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Ease App Design

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Executive Summary

Despite its relatively competitive market, based on our research, the products on the market for the outfit/closet organizer apps need some tremendous improvements and changes. As the world keeps developing and people's fast paced lives become filled with numerous goals and plans, students, adults, and those with hectic work lives need an efficient way to organize their clothes, because being able to save time for accomplishing bigger tasks and staying organized and prepared is crucial for our everyday life. Therefore, we decided to create the Ease App, a virtual closet organizer app that aims to ease people's hectic lives by saving their time in organizing their clothes, planning their outfits, and eliminating worries from daily life chores. Throughout our iterative design process, we tried our best to keep in touch with the participants we reached out to during our user research, receive constant feedback, get expertise advice and make small but constant improvements. At the end, through trial and error, we were able to complete our project and deliver a high fidelity prototype version of our app, described in detail in the *Design Solutions: High Fidelity Prototype and Evaluation* section of this report. We tried our best to utilize our analytical thinking and technical abilities in order to come up with a product that could one day make a positive impact on someone's life.

Design Problem Statement

Students, adults, and those with hectic working lives need a way to plan their outfits in advance and keep their closets organized because it is important to be able to save time during busy mornings and at the end of long days, and it could help them feel prepared for the day ahead, eliminating worries.

The **problem** is that many people seem to have trouble staying organized, especially with their wardrobe. College life limits students to living in apartments and dorms, where it is essential to keep their belongings in an area more compact than they would typically have at home, which can result in clothing being shoved into poor storage areas or tossed around aimlessly on the backs of chairs or under beds. This also pertains to adults who work full-time jobs. Not everyone has time to root through their closets and dressers during a busy morning, especially if they have children that they need to worry about getting to school on time or if they happen to oversleep. There needs to be a way to find new outfit combinations without actually having to spend time trying on all sorts of clothes, constantly taking things out and putting things back into a closet or drawer, and going through the process of trial and error to see what looks “good”. There needs to be a way to find particular articles of clothing and avoid a situation in which the user doesn’t remember whether or not they already have a certain top or pair of pants. We want to create an app that can make both of these easy for users and help them make their everyday decisions more quickly and with confidence.

The **targeted** users are busy students and young adults with limited space for storage and adults who work jobs that require them to dress for the occasion. It is a service that will aid those who seek to save time in planning outfits, need a place to save their favorite outfit combinations, and/or need to keep track of their abundance of clothes or what clothes they currently have. This is a large audience, as a great deal of college students live in small dorms and shared apartments, and many working adults are employed at companies that have some type of business casual dress code.

The **impact** of the issue is that time will be saved in planning and trying on clothes or rummaging through closets and dressers because it can all be done within the app. - Users will be able to quickly and efficiently prepare for each day with this interactive, wardrobe-organizing

app, eliminating unnecessary worries by helping them feel organized and confident in their decisions. If this problem isn't solved, people will continue to waste time digging through their closets or buying new clothes with the idea that they have "nothing to wear" or nothing to match with a certain article of clothing. They can potentially lose track of certain items if they have limited space for storage and risk buying a style of clothing they may already own but didn't think they had.

The problem is **occurring in homes** every single day, each time someone chooses their outfit for the day or picks a piece of clothing out from their closet to wear. This can affect people of all ages, but primarily students and working adults.

This design problem fits into the categories of Optimizing and Connecting, as the user will be able to make their daily outfit choices more efficiently and connect with other users within the app to view and save outfit inspiration.

Possible Design Solutions:

They will be able to plan outfits with clothing from their own closet, as they will be able to add clothing to their virtual closet from a set of pre-existing basics, an image search catalog, and an option to upload images of their own clothing. There will be options to save favorites and sort them for weather, occasion, and season, as well as options to save favorites from other users within the app. This service will also offer the ability to sort their virtual closet however they like, so they won't forget what they already own and what other clothes they tend to wear with them. There will be a variety of options to ensure that the user is fully prepared for what they need, such as weather forecasts at the beginning of the day and a feature to connect to their personal calendar in case they would like to plan even further in advance.

Related Works

1. Pureple Outfit Planner

<https://apps.apple.com/us/app/pureple-outfit-planner/id628106373>

The design problem that this system identifies is improving the process of organizing wardrobe and outfit creation. The system addresses the problems of accessing and evaluating the clothing items in a wardrobe as well as assembling an outfit through the use of a virtual closet. Some of the good principles in this design are enabling the user to efficiently create their virtual closet through the use of the auto categorization feature and providing the ability to plan your outfits. In addition, the app offers features such as sharing the user's "outfit of the day" to social media platforms, finding inspiration and trends from the Pureple community as well as an outfit suggestion generator feature. As a team, we will attempt to incorporate the app's principles of optimizing the user's closet through the use of a virtual closet and its auto-categorization feature by programming the app to automatically identify certain pieces of clothing. Through examining the app and reading the reviews

(<http://www.appreview.com/lifestyle/pureple-outfit-planner/>) of the Purple Outfit Planner users, we have identified the app's deficiencies in its outfit suggestion feature and small bugs from program updates. The users have complained that the outfit generator feature does not match their style and taste. Their constant program updates have also caused certain inconveniences to a small group of users.

2. Closet+

<https://closetapp.com/>

Similarly to the previous app, the design problem that this system identifies is optimizing the wardrobe organizing process, but also it suggests a solution to the struggles of outfit planning. This system addresses the related problems of time management and preparations for big events in our daily lives with respect to outfit planning by incorporating a calendar. The most prominent advantage of this design would be its use of the calendar (in addition to a virtual

closet feature) to allow the user to mark important events and create an outfit for that special occasion. We will attempt to apply this principle of event planning into our project by tying the user's app account to their existing Google account and use the already-familiarized feature of Google Calendar. One of the deficiencies in the Closet+ application is that not all of their features are free. With regard to the mission of our individual project, we would like to make our application completely free and accessible to all users.

3. Closet-space

<https://apps.apple.com/us/app/closetspace-closet-outfits/id549724282>

Besides the problem of organizing one's closet, this system also identifies the design problem of coordinating outfits and clothing items with regard to the weather. This system addresses the related problems of wardrobe categorization by incorporating the weather aspect. This is a good design principle to be applied for our project as weather and seasonal climate changes are one of the key aspects for outfit planning. We will attempt to apply this principle by allowing the users to sort out their clothing items in their virtual wardrobe and potentially adding the weather forecast feature into the calendar. Some of the faults of the Closetspace application would be its outdated interface and the lack of visual aesthetics. In some of the product reviews, the users have mentioned that when creating outfits they could not customize the collage/the layout of their created outfits and it looked visually unappealing.

4. Cladwell

<https://cladwell.com/>

This system provides an option to select some basic clothing items from its own database. This solves the problem of spending time on taking pictures of every item in the user's closet to create a virtual wardrobe. This principle of using an app's database for the users to choose items similar to the ones they already own is a notable design principle that we would like to apply for our project. We believe that time management is an important aspect for our app users as some of them might not have the desire to take photos of every single clothing item they own. We will attempt to apply this principle by allowing the users to have both options: take pictures of their own or add clothing to their virtual wardrobe from an image search catalog built

in our app. One of the disadvantages of Cladwell is that one of its features, “most worn items” and “least worn items”, is not accurate, especially if the user has not been using the app for a while. While some may see this as a minor disadvantage, but other groups of users may perceive this unsuccessfully implemented feature as a big issue.

5. Smart Closet

<https://smartcloset.me/>

Similarly to Purple Outfit Planner, the design problem that this system identifies is optimizing the process of assembling clothing items in the virtual wardrobe into outfits. This system addressed the related problem of outfit creating by giving better control over the outfit suggestions. The good principle of this design is the feature that you can make a “rule” for the outfit generator to create an outfit that better suits your style. With respect to addressing the problem we are dealing with, we would attempt to apply this principle of improving the outfit generator feature by incorporating a small survey/questionnaire. The survey will allow us to get to know the style/taste of the users in our individual project to avoid the results that would seem unappealing to our app users. The deficiency of the Smart Closet application is that it has a bigger focus on shopping rather than organizing which conflicts with the main mission of our project.

Design Process: User Research

Defining Users

The group of users we chose for this project are college students from James Madison University. We had five students, two boys and three girls of different grade levels, participate in our project. All of the participants are pursuing different majors, ranging from Media Arts and Design to Health Sciences. We chose these particular students because we believed that, as busy college students, they would most likely be interested in the features our app had to offer, benefit from those features, and actually put them to use.

We reached out to students through social media (group messaging apps and Instagram stories), describing our project, but ended up selecting five people to interview based on their feedback and interests. The face-to-face interview took place on campus or in the participants' homes. We sought to conduct the interview in a quiet, but casual, setting with minimal to no distractions.

It was very feasible for us to find people to interview, as the students from JMU were a great fit as the participants of our project (busy students who need to save time). Due to our broad connections and simple, but precise, standards for choosing the participants to interview, we did not have any trouble accessing the users we wanted to reach.

Interview Process

We conducted face-to-face interviews on campus and at the participant's homes, depending on their availability. We took photos of the interview process and took detailed notes using our laptops and notepads.

Interview Questions:

