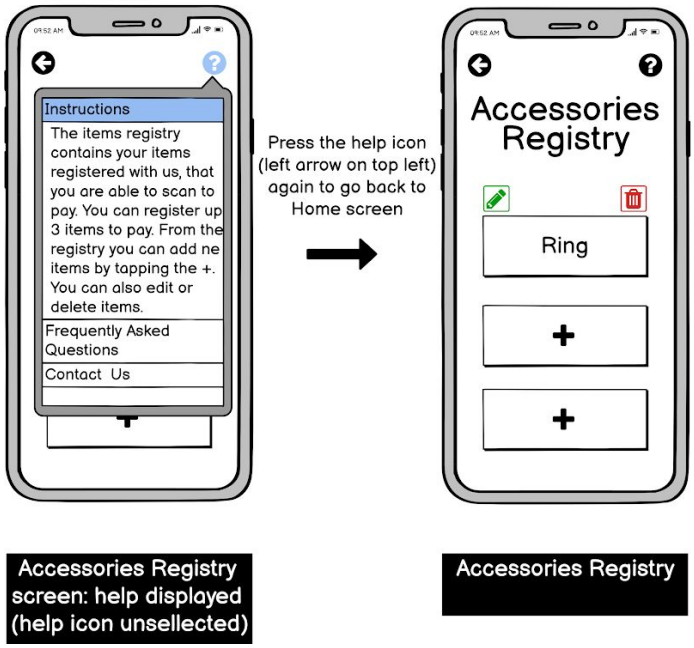


# Version 3 (Mid-Fi)

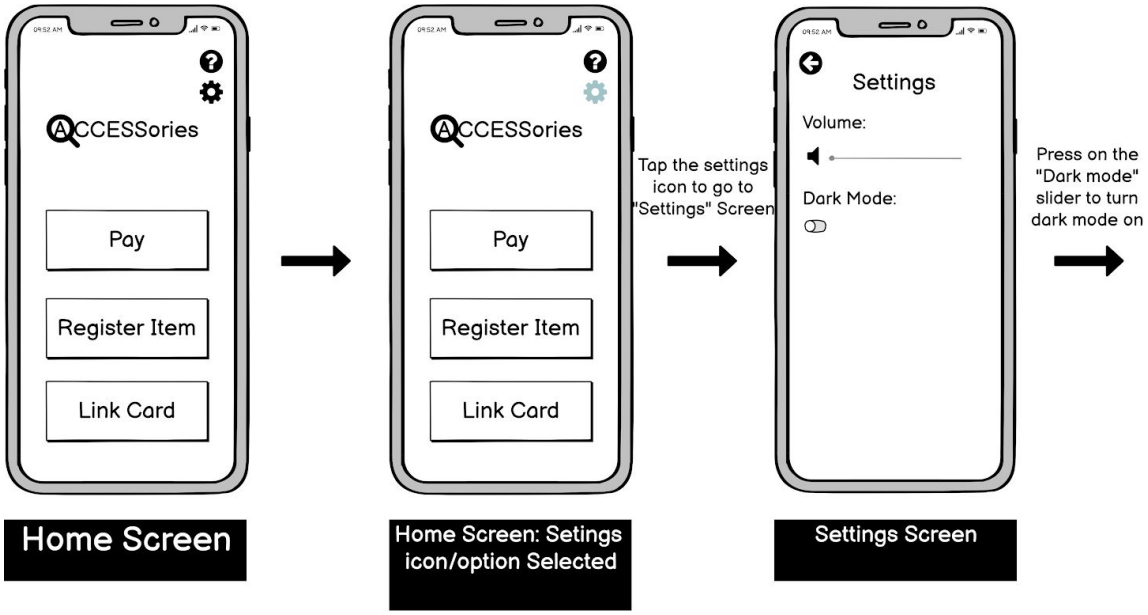
## New User Setup:(zoom in)

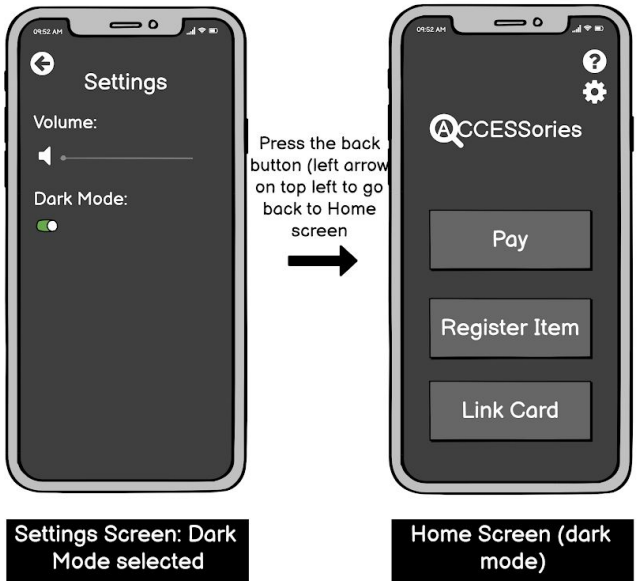
## Help:


Accessories Registry
Ring
Accessories Registry
Ring
Tap the help icon to go to display "Help" content
Instructions
The items registry contains your items registered with us, that you are able to scan to pay. You can register up 3 items to pay. From the registry you can add ne items by tapping the +. You can also edit or delete items.
Frequently Asked Questions
Contact Us
Accessories Registry screen
Accessories Registry screen: help icon/option selected
Accessories Registry screen: help content displayed (Instructions section)

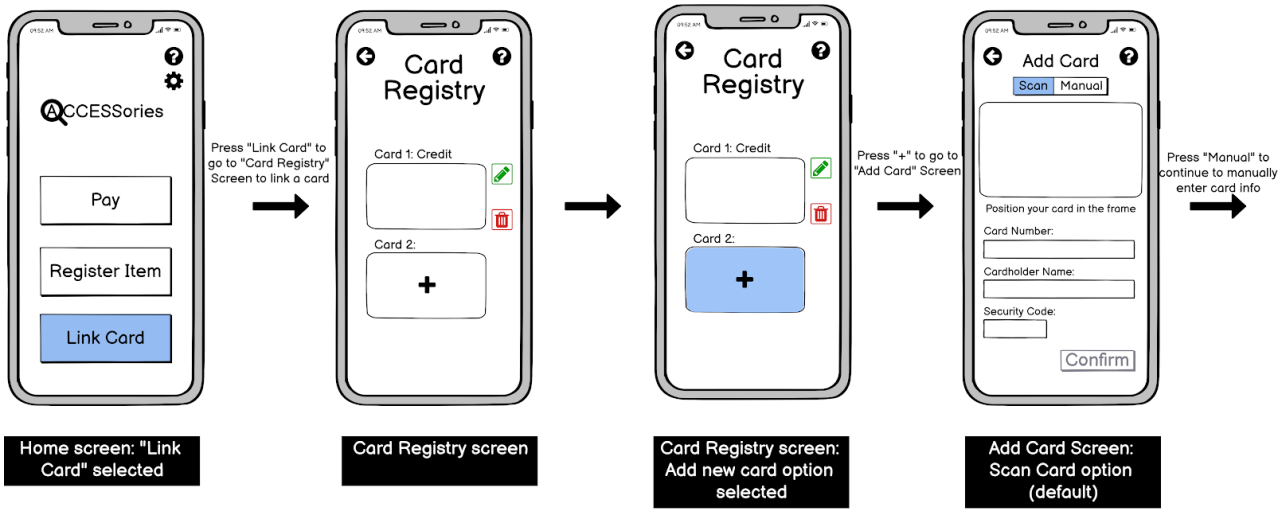

Instructions
The items registry contains your items registered with us, that you are able to scan to pay. You can register up 3 items to pay. From the registry you can add ne items by tapping the +. You can also edit or delete items.
Frequently Asked Questions
Contact Us
Press the help icon (left arrow on top left) again to go back to Home screen
Accessories Registry
Ring
Accessories Registry screen: help displayed (help icon unsellected)
Accessories Registry

