Pet Tracker — Team Propus

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Pet owners have many responsibilities. These include caring for their pets and managing the details of the lives of their pets. We conducted research and interviewed pet owners to find out what kinds of issues they experience while handling these tasks for their pets, and used this information to create an app that helps pet owners manage their pets' needs, called Pet Tracker. We created prototype scenarios of two distinct users and a plan for user testing along with a plan for evaluating heuristics in accordance with Jakob Nielson's Heuristics Laws. We then conducted two usability tests and two heuristic evaluations. This document holds a detailed explanation of the methods we used for both the user tests and heuristic evaluations. The results from these tests were examined and distilled into insights and design recommendations that our team will be using to further improve our app.

KEYWORDS

Pet App; Pet Health; Pet Providers; Pet Owners; Pets

Prototype URL:
https://www.figma.com/file/NC1FDdcF0mdaM9ClEFr4EJ/Module-6---Prototypes

Introduction

Pet Tracker is a mobile app idea that is aimed at helping pet owners of any age and any level of pet-ownership experience manage their pets' lives. Currently, most pet owners have to use many different resources to keep track of their pets' health, appointments, and other needs, which can make it difficult for them to stay organized and for them to easily complete tasks for their pets. Our mobile app, Pet Tracker, was created to solve this issue for pet owners—it is a one-stop destination for pet owners to store information and complete tasks regarding their pet companions.

Our team conducted preliminary interviews on pet owners of varying ages and levels of experience with pet ownership to gain a better understanding of the needs of our target audience. The data collected from these interviews provided insight into the common issues that pet owners face when completing pet-related tasks and the features that pet owners would find most helpful in a pet app. We also completed extensive research on usability in mobile apps. Analyzing the data from our interviews and our usability research has helped us develop a better understanding of the needs of our users and how we can address those needs in our app.

We used what we have learned from our research to create three initial design concepts. We shared each design with our professor and peers and received both positive and constructive feedback on how to improve each design. After iterating the three designs with this feedback in mind, we have selected one concept to move forward with as this design offers the most affordances and provides the best user experience. This concept focuses on readability and communicating information requirements. Overall, the concept is intuitive and has a minimalist layout.

Since selecting the design, we have added additional screens and states to improve navigation and to provide the user with more feedback. The design currently allows the user to create an account and to set reminders. With our current design, we completed usability tests with two participants. We also had two experts from our team complete heuristic evaluations. We will be using the data collected from the usability tests and heuristic evaluations to further improve the design concept for Pet Tracker.

Prototype Summary and Revisions

After completing the initial design concepts and completing a feedback review, our group decided to move forward with Concept #3. Critiques from all three concepts were considered and changes were implemented for this updated design iteration. We focused our efforts on revamping the designs for workflows related to the tasks that we planned to use in our user testing and heuristic evaluations. The current prototypes are hosted on Figma and a link can be found on page 1 and in Appendix B. Images of each screen and state can be found in Appendix G.

We found that during pet profile creation, each concept requested a different set of information from the user. For this design iteration, the pet data fields in every concept were collected and reorganized, first by required vs optional information and then in order of accessibility. Data fields such as pet name, species, and breed were deemed the minimum amount of information needed from the user to continue using the app. The rest of the data fields were left as optional and then ranked in order of accessibility. Owner information fields were included at the top of the optional information list because this information should be easily accessible, while fields like vaccination history, microchip ID, and current medication were placed at the bottom of the list because they may take more time for the user to locate.

The original Concept #3 did not have a detailed workflow for adding reminders. We implemented a workflow in this design based on the reminder creation screens in Concept #1.

Prototype Screens - Task 1 (Register an account and create a pet profile)

- Task 1 asks the user to go through the process of registering an account and adding in a pet profile.
- The app opens up to a landing screen that prompts the user to log in/register an account. Users can log in/register an account with their email or through Facebook/Google login. Prototype screens 1 to 5 walk the user through the process of registering an email and using that to log in to the app.
- Screen 6 is the home screen that a user will see once logged in for the first time. A colorful, eye-catching card element sits at the top of the screen. It has a text prompt that informs the user that they can access additional features of the app by adding their pet's information. The card element has a button that will allow the user to continue to the pet data entry screen.
- Screen 7 is the pet data entry screen that appears when the user selects "Add your pet" on the previous screen. This screen is split into two sections. The top section is the required information, which is basic background information about the pet that the app requires. The second section lists optional information fields. This section is more detail intensive and could require the user to search for information that is not easily accessible. The user also has the option of uploading a profile picture of their pet.
- Screen 8 is the pet data entry screen with information filled out. Font colors have changed to indicate that fields have been filled out. Greyed-out fields indicate that no action was recorded from the user. Once the "Add Pet" button is clicked, the user will see a dialog (screen 9). The dialog will display a confirmation that the data has been successfully entered and will prompt the user to either continue back to the home screen or to continue entering another pet's information.
- Screen 10 is the home screen after a pet has been successfully entered into the app. At the top of the screen will be a list that shows the pet profiles and a brief summary of their biological information. These card elements will also show snippets of other relevant information such as feeding information if the user has elected to use that part of the app. There are two buttons on each pet information card. The "Feed" button will allow the user to record a feeding event that is synced with the feeding schedule (if it has been set up). And the "Share" button will integrate with the mobile OS to allow users to share their pet's information with others. The user will also see that all the buttons in the main menu are

now in black to indicate that they are unlocked and the user can now access those features.
- Screen 11 is the reminders screen for a user with no current reminders. It was added to enhance the interactivity of the prototype.

Prototype Screens - Task 2 (Create a reminder)

- Task 2 asks users to go through the process of setting up a reminder in the app.
- Screen 1 is the home screen that appears for a user that has already logged in and entered in the data for at least one pet.
- Screen 2 is the reminders screen for a user with no current reminders. A calendar is displayed at the top part of the screen, with the current date circled in black. Users can interact with this calendar to view future/past events. A section below the calendar will display a list of upcoming reminders.
- Screen 3 is the screen that appears when adding in a new reminder. Adding a new reminder requires the user to categorize the reminder, by selecting from veterinarian, groomers, boarders, etc. The user is also able to assign a pet to the reminder. Typical data for a reminder is also collected, such as date, time, description, location, and recurring status.
- Screen 4 is the reminder data entry screen with information filled out. Greyed-out fields indicate that no action is necessary from the user. In this case, we anticipate that the "Recurring?" option will often be set to "Does not recur" so that is the default value of that field. A "Save" button at the top of the screen will save the reminder and return the user to the main reminders screen.
- Screen 5 is the reminder screen with a single reminder entered in. The date for the reminder is highlighted on the calendar with a color corresponding to the category of the reminder. The current reminders section will contain the new reminder as a card element. The reminder card will have the reminder category at the top of the card with a color-coded dot that matches what shows in the calendar. Then the text description briefly breaks down the reminder details - date, time, and location. On the far right is a picture of the pet that has been assigned to that reminder (if that has been set). Clicking on the reminder card will bring up a screen similar to the new reminders screen that will allow the user to view/update/remove the reminder at a later time (not shown in the prototype).
- Screen 6 is a home screen that was added to enhance the interactivity of the prototype. It allows the user to navigate between the home screen and the reminders screen that now has a reminder entered in.