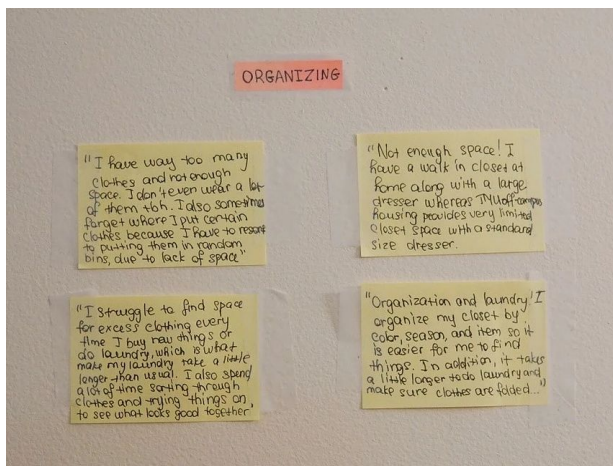
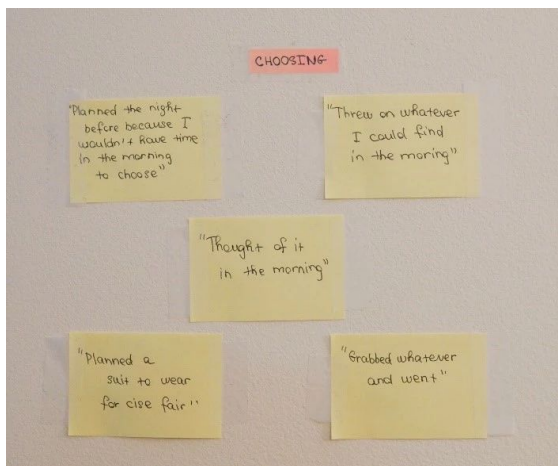
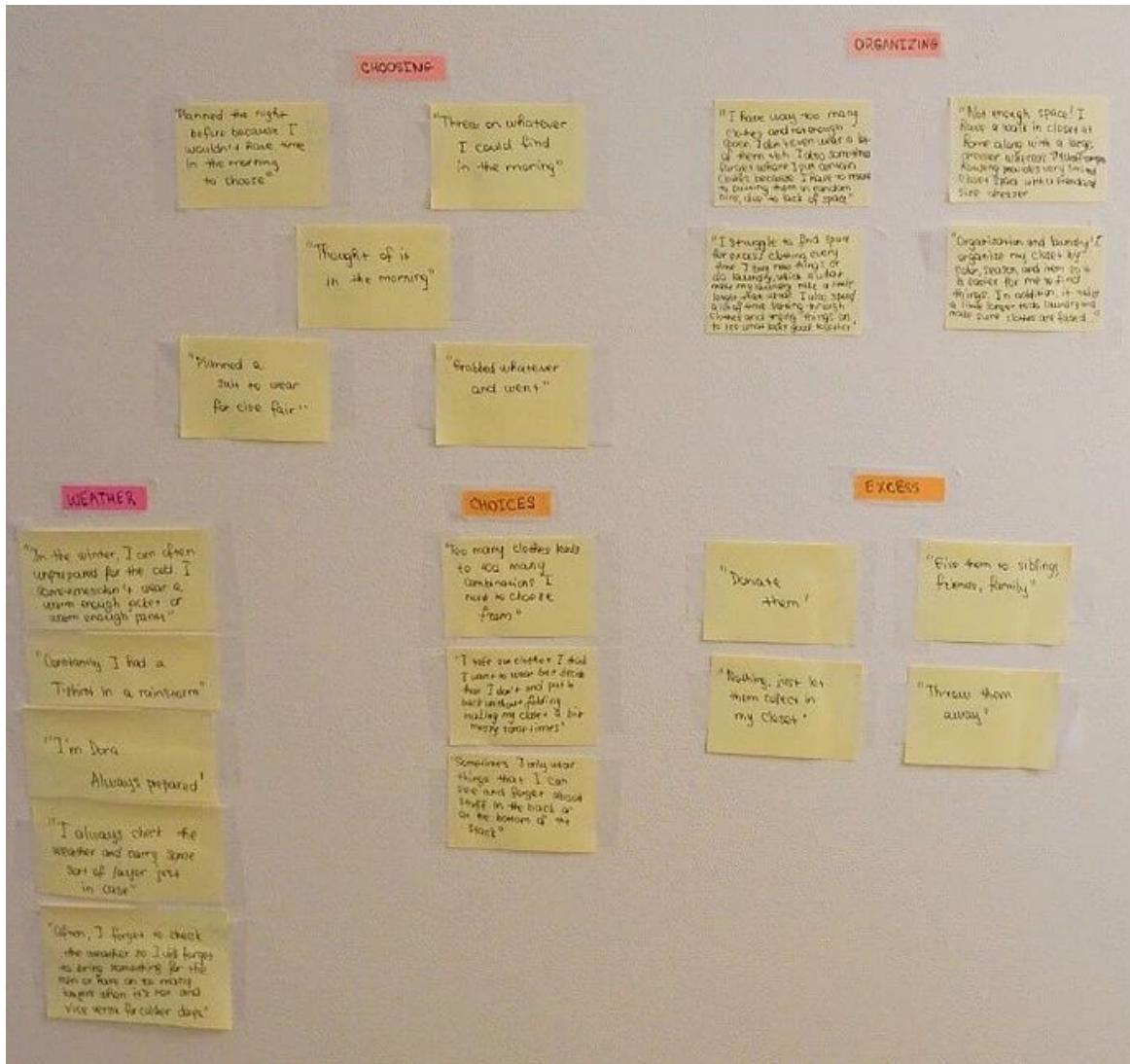
We conducted the interviews by asking our participants the following questions:

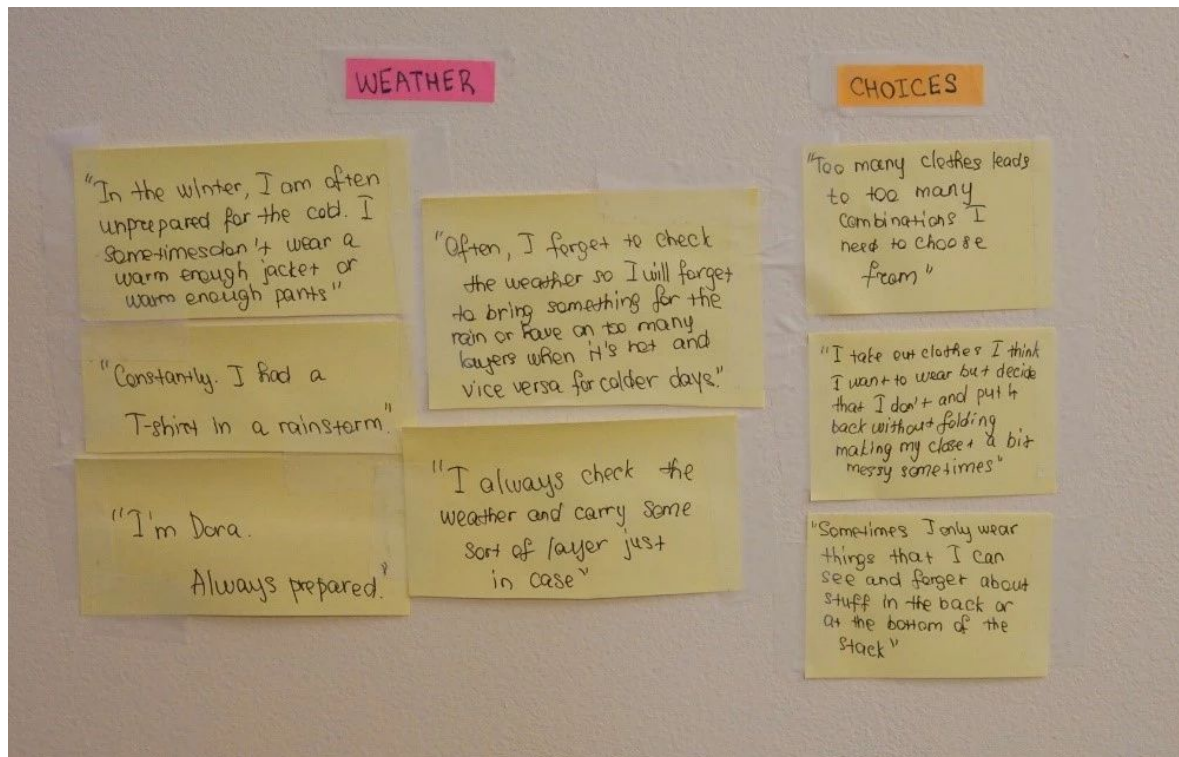
1. How did you choose your outfit today? How much time did you take?
2. What difficulties do you have in organizing your closet?

3. Where is your time going when it comes to maintaining your closet?
 - Do you struggle to find space for excess clothing?
 - Does doing your laundry take-up a lot of time? Why?
 - Do you end up spending a lot of time sorting through clothes to find something to wear?
4. Have you ever bought a piece of clothing on impulse in preparation for an event when you have perfectly good and suitable clothes in your closet?
 - Did you ever wear that piece of clothing again?
5. How do you deal with excess clothes?
6. How often do you find yourself dressed poorly for the weather?
7. How often do you leave home unconfident, insecure, or unsatisfied with your clothing choices/outfit?
8. There are clothing/wardrobe organizing apps with features like uploading clothes to a virtual closet, generating outfits, tying in a personal calendar to plan outfits in advance, and saving favorite outfits. Do you think these are helpful and are there features something you would use?
9. Are there any features you like on similar/other pre-existing apps that you would like to see in a wardrobe-organizing app?

Data Analysis







We sorted and clustered data using closed sorting, particularly card sorting. We chose this approach, as we felt that it was the best way to organize and gain insight to our users' decision-making processes and ways of thinking. It helps us find certain behavioral patterns and gives us a strong foundation to the design of our product. We used the following categories to break up all the valuable data and put them into perspective:

- Thought process in choosing daily outfit
- Difficulties with outfit choices and options
- Dealing with the weather
- Difficulties with organizing clothes
- Dealing with excess clothes

Each category is highlighted in a different color to help us sort our interview findings (see next section).

We compiled the answers from our interviews, both typed notes in Microsoft Word and written notes on paper, and highlighted the important pieces of information to sort the data. We wrote down relevant quotes from the interview on the sticky notes and color coded each one based on the above categories.

Interview Findings

1. How did you choose your outfit today? How much time did you take?

The majority of users either choose their outfits in the morning, throwing on whatever they can find in the morning under a couple minutes, or they plan it the night before and take the upcoming day's events and weather into account. For example, one student planned to wear a suit in advance for the CISE career fair. Most never took over five minutes to choose their outfits, but one user did take about 20 minutes to prepare her outfit in the morning.

2. What difficulties do you have in organizing your closet?

All of the users complained about having too many clothes and not enough space. One complained that, as a result, her things would get misplaced, and she was unable to find what she needed/wanted to wear. She added that she would sometimes only wear things that she could see right away and forgot about stuff in the back of her closet or at the bottom of a stack of clothes. Another user mentioned that he would often take clothes that he thought he'd want to wear out of his closet/dresser, change his mind, and then he would end up putting it back in a rush (without folding or hanging up properly), eventually resulting in a messy wardrobe.

3. Where is your time going when it comes to maintaining your closet?

Most interview respondents indicated that laundry took a lot of time when it came to maintaining their closets in general; they would struggle to find space for clothes after folding them, therefore taking more time to put stuff away. One user noted that finding something to wear took a lot of time because he had too many outfits that he thought looked good and had trouble making decisions. Another user organizes her closet by

color, season, and item, so it's easier for her to find things. However, the process of organizing all of it takes up a lot of time.

4. Have you ever bought a piece of clothing on impulse in preparation for an event when you have perfectly good and suitable clothes in your closet?

All users answered yes, they had indeed bought a piece of clothing on impulse in preparation for an event when they had perfectly good and suitable clothes in their closets. Three users answered that they did manage to find an opportunity to wear that piece of clothing again, but the other two never did.

5. How do you deal with excess clothes?

When dealing with excess clothes, two users regularly donated their clothing. One user threw their excess clothing away because they didn't want to go through the trouble of having to find a place to drop off clothes to donate. The last user simply gave excess clothes to friends and family.

6. How often do you find yourself dressed poorly for the weather?

Two users were usually prepared for the weather, always sure to check in advance and carry some sort of layering item just in case. The other three had their own experiences in finding themselves poorly dressed for the weather. One user stated that he was often unprepared for the cold winter, sometimes finding that the jacket or pants he chose weren't warm enough. Another user said that he constantly was getting caught in bad weather, dressed inappropriately. "I had a t-shirt in a rainstorm," he admitted. The last user said that she would often forget to check the weather, so she would neglect to bring something for the rain, have too many layers on during warmer days, and vice versa during colder days.

7. How often do you leave home unconfident, insecure, or unsatisfied with your clothing choices/outfit?

Three users usually only left home if they actually felt that they "looked okay." One of them even said, "I don't really want to leave home if I feel ugly." Another said that she didn't really ever leave feeling unconfident, because she usually ended up changing over

and over again until she found an outfit that she felt comfortable enough in. The other two users were only unconfident or insecure depending on their situation. They would be self-conscious if they left home dressing “like a slob,” when they’re meeting new people all of the sudden, or when they would have to attend a fancy event.

8. There are clothing/wardrobe organizing apps with features like uploading clothes to a virtual closet, generating outfits, tying in a personal calendar to plan outfits in advance, and saving favorite outfits. Do you think these are helpful and are there features something you would use?

All users agreed that those features sounded like they would be helpful. One user said that she would definitely use the feature to save favorite outfits. Another user said that she could see the features being useful to keep up with current fashion trends, following seasonal color palettes, and styling inspiration. She thought that saving favorite outfits and being able to generate new ones would definitely be helpful. Two other users also mentioned that a feature to generate outfits would be something they would use. “It would be nice to try a new outfit rather than just putting on whatever comes to mind,” one girl mentioned. However, not all of the users said they would be likely to use those features regularly. One user said that he wasn’t sure if he would use them, as he only felt that he needed to use the weather app to plan what to wear.

9. Are there any features you like on similar/other pre-existing apps that you would like to see in a wardrobe-organizing app?

