

Mobile App Design Specification

Animal Crossing: New Horizons companion application

Kenneth Huynh

Contents

Application Concept.....	3
Competition and Innovation.....	6
Feasibility and Technology.....	7
Interface Design and Storyboard Mock-ups.....	10
Scope and Limitations.....	12
Estimated Project Timeline.....	12

Application Concept

The recent release of the highly anticipated Nintendo Switch game “Animal Crossing: New Horizons” has gotten the attention of large audiences worldwide. The game features many aspects such as collecting, building and decorating which is left as hidden information within the game for the player to find. Many players are interested in collecting everything and decorating their island to their desire so as a result there has been a rise in demand for a way to keep track of their progress in a more convenient manner as well as be able to plan ahead for which villagers and island appearance they wish to have. The Animal Crossing: New Horizons companion application will satisfy these needs.

The audience of “Animal Crossing: New Horizons” consists of both males and females from all age groups interested in a non-intensive game; therefore, the general audience for this application will be the player base of the game. To be more specific though, the target audience for application will be people interested in investing their time in improving their Animal Crossing island because this applications purpose is to provide easier approaches to plan for the future and keep track of their progress in the game centralised in one place. This means that devoted fans of the game have a greater stakeholder presence than casual players of Animal Crossing. This software will also be made for the iOS platform thus it will further narrow down the audience to users of this platform.

The application to be built consists of features providing users with more convenience to oversee their advancement such as their collected critters and fossils, reminders like daily tasks as well as allowing them to plan for the future which include layout customisation, a turnip price log and calculator, recipe sources and ingredients and upcoming limited time events. Other features a part of the application will be support for users to choose their hemisphere.

Breaking down these functionalities down into finer details, the software will help the user track progress by having categories of collectables with their respective details that will be easily accessed from a screen listing each category separately. The main categories of collectables are fish, bugs, fossils and villagers. For fish, bugs and fossils they will have an option for the user to filter each collectable by their name, price, owned/caught, rarity, donated. This allows users to find out what the most profitable critters are, which ones they have left to collect and see if they have an item worth showing off to their friends due to its rarity. Each entry in these categories will also give the user an option to specify if they have caught it before and if they have donated to the museum already. As for villagers, they can be tracked by a similar fashion but without the price, rarity and donated filters. If the user is curious, there are pages for every entry in each category that detail about its location and time frame for which it can be found and caught for critters, and for villagers their type, species, gender and birthday. This functionality will allow players effortlessly track their current and future assets.

Furthermore, users may want a more compact summary of what they have done so far. The companion application can solve this by implementing a feature that shows the statistics of their island so far such as the percentage of fish, bugs and fossils collected so far. There can also be charts for different species or personalities of villagers on the island currently. Another problem is that users may want to also have a summary of the collectables available for a limited amount of time and to do this the application will get the users input if they are from the northern or southern hemisphere to determine the available collectables for the current month. Thus, another statistic can be shown which

illustrates what has been captured out of the creatures that are available for the current month. This functionality will allow players to have more control on how they view their progression of the game.

When users play the game for long enough, they will be introduced to island customisation and this allows them to have creative freedom over the look of their island but the game itself does not provide a convenient way of customisation their future island appearance. Thus, a functionality that will assist the users island designs would be a dedicated section of the app for drawing and mapping out their island appearance. The tools available for use will include placeable icons such as villager houses and bridges and a brush to paint out certain layouts. The map designer will also contain colours that correspond to the colours that show up on the in-game mini-map view on top of this the map editor will be split into grids similar to the mini-map so that users will find it familiar so the experience will not be jarring. To make the editor handy it will also contain a button to undo their previous actions in case a mistake is made so that the user does not have to paint over their slipup or delete icons manually. Sometimes players also want to show off their island designs to friends or create multiple custom layouts to fit certain themes and events, so to satisfy this desire the application will allow them to save their map creation into photo storage for future reference.

Another important feature a user might look for in a companion app are reminders for upcoming events. Not everybody can easily remember all the tasks they need to do thus the application would resolve this problem by allowing users to receive a notification when an upcoming event is arriving soon such as the limited time “Bunny Day” Easter event. Another event that players may also want to keep track of are their villager’s birthdays, so they do not forget to give out a special present. Instead of an event maybe players also want to be reminded of what tasks they should do daily to maintain their island or gather daily collectable resources. To help them with this the companion application can include a dailies checklist of tasks that can be done like mining resources from native rocks or collecting DIY Recipes from a bottle washed ashore. Finally, there may exist some other abstract reminders or tasks that the user may want to record and so to make it convenient for the user, the application will allow them to enter in custom notifications and create their own ‘To-Do’ lists.

