Planting Guidebook PWA

Team: Banana Inc.

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Contents

Key Findings

a. **Target novice gardeners**

Unlike experienced gardeners, learning planting for novice gardeners is especially challenging, because they don't know where to start and how to gather the basic information. Thus, we want to help beginners to learn how to grow while enlarging the group of gardeners.

b. **Target indoor planting**

If the prerequisite of planting is to own a large outdoor garden, perhaps a large number of people who have a strong interest in gardening will be discouraged due to limited space. However, we want to lower the bar to lure more people to start growing their own foods, no matter how much they can produce. Thus, our target user group is people without an outdoor garden and have to grow indoor plants in limited spaces.

c. **Novice gardeners need basic growing information**

Some of our interviewees mentioned that they don't have a professional resource to gather planting related information; instead, they just Google whatever they want to know. They have been looking forward to an app that provides all necessary information at one place.

d. **Novice gardeners need personalized advice in case of growing problems**

Most novice gardeners share failed planting experiences, and the main reason behind is that they didn't know how to react in case of a planting issue. For example, one interviewee said that the plant started to wither after a weekend of extremely high temperature. She noticed the problem immediately, but didn't know what remedies could be made.

    e. **Novice gardeners easily get impatient**

       Although novice gardeners claim to be passionate about planting, growing foods might require more patience and commitment than they thought. After watching the plants everyday for a month, they are likely to complain why the plants haven't grown much. We think that new gardeners need encouragement as well as senses of accomplishment so that they can be persistent and patient. The website should also provide them with an example progress bar, because some plants could be slow-grower, but it doesn't indicate that they are off track.

Project Description

As a team of five graduate students, we will redesign and rebuild a fully-responsive progressive web app for the *Vegetable Varieties for Gardeners* with Vue.js and Bootstrap. The project will be a full-life cycle user-centered design, including ideation, user research, prototyping, designing, programming and testing.

Target Users

    a. Novice gardeners with little to no gardening experience who are interested in learning more about growing plants at home.

    b. Novice gardeners without a large outdoor garden and can only focus on indoor planting.

    c. Novice gardeners who want to grow edible plants to adopt a more sustainable lifestyle.

    d. Advanced gardeners who are willing to share their growing experiences and answer elementary questions.

User Goals

- Explore interest in gardening
- Find information of the plant
- Choose a plant to grow
- Keep the plant alive
- Share sense of accomplishment with others
- Seek for help
- Get to know more other gardeners

User Interview

To understand the requirements and needs of novice gardeners, we conducted 15 user interviews in total with Cornell students with little planning experiences. All the interviewees don't have outdoor gardens and want to grow plants in their residential halls or apartments.

By asking their planting interests, planting knowledge and past planting experiences, both successful and failing, we understand the troubles they had and what knowledge and skills they need.

Also, we asked users to complete small tasks with the current web app, like searching for basic information of a specific plant, to understand which aspects of the usability and experiences need to be improved and what else information is needed from the target users.

The interview script is included in the appendix.

Persona

Michael is a novice gardener with less than 3 months' planting experience. He is an undergraduate student studying at Cornell, and currently lives at CollegeTown Terrace apartment. He has tried to use hydroponics techniques to grow tomatoes at home before, but the products were not of high quality. However, the growing experience has aroused his strong interest in indoor planting and he is looking forward to learning more related knowledge and skills.

Since he doesn't own an outdoor garden, he currently focuses on planting indoor edible plants. Also, because of the lack of experience and limited time that he can devote to growing, he plans to start from easy-to-grow plants. When he reflects on the previous failure, he thinks it was because he didn't gather enough information on how to grow the tomatoes correctly and he didn't find an advanced gardener to ask for advice when he ran into troubles.

His goal is to grow small edible plants, like garlic and basil, in the next year and share his experiences with his friends to encourage them to grow foods as well.

   a. Micheal has strong interests in learning planting.

   b. Micheal has no preference on what kinds of plants he wants to grow.

   c. Micheal has little planting experience. He is a little discouraged because of the previous failure.

   d. Micheal focuses on indoor planting.

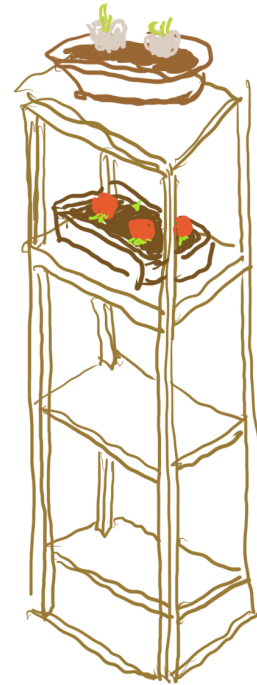   e. Micheal wants to grow easy-level plants.

(R) Michael

A novice gardener with 3 months' planting experience

I like indoor planting

I want to learn more about planting. I want to start planting something easy to take care with

Difficulty Level: ★☆☆☆☆

I have limited space to grow so I can't do large-scale planting.

User Tasks

a. Gathering information: Users search for specific plant name to get information about the appearance, suitable growing environment, water requirements, "how to" instructions, etc.

b. Filter information: Most of the interviewees mentioned that they would like to learning planting from easy-to-grow plants. Thus, users can search for plants of selected levels.

c. Get plant recommendations: Users get daily recommendations and featured plants based on seasons and climate

d. Upload plant photos: Users logs in with the email and password. They have a private album to upload photos of plants they are growing.

e. Read posts in community: Gardeners share their planting experiences, both successes, and failures so that they can learn from each other and improve their planting skills. Also, they get to know other novice gardeners around them and build an in-person community.