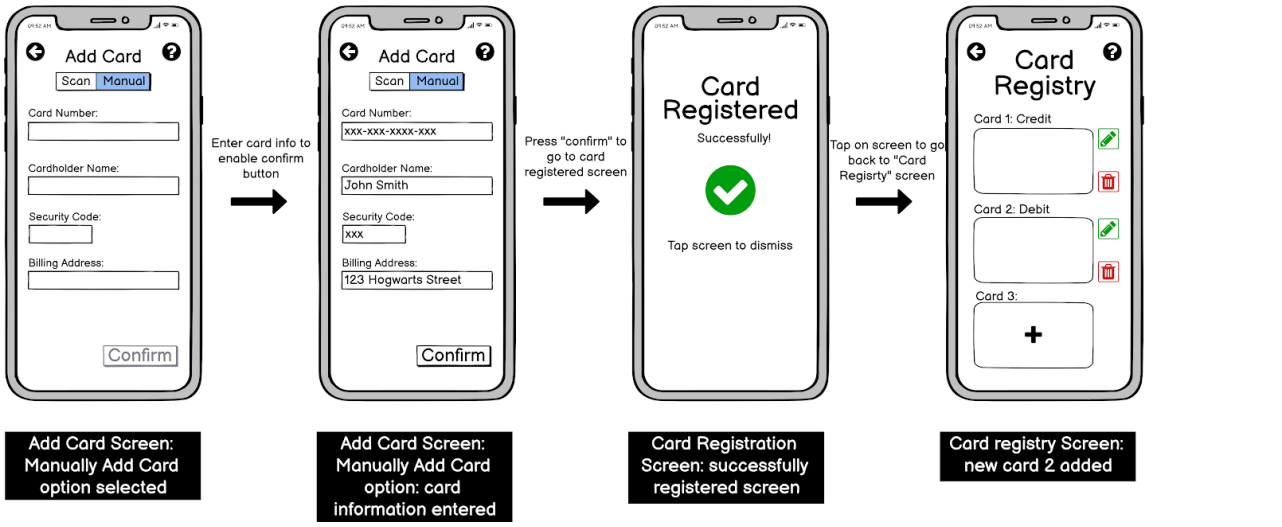
# Settings:


ACCESSories
Pay
Register Item
Link Card
Home Screen
Home Screen: Setings icon/option Selected
Tap the settings icon to go to "Settings" Screen
Settings
Volume:
Dark Mode:
Settings Screen
Press on the "Dark mode" slider to turn dark mode on

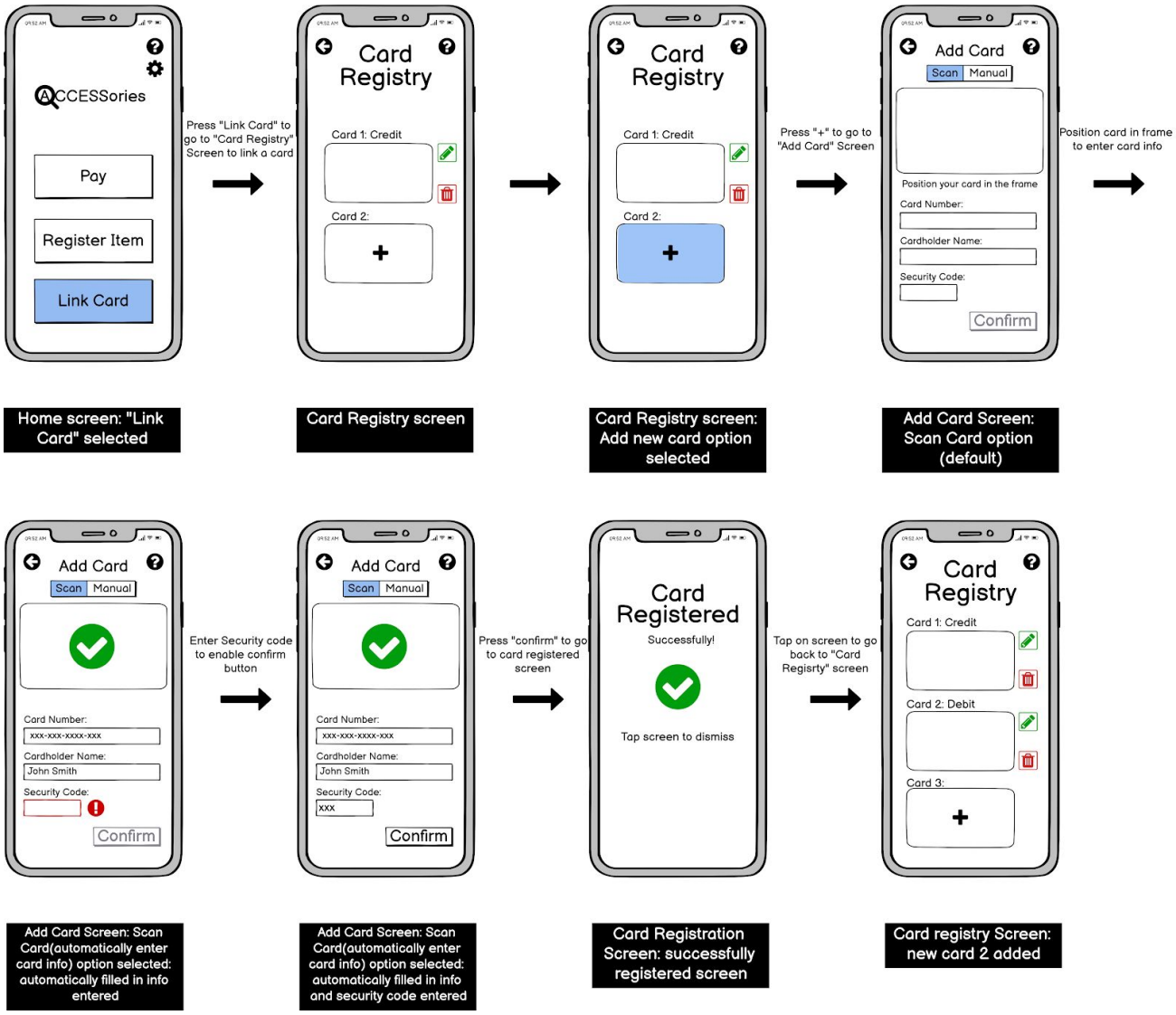

Settings
Volume:
Dark Mode:
Settings Screen: Dark Mode selected
Press the back button (left arrow on top left to go back to Home screen
ACCESSories
Pay
Register Item
Link Card
Home Screen (dark mode)