An issue that comes with designing an island in Animal Crossing is that the player does not have their desired decorative items. This is because the player has not unlocked the certain DIY recipes yet. To fix this there will be a section in the application that will detail for each recipe what sources they can receive it from. Along with this, it will show other details such as the materials needed to build it so that the items can be stocked up before receiving the recipe; there are categorises shown for each item recipe so that the user can search recipes with this as a filter.

At a certain point Animal Crossing allows the player to create a theme song for their own island which is played when the player enters shops, starting conversations with villagers and other ways. Usually to create a song you will have to go through travel to the town hall and talk to Isabelle an NPC. To make this process quicker the companion app will allow the user to setup an island tune and preview what it would sound when played. Additionally, it would allow users to make multiple tunes and save them into storage for future reference when it is the case that they choose to change island themes.

Part of the Animal Crossing gameplay will have the user collect decorative items and fund structures or alter building locations. In order to do this the player will have to save up bells (Animal Crossing's in-game currency) in order to pay off these fees that they incur and so a well-known mechanic known has 'turnip stock market' where the player sells the turnips for a higher price than what they have purchased it for. In order for the player to make a profit the sell price pattern for the turnips must be recorded to make a future prediction, and so the companion application will accept these as inputs and then give out an estimate from these values for what the expected profit range will be. The user will be also be able to view this in a format that is easy to interpret such as a graph.

A way of enhancing the scenery of a player's island is by decorating it with different types of flowers. At the start of the game the player is given a set of native flowers but they can get more flowers through purchasing seeds or digging out flowers from other islands but there also exists another way to get different types of flowers which happens through a mechanic called flower breeding. The companion application can help with this process by simulating what the possible outcomes would occur if multiple flowers were to crossbreed. A separate section would exist for the user to select from the possible types of flower and then another option for the users to pick out the colours to crossbreed with; the resulting flowers will show the possible colour outcomes and how rare the likelihood of it is.

There can be a situation in which users switch devices or have multiple people that have access to the same phone that are also interested in tracking their progress so in order to compensate for this the companion application will have an account feature. This feature will take advantage of an online database to store the user's information such as the donated items and island design layouts. The user will have the ability to create an account with their email address and thus have multiple people using the application on the same device or the resync all their account data from the online database when transferring to another phone.

Competition and Innovation

Within the market there are currently several applications that have emerged to fill similar purposes. The two that will be looked at for analysis are 'ACNH Guide' and 'Guide for Animal Crossing NH' which can be both found in the Apple app store.

The first application 'ANCH Guide' has functionalities to help the user to track their progress for collectables by having separate category list for all the fishes, bugs and fossils. The application achieves this by having a list for each separate category with entries for easy lookup. For each entry in these categories there are check boxes that users can use to check-off their donation progress if the item had been donated to the museum and along with this there are details for every entry so it can further inform the users where they need to go in order to capture it, what time frame its available for capture and the selling prices. In the application there is another section that acts as a recommendation page for the what action the user can do next. It will suggest the which fish and bug to catch next from the currently available, prioritising the critters that are only available for the current month. An additional feature extends this functionality by listing all the available fish and bugs that can be currently caught in separate lists. For these recommendations to work, when opening the application for the first time it will ask the user for their input for which hemisphere they belong in and then structure the recommendations through this.

A strength for this app is that it assists usability and reliability by asking the user for their hemisphere location. It also allows for searching through names and their other details like location and month for more versatility for example when a user wants to search specifically for fish that only appear in rivers. Another strength is that the application sets a recommendation or goal for the user so that they themselves do not have to worry about finding out manually what is left to catch. There is an option to change languages for users that do not use English which can bring a larger audience towards the application. On the downside this application it does not allow for some summary that can give insight for the user like seeing overall the amount progress they have made through statistical graphs. The application also limited to only recording donated fishes, bugs and fossils when there are other important features that users may also want to have such as villager tracking.

The second application 'Guide for Animal Crossing NH', has similar functionalities to the first application for following advancement while also adding some new functionality. These include a daily checklist, upcoming events such as villager birthdays and a summary of the museum progress showing a fraction for each category what has been collected. It also has a section for villagers so users can find mark ones that are currently on their island and mark ones that they would like to have in the future. For each villager there are details about their name, gender, personality, species and their birthday which is shown in a list by a selection of filters.

A strength for this app is the way it helps users to keep track of their progress by having the statistical summary. Another strength of the application is that it reminds the users of what they should be doing every day on their island and allow users to tick it off so they can be assured. It also provides a reminder of birthdays for current residents on the island if the current month contains it which helps users improve their relationships with their residents. The weaknesses of this application include the assumption that the user is in the northern hemisphere and shows available fish and bugs from this which can be inconvenient for players that are in the southern hemisphere. Also, it does not consider

if the user has any other goals or things they would like to do, and it feels like a missing functionality since there is no way to create a custom checklist.