Prototype Scenarios and Tasks

Scenario 1 (New Pet Owner)

- Imagine that you have returned home from a local kennel with a new golden retriever puppy. Though you have never had a pet before, you know that you want to be the best pet parent around. You prefer to keep track of life events on your phone and heard from a friend that there is an application you can download called Pet Tracker that will help you keep track of your furry friend's life in addition to your own. You also use an application recommended by your medical care provider that manages your own appointments, medical records, personal information, and suggested nutrition.
- **Task 1:** Open up the Pet Tracker app and create an account. Add the puppy as a new pet and set up their profile.

Scenario 2 (Busy Lifestyle)

- You have had an extremely busy month. You have been spread thin with career projects, staying on top of school assignments, and maintaining your own well-being and that of your three pets. You find it hard to remember which appointments you scheduled for your pets and have already missed 2 dates due to double booking. Your veterinarian told you about an application called Pet Tracker and suggested you install it on your phone so you

will be reminded of events while on the go. You've installed the app and have already entered in the information for one of your pets.
- **Task 2:** Open up the Pet Tracker app and set up a reminder for the upcoming veterinarian appointment.

Prototype Revisions

Feedback on the previous prototype pointed out a general lack of interactivity that could limit the amount of information that we would be able to gain from our usability testing. Several updates and revisions were made to remedy these for this round of testing.

- Full interactivity for the bottom navigation bar was implemented.
- The "Settings" button on the bottom navigation bar now triggers a settings sidebar to slide out from the left side. This sidebar contains navigation to account details, notification settings, a help guide, and a way to send in feedback.
- The calendar on the reminders screen was updated to allow the user to click on a particular date in order to trigger a new reminder entry screen. This new reminder screen will already have the date that the user selected as the date for the reminder.
- The reminders data entry screen was extended to allow for the user to select the "Pet", "Description", and "Location" fields in any order.
- Two features of Figma were discovered and implemented in this updated prototype revision. The "overlay" feature was used to implement the settings sidebar. The "components" feature was used to implement the text fields in the task 2 prototype, making it substantially easier to mock-up variant screens.

Usability Test Plan | Summary and Revisions

The study will be conducted remotely using a webcam. We will act as moderators and have a pilot run done ahead of time to ensure readiness. All notes will be taken with a Google document provided ahead of time to organize the data we wish to collect. Currently, our design is stored in Figma and not all users are familiar with the application. 1-2 of us acting as moderators will allow us to guide the users as necessary, but we will keep the interactions minimal if possible. In order for us to properly guide participants, we will be running Microsoft Teams or Zoom and have the screen share at the same time. Participants will be asked to talk and describe the steps they are performing to complete each task. This style of thinking out loud may help us catch something we might otherwise have missed while taking notes. The final research method we will be using is a post-test questionnaire. We feel this will be the preferred method as we want to ensure our users can remain focused on performing the tasks. Since there are only two scenarios and two tasks, this should limit the time spent so the participants will retain all the information. We also took into consideration that we will likely need to perform this study remotely due to COVID-19 and our work/school schedules.

Data We Will Collect

Demographic Data

- We will collect the participants' personal information so we can ensure they are part of the target audience.
- We will be collecting ages, new or existing pet owners, lifestyles, average gross household income, and the highest level of education.
    - Lifestyles: Busy, Moderately Busy, and Lots of Free Time.
    - Knowing the education level of the participant will help us to better understand their critical thinking skills. This may impact their ability to use certain features we add to our application.
- We will ask the participant to share how much time they spend online and to reveal what websites or applications they use most commonly.
    - We can uncover if they use similar applications, how easily they should interact with digital applications and their level of interest in our product.

Usability Test Time

- The time taken to complete the test will be the sum of time taken to complete each of the following:
    - Read the Requirement for Participation, Debriefing Participant, and Confirming Readiness Sections.
        - Once the participant has met these requirements and understands the process, we will proceed.
    - Collect Demographic Data
    - Present Task 1 and have the participant complete the task.
    - Q&A session after this task. Not to exceed 5 minutes.
    - Present Task 2 and have the participant complete the task.
    - Q&A session after this task. Not to exceed 5 minutes.
    - Record the time taken to complete the Post-Test Questionnaire.

Pain Points

- We will list the pain points the user runs into and rate them on the level of severity. These are areas that the user struggles with and will be considered a pain point once the user becomes unable to progress after 30 seconds or unable to complete the task without direction.
    - Ratings will be listed as *Fail* (Unable to complete the task without direction) or *Frustration* (spent more than 30 seconds trying to complete the task).
    - We will address the issues the user runs into accordingly:
        - High (Appears in Both Tests): The task will be reviewed in-depth and the particular area will be altered completely.
        - Low (Appears in One Test): Minor changes or adjustments will need to be made. This will be mostly cosmetic.

Facial Expressions and Tone of Voice

- Since we will have the webcam running throughout this process, we will be observing facial expressions and the tone of the participant's voice as they perform the assigned tasks. This will help us to gauge the likeability and frustrations of our application.

Post-Test Questionnaire

- These activities are all focused on measuring how easy we have made it for people to use the application. At the very end of the test, we will send the users the Post-Test Questionnaire. The questionnaire will be provided via Google Forms and the link can be found in Appendix C.

Usability Test Revisions

Originally we had planned on using 1-2 moderators to conduct this study. We would be observing facial expressions and voice over a webcam while the participants perform the tasks with specific scenarios in mind. We have decided to now use Microsoft Teams or Zoom and have the participants screen share so we can see how they are interacting with the application. This will also help us to guide them when they require assistance. This process will require a minimum of 2 moderators, one for collecting data on facial expression and voice data while the other monitors interactions with the application. We are also going to use a structured form for taking notes so we can reduce the amount of time taking notes and allow us to focus on the interactions. This form has been modified to include a pre-test section so we can collect relevant data about the participant that will help us to further confirm the accuracy of this test.

Usability Test

Testing Preparation Description

Requirements for Participation

- The participant must have a computer or laptop with Windows 10 or Apple OSX or later installed.
- There must be an active high-speed internet connection the participant can access.
- The computer must have a functioning webcam connected.
- The participant must have active accounts set up or register for new accounts with Microsoft Teams or Zoom. The use of any other application must be cleared immediately with a moderator prior to the start of the study.
- The participant must be a new or existing pet owner.

Debriefing Participants

- There is no right or wrong answer. You are free to ask questions or make comments at any point.
- If you ever feel lost or are unable to complete a task with the direction that you have been given, we will provide a real-world scenario and then provide further direction or move on to the next task.
    - We will defer from answering questions, unless absolutely necessary, until the end of the test to avoid influencing your actions.
- If you consent, you will be observed (but not recorded) using a webcam. We want you to feel comfortable and using the webcam will allow us to conduct our research while you are in the comfort of your own home.
    - Informed consent is required before documenting any data regardless of whether it is verbal or written. We delivered the consent form via email to each participant and verbally confirmed receipt before granting access to our design. The consent form can be found under Appendix A.
- Your names will not be associated or reported with data or findings from the evaluation.
- We do ask that you verbally describe the task you are performing, the methods you are using, and the challenges you are experiencing.
- We may ask questions as we go if we feel there is not enough feedback from you.