# Link New Card Manually:

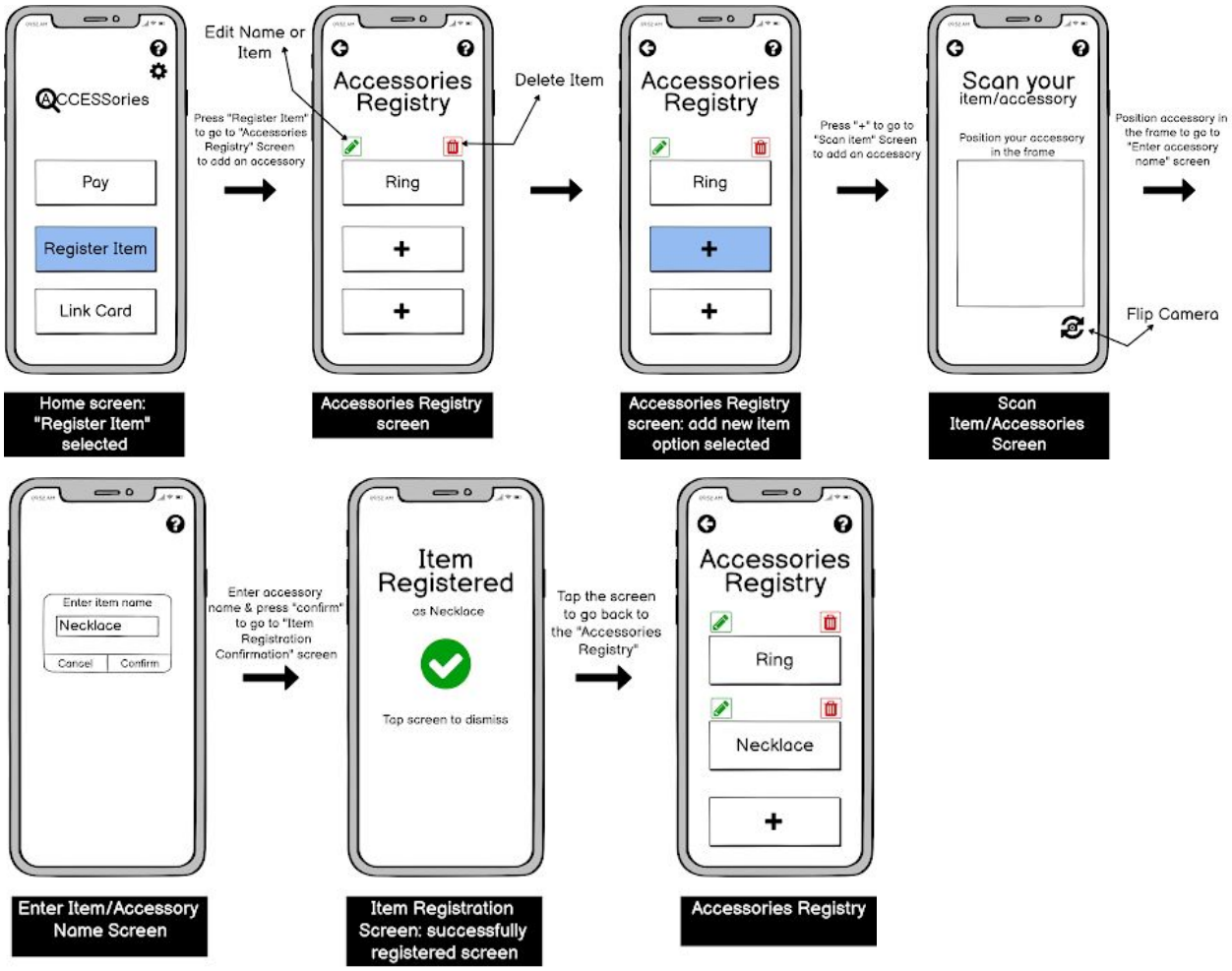


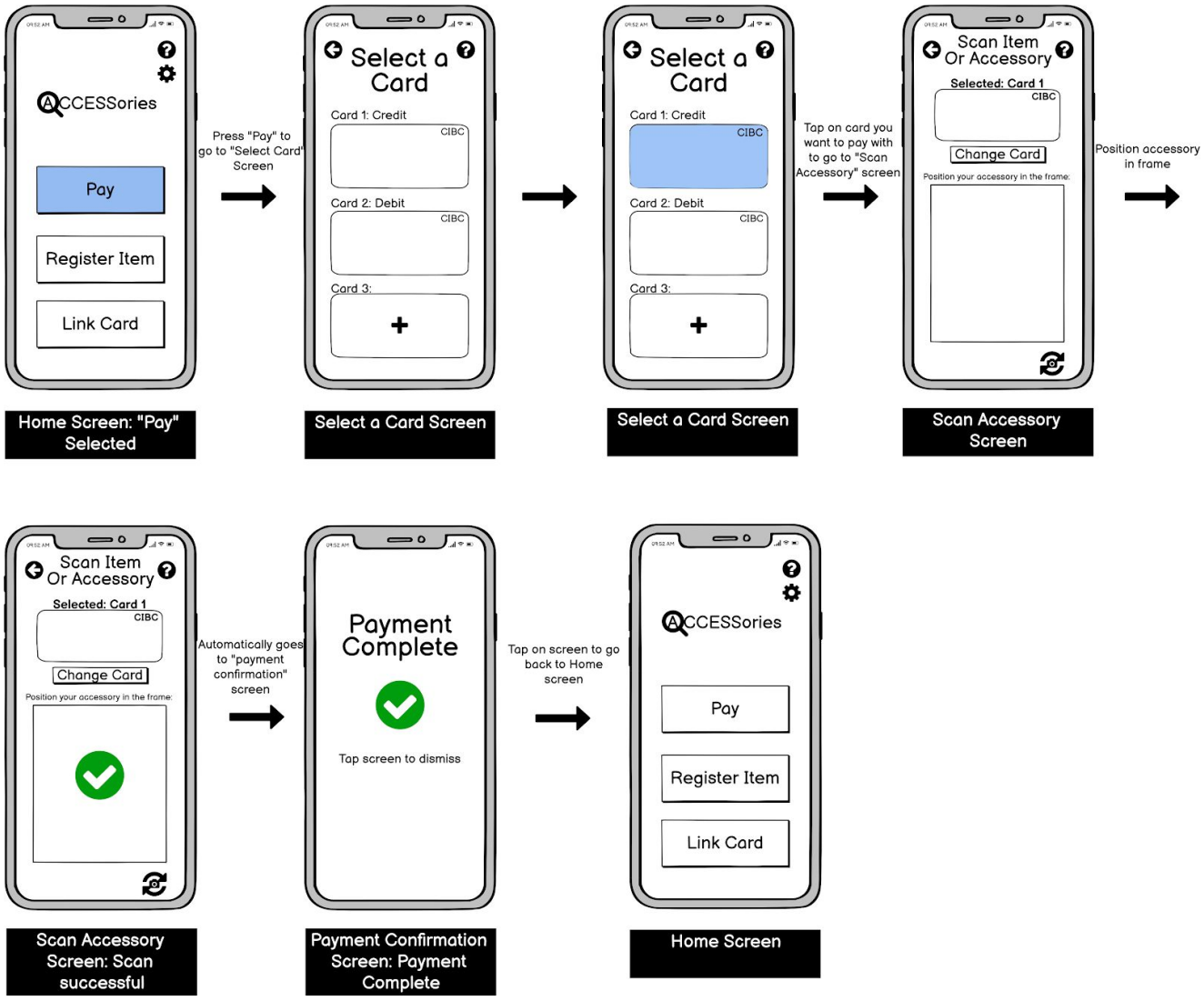
# Link New Card Scan:



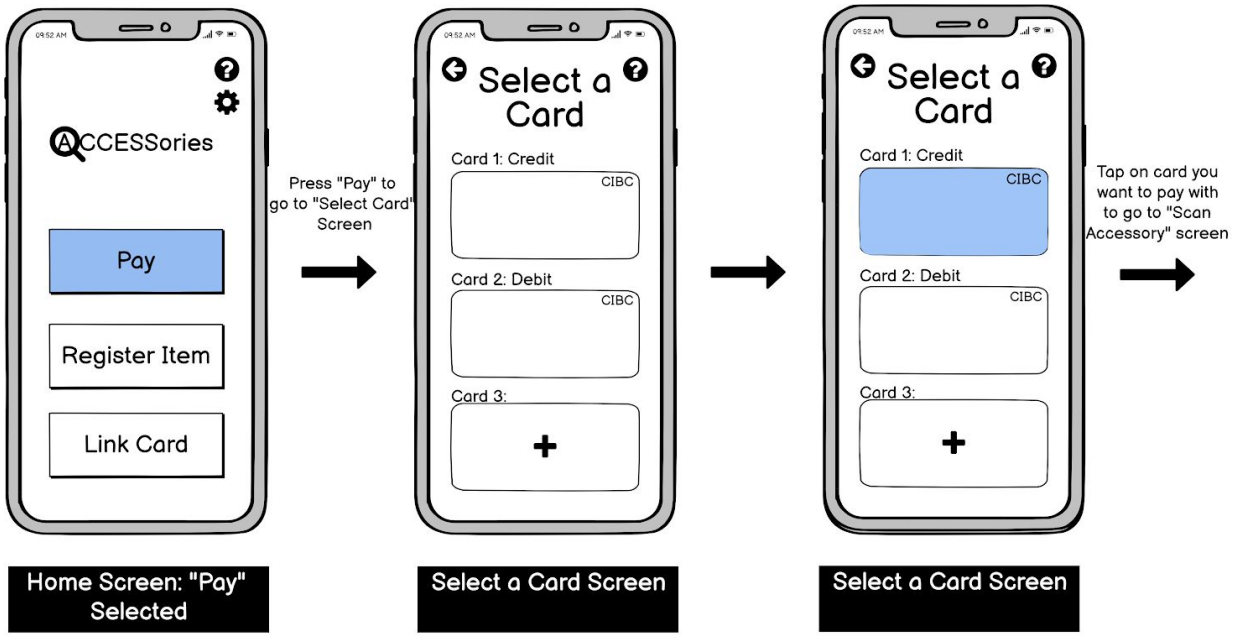
## Register New Item:

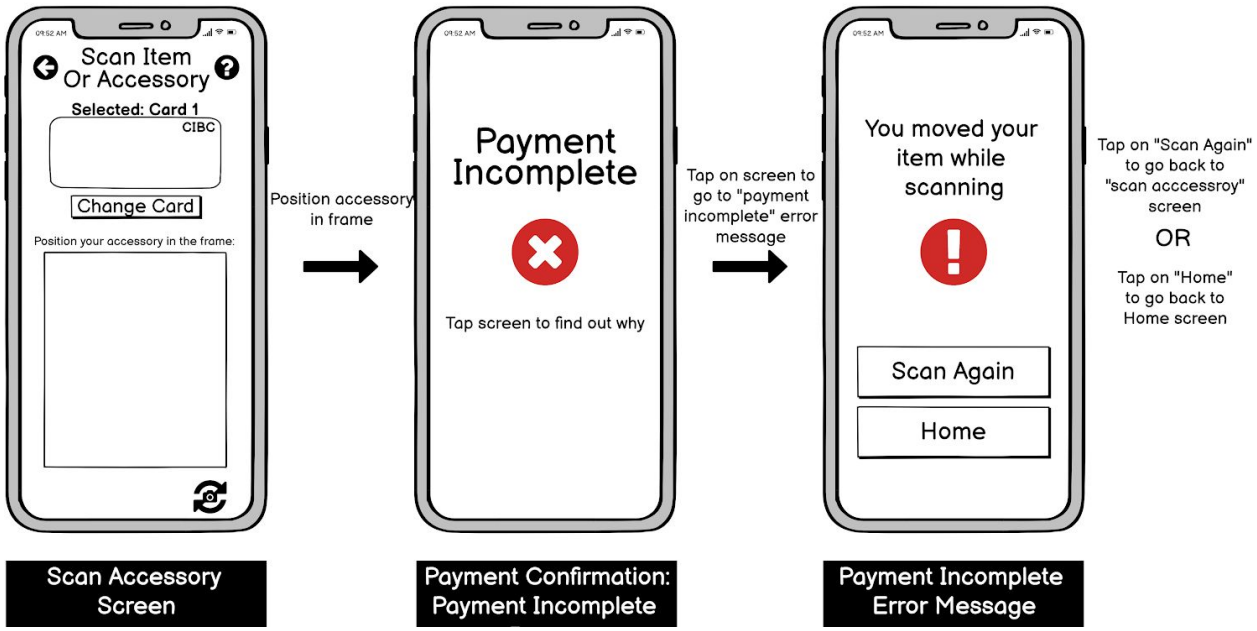


# Pay (Payment Complete):

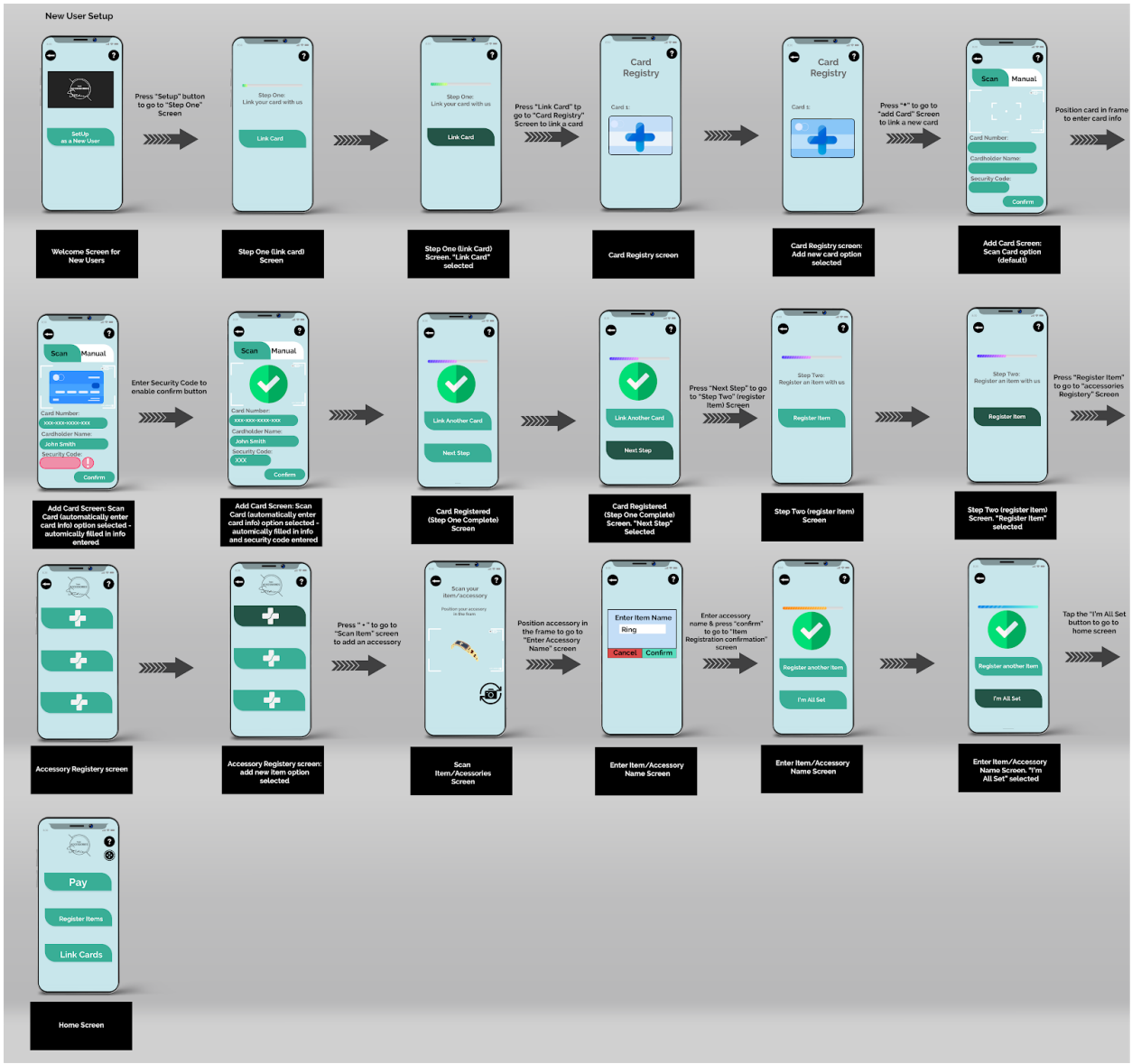


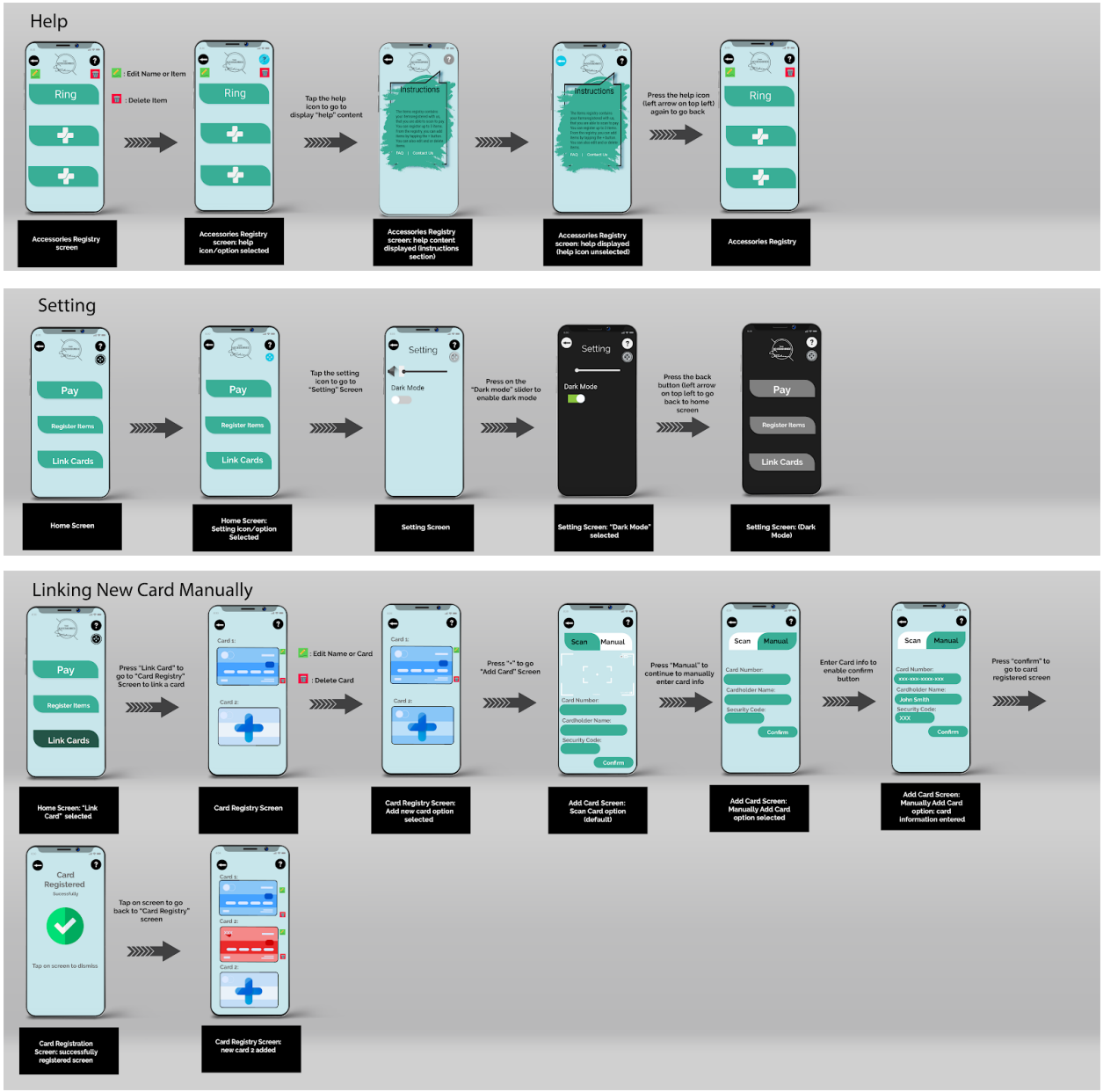
## Pay (Payment Incomplete):