One user said that she would be interested in something with a similar layout to Instagram because it’s the social app she’s most familiar with. Another user wants something simplistic that allows her to look at a variety of different outfits, filter by occasion, and filter by weather. Another user brought up the idea of a tagging system, “because you could tag outfits of a similar style and depending on your mood, you could choose a style tag and be able to see all of the options there.” Like the first user mentioned, another liked the idea of having a social platform in which he would be able to view others’ profiles, thinking it would suite a wardrobe application. The last user found the idea of a virtual planner appealing. “You could pick out an outfit and save it on the calendar.”



Design Requirements

- The solution should allow users to plan outfits with clothing from their own closet, shortening the time it takes to try on clothes and reducing the mess that comes with haphazardly putting back clothing in a rush during busy mornings.
- The solution will have options to save favorite outfits and sort them for weather, occasion, and season (using tags), as well as options to save favorites from other users within the app (a social aspect).
- The app will include a feature to generate outfits for users and allow them to connect with others for outfit inspiration.
- This service will also offer the ability to sort users' virtual closet however they like, so they won't forget what they already own and what other clothes they tend to wear with them. They will never run into the problem of forgetting they own something or neglect to wear an item because it isn't in their immediate view.
- There must be a variety of options to ensure that the user is fully prepared for what they need, such as weather forecasts for each day.
- The app will have a feature to locate ways/places to donate clothing, allowing users to save time in finding nearby donation centers or looking for organizations that are willing to pick up clothing. That way, users will be more inclined to recycle their clothing instead of throwing them away.
- The app will include a feature to connect to their personal calendar in case they would like to plan outfits for particular events, special occasions, or simply just in advance.

Further Research: Observation

We had the opportunity to observe one of our participants, Briana Chien, at her home. This observation took place in her room, on a Saturday afternoon. We were able to see the routine she follows weekly to organize her closet. Briana stated that she usually chooses her outfit for the day in the morning. However, due to her indecisive nature, she tends to take her clothes in and out of her closet, leaving the clothes on her bed unfolded. Because of her busy weekdays as a Health Sciences major, Briana often only organizes her clothes during the weekends.



Design Process: Personas

Primary Persona: Justine Chen



"My closet doesn't have enough space! I usually end up squeezing things into my dresser to try to make it all fit."

Age: 20

Year: Junior

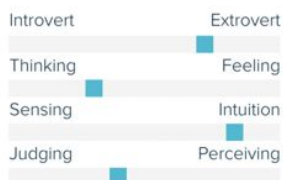
Major: Computer Science

Work: Student, works part-time on campus at a computer lab

Home Life: Lives with roommates in an apartment near campus

Location: Harrisonburg, VA

Personality



Sociable

Open-Minded

Meticulous

Goals

- To maintain better organization of her closet to maximize overall closet space.
- Be able to find a more efficient way to organize her closet by color, season, and item, so it's easier for her to find things.
- Find a convenient way to save her favorite outfits.
- Keep up with current trends while connecting with others.

Frustrations

- Avoid being unable to find a certain item she wants to wear.
- Avoid forgetting about clothes in the back of her closet and what she already owns.
- Struggle less to find space for clothing while putting away laundry.

Bio

Justine attends two to three classes each weekday, waking up around 8AM each day to get to her first class on time. She typically plans her outfits the night before, based on weather and the upcoming day's events. However, sometimes the outfit she planned doesn't look as good as she thought it would, and she has to spend extra time in the morning looking for alternatives. She has a bad habit of leaving all the clothes she takes out messily strewn across her bed or hurriedly shoved back into her closet in order to leave for class on time. It can be hard for her to find certain items; she forgets what she has. She **needs** a way visualize what she has in her closet, all at the same time, to avoid taking multiple things out at a time and going through trial and error with outfits.

Justine has a lot of outfits she likes to wear, but she'll often forget what her favorite pairings are if she doesn't record them somewhere. She **needs** a way to save her outfits, so she can refer back to them.

When it comes to organizing her closet, laundry is what takes up most of Justine's time. She struggles to find space while putting away clothes. She also enjoys organizing her closet by color, season, and item, so it's easier for her to find things. However, this takes a long time, and she **needs** to find a more efficient way to do this.

Although Justine has a lot of clothes and not enough space, she does occasionally donate excess clothes. However, she donates infrequently because she's unsure of what she still does and doesn't wear. She **needs** a way to know what she never wears. This would help her to maximize essential closet space.

Technology Use

Justine uses her iPhone 7 and Mac laptop on a daily basis. Her phone is always with her, and she brings her laptop with her whenever she expects to do work. Both of them were bought new from the Apple store within the past two years.

She loves using social media and uses Instagram and Twitter excessively. She is constantly downloading and deleting new apps, eager to follow the latest trends and games, but she will only keep what she actually uses regularly. She loves any apps with a social aspect and would really enjoy being able to connect with others.

Primary Devices



Technical Usage

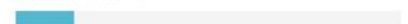
Internet



Online & Social Media



Cable or Satellite TV



Calling & Texting



Key Significant Differences

- Donates her excess clothing
- Already has her own method of planning outfits (night before, based on weather and the upcoming day's events)
- Has a certain way she organizes her closet but needs a way to make it more efficient.
- Uses social media more heavily compared to other groups and enjoys the social aspect of an application

Secondary Persona: Samantha Dawson



"I want to become more practical about planning my outfits for the day, but nothing seems to work for me."

Age: 22

Year: Senior

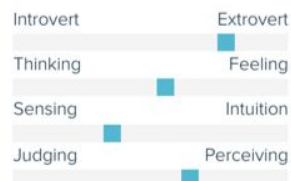
Majors: Media Arts & Design,
Computer Information System

Work: Full time student works part-time on campus as a graphic designer

Home Life: Lives with roommates in an apartment an hour away from campus

Location: Harrisonburg, VA

Personality



Enthusiastic

Practical

Busy & Forgetful

Goals

- Be able to **efficiently plan outfits ahead of time** for important events.
- **Keep up with the weather forecast to coordinate her outfits** accordingly.
- Find a more **sustainable way** to deal with **excess clothes**.
- Finding ways to **optimize time**.

Frustrations

- Avoid spending a lot of time to search clothing items and plan an outfit for an important meeting/event.
- Avoid being unprepared for the weather.
- Struggle less with seeking an environmentally sustainable life.
- Struggle less with time management and forgetfulness.

Bio

Due to her challenging academic program in Computer Information Systems and Media Arts & Design, Samantha finds it hard to manage her time accordingly and balance out her wants and needs. As a person, she is very practical and enthusiastic and loves embracing changes. However, due to high academic and career goals, she is often really busy with work and tends to be forgetful. Samantha usually stays on campus until 10PM and commutes home after finishing all her work at the library. Since she has to commute, she gets home late. Samantha **plans her outfit in the morning** as she gets ready for school. She ends up wearing the same clothes over and over again as she runs short on time in the morning and doesn't like making a mess in her closet. Due to Samantha's forgetful nature, she is very often **dressed poorly for the weather**. She is very practical about her studying, but she believes that she also **needs** a more practical approach in dealing with her **day-to-day chores** like doing laundry, **organizing her closet** and **planning an outfit for the day**. For big events like a Career Fair, Samantha usually stays up very late to plan her outfit as she wants that perfect first impression, but she ends up not getting enough sleep for the next day. Recently, after watching a documentary in one of her classes, Samantha decided that she **wants to put more effort in living a sustainable life**. She noticed that she tends to **throw away her excess clothes** very often as she finds it hard to find recycling or donation centers near her house. Samantha hopes that one day she will be able to not only excel in her academics but also become very effective and skillful in handling her day-to-day chores.

Technology Use

Samantha uses a Google Pixel phone and a Microsoft Surface Laptop 2 on a daily basis. She uses her phone regularly to set up reminders. She never leaves anywhere without her laptop as a lot of her work is done on it.

She is enthusiastic about innovative technology solutions that deal with real-world problems, especially anything that deals with planning and time management. However, as a SMAD and CIS double major, she is really picky about the app's usability.

Primary Devices



Technical Usage

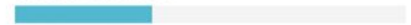
Internet



Online & Social Media



Cable or Satellite TV



Calling & Texting



Key Significant Differences

- Already has a way to organize her closet, but wants to be able to plan her outfits more efficiently without having to have a physical access to her closet
- Usually throws away her clothes without donating or recycling, but recently decided to live more sustainably
- Often forgets to check the weather and is usually short on time in the morning (as she commutes to school)
- Tends to plan her outfits in the morning, but wants to find a better way to plan ahead

Design Process: Scenario

Scenario User 1:

Justine Chen

"My closet doesn't have enough space! I usually end up squeezing things into my dresser to try to make it all fit."

- To maintain better organization of her closet to maximize overall closet space.
- Be able to find a more efficient way to organize her closet by color, season, and item, so it's easier for her to find things.
- Find a convenient way to save her favorite outfits.
- Keep up with current trends while connecting with others.

Justine has just finished a long day of doing homework at the library. It's Sunday, and she's finally home at her apartment with some time to spare, so she decides to tackle the towering pile of laundry sitting in her hamper at the corner of the room. As she starts the load of laundry, she looks through her closet to see what else she might need washed. As she digs through to the deepest parts of her closet, she finds a few dresses that she completely forgot she had.

"Huh," she wonders aloud. "Do I even wear these anymore?" She contemplates whether or not she should donate the dresses, but then she hesitates. "Maybe I'll need them for a special occasion in the future." She's not sure when she wore them last, but she wants to say that it hasn't been that long since she wore them. Little does she know, it's been a couple years, and she's lost weight since then and doesn't fit them anymore. It would have been nice to have a way to keep track of how many times she's worn a certain article of clothing and a way to keep her from forgetting what she owns. That way, she could maximize closet space by getting rid of what she no longer wears or can wear.

She sits down on her bed and texts her friend, Sam, about her little dilemma. Sam immediately recommends her to an app called, Ease, suggesting that it could help her keep track of her clothing statistics and how often she wears each item. She also mentions that Justine will be

able to upload her entire closet to the app, making it easier to organize and keep track of what's in her wardrobe. Excited about what the app has to offer, Justine downloads it. While she waits for her laundry to finish its cycle, she creates her profile and follows Sam on Ease. She really likes the social aspect of the app and how she can connect with others and view their saved outfits.

Justine begins adding her own clothing to her virtual closet, and it's much easier than she expects it to be. A lot of her clothing, or at least similar styles, are simple to find and add using Ease's online image search. All she has to do is type in some describing words about the article of clothing she wants to upload (for example, "teal denim jacket"), and the app will do a Google image search displaying the results. From there, Justine can just pick the jacket that looks most like her own and add it to her virtual closet. She even has the option of uploading her own images.

Once the load of laundry is finished washing and drying, it's time to sort and put away clothing. This always takes her a long time because she enjoys organizing her closet by color, season, and item. The process is much quicker with Ease. It only takes a few minutes to add her freshly washed laundry items to her virtual closet. With Ease, she is able to sort each article of clothing by color, season, and item with the touch of a few buttons. She simply tags each article with a certain color, season, or whatever category she chooses, as she adds it to her closet. Once that is done, she can filter by those tags, and then all there's left is putting away the clothes. She keeps in mind that using Ease makes keeping her closet organized easier.

Scenario User 2:

Samantha Dawson

"I want to become more practical about planning my outfits the day and dealing with my excess clothes but nothing seems to work for me"

- Frustrated about having to plan an outfit in the morning
- Frustrated about having to throw away excess clothes, and therefore, producing waste
- Constantly feels rushed

Samantha had just come home from after an hour-long drive from James Madison University. After taking some time to get ready for bed, she reviews her class and work schedule for the next day and sets an alarm at 7:30am.

In the morning, Samantha starts off with doing her morning routine and preparing breakfast. As she eats, she is thinking about what outfit she should wear for school. After washing her dishes, Samantha goes to her closet to pick out an outfit. As she opens her closet, her mind wanders about what tasks she needs to finish at school, little does she know - she's running out of time. Samantha ends up wearing the same outfit she wore two days ago as she becomes indecisive about choosing a new one. She asks her father to take her to school and hops on his car, ready to go to her first class.