Use Scenarios

1. Scenario 1

   a. User: Novice gardeners with little planting experience

   b. Task: Learn how to plant and what to plant

   c. Context: Beginning gardeners have difficulties in finding appropriate resources for planting-related knowledge. They want to learn how hard it would be to plant a specific type of plant, like tomatoes, and prefer to start from the easy level.

2. Scenario 2

   a. User: Gardeners who have a specific planting plan

   b. Task: Search for planting instructions

   c. Context: Users who have specific planting plans need to gather detailed information about what temperature, humidity, watering frequency, soil types, etc. are required to grow the plants of high quality.

3. Scenario 3

   a. User: Gardeners who are planting

   b. Task: Track and record the plants' conditions

   c. Context: Users who are growing plants want to monitor the planting growing conditions.They take photos every 3 days and upload the photos to their private album. Also, they can write a short description for the photos.
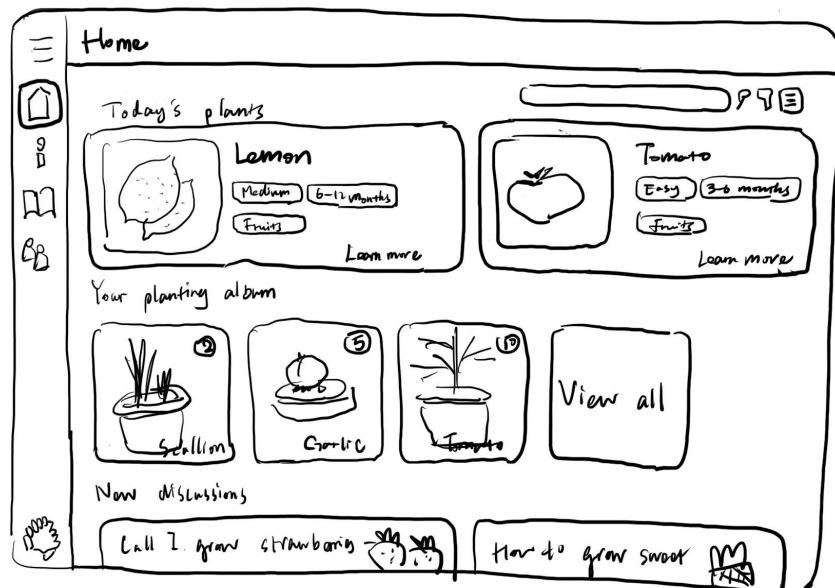
4. Scenario 4

   a. User: Novice gardeners who have planting related questions

   b. Task: Face a problem in planting and want to resort to a more experienced gardener for advice

   c. Context: Novice gardeners are likely to run into problems at the early stages of planting. They want to ask someone with more experience for suggestions or read a shared blog from advanced gardeners to solve the specific problem.

Prototypes

We worked as a team of 5 students, discussed and analyzed the target users' basic needs. We made affinity diagrams to categorize functions included in the app and proposed several iterations of the prototypes.

Based on the persona's requirements and user tasks, we designed four major sections in the web app, which are home, planting information, planting album and planting community. Also, we came up with a complementary function, support, for the web app to get funds.

Home

The home page includes daily featured plants, thumbnails of the user's planting album as well as a section for trending discussion. Basically, the homepage is like a quick portal for users to navigate to assorted sections in the app.`

Homepage, Iteration 1

Homepage, Iteration 2

☰ Home

[_____] 🔍 ▽ ⊕

Today's Plants
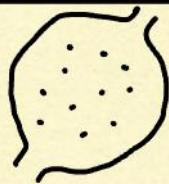
🍋	**Lemon** Difficulty: Med Time: 6-12 mos Fruits
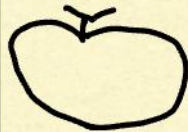
🍅	**Tomato** Difficulty: Easy Time: 1-3 mos Veggies

Your Planting Albums
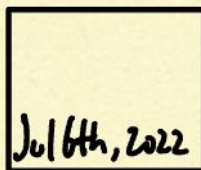
Jul 6th, 2022	Aug 2nd, 2022	Sep 10th, 2022

🏠   ⓘ   📖   👥   ⚙️

Homepage, Iteration 3

Planting information

The planting information section is where novice gardeners can gather related information. We suppose necessary information to grow plants successfully should all be included here, ranging from soil type, watering frequency, temperature, etc. (Use scenario1)

Considering the lack of experiences of novice gardeners, we also provide a "questionnaire" for users to select their planting preferences and experience level. Based on the answer, the app will give a list of suitable plants as recommendation. (Use scenario2)

Planting information, Iteration 1

◀ Back

Lemon ♡

[Medium] [6-12 months] [Fruits]

Category: _____

Community discussion

Planting Instructions:

Soil type: _____

Watering frequency: _____

Weather: _____

Recipe: Lime

Planting information, Iteration 2

Growing | plan.