Confirming Readiness

- The participant's webcam must be positioned so we can capture their facial expressions and their voice.
- Share user names for either Zoom or Microsoft Teams and confirm moderators can see the screen and webcam video. Also, confirm audio is functioning properly.
- The moderators will confirm receipt of the consent form and share the link to Pet Tracker on Figma.
- Moderator 1 will monitor webcam video. Moderator 2 will monitor the screen share. Moderator 2 will use the stopwatch application on a mobile device to record the time taken to complete each task.

Demographic Data

- What is your age?
- Are you a new pet owner or an existing pet owner?
- Tell us about your lifestyle? Are you normally very busy, moderately busy, or have lots of free time?
- What is your highest level of education?
- How much time do you spend online?
- What applications or websites do you most commonly use?

Data Collection

- The data for this test was collected on a google document where both Moderator 1 and Moderator 2 could add the necessary information on their part of the observation. These forms can be found in Appendix D (Usability Test 1) and Appendix E (Usability Test 2).
    - Moderator 1
        - They will work with the participants and complete the checklist.
            - Requirements for Participation
            - Debriefing
            - Readiness Check
        - Collect Demographic Data
        - They are also responsible for monitoring and recording data regarding the facial expressions, tone of voice, and any data the participant says relevant to the project in the Participant Questions or Comments section.
            - Moderator 1 will answer any questions and document any comments or concerns during the Q&A session held after each task.
    - Moderator 2
        - They will present the scenarios and tasks.
        - They will also record the time it takes to complete every section of the test.
            - Requirement for Participation, Debriefing Participant, and Confirming Readiness Sections.
                - Once the participant has met these requirements and understands the process, we will proceed.
            - Tasks: Read, Complete, Q&A
                - Moderator 2 will read the scenario aloud. The participant will be asked to complete the task. Q&A session is held after each task. This will not exceed 5 minutes.
            - Record the time taken to complete the Post-Test Questionnaire.
        - They will document the pain points the participant experiences while performing the tasks.

Usability Test 1

Initial Check and Fact Gathering (Appendix D, Page 1)

Requirements for Participation, Debriefing Participants, Confirming Readiness	17:45 (MM:SS)

Moderator 1	**Moderator 2**	**Requirements for Participation Met**	**Debriefing Participants Complete**	**Confirmed Receipt of Consent Form**	**Readiness Check Complete**
Andrew A.	Andy T.	✓	✓	✓	✓

Demographic Data	06:40 (MM:SS)

Age	Gender	Gross Household Income	New or Existing Pet Owner	Lifestyle	Highest Level of Education	Commonly Used Apps and Sites
35	Female	$45,504	Existing	Lots of Free Time	High School	✓

Presentation of Scenario and Tasks (Appendix D, Pages 2-3)

- The next step in the process was to present a scenario and two tasks. The participant we selected has a very similar lifestyle to the one we presented. This was done in hopes that we could retrieve more accurate results from this particular test. Each task was presented one at a time. We allowed for up to 5 minutes to answer questions and document additional comments or concerns after each task. present the scenario and two tasks.
    - **Task 1:** Imagine that you have returned home from a local kennel with a new golden retriever puppy. You have no idea what is expected of you as a pet owner. One of the workers at the kennel had mentioned that you need to keep up with vaccinations and that some services require you to provide this information before they can work with your puppy. They also mentioned that there is a new application called Pet Tracker that will guide you through the process of entering this information and store it in a place where you can provide it as needed. You decide to download the application and give it a shot. Create a user account in the Pet Tracker application and set up a profile for your new puppy.

Task 1: Read, Complete, Q&A	12:50 (MM:SS)
Moderator 1 Data Collected	✓
Moderator 2 Data Collected	✓

    - **Task 2:** You are a full-time college student and a full-time worker. Life is hectic and you have already missed two veterinary appointments in the past two weeks for your new puppy. Now that you have the Pet Tracker application installed, you remember seeing a feature called Reminders. Add a new reminder in Pet Tracker. Enter the data for a veterinary appointment.

Task 2: Read, Complete, Q&A	14:10 (MM:SS)
Moderator 1 Data Collected	✓
Moderator 2 Data Collected	✓

Post-Test Questionnaire

- The Post-Test Questionnaire was generated in Google Forms. We were able to send a link to the participant so they could answer questions about their experience. We allowed up to 15 minutes to answer all the questions and submit the results. The link to the host form can be found in Appendix C.

Time Taken to Complete	06:10 (MM:SS)

Usability Test 2

Initial Check and Fact Gathering (Appendix E, Page 1)

Requirements for Participation, Debriefing Participants, Confirming Readiness	09:05 (MM:SS)

Moderator 1	**Moderator 2**	**Requirements for Participation Met**	**Debriefing Participants Complete**	**Confirmed Receipt of Consent Form**	**Readiness Check Complete**
Andrew A.	Andy T.	✓	✓	✓	✓

Demographic Data	04:10 (MM:SS)

Age	**Gender**	**Gross Household Income**	**New or Existing Pet Owner**	**Lifestyle**	**Highest Level of Education**	**Commonly Used Apps and Sites**
29	Male	$100K+	New	Very Busy	College	✓

Presentation of Scenario and Tasks (Appendix E, Pages 2-3)

- Next, we presented the second scenario. The participant we selected met most of the criteria outlined in the description. This was done in hopes that we could retrieve more accurate results from this particular test. Each task was presented one at a time. We allowed for up to 5 minutes to answer questions and document additional comments or concerns after each task.
    - **Task 1:** You have three dogs and two cats. An envelope is stapled to your calendar filled with vaccination times and dates to remind you when it's time to get them renewed. Your friend Bridget comes over and notices it out of the corner of her eye. She mentions that she uses Pet Tracker to keep all her pet information organized. She suggests you download it and give it a try. Create a user account in the Pet Tracker application and set up a profile for one of your dogs.

Task 1: Read, Complete, Q&A	10:10 (MM:SS)
Moderator 1 Data Collected	✓
Moderator 2 Data Collected	✓

    - **Task 2:** You just landed your dream job in the big city. You and your family have been busy packing for the big move when you suddenly remember that you were supposed to pick up your dog Layla at the veterinary clinic. You jump in the car and rush over. Luckily you made it before they closed the doors. The veterinarian reminds you that you need to schedule a follow-up appointment, but you have a lot going on in your life and you are fearful you may forget. You had started setting up a new application called Pet Tracker last week and recall seeing some features that might help you remember to follow up. Determined

not to forget this appointment, you decide to take another look. Add a new reminder in Pet Tracker. Enter the data for a veterinary appointment.

Task 2: Read, Complete, Q&A	10:05 (MM:SS)
Moderator 1 Data Collected	✓
Moderator 2 Data Collected	✓

Post-Test Questionnaire

- The Post-Test Questionnaire was generated in Google Forms. We were able to send a link to the participant so they could answer questions about their experience. We allowed up to 15 minutes to answer all the questions and submit the results. The link to the host form can be found in Appendix C.

Time Taken to Complete	05:25 (MM:SS)

Calculating Results

Once both usability tests were completed, we reviewed and summarized the results to determine what changes need to be made to Pet Tracker. We analyzed the data we collected in the demographic section to ensure our participants fit into our target audience. This also helped us to gauge their level of experience with technology and problem-solving skills. Then we looked at pain points and considered the frequency in which they occur. If these areas of difficulty show up in both tests (High), we plan to make big changes to correct the issue. If they only show up in a single test (Low), we will only be making minor changes to improve the user's experience. Next, we looked at facial expressions and tone of voice. We plan to use this information to gauge likability and difficulty while using the application. Lastly, we delivered a Post-Test Questionnaire via Google Forms. We will take the results from both submissions and average them. This will help us determine the likeability, ease of use, and relevance of our application.