On her way to school, it started to rain. As Samantha gets out of the car to go to her class, she gets caught in the rain and her clothes are now soaking wet. Samantha enters the classroom and tells her friend about how she ended up wearing the same clothes as two days ago because she got too caught up in her thoughts about the school work. She also says she forgot to check the weather because she was running late for school. After their class ended, her friend, who is a fashion enthusiast, recommends her to check out a new closet organizer and outfit planner app called "Ease". Samantha, excited about her friend's recommendation decides to download the app. She discovers that the app lets her plan her outfit accordingly to the weather using a built-in weather forecast and calendar feature. The app also lets her recreate her closet virtually by adding the photos of her clothing items. Samantha realizes that with "Ease" she can plan her outfits ahead of time during the free time she has in between her classes. Samantha realizes that she really wants to give the app a try.

Fast forward to a week later, Samantha is now a master of the "Ease" app. She doesn't plan her outfits in the morning and does not run late to school anymore. Samantha believes that now she can *"Live her Life with Ease"*.

Design Process: Storyboards

Storyboard 1



Justine wakes up to her alarm at 8 am. It's Tuesday, and she has about an hour to get ready and drive to her 9:05 am class.



As she sits up in bed, she thinks about the outfit she planned the night before.



She goes to her closet and pulls out the top and skirt she wanted to wear.



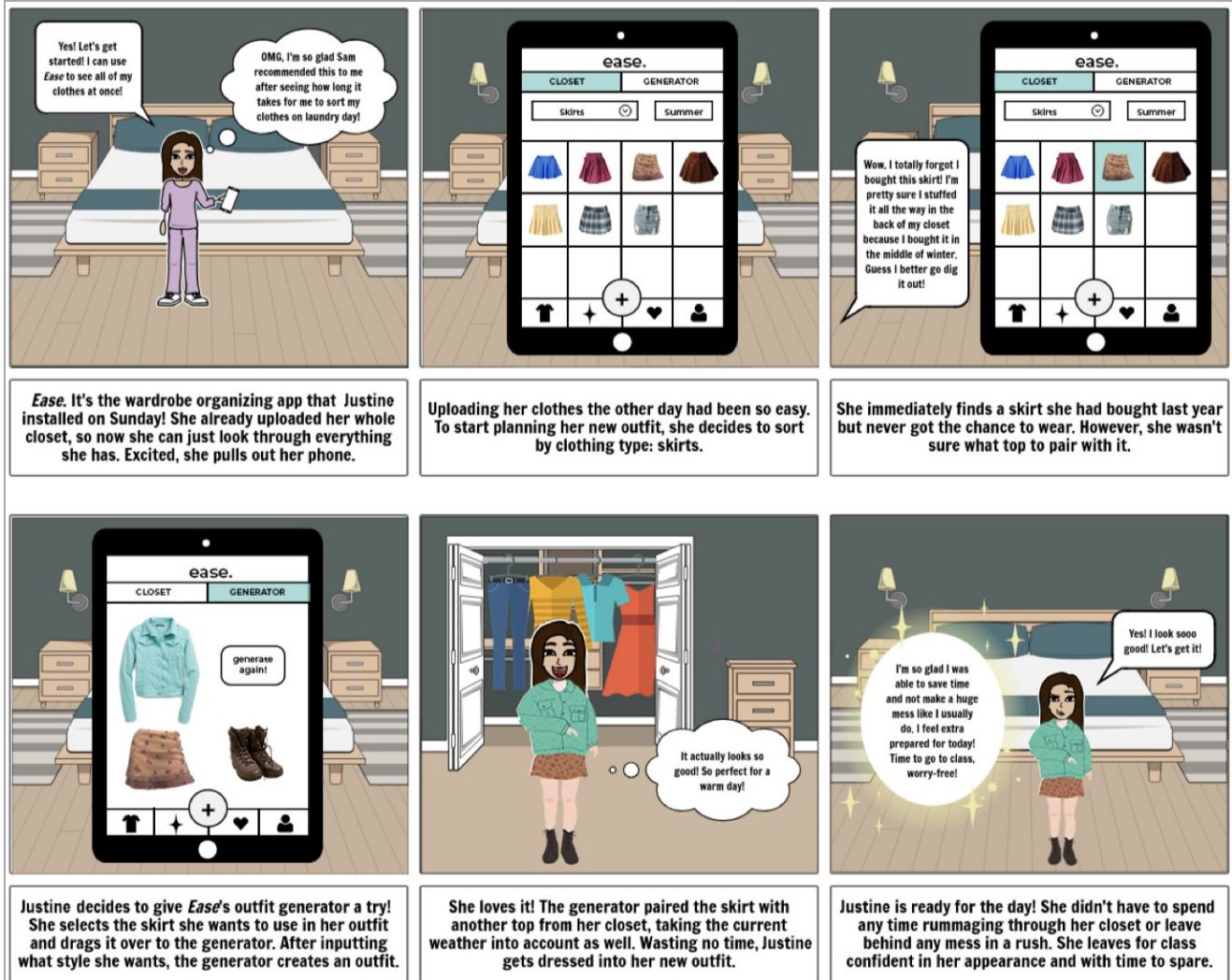
She tries on the outfit. One look in the mirror is all it takes for her to realize that she absolutely hates it.



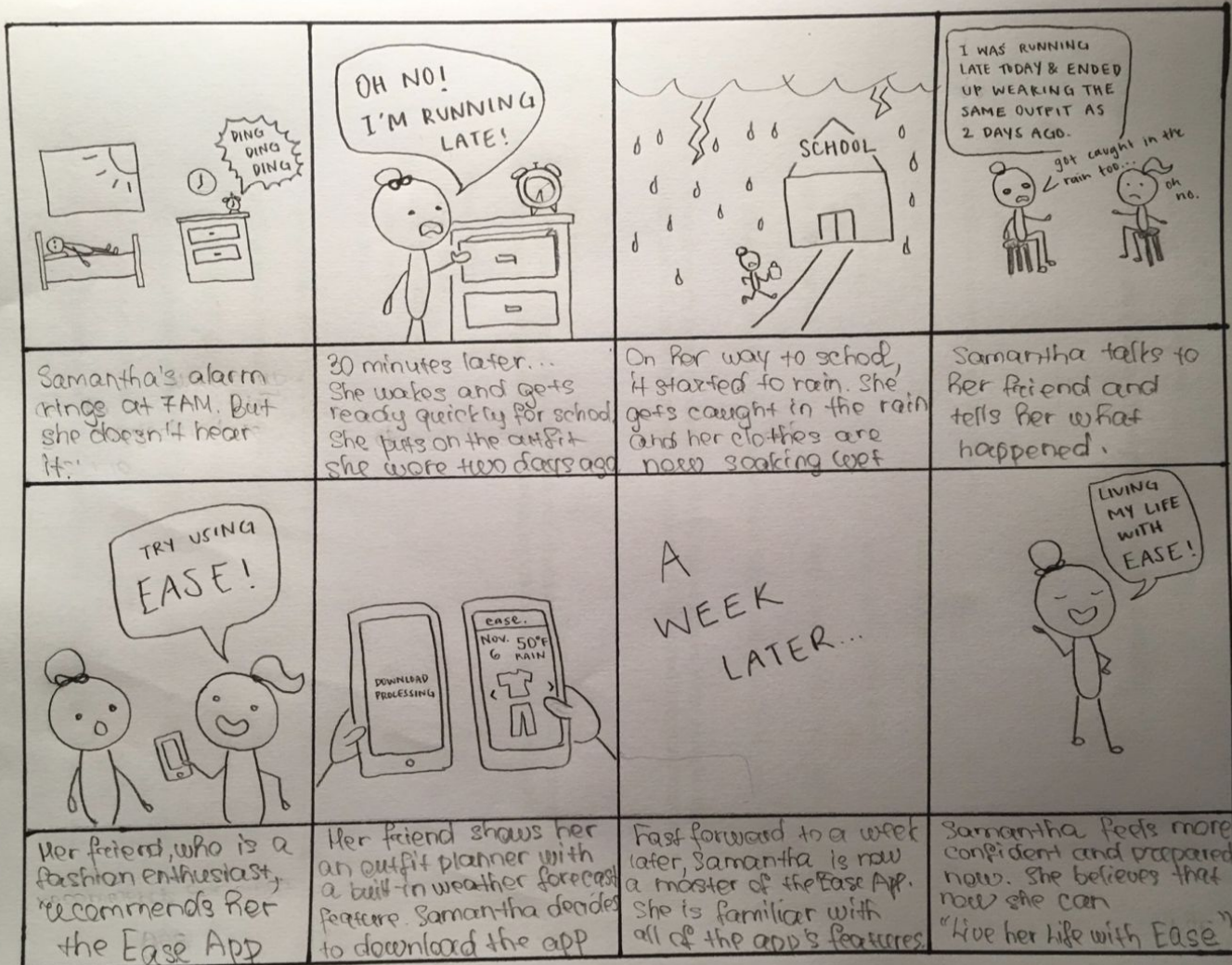
Absolutely horrified, she changes back into her pajamas and rushes back over to her closet, prepared to go through all her stuff to find suitable outfit for the day.



She wishes she had some way to visualize everything in her closet without pulling everything out. But then she remembers about the app she downloaded last weekend.



Storyboard 2



Design Process: Design Requirements

Data Requirements

- Images (from the database)
- Map

Contextual Requirements

- A survey to identify user's fashion preferences

User Requirements

- User information
 - Name
 - Age
 - Gender
- User-friendly design interface
- Intuitive functions
- Customizable and personal
- Cost: Free or under \$2.99
- Notifications
- Easy navigation

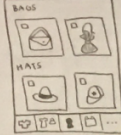
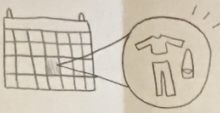
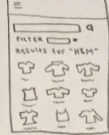
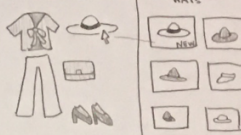
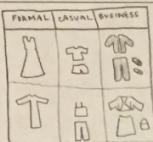
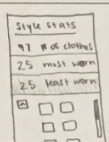
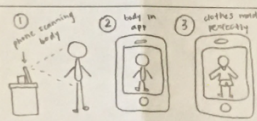
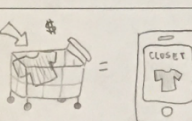
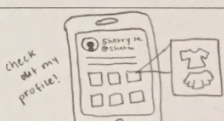
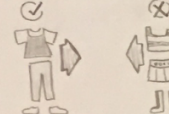
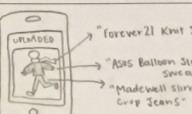
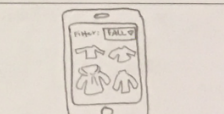
Functional Requirements

- Ability to create a virtual closet
- Ability to create/plan outfits
- Ability to save favorite outfits
- Ability to sort outfits by categories
- Ability to auto-generate outfits
- Ability to view the weather forecast
- Ability to locate donation/recycling centers
- Ability to connect with other users
- Ability to utilize personal calendar

Technical Requirements

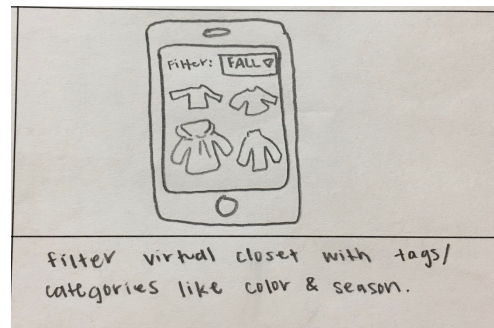
- Software platforms: Mobile phones only
- Support on both iOS and Android operating systems
- Access to Internet or Wifi (for some features only)
- Location Services
- Installation through App Store or Google Play
- Access to user's photo library

Design Solutions: Brainstorming and Sketches

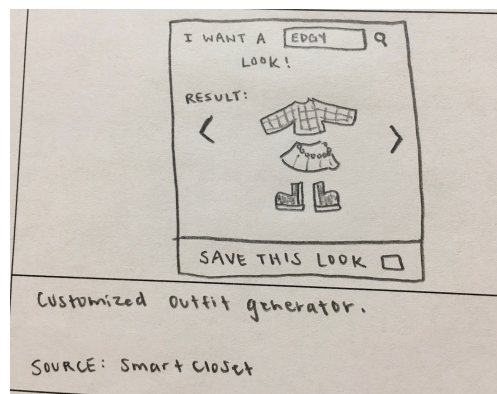
10 Ideas from designs that already exist in the world, whether available as products, described as in research papers, or elsewhere.				
				