01/28 Add light

02/20 Water your plant

02/29 Add fertilizer

02/28 Water your plant
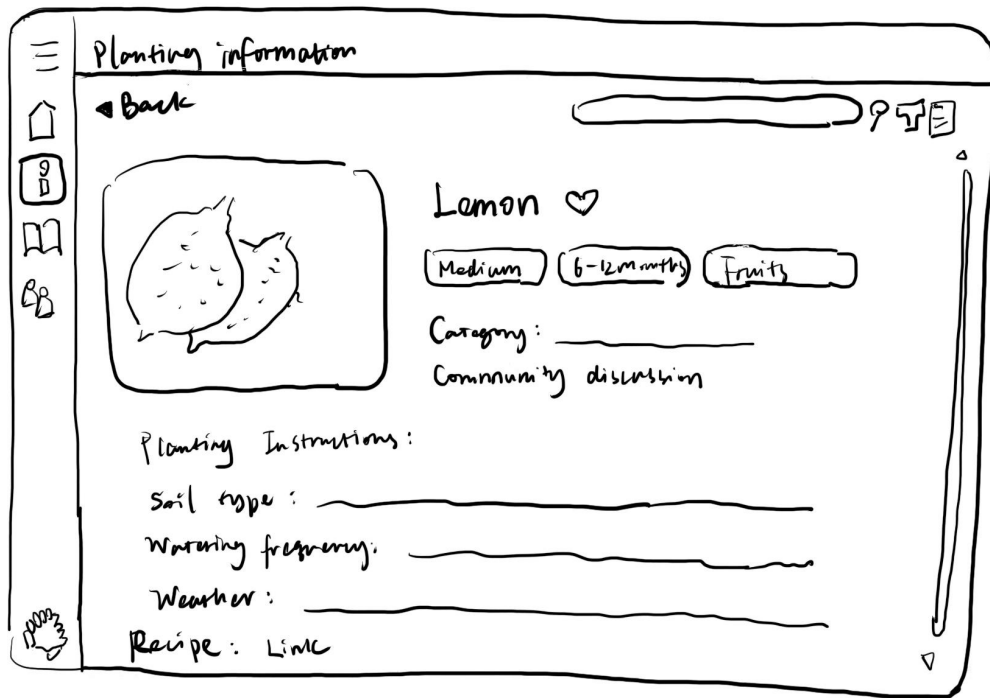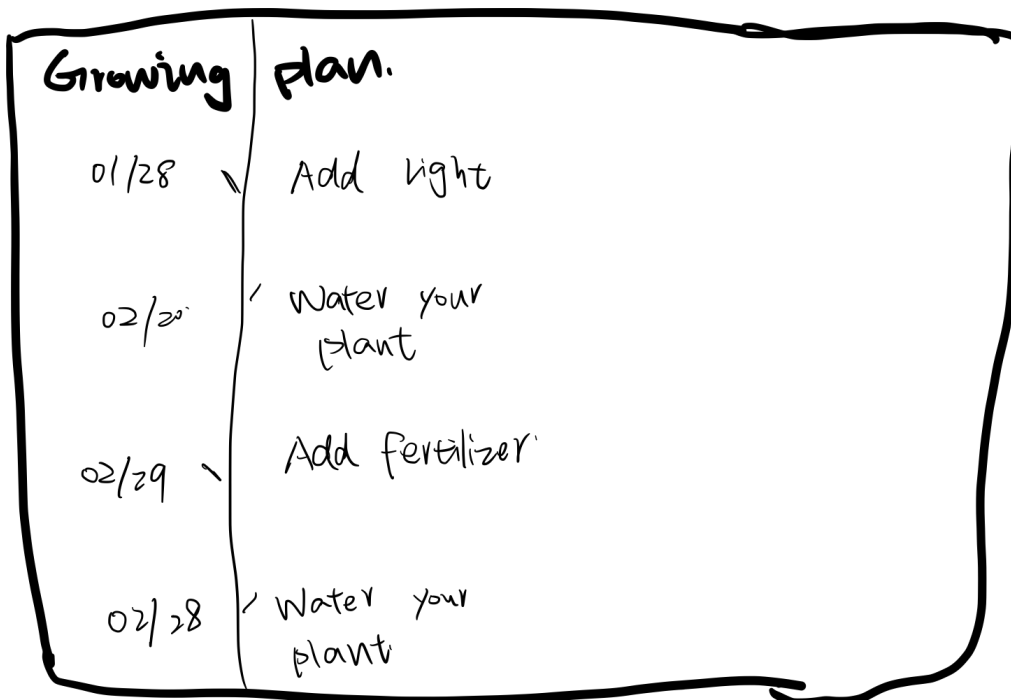
Planting information, Iteration 3