Heuristic Evaluation Plan | Summary and Revisions

Recap:

We completed a heuristic evaluation on Pet Tracker to determine what changes we could make to improve the user experience of our app. Our two nominated experts, Melissa Nell and Nancy Nguyen, were chosen to conduct the heuristic evaluations. They both conducted evaluations while completing the two tasks currently afforded in Pet Tracker: creating an account and setting a reminder. They completed their evaluations independently and recorded their findings. Afterward, they collaborated to finalize the severity scores for each heuristic under each task and documented this information in an excel spreadsheet (Appendix F). They then determined which heuristic(s) under both tasks needed the most attention in terms of improving usability in Pet Tracker. The conclusions that Nancy and Melissa made from their evaluations will help the team decide which areas of the app to focus on changing when completing additional iterations.

Heuristic Evaluation Revisions:

Nancy and Melissa initially planned to conduct evaluations on three different tasks: creating an account, adding pet information, and setting a reminder. However, after receiving feedback about their heuristic evaluation plan, they decided to combine creating an account and adding pet information into one task. The usability test section of our report defines the two tasks that users can complete in Pet Tracker as creating an account (including adding pet information) and setting

a reminder. Nancy and Melissa wanted to be consistent with the rest of the testing by evaluating the same tasks that the usability tests cover.

Heuristic Evaluation

Nancy and Melissa used all 10 heuristics in their evaluations. They went through both tasks independently, (creating an account and setting reminders) and compared each screen and function with the list of heuristics. While evaluating each heuristic for both tasks in Pet Tracker, they recorded their observations in identical spreadsheets. The spreadsheet listed each of the 10 heuristics with categories including the associated severity score, severity/error description, location of the error, and additional notes. When addressing each heuristic, Nancy and Melissa provided severity ratings, on a scale from 0-4, to describe any usability issues. The lower the severity rating, the lower the severity of the usability problem. The higher the rating, the greater impact they believed the usability problem has on the overall app experience. They also provided short, detailed explanations of how a feature or action violated one of the heuristics and recorded how they determined the score of each violation. They noted in the “location of the error” section the screen or page where the error occurred. Under the “additional notes” section they included additional information about the heuristic and about what could be improved in the design. Each of the heuristics below describes what both experts focused on when evaluating the tasks in Pet Tracker.

1. Visibility of System Status

- According to the article “10 Usability Heuristics for User Interface Design” by Jakob Nielsen, this type of heuristic is a way of creating a design that informs the user of “what is going on” through some appropriate actions, such as feedback, within “a reasonable amount of time” [4]. In other words, a user must be notified in a way where they can clearly understand what is happening to the current state in a system after performing some type of action. The Visibility of System Status allows the user to gain a sense of control and feel a sense of ease that they are being clearly communicated to with some sort of feedback to signify the current status of a system or interface [4].
- When Nancy and Melissa reviewed Pet Tracker, they assessed how well the user is conveyed of the current system status with feedback and whether or not it is done in a timely manner. In addition, Nancy and Melissa checked whether or not the feedback presented to the user is distracting or overwhelming, and if so, if this could cause the user to potentially not understand or miss key pieces of the information that they are looking for.

2. Match Between System and the Real World

- This heuristic evaluation describes designing an interface or system that uses and follows real-world conventions so that users don’t have to spend time looking up definitions and trying to understand any part of the app. In the video “Usability Heuristic 2: Match Between the System and the Real World” by Alita Joyce mentions that in this heuristic, users have already developed their own “mental models of technology” that are “based on their previous digital experiences in addition to their prior experience in the physical realm” [2]. In other words, the interaction in the system should match up with the physical experiences in the real world [2].
- When our experts reviewed Pet Tracker, they compared Pet Tracker’s system conventions with the conventions of the real world to ensure that there is a match between the system model and the user’s mental model. For example, our experts observed whether setting a reminder is similar to how someone would write a reminder on a physical notebook.

3. User Control and Freedom

- When looking at User Control and Freedom, the system should allow the user to quickly discover that they can either undo or redo a certain action or function when they are using

any type of application. This gives the user a sense of control and freedom of their actions so that they won't feel stuck if they are trying to accomplish a certain task [3].

- Nancy and Melissa focused on whether there are clearly marked exit routes that users could conveniently utilize if they wanted to leave a step process or cancel a certain functionality in the system. Typically, in a mobile application users are prone to accidental taps, so Nancy and Melissa checked if there were any screens that a user could accidentally get to without an easy way to leave that screen.

4. Consistency and Standards

- Users should not be left second-guessing the meaning of any of the icons, actions, or components in a system. In order for the design to be predictable and learnable for the user, it must consistently follow an existing standard or convention that has already been established by similar systems [4]. According to the article, "Maintain Consistency and Adhere to Standards (Usability Heuristic #4)" by Rachel Krause, there are two types of consistency, internal and external. A system should "adhere" to both consistencies and follow the same pattern inside a system and should also follow conventions from other platforms [7].
- Our experts determined if Pet Tracker violates this heuristic by checking to see if there are any aspects of the app that would not make sense or that would be difficult for a user to follow. When Nancy and Melissa examined the app they checked the use of the icons, colors, and layout to see if they are consistent within the application and if they also follow established industry conventions.

5. Error Prevention

- Some of the errors in a system are commonly caused by users unintentionally. It is important to clearly disclose to the user the error that is happening and also provide suggestions to prevent the error from happening again [6]. The point of this heuristic is to not let the user feel the blame for the error, so developers must design a system that doesn't easily lead to errors or make the users have to take the extra time to learn to fix the issue by themselves [6].
- Nancy and Melissa assessed if there are any features that include any instructions or helpful constraints, such as setting clear rules and providing limited options, that help the user avoid potential slip-ups or mistakes. They also checked if the application offers any helpful suggestions to guide the user to complete a task in the system.

6. Recognition Rather than Recall

- Users shouldn't have to try to recall anything about a system from memory. The layout should be clear and easy to follow so that the interface guides the user through completing tasks, rather than leaving the user clicking on different buttons until they find what they need because they can't remember how to use the system. The best way to communicate different options within a system is with a menu or navigation bar that has distinct buttons and icons [8].
- Nancy and Melissa focused on how easily users can complete tasks and how navigation between different screens (using the menu and navigation bar) affects task completion. They also looked at the steps in each task and determined whether or not there are any instances where information from a previous screen is needed on another screen.

7. Flexibility and Ease of Use

- This heuristic focuses on providing different affordances to complete the same task, with the idea that an experienced user and novice user have their own different mental models. When it comes to Flexibility and Ease of Use, "shortcuts--hidden from novice users--may speed up the interaction for the expert user"[4]. This ensures that novice users can still use the system and that they are not overwhelmed by different affordances. It also allows experienced users to have some flexibility in the way that they complete tasks.
- Nancy and Melissa looked at Pet Tracker and determined whether or not the current design is clear enough for a novice user to understand how to use it, and whether or not

there are other options to complete the same task for more experienced users, such as when setting reminders.