App to help plan outfits in regards to the weather. SOURCE: Closet-space	Organizing wardrobe with auto-categorization feature. SOURCE: Purple Outfit Planner	Planning outfits with a calendar to plan ahead. SOURCE: Closet+	Build a virtual closet using the built-in image-search catalog. SOURCE: claidwell	Shop online and match the new item w/ what's already in your closet. SOURCE: Stylish Girl
				
Customized outfit generator. SOURCE: Smart Closet	Categorize outfit by occasion. SOURCE: CLOTH	Post your own outfit & get feedback from other users. SOURCE: GLAMORFIT	Find out what clothing items you never wear. (Closet Statistics) SOURCE: YOUR CLOSET	Find style inspirations while organizing & planning your wardrobe. SOURCE: CLOSET LOVE
10 Ideas you think does not yet exist in the world; these should be ideas you thought of yourself				
				
Find ways/places to donate clothes in the app.	Scan your whole closet into your virtual closet.	Try on your outfit virtually.	Have clothes you buy online go directly into your virtual closet app.	Share your outfits with friends using the app.
				
Swipe through automatically-generated outfits (Swipe right for yes, left for no) to pick favorites. (like Tinder)	Model your virtual closet exactly like your actual closet (3-D/interactive virtual closet).	Scan outfit you're currently wearing directly into the app.	Find the exact outfit of someone in a photo if you upload that photo to the app.	Filter virtual closet with tags/categories like color & season.

During the brainstorming and sketches phase, we sketched 20 ideas to our design problem, one in each square, writing a brief caption for each to help someone else understand the idea each sketch conveys. At least 10 of these ideas came from designs that already exist in the world, whether available as products, described as in research papers, or elsewhere. For ideas we found that are already in the world, we provided our source information to where we found it. The other 10 ideas were some things that we thought did not yet exist in the world; these were ideas we thought of ourselves.

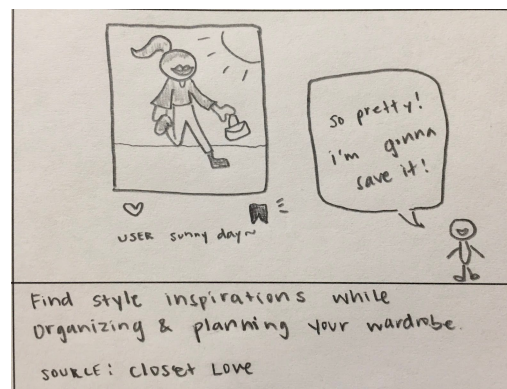
Design Solutions: Three Best Concepts



Filter virtual closet with tags/categories like color and season.



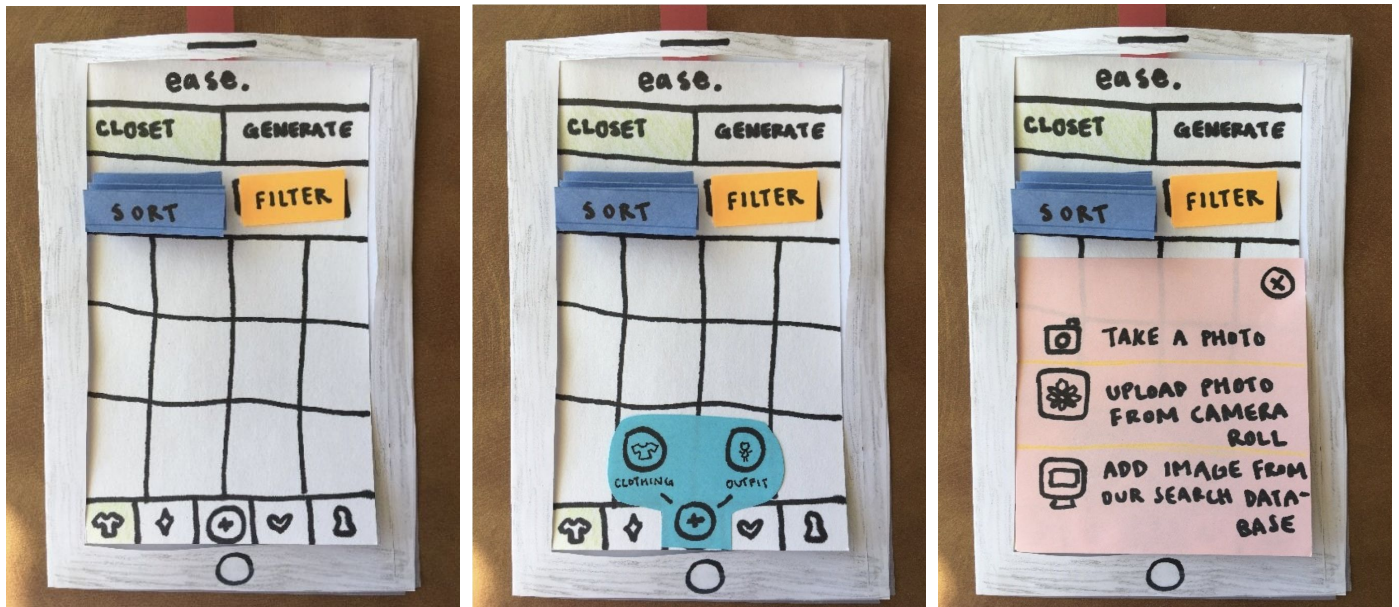
Customized outfit generator.



Find style inspirations while organizing and planning your wardrobe.

Design Solutions: Paper Prototype and Testing

Task 1: Adding an item to your Closet, using your own photo.



- 1) Upon opening the Ease app, you are taken to your homepage. This page contains your Closet in one tab, and an option to Generate [Outfits] in the other. It is defaulted to take you to the Closet page first
- 2) Click the add/plus (+) icon at the bottom navigation and get a small menu asking if you want to add new Clothing or a new Outfit. Click the Clothing button to add new clothing
- 3) A set of options will pop up after you click Clothing, asking if you want to add new clothing by taking a photo, uploading a photo from your camera roll, or adding an image from Ease's search database. Click "Upload Photo from Camera Roll" to use your own photo that you currently have.

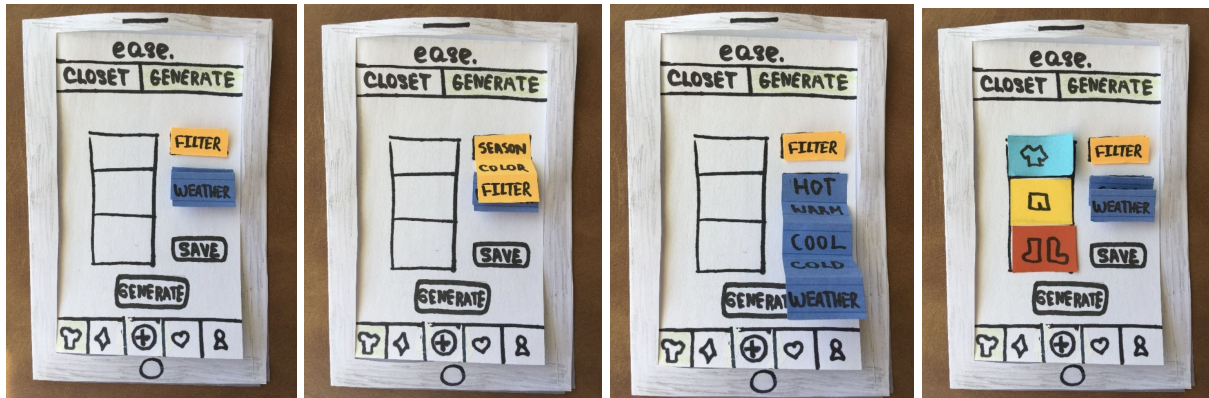


4) You are brought to a new page to select your desired photo. These photos are from your phone's Camera Roll. The photo that is automatically featured is your most recent photo.

5) The photo, even if featured, is not selected to upload until you click on it. Once you click on a photo to upload, the circle in the right hand corner of its box is checked off. Next, click the check button on the upper right corner of the page to confirm.

6) The photo of your newly added item now appears in your closet.

Task 2: Generating a new outfit.



- 1) Upon opening the Ease app, you are taken to your homepage. This page contains your Closet in one tab, and an option to Generate [Outfits] in the other. Click the Generate tab to find the outfit generator.
- 2) You can generate your new outfit using filters, like an outfit for a specific season or of a certain color.
- 3) You may also choose a weather option, in addition to a filter. You can choose to generate an outfit for hot, warm, cool, or cold weather if desired.
- 4) Once you've selected your desired filter and/or weather, click generate and you will get a new outfit, made up of items from your closet. You may click the generate button as many times as you want.

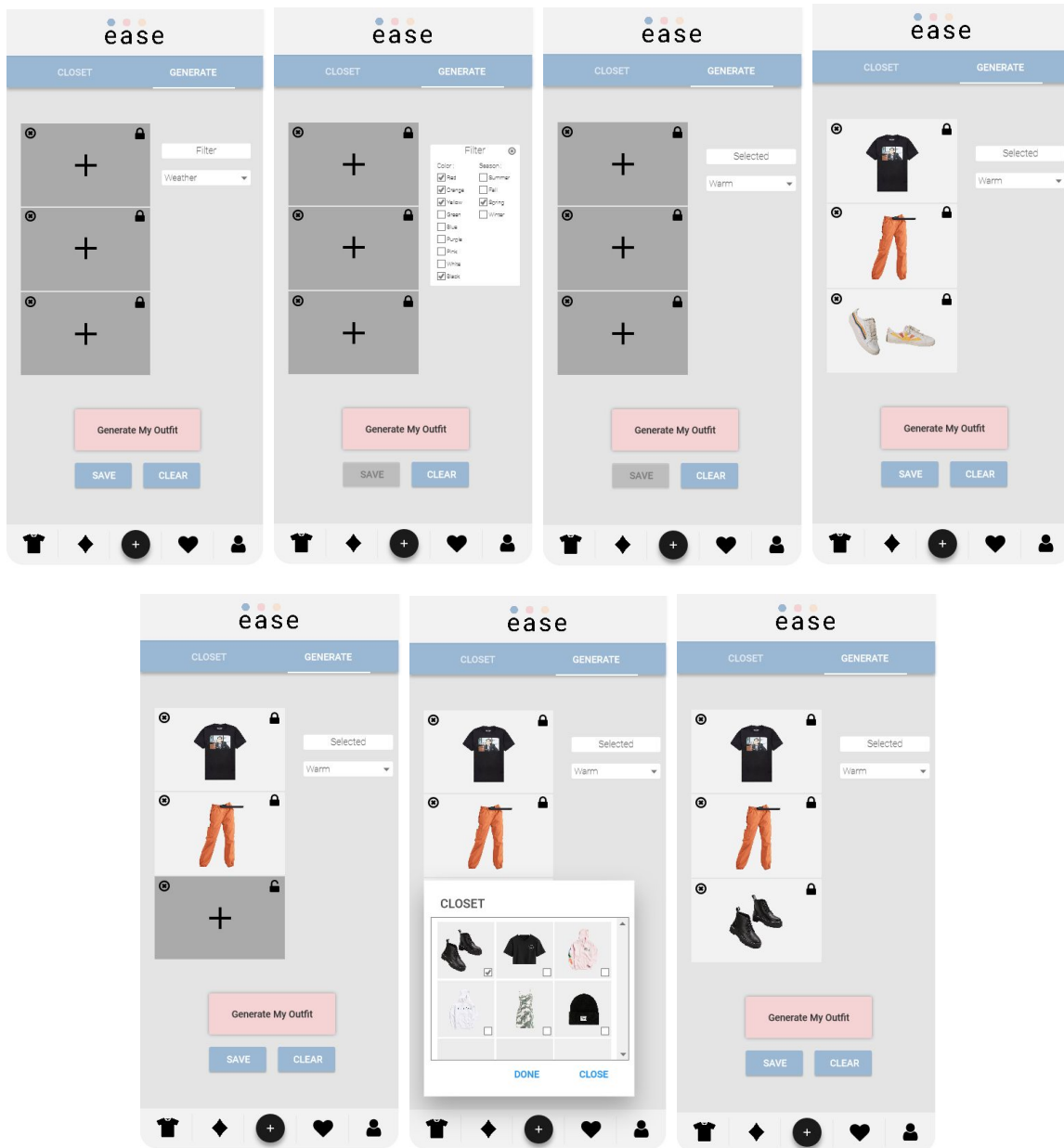
Design Solutions: Low-Fidelity Prototype and Feedback