Planting album

The album is a digital space for users to track their planting progress. Novice gardeners easily get impatient at the early stage or forget to water the plants regularly. The album helps users to track the health status of the plants and give them a sense of progress and accomplishment. Also, photos are a direct way to monitor the plants so that users can distinguish a problem by comparing the photos across the time. (Use scenario 3)
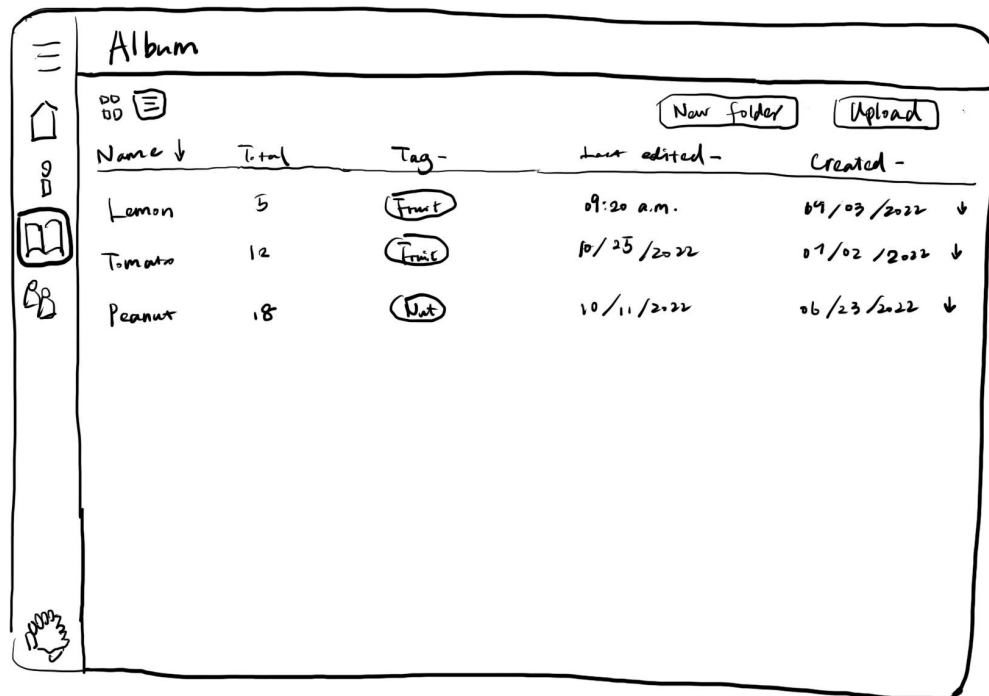
Planting album, Iteration 1
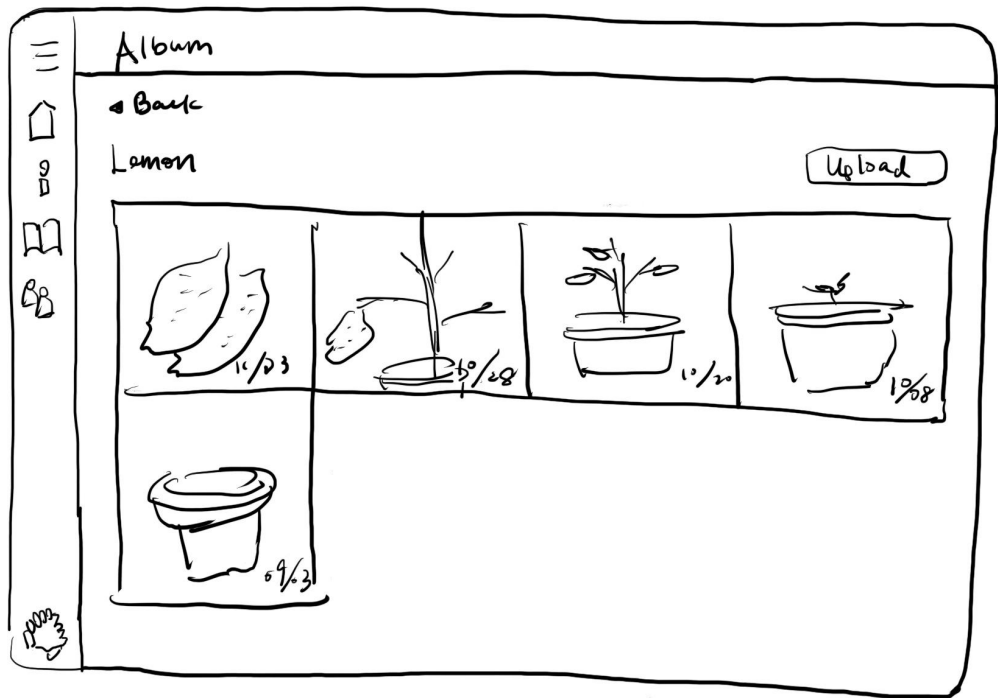
Planting album, Iteration 2
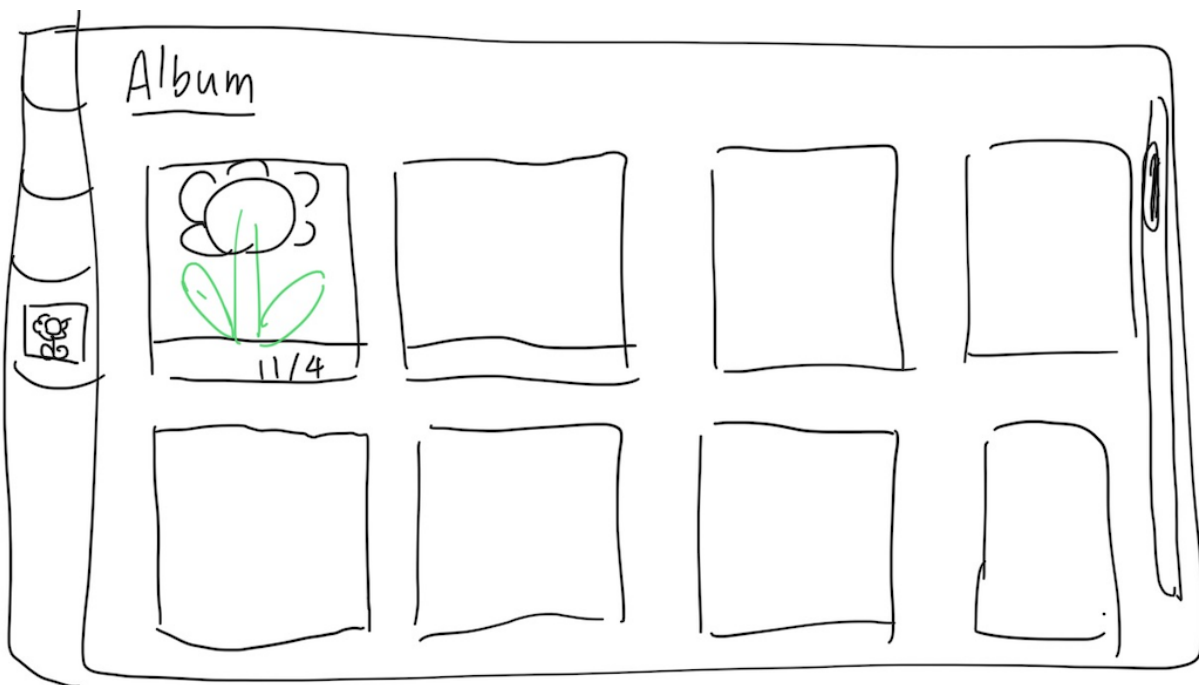
Planting album, Iteration 3
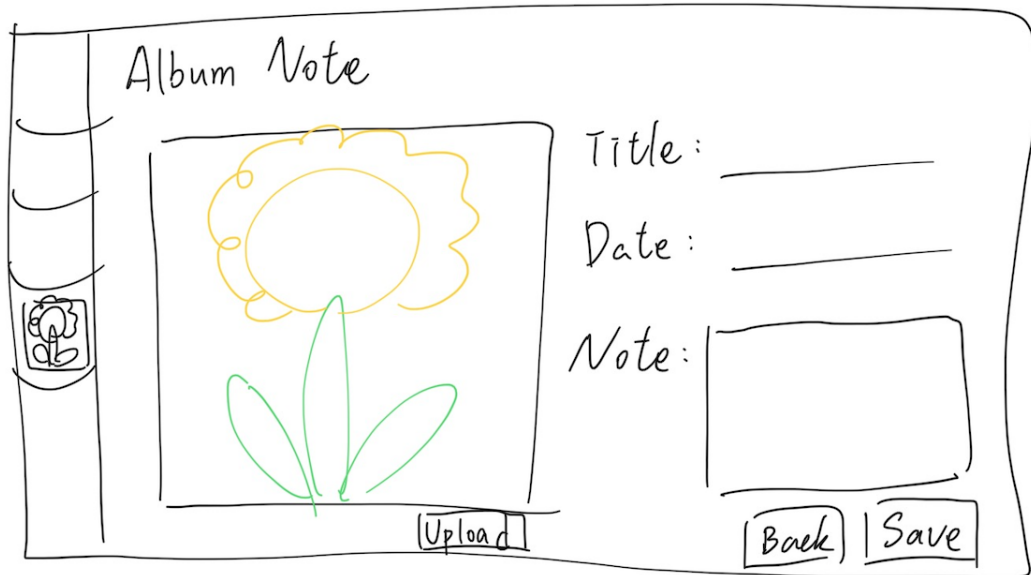
Planting album, Iteration 4