8. Aesthetic and Minimalist Design

- Evaluating the Aesthetic and Minimalist Design helps ensure that interfaces don't have too much information and that all information present is helpful and beneficial for the user [1]. This means that each screen the user is looking at should only be filled with text, graphics, and other visuals that assist the user in completing tasks.
- When evaluating this heuristic, Nancy and Melissa looked at the amount and type of information displayed on each screen in Pet Tracker. They also looked at the primary task that the user is trying to complete on each screen and determined whether or not the interface solely provides information that is necessary for helping the user complete that task.

9. Help Users Recognize, Diagnose, and Recover from Errors

- Heuristic #9 addresses how easily a user can recover from an error when they receive an error message in a system. If the user encounters any errors, such as clicking on a box when they aren't supposed to or entering the wrong information somewhere, there should be an error message that is clearly displayed so that the user understands the error and can recover from it.
- Pet Tracker doesn't have any error messages. When evaluating this heuristic, our experts determined if there are aspects of completing different tasks that could potentially warrant an error. For any errors that they found, they will consult with the team and the app will potentially be updated to include error messages where necessary. If error messages are added, Nancy and Melissa will conduct another heuristic evaluation to ensure that the error messages meet the standards for usability.

10. Help and Documentation

- If there are aspects of an interface that are unclear and/or that users commonly get confused by, it is beneficial to add help and documentation so that users can confidently and easily complete tasks. There are two different types of help--proactive help, which "is provided before the user has encountered a problem" and reactive help, which "includes materials such as documentation, videos, or even tutorials" [1]. Depending on the type of issues and questions that users have about an app, either proactive help, reactive help, or a combination of both can be used to improve usability.
- Pet Tracker doesn't currently have any help or documentation. When Nancy and Melissa evaluated Pet Tracker, they focused on whether or not either could be added to improve the usability of the app. For any scenarios where they determined that help and documentation should be added, the app will be updated to include these features and Nancy and Melisa will conduct another heuristic evaluation. In this evaluation, they will focus on how easily users can access help and documentation and whether or not it is necessary and relates to tasks users are trying to complete.

How data was consolidated:

Once both experts completed their own heuristic evaluations, they met together to discuss their findings in order to identify the main usability problems in Pet Tracker. They compared the severity ratings that they provided for each of the 10 heuristics and provided reasoning for their severity ratings. If any of the heuristics had a similar severity rating then Nancy and Melissa confirmed that it was the final score to the associated heuristic. On the other hand, if the heuristic rating that was provided by Nancy and Melissa were different from each other, they discussed whether or not one or both of their ratings should be adjusted. If they couldn't reach a compromise, they conducted the heuristic evaluation again together to determine a fair severity rating.

Both experts completed this process for the heuristic evaluations that they conducted for both tasks in Pet Tracker. After they determined what the severity rating of each heuristic was for both tasks, they consolidated their evaluations into one spreadsheet. This information was organized in a clear and simple way so that the team can easily refer to the key findings from the heuristic

evaluations. The team will be able to use this information to iterate Pet Tracker in a way that solves the primary usability issues.

Evaluation Results

Problems discovered in heuristic evaluations

Task 1:

Heuristic 4: Consistency and standards

One of the problems that were identified in the heuristic evaluation that was reviewed by one of the experts was the Consistency and standards in the Pet Info page of the prototype. After the user completes their account creation on the email registration page, they will then create a profile for their pet which can be found on the menu screen. After the user fills out the necessary information such as Pet name, Species, Breed, and Sex, they will then scroll down to the Optional info section. In the Optional Info section, there is a subheading called Owner Information, which allows the user to fill in their own information. However, after the emergency contact box, the experts were first left wondering whether the rest of the information that needed to be filled out such as, birth date and weight, were meant for the owner or for the pet. The experts later assumed that the rest of the information was meant for the pet after looking at the other boxes such as microchip id, current medication, and dietary notes.

This is a violation of the Consistency and Standards because users are left to increase their "cognitive load"--they have to try to determine whether the rest of the optional info after the emergency contact box is asking for the owner's or pet's information because there is a lack of consistency between the clearly labeled "Pet Info" section and the unclearly labeled "Optional Info" section. The experts have concluded that this type of issue has a severity score of 3. Imagine if the user were to send the information that they have filled out in the Pet info page to a service provider, and as the service provider is looking through the information they see that the birthdate is 11/12/1989 and weight is 130lb when the pet is actually a small chihuahua who is still very much a puppy. This could cause a lot of inconvenience for both the provider and the pet owner when it could've been resolved if there was a subheading to indicate which section was asking for pet's or user's information.

Heuristic 6: Recognition rather than recall

Another problem that was discovered during the heuristic evaluation was in the Menu screen after the user logs into their account for the first time. The issue that occurred was that there is no clear direction or cues to help guide the user to access the other features on the app such as, set reminders, feeding schedule, schedule appointments, and contact a vet. The feature to add/create a pet profile is not as visible as the other features displayed on the menu screen which could cause the user to overlook it and lose their chance to access the rest of the app's features. This is a violation of heuristic 6 because the user has to rely on recall rather than being guided by the app. It would be helpful to make the add pet feature accessible by having it in the same format as the rest of the other features so that users don't have to remember that the adding pet profile is on top of the screen, rather that it is a part of the rest of the features listed on the menu screen. That way it will allow users to clearly "recognize information in the interface, rather than having to remember ("recall") it" [4]. Our experts noticed that after logging in to the app, their focus was directed towards the other features at the middle of the screen because the image post on top of the screen overshadowed the add a pet option, but after taking some time they recalled that the option is near the top of the screen on the image post.

This issue was noted to have a severity score of 2 because users are still able to access the "add your pet" option but it would be more convenient and less annoying to have to recall where it's located when it shouldn't be displayed in a way that makes it difficult to see because the image post takes the attention away from the user making that featureless visible. But with more time and resources available this usability error could be improved and designed in a way that promotes recognition of the interface than recalling it.

Heuristic 9: Help users recognize, diagnose, and recover from errors.

The interface should allow users to quickly recognize, diagnose, and recover from errors. Users shouldn't be left wondering how to fix a mistake and then unable to fix it. There is a violation of heuristic 9 in two different places in Task 1: the login screen and the screen where the user can add their pet information. On the login screen, there is no error message if the user doesn't enter a valid email address or password. This could leave the user confused and unable to log in or create an account if they enter information and it is not accepted by the app. In addition, when the user gets to the screen where they can add information about their pet and then gets back to the home screen after adding the information, there isn't an option to edit the pet information or even go back to the previous screen. If the user entered the wrong information and can't fix it, they will likely feel frustrated and also concerned when trying to share their pet's information with providers.

This violation was given a severity rating of 3 because it is essential that users understand how to address and fix mistakes quickly and effectively in the app in order to enjoy using the app and successfully complete tasks. Both the error message and option to edit aren't vital in the current stage of the design process because as of now a hypothetical user's information is auto-filled when you click through the prototype. However, error messages and clear options to edit will be vital to creating an app with great usability and shouldn't be overlooked early in the design process.

Task 2:

Heuristic 9: Help users recognize, diagnose, and recover from errors.