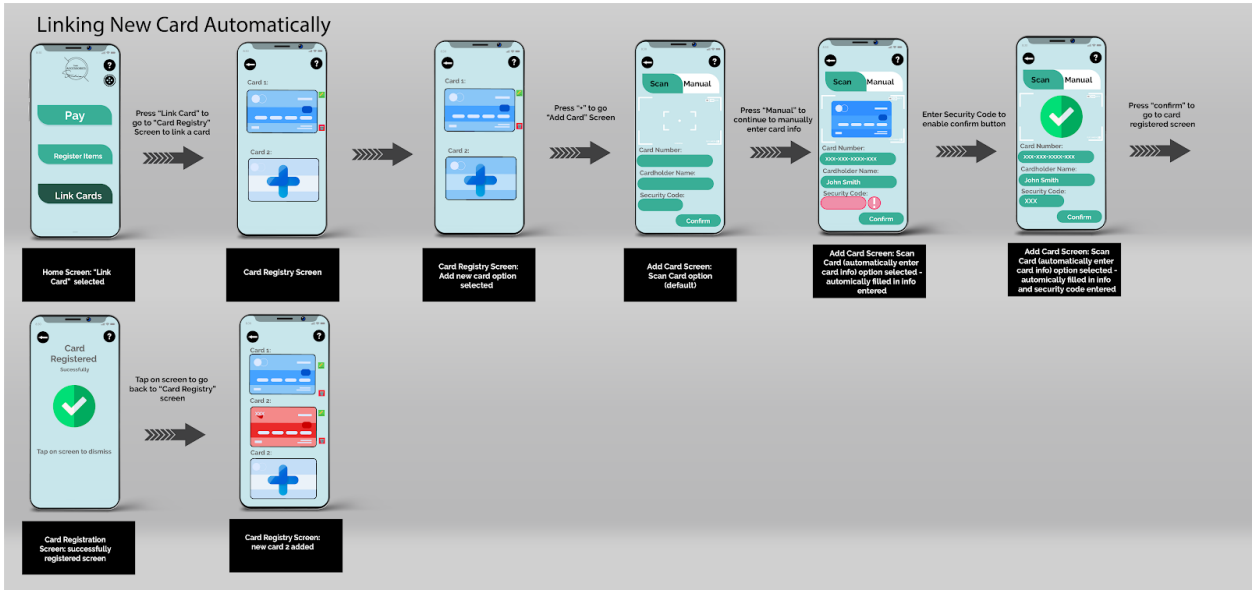


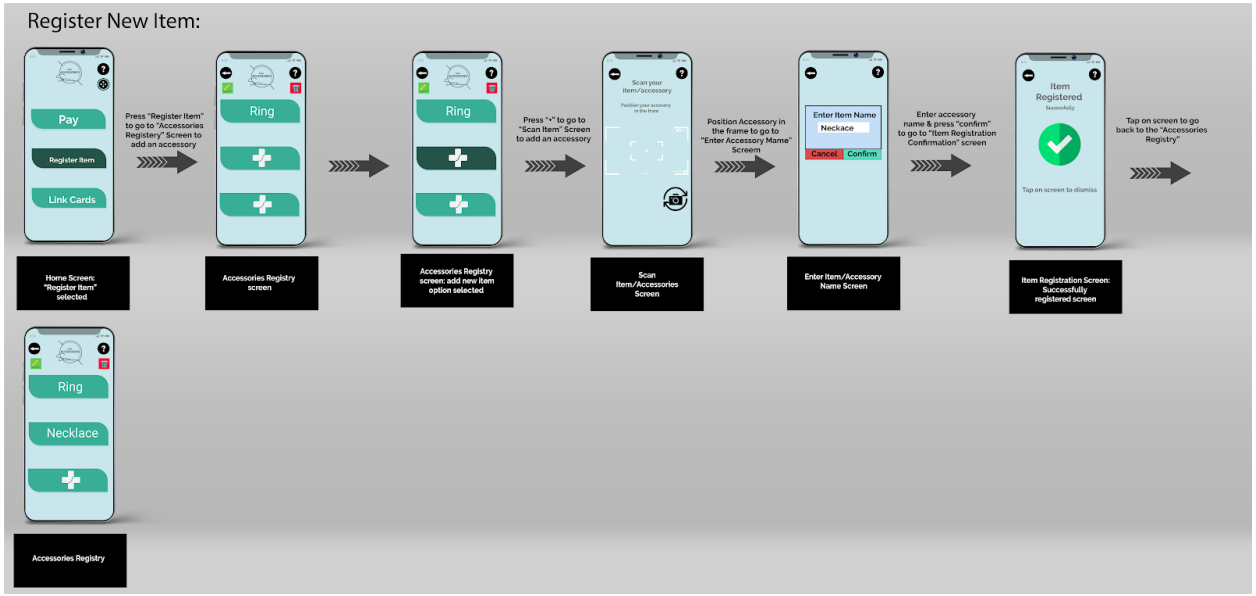



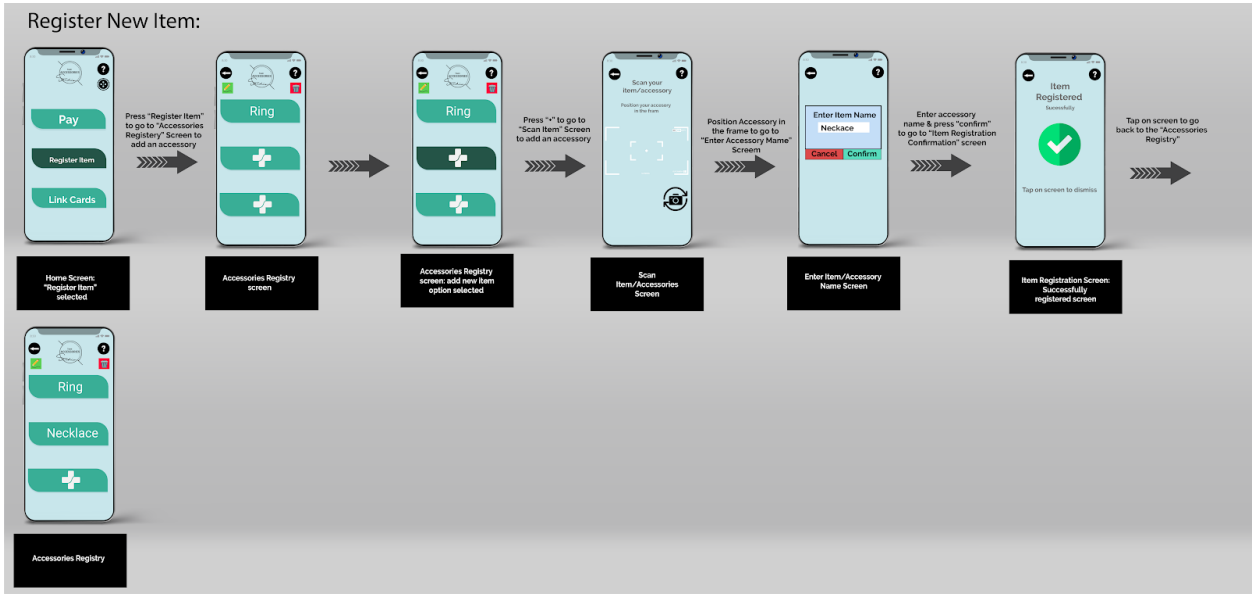
# Version 4 (Hi-Fi)

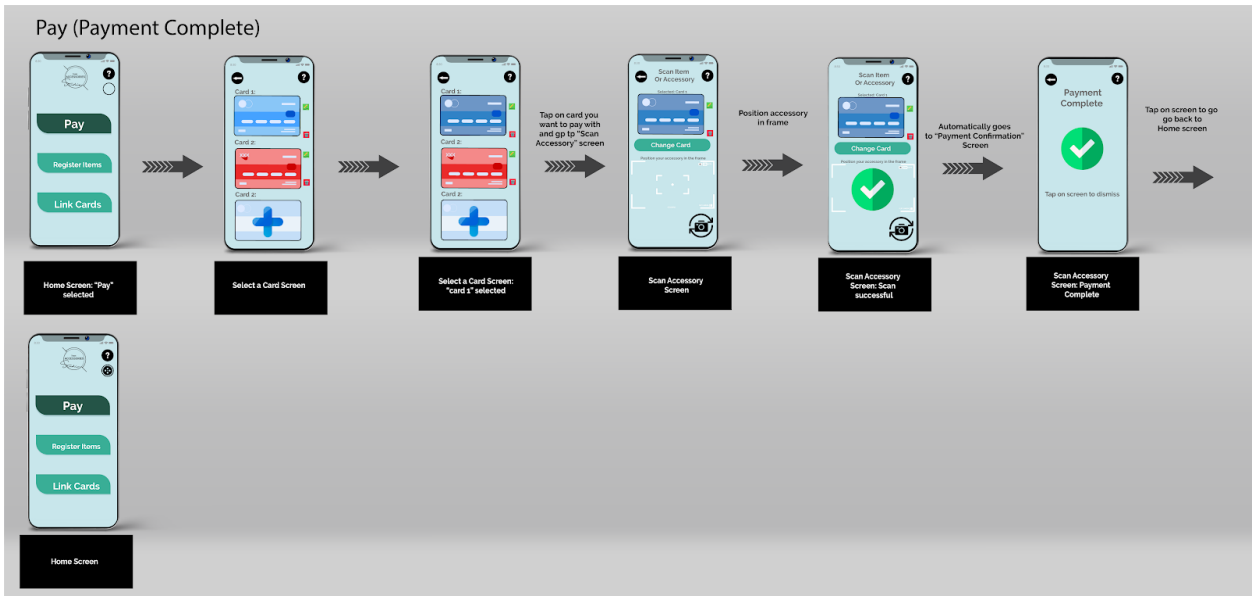


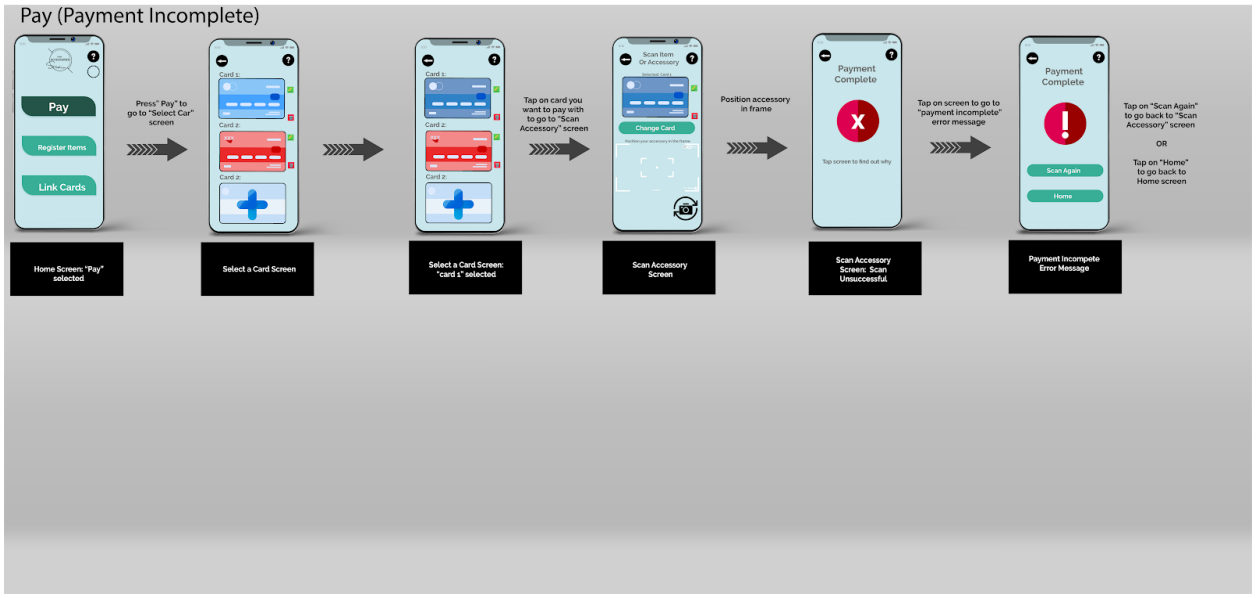

Help
Ring
: Edit Name or Item
: Delete Item
Tap the help icon to go to display "help" content
Instructions
Press the help icon (left arrow on top left) again to go back
Accessories Registry screen
Accessories Registry screen: help icon/option selected
Accessories Registry screen: help content displayed (instructions section)
Accessories Registry screen: help displayed (help icon unselected)
Accessories Registry
Setting
Pay
Register Items
Link Cards
Tap the setting icon to go to "Setting" Screen
Setting
Dark Mode
Press on the "Dark mode" slider to enable dark mode
Press the back button (left arrow on top left to go back to home screen
Home Screen
Home Screen: Setting icon/option Selected
Setting Screen
Setting Screen: "Dark Mode" selected
Setting Screen: (Dark Mode)
Linking New Card Manually
Press "Link Card" to go to "Card Registry" Screen to link a card
Card 1:
Card 2:
: Edit Name or Card
: Delete Card
Press "+" to go "Add Card" Screen
Scan
Manual
Card Number:
Cardholder Name:
Security Code:
Confirm
Press "Manual" to continue to manually enter card info
Enter Card info to enable confirm button
Press "confirm" to go to card registered screen
Home Screen: "Link Card" selected
Card Registry Screen
Card Registry Screen: Add new card option selected
Add Card Screen: Scan Card option (default)
Add Card Screen: Manually Add Card option selected
Add Card Screen: Manually Add Card option: card information entered
Card Registered
Tap on screen to dismiss
Tap on screen to go back to "Card Registry" screen
Card Registration Screen: successfully registered screen
Card Registry Screen: new card 2 added