Planting album, Iteration 5

Planting community

The community is a social space for users to share their planting experiences as well as posting planting related questions. Most of our interviewees mentioned that they could not find advanced gardeners to resort to for advice and suggestions. Although they noticed a health problem, they failed to take effective reactions except watching the plants die. Thus, we proposed the user community for users to seek advice and enlarge their social circles to get to know more people with similar interests.
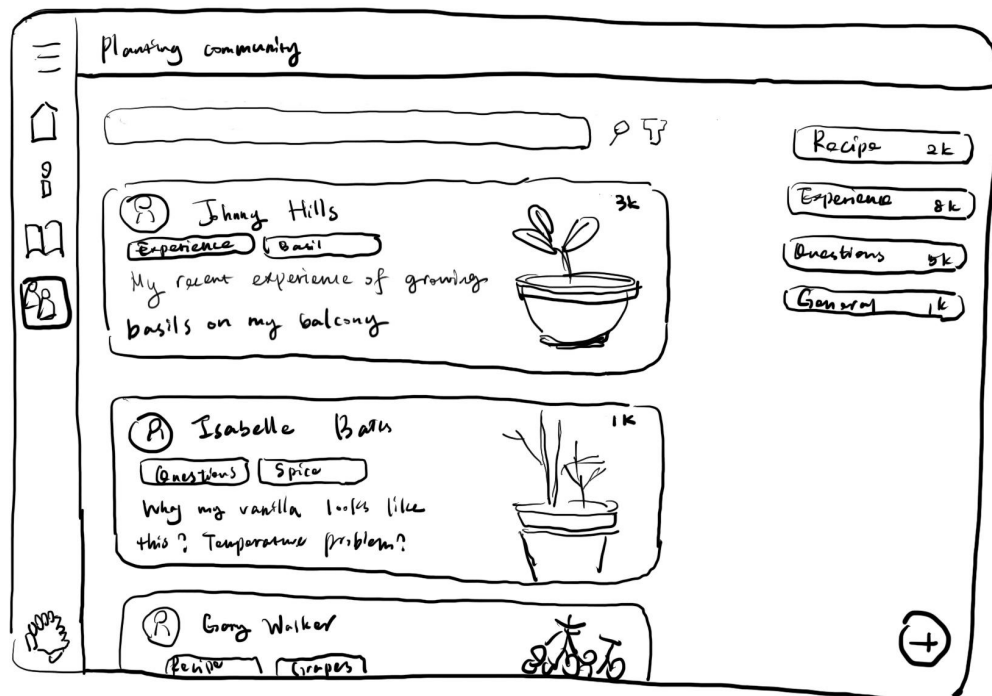
User community, Iteration 1
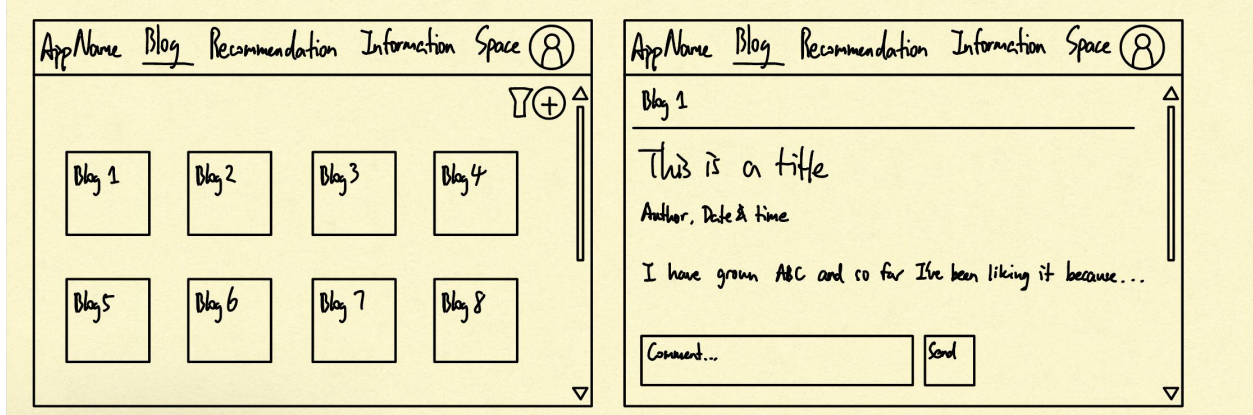
User community, Iteration 2