Heuristic 9 was also violated in Task 2. When creating reminders, the user should be able to quickly identify how they can fix mistakes if they made any errors in the reminder. They should then be able to easily fix the error and have feedback so that they can see that their changes were successful. However, after creating a reminder, there isn't an option to edit the reminder. If a user makes a mistake, it isn't obvious how they would fix the mistake or even if they would be able to fix the mistake. This is a problem because users would likely have to end up creating a new reminder in order to correct mistakes. However, if they created an additional reminder for the same event, then they would still get notifications about the incorrect reminder. This could lead to huge inconveniences if the dates or descriptions were incorrect. For example, If the wrong date was added for a vet appointment and the user still had that reminder saved in the app, the user might get confused and show up to the appointment on the wrong date, not realizing they didn't actually have an appointment that day until after driving all the way to the vet.

This heuristic was given a severity rating of 3 as it is a major usability issue that needs to be addressed. As mentioned in Task 1 violation of heuristic 9, not being able to edit reminders isn't a huge issue currently since we are auto filling information. However, it will be very important when the user has the ability to create their own reminders.

Problems Discovered in Usability Tests:

Usability Problem 1

- **Issue:** Home screen is a little confusing and users would like to be able to interact with the list of pets in order to do specific tasks.
- **Screens:** Task 1 | Screens 6 and 10
- **Severity:** High
- **Description:** Both participants reported having issues with the home screen during the usability test. One found the home screen to be aesthetically bland but also pointed out that they were unsure if the screen they were looking at was the home screen. The other participant voiced concerns about the layout of the home screen if they created pet profiles for more than 4 pets. They wondered what would happen to the menu of task buttons. Both participants also commented that they would like the ability to tap on the pet profile on the home screen in order to complete tasks.

Usability Problem 2

- **Issue:** Pet data entry screen is disorganized and inconsistent.
- **Screens:** Task 1 | Screen 7
- **Severity:** Low
- **Description:** The participant in one of the usability tests had a strong reaction to the layout and organization of the pet data entry screen. They found it to be generally disorganized and difficult to parse. They were confused as to why certain data fields pertaining to the pet (specifically birthdate, weight, and color) were not under the pet information subheading. The way the information was presented, there wasn't a clear logic to the order of information requests to them. Design-wise, the subsections were intentionally made this way to separate required information from optional information. During the debriefing the participant made a comment referencing this and said they would have preferred to have seen more subheadings and red asterisks to denote required information fields.

Usability Problem 3

- **Issue:** Bottom navigation bar can be confusing and redundant in communicating actions.
- **Screens:** Task 1 | Screen 6
- **Severity:** Low
- **Description:** The participant in one of the usability tests had difficulties understanding the layout and use of the buttons on the bottom navigation bar. They were confused by why there was a "Reminders" button when they could set a reminder from the home screen and experienced some difficulty understanding that both buttons would take them to the same reminder screen. In addition, they questioned the utility of the "Settings" button. The participant was searching for a menu button and stumbled upon the "Settings" button.

Usability Problem 4

- **Issue:** Home screen is bland.
- **Screens:** Task 1 | Screen 7
- **Severity:** Low
- **Description:** A participant reported that the home screen was flat and bland. Also commented that they were unsure if they were actually on the home screen after logging into the app.

Post-Test Questionnaire Discoveries

We delivered the Post-Test Questionnaire at the end of each test. Using Google Forms allowed us to analyze the results to determine which improvements would increase the appeal and usability of our application. We also asked about the desirability of some of the functions of the application that they could see but were not part of the tasks. With only two tests, the results were a bit scattered. However, we did see some commonalities.

- **Tile Buttons**
    - The tile buttons were a feature we added so that the options were openly presented to the users. Despite that, users found that they were difficult to understand and questioned the relationship between the tile buttons and the pet. This negatively impacted the user's confidence when working through the task as well as making the experience less appealing.
- **Creating a User Account, Adding a Pet, and Entering Pet Information**
    - Creating a user account, adding a pet, and entering pet information were some of our easiest tasks to complete according to our feedback. These features were found to be important, though one user did mention that they do not care for creating user accounts and that would reflect in their feedback. In addition, these features were found to be important, but slightly boring. One participant mentioned that the app looked dull and needed some color. This is something that we will be taking into consideration. The confidence level we were hoping for was achieved as both users were certain they completed these tasks correctly.

- **Not in the Test, But Is It Desirable?**
    - We were curious to learn the level of importance of including a feeding schedule, a search function for providers, and having the ability to share entered information with others. In comparison to other ratings, we found that having a feeding schedule and being able to search for providers were only somewhat desirable. This was very helpful feedback because it will allow us to focus on areas that really matter to our users. We have only conducted two tests and these were not tasks that the participants could explore in detail.
- **Capturing Necessary Data and Security**
    - Both our participants felt all necessary data was captured. What was a bit alarming was that they were not confident that the information they entered was secured. This was something we wanted to explore because the aesthetics of an application, if professional, can present levels of security to be included. We will need to revisit this and ensure our application has a professional appeal to it. We are also considering some kind of confirmation assuring the user this is taken into account as a way of presenting this.
- **Would You Recommend This to Others?**
    - One very important question, all said and done, was the level of confidence they had with recommending this application to others. Both participants gave it a rating of 4 out of 5. This just confirms that despite our application being ahead of its time, it still has flaws that need to be corrected.

Insights and Recommendations:

Heuristics

Based on the Heuristics evaluations the primary issues that were found in the app were: lack of error messages during the sign-up process, unclear headings when adding pet and owner information, inability to edit pet information, unclear navigation in some parts of the app, and the inability to edit reminders.

Sign Up Page:

- Currently, there is no feedback mechanism to inform the user of errors during the signup process. Following conventional methods, the login page will display error messages in red text. This will be done on the login page in cases where the user enters in an invalid email/password or provides the details to an account that does not exist.
- In addition to some heuristic changes, account information should be asked during this stage such as first name, last name, phone number, home address, and emergency contact information all of which can be accessed from the setting if information needs to be changed such as email address and phone number to name a few. This will complete the setup stage and allow for a smooth transition for the app.

Adding Pet and Owner Information:

- To remedy the issues discovered when adding pet information, we can adjust the screens to include additional and clearer headings so that the user knows what information to add in each field. This will help ensure that users fill in the correct information for pet service providers. Another recommendation is that since users initially sign up for the app, it might be better to have the information such as first name, phone number, home address, and emergency contact on a separate page. This would reduce and eliminate confusion on what information is being asked. We also will add the option to edit both pet information and owner information so that if any mistakes are made, it is easy for the user to fix them.

Home Screen Fixes

- During testing, it was found that the “add a pet” feature was overshadowed by the other options. A really good way to really draw attention to the feature so users will remember it is by dedicating a sidebar for viewing current pets and to access the “add another pet” feature. A sidebar for this instance would be similar to how the current setting option works by pulling a sidebar overlay. Doing something similar for this feature would simplify the home page while still having that utility. This would allow users to only need to recall that the feature and their pets are located in the same location in the sidebar. Then we could further simplify the layout by removing the text and using the well-known addition symbol. Additional features could also be accessed from this sidebar to improve navigation through the app.