(screens in order of left to right, top to bottom)

Task 1: Add a new piece of clothing to the user's closet with a photo from his/her Photo Library

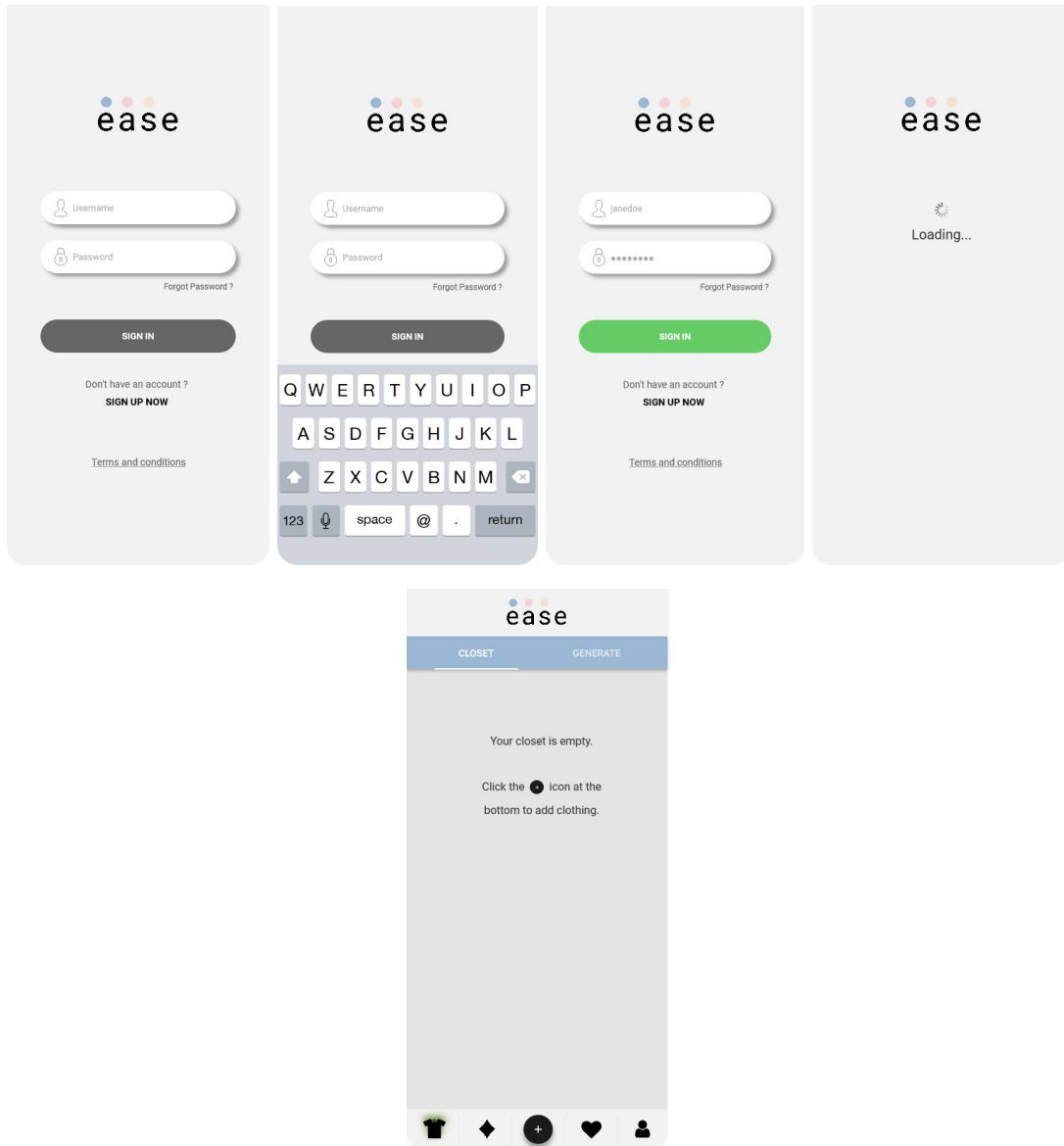


Task 2: Generating/creating a new outfit



Task 3: Log in or sign up

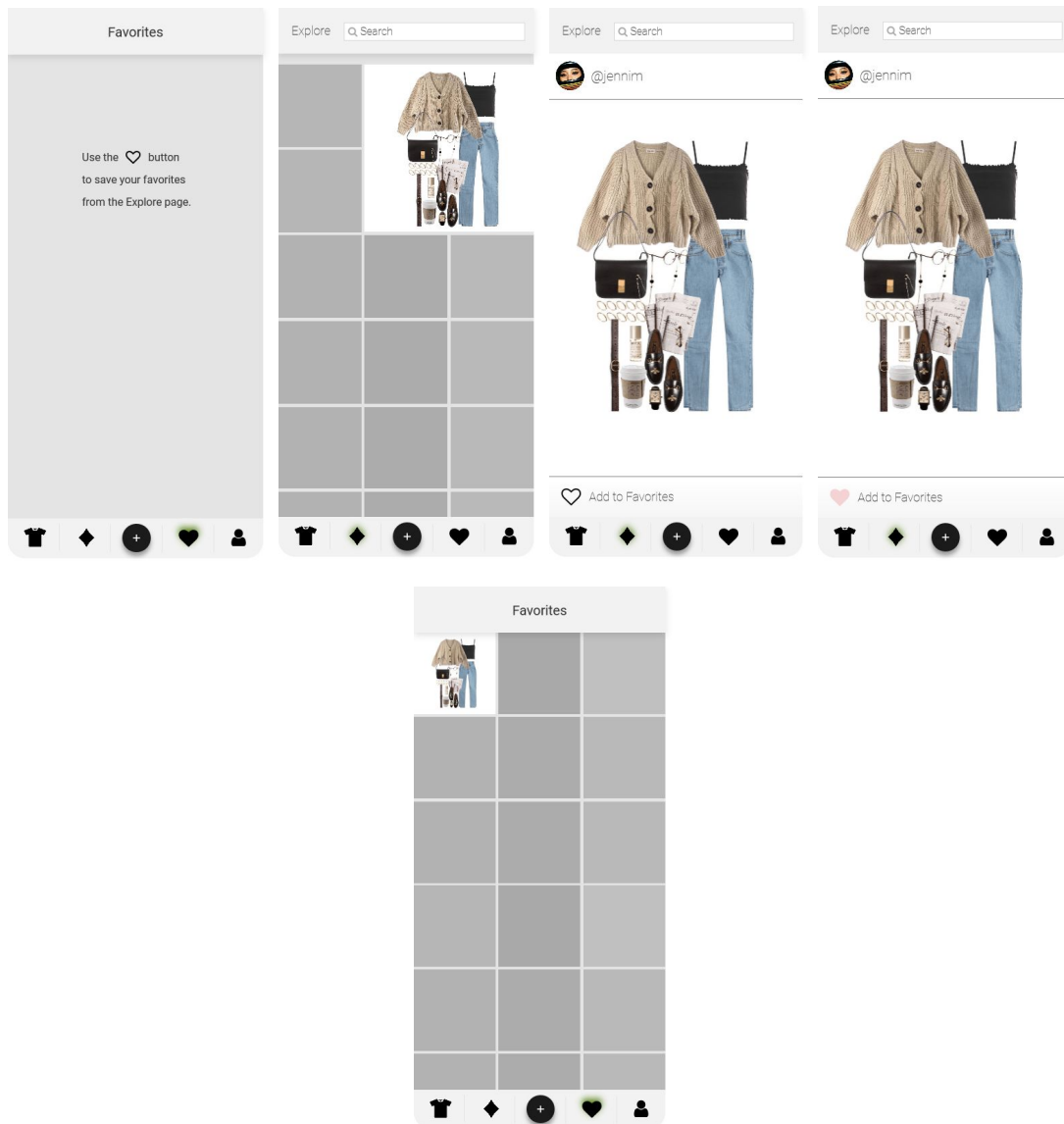
LOG IN



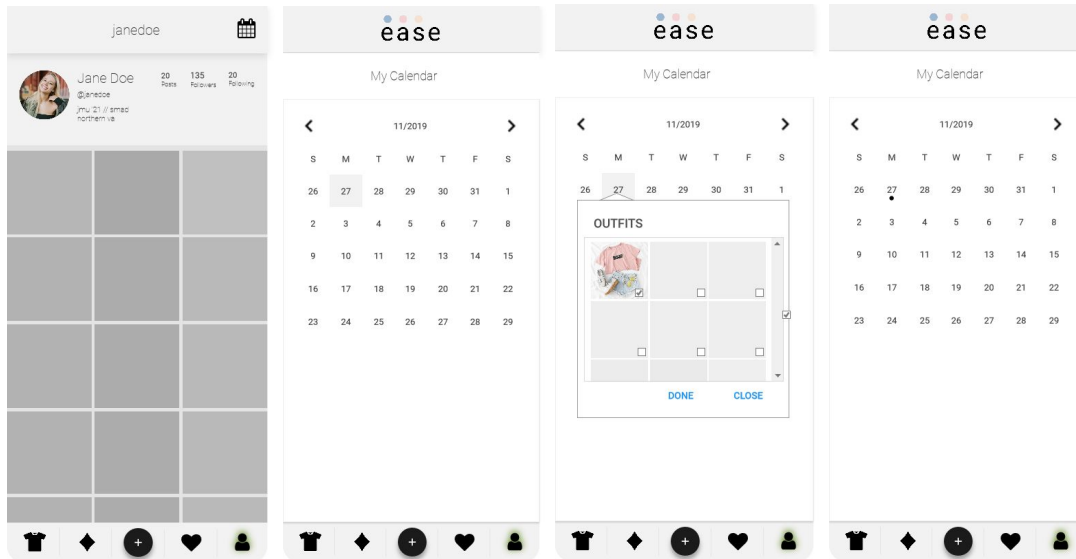
SIGN UP

The sign-up process for the 'ease' app consists of the following steps:

- Initial Sign-up Screen:** Displays the 'ease' logo and input fields for Email, Username, Password, Confirm Password, and Birthday (MM/DD/YYYY). A checkbox for 'I agree to the Terms and conditions' and a 'SIGN UP' button are at the bottom.
- Keyboard Overlay:** A standard QWERTY keyboard is shown over the input fields.
- Date Picker:** A date selection interface with 'Cancel' and 'Set' buttons. The selected date is September 17, 2014.
- Completed Sign-up Screen:** The input fields are now populated with 'janedoe@gmail.com', 'janedoe', and '*****'. The 'SIGN UP' button is green.
- Loading Screen:** Displays the 'ease' logo and a 'Loading...' message with a circular progress indicator.
- Empty Closet Screen:** Shows the 'ease' logo, a 'CLOSET' tab, and a message: 'Your closet is empty. Click the + icon at the bottom to add clothing.' The bottom navigation bar includes icons for a closet, a diamond, a plus sign, a heart, and a profile.