Linking New Card Automatically
Pay
Register Items
Link Cards
Press "Link Card" to go to "Card Registry" Screen to link a card
Card 1:
Card 2:
Press "+" to go "Add Card" Screen
Scan
Manual
Card Number:
Cardholder Name:
Security Code:
Confirm
Press "Manual" to continue to manually enter card info
Enter Security Code to enable confirm button
John Smith
XXX
Press "confirm" to go to card registered screen
Home Screen: "Link Card" selected
Card Registry Screen
Card Registry Screen: Add new card option selected
Add Card Screen: Scan Card option (default)
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info entered
Add Card Screen: Scan Card (automatically enter card info) option selected - automically filled in info and security code entered
Card Registered
Successfully
Tap on screen to dismiss
Tap on screen to go back to "Card Registry" screen
Card 3:
Card Registration Screen: successfully registered screen
Card Registry Screen: new card 2 added

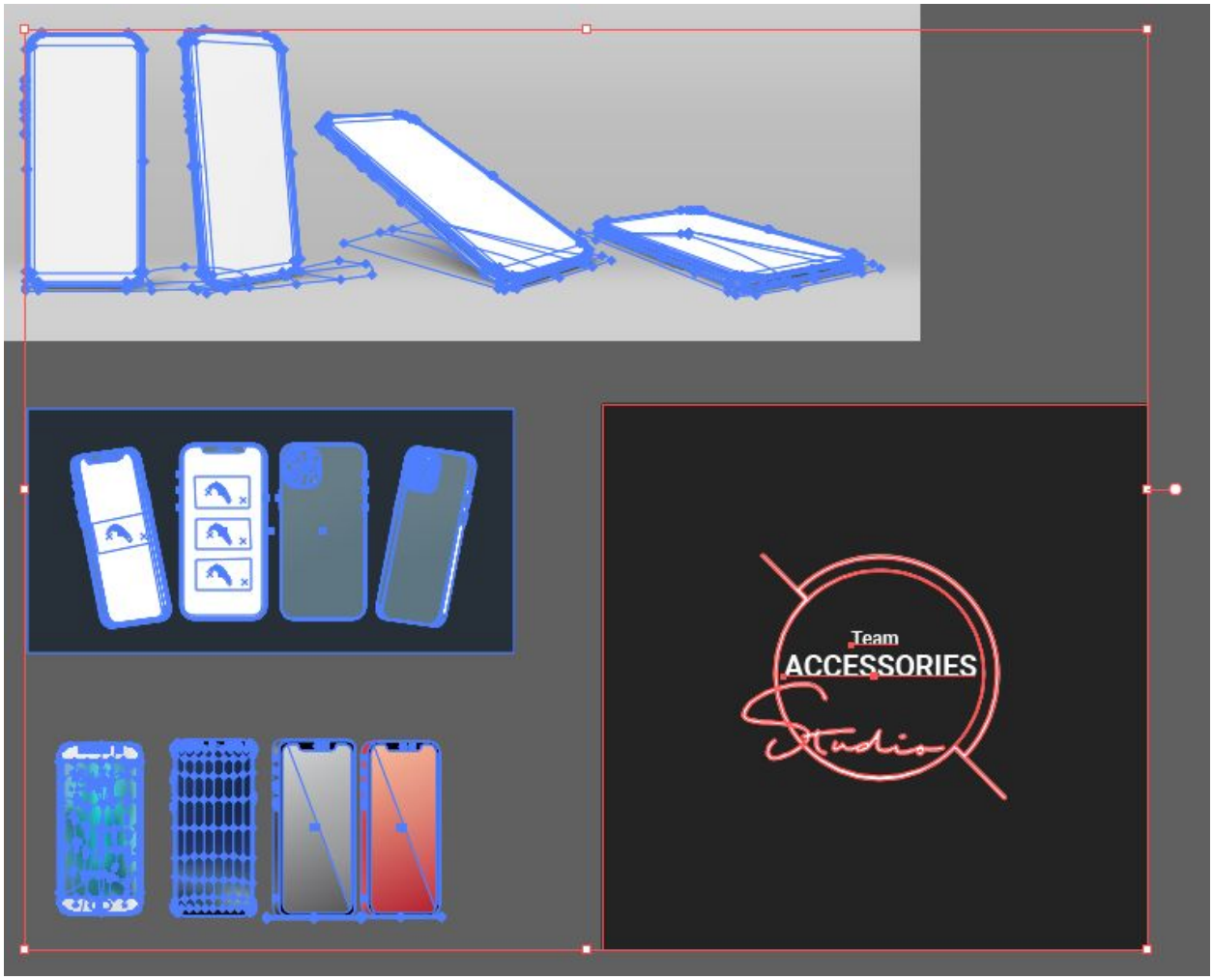

Register New Item:
Pay
Register Item
Link Cards
Press "Register Item" to go to "Accessories Registery" Screen to add an accessory
Ring
Press "+" to go to "Scan Item" Screen to add an accessory
Scan your item/accessory
Position your accessory in the frame
Position Accessory in the frame to go to "Enter Accessory Name" Screem
Enter Item Name
Neckace
Cancel
Confirm
Enter accessory name & press "confirm" to go to "Item Registration Confirmation" screen
Item Registered
Successfully
Tap on screen to dismiss
Tap on screen to go back to the "Accessories Registry"
Necklace
Home Screen: "Registor Item" selected
Accessories Registry screen
Accessories Registry screen: add new item option selected
Scan Item/Accessories Screen
Enter Item/Accessory Name Screen
Item Registration Screen: Successfully registered screen
Accessories Registry