Reminder Page

- We will enhance the reminder screen by implementing a more detailed view to highlight current reminders. This would entail giving visual feedback when adding a reminder either by using the space under current reminders as a weekly calendar with either a 7-day forecast or have it be a 4-day forecast that refreshes its start point when a new day cycles. This would allow for the user to see upcoming reminders and they would also be able to refer to the calendar. To clarify this point, the empty space below the calendar could host a weekly styled reminder that could be tapped on to zoom in and see hourly. Creating a reminders screen with improved layout and design will make it easier to incorporate a clear and obvious edit option for reminders. By giving users the option to edit their reminders, they will be able to easily fix mistakes when necessary.

Usability

Home Screen

- Users stated that they would like to be able to click on a pet to complete tasks for that pet. The addition of a side bar will allow users to be able to pick pets on the bar and specify an action they want to do when they click on the pet profile. They could either edit information, add a reminder for a said pet, or even have a “share info” option all easily from the sidebar. In addition, we will add more colors and graphics to the home screen to help indicate different affordances and improve navigation through the app.

Pet Data Entry

- On the pet page, some quality of life changes will be made to the vaccine list where instead of listing the information it is served in a manner that requires the user to enter vaccination information in a table such as that shown below. This provides the user an organized way to maintain records when asked on the “add pets” page.

Vaccine Type	Date Vaccinated	Expires
Rabies	06/01/2013	07/05/2014

- We will update the current data field “Color” to “Fur Coat Color” to more clearly communicate the intention of that particular data field. We will also reorganize the pet profile photo to be prioritized on top of the data entry screen - similar to how you would enter a photo on a phone contact.

Bottom Navigation Bar

- Although useful, the bottom navigation bar is redundant in its current state. The “Home” and “Reminders” buttons do not add very much value - “Reminders” are easily accessible from the home screen and the home screen is only one screen away from every other main screen in the app. Overall, the decision to implement a sidebar will help supplement some of the features we had hoped to get out of a bottom navigation bar. The sidebar has more vertical space allowing us to fit more menu options and will be accessible from every screen in the app.

First-time User Experience and Feedback

- Moving forward, as we include new elements to our prototype, we will be keeping usability in mind, focusing on communicating to the user why certain actions failed. We’ll also work on highlighting data discrepancies for the user, such as when the current vaccination records have reached their expiration date. Expired vaccinations will have red text and a popup to alert the user that they should act to update their pets’ vaccinations.
- Including an optional mini-tutorial could help new users quickly learn how to navigate the app and learn of its capabilities. The tutorial would be short and walk the user through an overview of where to find specific features. The user would also be able to trigger this tutorial later on from the settings menu.

Appendix

Appendix A

This consent form will be presented to participants prior to the study in order to obtain informed consent. The consent form was adapted from the “Consent Form: Remote Usability Test (Adult)” document provided by usability.gov.

https://docs.google.com/document/d/1p-FBlQ0s9OvCHLzwQBnv5BL811GavKDu1P7GlBkDcqY/edit?usp=sharing

Appendix B

The design iterations were completed in Figma and are linked here:
https://www.figma.com/file/NC1FDdcF0mdaM9CIEFr4EJ/Module-6-Prototypes?node-id=308%3A1776

Appendix C

Post-test questionnaire to be done after the Usability Study is complete:
https://docs.google.com/forms/d/1GkreRa4RFWY0m3GgoKovOcuJUOgyXLdvbPcEwurW_ro/edit?usp=sharing

Appendix D

Usability Test document to be used before and during the first test.
https://docs.google.com/document/d/1ptmVT4pHPW7LfYUaWXZrPZ4Hzb7JnqlBJerWTLIHVjk/edit?usp=sharing

Appendix E

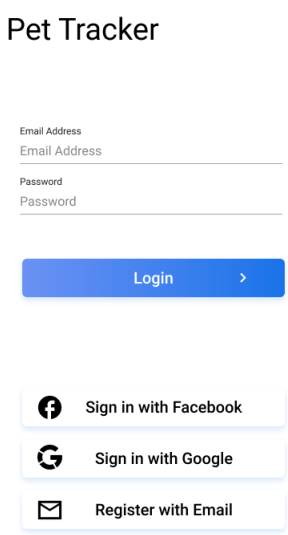
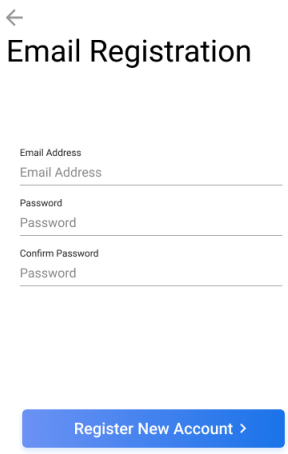
Usability Test document to be used before and during the second test.
https://docs.google.com/document/d/14ly1hKNJ2f-DDMYr5dtCbnG8b0TsmICt4czNpDBSiNY/edit?usp=sharing

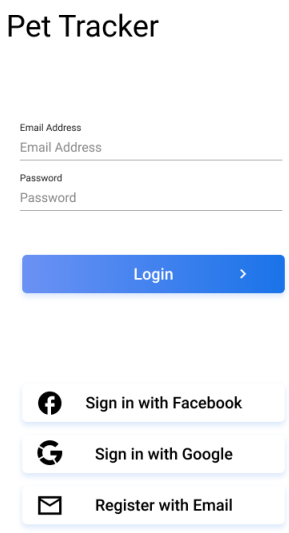
Appendix F

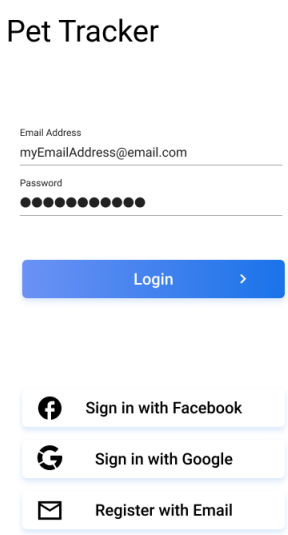
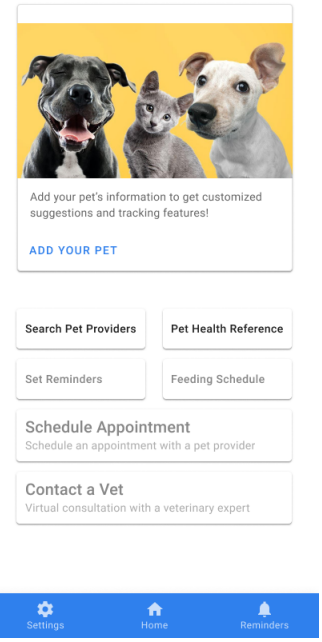
Heuristic Evaluation spreadsheet document of the prototype for task 1 and task 2
https://docs.google.com/spreadsheets/d/1RSToGlZw3OFchet8Btls8TdA9FSLJYij5NX-j2heneQ/edit?usp=sharing

Appendix G

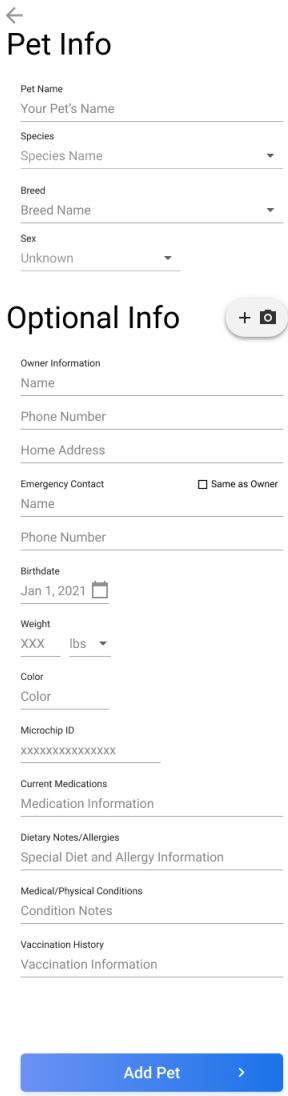
Prototype screenshots for both Task 1 and Task 2.