Task 4: Add an outfit to the user's Favorites from the Explore page

Task 5: Add an outfit to the user's Calendar on his/her Profile page



Feedback

Based on our professor's feedback, we decided to implement the following changes:

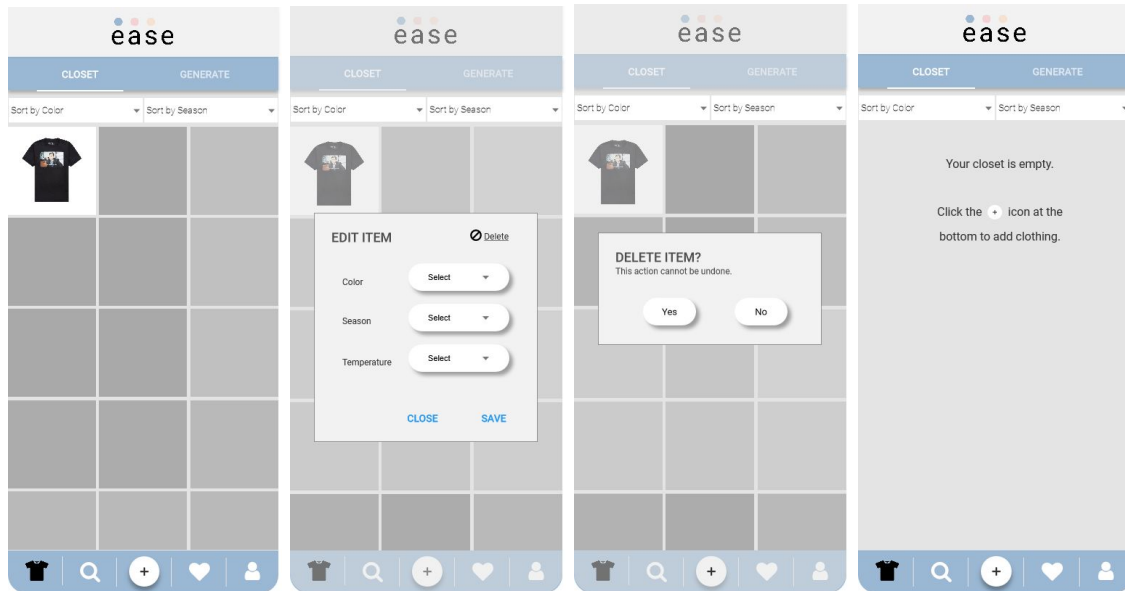
1. Improve the design of the bottom navigation
2. Replace the "Generate" option under the pop up menu of the "+" button with a new "Add Friends" option
3. Change the form of the drop-down menus on the closet-photo tags page to follow a consistent design
4. Consider implementing the following functions:
 - Delete/modify an item in the closet
 - Organize/search/filter items in the closet
5. Improved the filter widget design to give a better visual perception by changing regular checkboxes to a colored checkboxes with corresponding colored text as well as added weather icons to corresponding weather texts

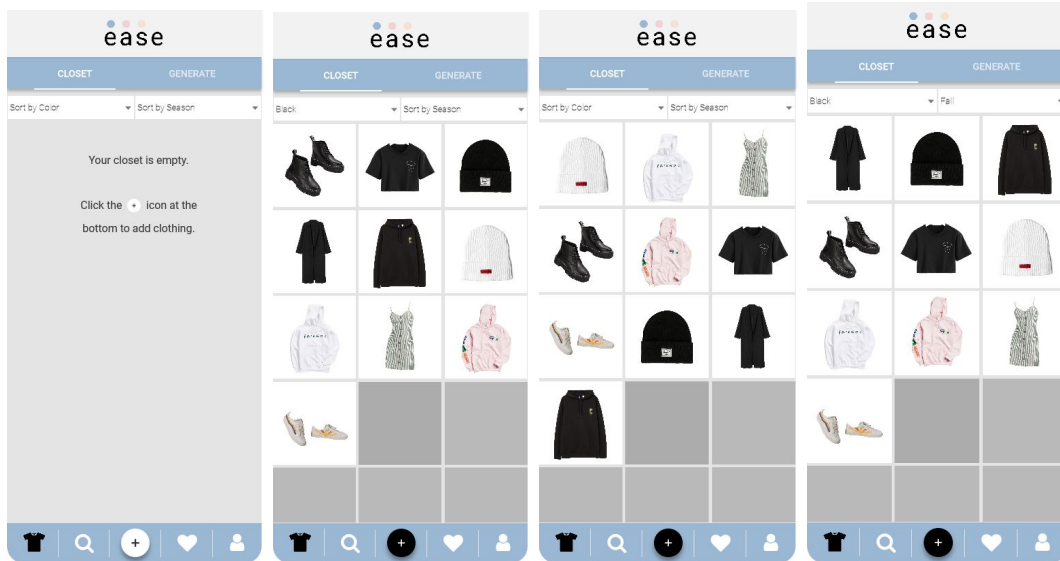
Design Solutions: High-Fidelity Prototype and Evaluations

(screens in order of left to right, top to bottom)

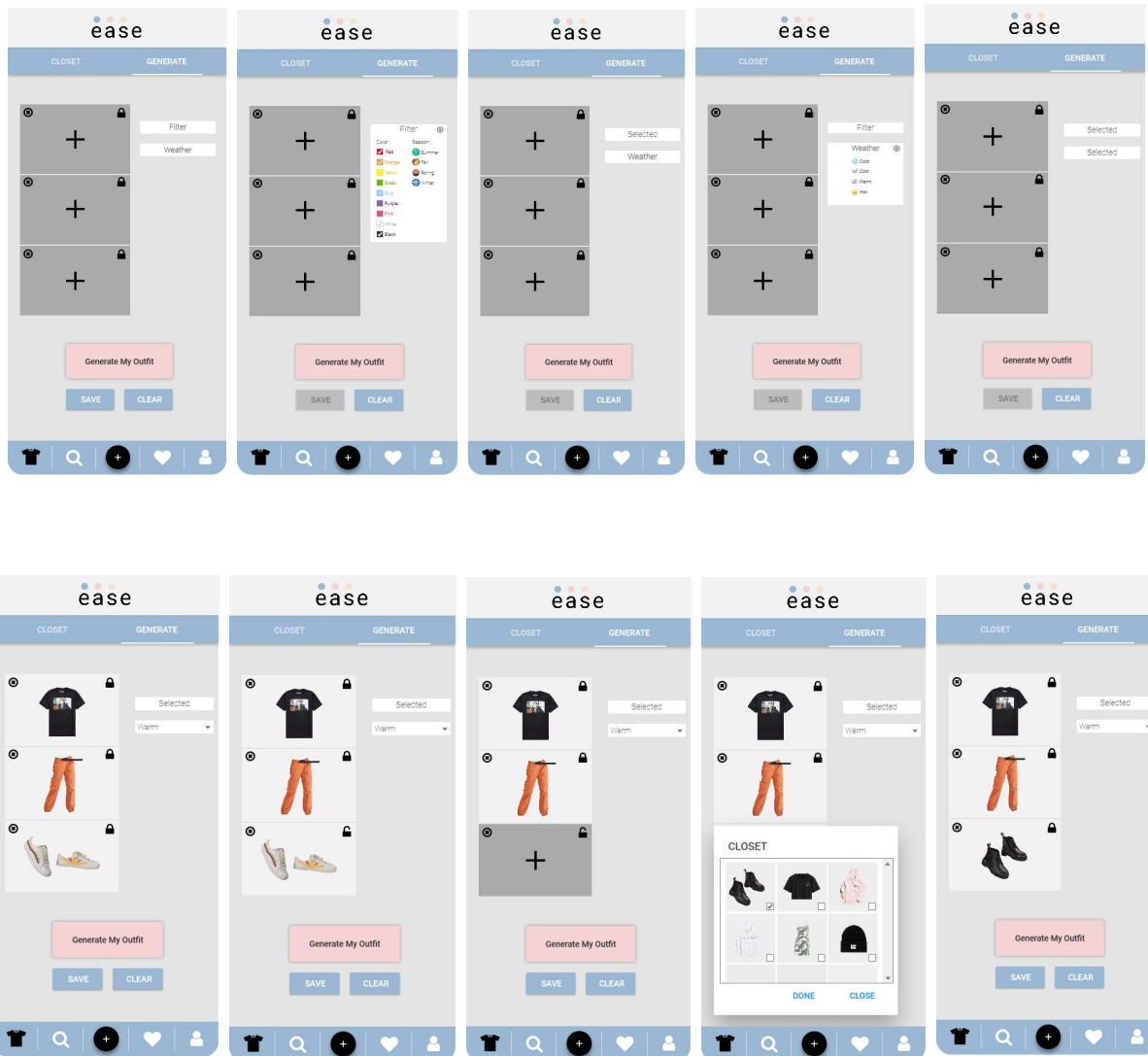
Task 1: Add a new piece of clothing to the user's closet with a photo from his/her Photo Library



Task 1-A: Delete/modify an item in the closet

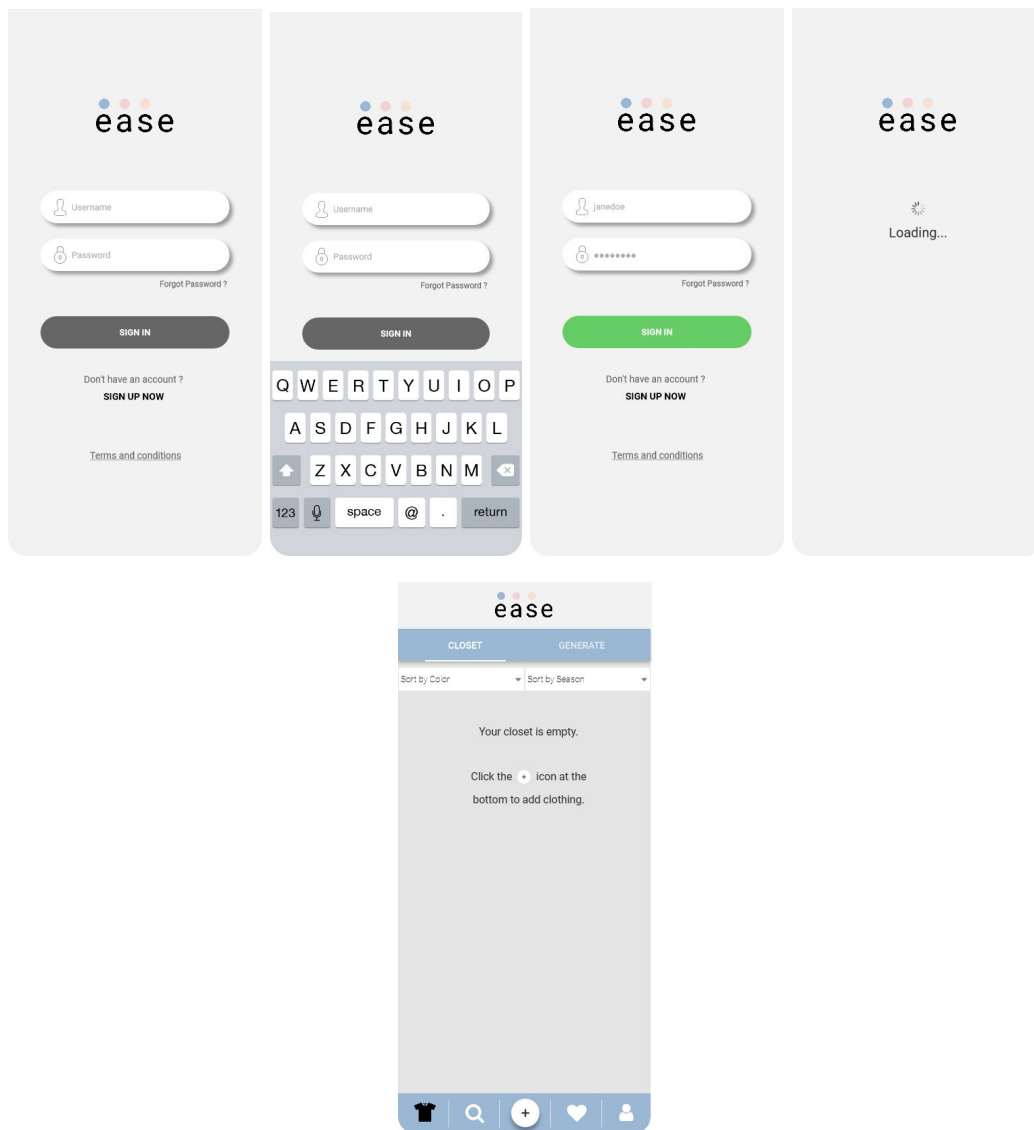
Task 1-B: Organize/search/filter items in the closet