User community, Iteration 3

Value Propositions

    a.   The app provides insights for novice gardeners on how to grow plants successfully.

b. The app helps new gardeners to gain a sense of accomplishment when they've successfully grown a plant and/or got the food they've been looking for. In this way, the new gardeners will be engaged in the group while actively trying to grow more foods.

c. The app creates a sense of community to enhance user experience with social networking.

d. The app helps to promote food planting by educating more novice gardeners to gradually grow into advanced gardeners. The increasing user group helps the society to transition into a more sustainable one.

Updated Design

- Enhanced the user's understanding of the Login icon by redesigning it.
- Redesigned mobile navigation bars to differ from those for desktop designs. Our website includes a navigation bar at the bottom for the mobile version, which is convenient for users to use in order to navigate the site.
- Included a seasonal seccomendation section and a featured plant section in the home view for gardeners without a plan to browse for an idea.
- Added planting difficulty tag for each plant, so that users can choose the level of difficulty that they think is the most appropriate for their skills.
- Improved the design of detailed plant information view. Used icons and short description of planting requirements for users to quickly understand the essential prerequisites.
- Created private album for users to upload their planting photos, and also portals for users to log in their planting stories.
- Added more plant data, user data and community post data.

Implementation Phases

- Done:
    - Comprehensive router to each navigation tab and also the private album tab after log in.
    - Responsive styled navigation bar with icons and texts.
    - Login and logout modal. The user can log in if the inputs match the data, and the modal shows a prompt if a wrong email or a wrong password is entered.
    - Seasonal recommendations based on date and climate in the home view.
    - Featured recommendations for users to pick a random plant.
    - Plant information view showing all the plant data from the json file.
    - Planting difficulty filter. The user can check out plants at a specific difficulty level.
    - Plant search bar. The user can search for a specific plant, and if the input is not found in the database, a prompt will be shown.
    - Plant detail page showing more detailed information and "how-to" instructions.
    - Private album view showing the user's albums after log in.

- Detailed album view for users to log short descriptions for plant photos.
- Community page showing users' shared thoughts.
- Note: Check email and password in user data json file to log into the app.

Feedback response

Based on feedback from previous milestones, we made some changes to the planning.
Milestone 2:
- Expanded user demographic from Cornell students only to novice gardeners. These users may not have a large outdoor garden and are looking to grow edible plants indoors to adopt a more sustainable lifestyle.
- Added more detail to persona (Michael)
- Explained value proposition more thoroughly
- Combined user scenario with app usage
- Added interview script to milestone 3

Milestone 3:
- Rephrased and revised user goal in a user mindset

Final Project:
- Album section only available after log in. Different posts in the album when the account switches.
- Added delete, add, edit function to album
- More data in album, community, information
- Added information page filter by plant type
- Adjusted button style

Contribution Breakdown

Bob Zhang

a. Proof read the report and interview script, improved phrasing to make things clear,
b. Conducted interviews, collected data, helped with data analysis.
c. Sketched several design iterations, considering different devices for PWA.
d. Brainstormed value proposition, keeping in mind about user persona, the technologies we'll use, and the goal initiated by the client.
e. Programmed the Community page (from mock data to frontend card view components and page view), fixed various styling issues from desktop view
f. Came up with the structure of our mock data in JSON, allowed the pages to be displayed using v-for instead of hardcoded titles

Hung-Han Sung

a. Participated in the design solution discussion, ensuring our final deliverable would stick to our client's needs.
b. Designed, conducted interview questions, and collected data
c. Designed iterations for some of the functions, including different devices.

d. Implemented the album page and album detailed page, also mock the album record data to show in the album page

Jinyu Li

a. Participated in the design solution discussion.
b. Designed interview questions and script
c. Designed user experiment process
d. Revised value proposition

Jiaxin Li

a. Participated in the code implementation discussion and worked on the high-fidelity prototype app.
b. Worked on target users, value propositions and updated design changes.
c. Conducted interviews and collected data.
d. Designed iterations for the functions of the website in order to improve its functionality.
e. programmed for the information page and added some styling to it.

Yunqin Wang

a. Participated in the design solution discussion.
b. Designed iterations for each of the functions.
c. Helped to summarize the key points.
d. Revised the target users, persona, use scenarios and value propositions.
e. Implemented the router to public tabs and private tab.
f. Implemented the responsive navigation bar.
g. Implemented the login and logout modal and the connection to private data.
h. Implemented the homepage, including banner, calendar section and featured plant section.
i. Implemented the information page, filters, search bar and plant cards.
j. Implemented the detailed plant page with requirement sections.
k. Implemented top-fixed back button and user profile bar.