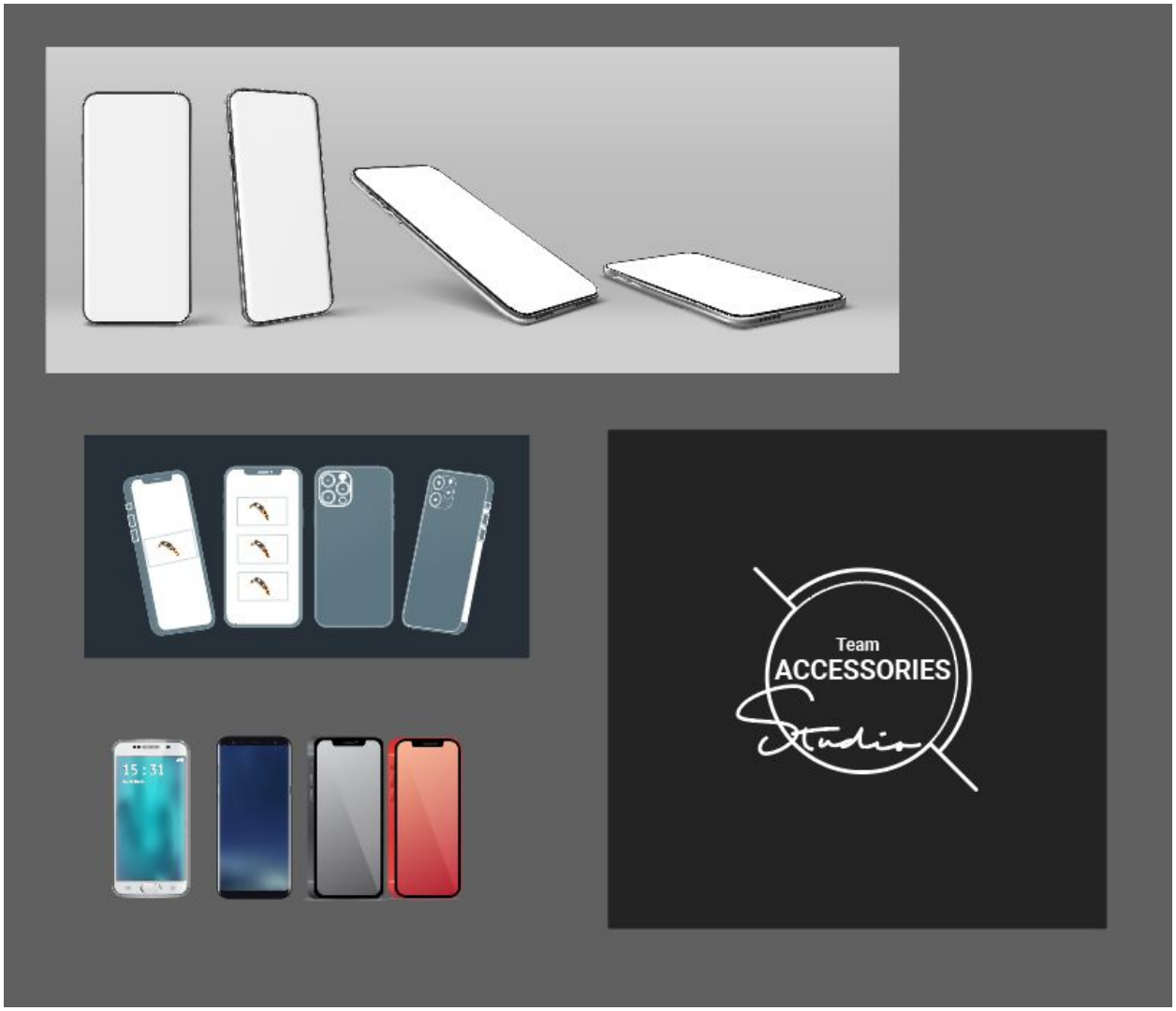

Register New Item:
Pay
Register Item
Link Cards
Home Screen: "Register Item" selected
Press "Register Item" to go to "Accessories Registery" Screen to add an accessory
Ring
Accessories Registry screen
Accessories Registry screen: add new item option selected
Press "+" to go to "Scan Item" Screen to add an accessory
Scan your item/accessory
Scan Item/Accessories Screen
Position Accessory in the frame to go to "Enter Accessory Name" Screen
Enter Item Name
Neckace
Cancel
Confirm
Enter Item/Accessory Name Screen
Enter accessory name & press "confirm" to go to "Item Registration Confirmation" screen
Item Registered
Tap on screen to dismiss
Item Registration Screen: Successfully registered screen
Tap on screen to go back to the "Accessories Registry"
Ring
Necklace
Accessories Registry


Pay (Payment Complete)
Pay
Register Items
Link Cards
Home Screen: "Pay" selected
Select a Card Screen
Select a Card Screen: "card 1" selected
Tap on card you want to pay with and go to "Scan Accessory" screen
Scan Item Or Accessory
Change Card
Scan Accessory Screen
Position accessory in frame
Scan Accessory Screen: Scan successful
Automatically goes to "Payment Confirmation" Screen
Payment Complete
Tap on screen to dismiss
Scan Accessory Screen: Payment Complete
Tap on screen to go go back to Home screen
Pay
Register Items
Link Cards
Home Screen


Pay (Payment Incomplete)
Pay
Register Items
Link Cards
Press" Pay" to go to "Select Car" screen
Card 1:
Card 2:
Card 3:
Tap on card you want to pay with to go to "Scan Accessory" screen
Scan Item Or Accessory
Change Card
Position accessory in frame
Payment Complete
Tap screen to find out why
Tap on screen to go to "payment incomplete" error message
Scan Again
Home
Tap on "Scan Again" to go back to "Scan Accessory" screen
OR
Tap on "Home" to go back to Home screen
Home Screen: "Pay" selected
Select a Card Screen
Select a Card Screen: "card 1" selected
Scan Accessory Screen
Scan Accessory Screen: Scan Unsuccessful
Payment Incompete Error Message

*Note: below image is other design models for hi-fi prototypes*




15 : 31
Team
ACCESSORIES
Studio

# Work Load

**Assignment 3, 4, and 5:**
We all worked together for all components for the contents of these assignments.
**Illustrations for A3 and A4:** TianYu Pan.
**Prototypes for A5:** Manahil Masroor.

**Assignment 6:**
**Note Takers:** WeiHsuan Lin, Mihail Cubata, TianYu Pan
**Facilitator:** Manahil Masroor
**Slides control/operator:** Mihail Cubata
**Lo-fi Prototype drawings:** Manahil Masroor, WeiHsuan Lin, Tian Yu Pan
**Usability Evaluation Protocol:** WeiHsuan Lin, TianYu Pan
**Update Protocol:** WeiHsuan Lin, TianYu Pan
**Studio Results:** Mihail Cubata, Manahil Masroor
**Editing and formatting of content:** Mihail Cubata, Manahil Masroor
**Editing and formatting of images:** TianYu Pan

**Assignment 7:**
**Note Takers:** WeiHsuan Lin, TianYu Pan
**Facilitator:** Mihail Cubata
**Slides control/operator:** Mihail Cubata
**Designated Timers:** Manahil Masroor, Mihail Cubata
**Update Usability Evaluation Protocol:** Mihail Cubata, WeiHsuan Lin
**Update to Usability Evaluations Results:** Manahil Masroor, WeiHsuan Lin, Mihail Cubata
**Mid-fi Prototype/updates to lo-fi design:** Manahil Masroor
**Editing and formatting of content:** WeiHsuan Lin, Mihail Cubata, Manahil Masroor
**Editing and formatting of images:** Manahil Masroor

**Assignment 8:**
**Note Takers:** WeiHsuan Lin, TianYu Pan
**Facilitator:** Manahil Masroor
**Designated Timers:** Manahil Masroor, Mihail Cubata
**Slides control/operator:** Mihail Cubata
**Lo-fi and Mid-fi Prototype drawings and Storyboards:** Manahil Masroor
**Hi-fi (final) Prototype drawings and Storyboards:** TianYu Pan
**Update Usability Evaluation Protocol:** Mihail Cubata, WeiHsuan Lin, Manahil Masroor
**Studio Results:** Manahil Masroor, Mihail Cubata
**Executive Summary:** Mihail Cubata, WeiHsuan Lin
**Conclusion:** Mihail Cubata, Manahil Masroor
**Editing and formatting of content:** WeiHsuan Lin, Mihail Cubata, Manahil Masroor
**Editing and formatting of images:** Manahil Masroor, TianYu Pan

# Resources

Clement, J. (October 1, 2020). *Number of Apple Pay users worldwide as of September 2019*. Statistica. Retrieved October 19, 2020 from https://www.statista.com/statistics/911914/number-apple-pay-users/#:~:text=Number%20of%20Apple%20Pay%20users%20worldwide%202016%2D2019&text=As%20of%20September%202019%2C%20there,users%20had%20enabled%20Apple%20Pay.

Iqbal, M. (July 3, 2020). *WeChat Revenue and Usage Statistics*. Business of Apps. Retrieved October 19, 2020 from https://www.businessofapps.com/data/wechat-statistics/#:~:text=WeChat%20Pay,-The%20mobile%20payments&text=In%20all%2C%20mobile%20payments%20transactions,800%20million%20in%20Q4%202019.

Wireframes made by Manahil Masroor using Balsamiq. https://balsamiq.cloud/