Task 2: Generating/creating a new outfit



Task 3: Log in or sign up

LOG IN



SIGN UP

The image displays four sequential mobile app screens for the 'ease' sign-up process. Each screen features the 'ease' logo at the top, consisting of three colored dots (blue, red, orange) above the word 'ease'.

Screen 1: Shows the initial sign-up form with fields for Email, Username, Password, Confirm Password, and Birthday (MM / DD / YYYY). Below the fields is a checkbox for 'I agree to the Terms and conditions' and a dark grey 'SIGN UP' button.

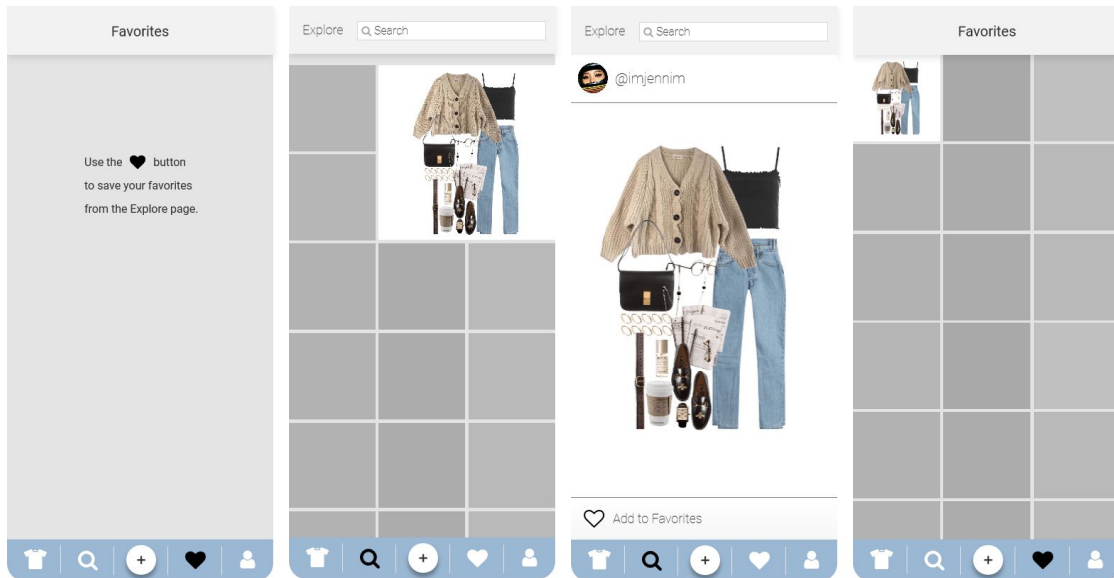
Screen 2: Shows the form with a keyboard overlay. The fields are filled with: Email (jane@doe@gmail.com), Username (jane@doe), Password (*****), and Confirm Password (*****).

Screen 3: Shows the form with a date picker overlay. The fields are filled with: Email (jane@doe@gmail.com), Username (jane@doe), Password (*****), and Confirm Password (*****). The date picker shows a calendar for 2014, with September 17 selected.

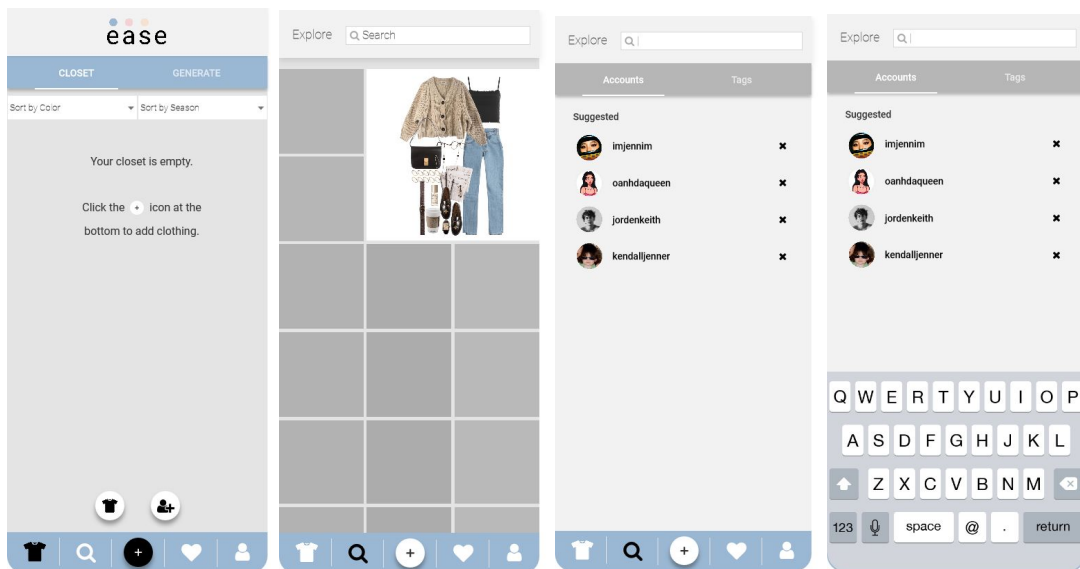
Screen 4: Shows the form with the date picker closed. The fields are filled with: Email (jane@doe@gmail.com), Username (jane@doe), Password (*****), and Confirm Password (*****). Below the fields is a checkbox for 'I agree to the Terms and conditions' and a green 'SIGN UP' button.

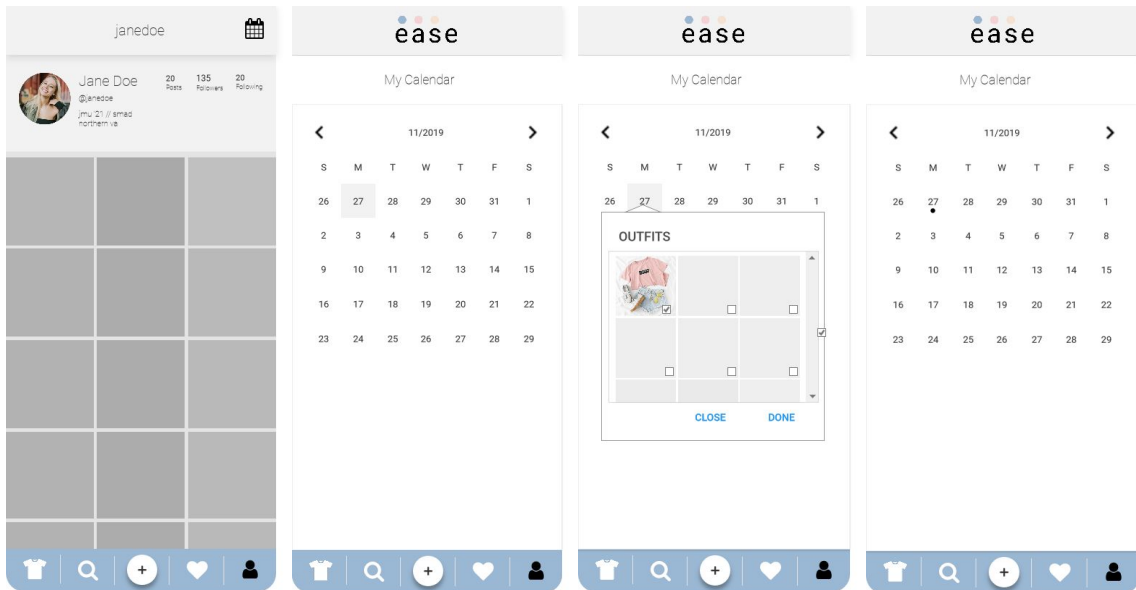
Screen 5: A vertical screen showing the 'ease' logo and a loading spinner with the text 'Loading...' below it.

Task 4: Add an outfit to the user's Favorites from the Explore page



Task 4-A: Search the Explore page



Task 5: Add an outfit to the user's Calendar on his/her Profile page

EVALUATIONS

Based on our professor's evaluations, these are the things we would do differently if we were to fully implement this application:

1. Add two more input boxes for the user to select the type of clothes and add names, for the adding new items and editing items tasks. This would make it easier for them to search for clothes in the closet.
2. Add a search function to the home page that allows the user to search for a piece of clothing in the closet. However, while this feature may be nice to have, it may add too many options (as they are already to filter their closet by a number of filter tags) for the user to take on the home page.
3. Find a way to add more emphasis to the "Generate my outfit" button. It is different from the "Generate" tab, as the "Generate" tab is only a place to house the outfit generation feature. Whenever the user clicks the "Generate my outfit" button, a new set of clothing is generated (unless a specific item is locked). The new set of clothing generated can be customized with the filtering options, or they can choose not to select any filtering options and have the outfit generation be completely random. The outfit is only saved to the profile once the user clicks the "Save" button (which they can only press once they've generated an outfit).

Conclusion

Throughout this journey, we have been able to apply different design methodologies and techniques to put together a product that could potentially and hopefully have a positive impact on someone's life. We worked hard to come up with innovative design solutions to real life problems (in our case, organizing a closet) by applying the knowledge we've acquired throughout the semester. During our iterative design process, we made sure to receive constant feedback from peers and participants from our user research, as well as expertise advice from our professor. At the end, despite going through countless trial and error, we were finally able to put together a high-fidelity prototype version of our Ease App. Although the high-fidelity version has some minor limitations on certain functionality, as there's no back-end implementation, we believe that it greatly showcases our vision for creating this application.

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Cladwell. (2019). Personal Styling For Women and Men: Online Personal Stylist: Outfits App. Retrieved December 16, 2019, from <https://cladwell.com/>.

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Iceclip. (2018, March 8). Pureple Outfit Planner App Reviews. Retrieved December 16, 2019, from <http://www.apprview.com/lifestyle/pureple-outfit-planner/>.

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Rabbit Tech Inc. (2018). Smart Closet. Retrieved December 16, 2019, from <https://smartcloset.me/>.

Stylitics, Inc. (2012, August 8). ClosetSpace - Closet & Outfits. Retrieved December 16, 2019, from <https://apps.apple.com/us/app/closetspace-closet-outfits/id549724282>.