Appendix

Interview Structure

1. Introduction

Today we would like to learn more about how novice gardeners learn to plant and what skills and knowledge you would like to learn more in terms of planting. We will ask you questions about your experience in planting and how you monitored their plants' states. The questions will

focus on your experiences, challenges you encountered, and strategies you adopted. The interview will take up to 20 minutes.

2. Demographics

    a. What is your name?

    b. Which program are you studying? Which year are you in?

    c. What are your pronouns?

3. Core questions

    d. What plants are you interested in? Should it be grown in a yard or pot?

    e. Have you had planting experience before? If so, can you describe your last experience of gardening?

        i. What did you grow?

        ii. Why did you grow that species?

        iii. Does that type have specific growing requirements?

        iv. Did it grow well? Any challenges? How did you solve it?

        v. How do you get information about gardening? Web, social media, …?

    f. What information would you be interested in when gathering gardening information?

    g. What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc)

4. Experiment

    h. This is what [one planting information website](#) looks like, can you try to search for anything you are interested in?

    i. What do you think of your interaction with the website?

    j. Would you use this website if you were to search for gardening-related information?

    k. What other information would you be interested in?

    l. Would you recommend this website to others?

Interview Script

Interviewee 1

1. Demographics
    a. What is your full name?
        i. Shanni Jin
    b. Which program? Which year?
        i. Class of 22' Alumni
    c. (Optional) What are your pronouns?
        i. She/Her
2. Core questions
    a. What plants are you interested in? Should it be grown in a yard or pot?
        i. Low maintenance plants/vegetables.
        ii. Pot
    b. Have you had planting experience before? If so, can you describe your last experience of gardening?
        i. What did you grow?
            1. Colocasia (elephant ear) / Pachira aquatica (money tree)
        ii. Why did you grow that species?
            1. Low maintenance / whatever have in the market
        iii. Does that type have specific growing requirements?
            1. Not very much
        iv. Did it grow well? Any challenges? How did you solve it?
            1. Growing well.
                a. Colocasia: the leaves drop water especially in the morning, the water drop may contain toxic chemicals to human beings. Need extra accessories (gloves, plant scissors) to maintain the plants. Need to consider a special area to grow to prevent electronic accident because of the drops
    c. How do you get information about gardening? Web, social media, …?
        i. Mostly internet, may ask plants specialists around via email / message
    d. What information would you be interested in when gathering gardening information?
        i. How much maintenance effort do I need: water level, lighting condition, special requirements, soil types, insect hazard potential, etc.
    e. What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc)
        i. What does it mean to become a gardener (gardening 100 videos might help); how much time and effort do I need to involve?
3. Experiment

a. This is how [the example planting information website](#) looks like; can you try to search for anything you are interested in and see if you are able to find it? If not, what's the blocking factor?
   i. Search bar need to be more obvious than the login bar?
b. What do you think of your interaction with the website?
   i. Confused by whether I need to register first to use the website.
c. Would you use this website if you were to search for gardening-related information?
   i. Maybe? Like the details provided for each species. Would like more images and better UI/UX. Impressed by the user groups it has. Would like
- What other information would you be interested in?
   ii. Would like to see more categories/ recommendations for entry level vegetable gardeners (inspire me to search)
d. Would you recommend this website to others?
   i. Maybe.

Interviewee 2

1. Demographics
   a. Pronouns?
      she/her
2. Core questions
   a. What plants are you interested in? Should it be grown in a yard or pot?
      succulent plants
      Pot

   b. Have you had planting experience before? If so, can you describe your last experience of gardening? (**IMPORTANT**: only interview those who are experienced before and ask below questions, those without are to be made up)
      i. What did you grow?
         Painter's-palette X3
      ii. Why did you grow that species?
         A gift from a friend
      iii. Does that type have specific growing requirements?
         Not sure if its an Internal plant
         Grow on balcony
         Water weekly,
         Water till the pot is filled with water
         Asked a professional gardener
         Do not know if its a seasonal
      iv. Did it grow well? Any challenges? How did you solve it?
         Not grow well,
         Summer is too hot
         Probably not water enough
         Root is still alive, new leaves, but small and short, no more flower

c. How do you get information about gardening? Web, social media, …?
Google, not specific websites
No app
Don't think an app is necessary, and don't have that much time on gardening
Planting casually,
If flowers died, just get another one

d. What information would you be interested in when gathering gardening information?
How to plant flowers,
What plants have flowers and are easy to grow, like only require watering
Priority is easy to take care and flower
Where to buy
Don't care how to choose, trust her own eyes lol

e. What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc)
Really really want to know where to buy soil
Because sold soil contain enough nutrients to grow plants and don't require additional fertilizers
And she can ask sellers which kind of soil is suitable for her plants
Also where to get pottery, now she gets pottery on shopping platforms
Some potteries she bought online are too small because the specifications of the size are confusing

3. Experiment (click)
   a. This is how one planting information website looks like, can you try to search for anything you are interested in?

   b. What do you think of your interaction with the website?
   c. Would you use this website if you were to search for gardening-related information?
   d. What other information would you be interested in?
      Want more images, Want a community to ask questions and other users can come and answer. What chemicals to use in case of pests?