Task 1 - Screen 1	
Task 1 - Screen 2	

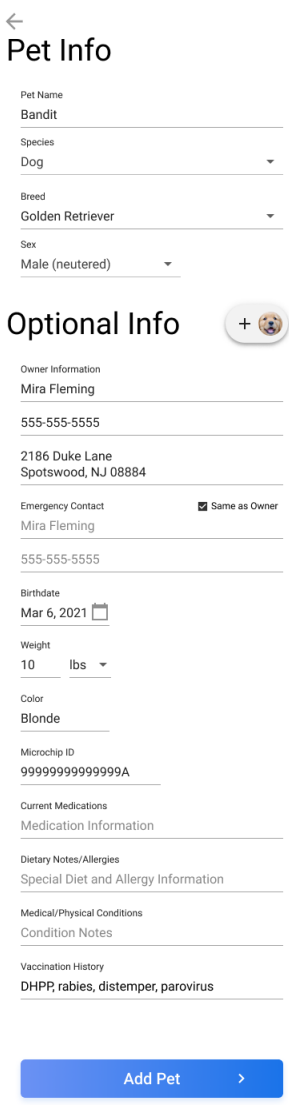
Task 1 - Screen 3	
Task 1 - Screen 4	

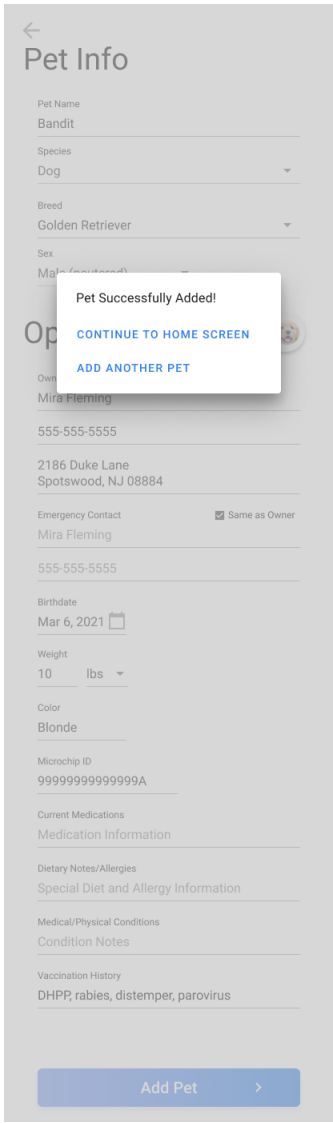
Task 1 - Screen 5	
Task 1 - Screen 6	

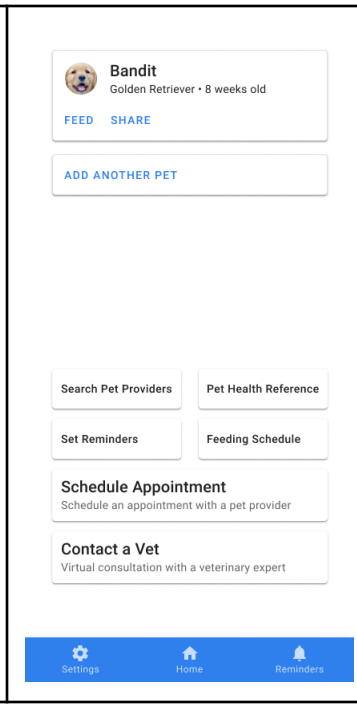
Task 1 - Screen 7

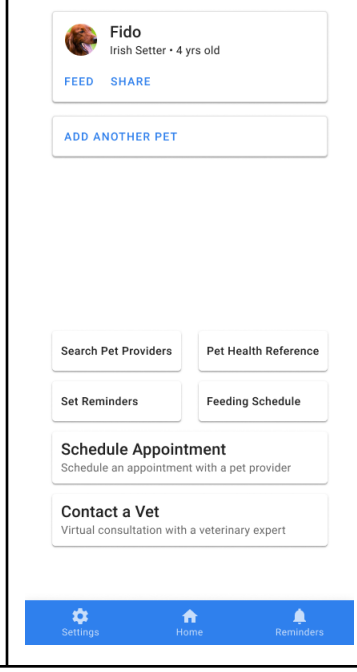


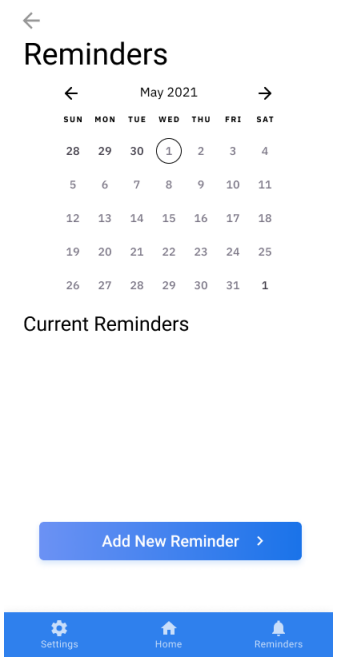
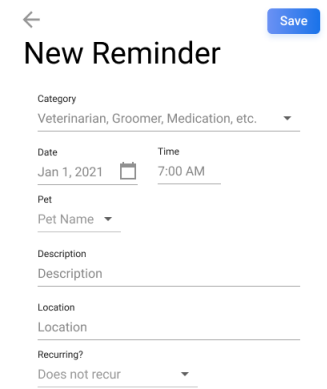
Task 1 - Screen 8

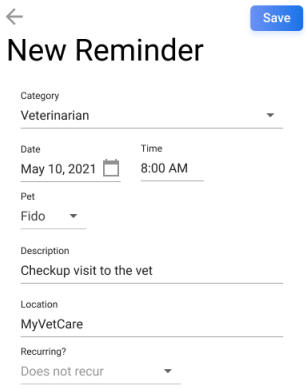
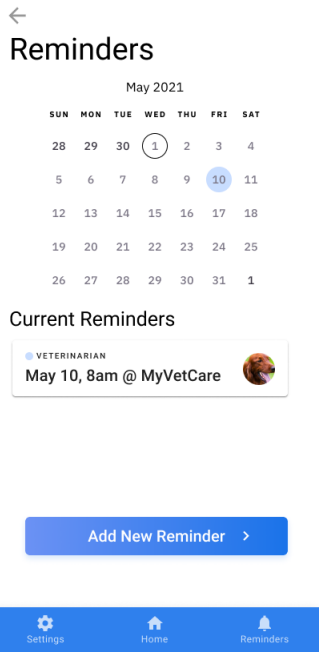


Task 1 - Screen 9	

Task 1 - Screen 10	

Task 2 - Screen 1	

Task 2 - Screen 2	
Task 2 - Screen 3	

Task 2 - Screen 4	
Task 2 - Screen 5	

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