Interviewee 3

1. Demographics

      a. What is your full name? Li-Ling Chen
      b. Which program? Which year? An housewife in Taiwan
      c. What are your pronouns? She/her

2. Core questions
      a. What plants are you interested in? Should it be grown in a yard or pot?
            i. Succulent plant
            ii. Frangipani
            iii. Epipremnum aureum
            iv. Dracaena trifasciata
            v. **Strelitzia reginae**
      b. Have you had planting experience before? If so, can you describe your last experience of gardening? (**IMPORTANT**: only interview those who are experienced before and ask below questions, those without are to be made up)
            i. What did you grow? Indoor (without sunlight), balcony
            ii. Why did you grow that species? Pot,
            iii. Does that type have specific growing requirements? Fertilizer, sunlight?
            iv. Did it grow well? Any challenges? How did you solve it? Amount and Frequency of watering (different in seasons), better to record, humidity
      c. How do you get information about gardening? Web, social media, …? Google, sellers, friends sharing
      d. What information would you be interested in when gathering gardening information? Easy to plant, appearance, functionality (for cooking e.g., vallina, mint, chili) can get a sense of accomplishment (has fruits)
      e. What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc) plant information, how to plant, plant in pots? How large the pot need to be? Type of soil? How to fertilize?

3. Experiment (click)
      a. This is how [one planting information website](#) looks like, can you try to search for anything you are interested in?
      b. What do you think of your interaction with the website?
      c. Would you use this website if you were to search for gardening-related information?
      d. What other information would you be interested in?
      e. Would you recommend this website to others?

Interviewee 4

1. Demographics
      a. What is your full name?
      b. Which program? Which year?

c.   What are your pronouns?
2. Core questions
    a.   What plants are you interested in? Should it be grown in a yard or pot?
        I'm interested in growing tomatoes and zucchini
    b.   Have you had planting experience before? If so, can you describe your last experience of gardening? (**IMPORTANT**: only interview those who are experienced before and ask below questions, those without are to be made up)
        i.   What did you grow?
        pepper, cucumber, tomato, parsley, sage, and rosemary

        ii.   Why did you grow that species?
        to get organic, healthy food for personal consumption, and also as a hobby.

        iii.   Does that type have specific growing requirements?
        tomato, pepper, cucumber: you have to plant the seed in a pot indoors during early spring, and later plant in the garden bed. Eat in summer.

        iv.   Did it grow well? Any challenges? How did you solve it?
        Sometimes the cucumber gets disease from insects, which will eat the cucumber leaves. You can use pesticides, but preferably remove it by hand.

    c.   How do you get information about gardening? Web, social media, …?
        read articles or videos online, or learn from other friends/hobbyist

    d.   What information would you be interested in when gathering gardening information?
        how to make the plants grow faster and harvest more, and how to take care of the plants.

    e.   What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc)
        First, I would research online about how to plant the seeds. You should decide what you want to plant and how to take care of the plant (water amount and frequency, soil, season). Depending on how much you are planting, the type of tools differ.

3. Experiment (click) ~~(eye tracker available @ Gates but hard to analyze, skipped)~~
    a.   This is how [one planting information website](#) looks like, can you try to search for anything you are interested in?
        Yes, I used the search tool to find varieties of tomatoes.

    b.   What do you think of your interaction with the website?

seems limited in what I can search for

c. Would you use this website if you were to search for gardening-related information?
search up the variety of the seeds

d. What other information would you be interested in?
a planting guide from start to finish

e. Would you recommend this website to others?
no

Interviewee 5

1. Demographics
   a. What is your full name?
   b. Which program? Which year?
   Hotel, 2023
   c. What are your pronouns?
   she/her
2. Core questions
   a. What plants are you interested in? Should it be grown in a yard or pot?
   succulent plants
   Pot

   b. Have you had planting experience before? If so, can you describe your last experience of gardening? (**IMPORTANT**: only interview those who are experienced before and ask below questions, those without are to be made up)
      i. What did you grow?
      Painter's-palette X3
      ii. Why did you grow that species?
      A gift from a friend
      iii. Does that type have specific growing requirements?
      Not sure if its an Internal plant
      Grow on balcony
      Water weekly,
      Water till the pot is filled with water
      Asked a professional gardener
      Do not know if its a seasonal
      iv. Did it grow well? Any challenges? How did you solve it?
      Not grow well,
      Summer is too hot
      Probably not water enough

Root is still alive, new leaves, but small and short, no more flower

Before summer, grows well, very tall, but flowers withered in hot summer
Bloomed for 2 months

Trimmed withered leaves
Forgot to water in a week

c. How do you get information about gardening? Web, social media, …?
Google, not specific websites
No app
Don't think an app is necessary, and dont have that much time on gardening
Planting casually,
If flowers died, just get another one

d. What information would you be interested in when gathering gardening information?
How to plant flowers,
What plants have flowers and are easy to grow, like only require watering
Priority is easy to take care and flower
Where to buy
Don't care how to choose, trust her own eyes lol

e. What information do you need to plant as a beginner gardener? (basic planting background knowledge, equipment purchasing, … etc)
Really really want to know where to buy soil
Because sold soil contain enough nutrients to grow plants and don't require additional fertilizers
And she can ask sellers which kind of soil is suitable for her plants
Also where to get pottery, now she gets pottery on shopping platforms
Some potteries she bought online are too small because the specifications of the size are confusing

3. Experiment (click) ~~(eye tracker available @ Gates but hard to analyze, skipped)~~
a. This is how [one planting information website](#) looks like, can you try to search for anything you are interested in?

b. What do you think of your interaction with the website?
c. Would you use this website if you were to search for gardening-related information?
d. What other information would you be interested in?
Want more images,
Want a community to ask questions and other users can come and answer
If pests? What chemicals to use?

e. Would you recommend this website to others?