The Animal Crossing New Horizons companion application however will improve upon these weaknesses by implementing features that solve this. It serves a similar purpose which is to help enhance the users experience by having a convenient way for following island improvement. This application is not limited to just these improvements though, because it will implement some other unique features to differentiate itself from other applications in the market like the island tune maker, an island designer, how to find recipes and having ways to save user data. In this way the companion app will be more innovative and have many wanted features centralised into one application.

Feasibility and Technology

This application will be built for the iOS platform which is one of the top platforms well known from Apple mobile devices such as the iPhone, iPad and iPod Touch. The platform has over 2.2 million iOS applications available in the year 2019 and the App Store has gathered approximately \$54.2 billion (USD) revenue from app sales in 2019 and on top of this there are over 1.5 billion iOS devices in user since January 2020. These statistics provide a good indication of a well-established and successful platform which can make this companion application a good addition as it has the potential to be seen by a large audience. Also, the iOS platform promotes principles that each application in the app store must follow which are arranged into the section's safety, performance, business, design and legal. The guidelines show that the platform values products that improve and change to suit customers' needs because they want their platform to be the best it can be. With this standard and reputation, the companion application will be well suited in this environment as the app will also aim to suit users' needs and improve over time to achieve it.

To create such an application, many technologies come into play such as programs used to develop this app and frameworks. Apple themselves provide a way for coding applications through a software known as 'Xcode', which is an integrated development environment officially supported by Apple on macOS and iOS. This integrated development environment has a source code editor, Apple LLVM compiler to help parse code, debugging tools to help with any bugs and syntax errors and other mistakes along the way. It also provides a user interface builder so that parts of the code can be easily linked up to the parts by using the Assistant editor tool which presents related source code in a split windowpane for easy coding. Additionally, it will have an iOS simulator to simulate the how the product would behaviour and interact on the user on an iPhone and iPad. This will be the core technology utilising different frameworks and creating the user interfaces to realise the full product along with its deployment tools.

There are primarily two programming languages that are used when coding up a mobile application for iOS development which are Objective-C and Swift. When comparing the two, Objective-C was originally chosen by Apple to develop iOS apps but now Swift has been more prevalent due to it being developed and supported by Apple to be a faster, safer and more concise language. Some other advantages to using Swift is that its syntax complexity is simpler plus it supports dynamic libraries and is open source. Due to these strengths the Swift programming language will be used to create the companion software.

To satisfy the functionalities needed to build the companion application there are frameworks and other technologies used for a specific purpose such as a database for persistent storage. This will be used to keep track of settings and other inputs that have been made like critters captured. There will also be an online database used known as Firebase which helps with account creation and having separate accounts of user data. Firebase has many useful features such as cloud storage, authentication and ways to monitor the application. Furthermore, it allows for application flexibility because extra data can be added afterwards if there is a content update in Animal Crossing or any other missing functionalities. As an example the application may have some entries for fish but there turns out to be another that needs to be added so by editing the online database the application can resync with it and display the latest information to the user which helps with the reliability of the software. There is a chance that the user may not have a connection to the online database to get images from upon fresh installation so in cases like this the application will then show an alternative placeholder image from the local database.

To incorporate the ability for different user accounts for data storage, the WebKit framework can be used so that users can login into their accounts. It does this by displaying pages of interactive web content to the user which can display local and external webpages and provide scrolling as well as ways for the user to follow link through tapping it. Along with Firebase the application can get data from the cloud easily through requests for documents like JSON data. In the event that the connection to the online services are not possible the application can store user data locally until can get a connection to resync everything.

In order to keep track of the progress of users there will need to be a way to manage the graphical, event-driven user interface of the iOS software and the framework that is used to achieve this is UIKit. This framework provides deals with event handling for inputs to the application and can sort out text and how its displayed to the user, it also has an event handling infrastructure for delivering Multi-Touch inputs which can be useful for the mini-map editor. Using this the user will have the ability to zoom into further detail so they more precisely change the map appearance to their desire. Another framework that can be used to make editing easier is known as PencilKit which captures touch input and displays this in a drawing environment. It provides access to a canvas and a tool palette which can be utilised so the user can have creative freedom over how the mini-map should look with features such as a tool picker which has a selection of drawing tools and colours, an inking tool which defines the drawing characteristics such as the lines width and an eraser tool for erasing mistakes.

Some more frameworks that can be used is Photos and PhotosUI through PhotoKit which works with images and video assets managed by the iOS Photos app. It provides ways to create a new album add assets to a collection. This can be useful for the map editor and island tuner creator features as this allows users to save their designs into their photo library to share it later to other players or other reasons; Plus it will have a dedicated album in their photo library making it easier for the user to access since all photos from the application is stored all in one place. Another framework that was similar to this was AssetsLibrary but it this was documented as deprecated as of iOS 9.0 so instead of incorporating it PhotoKit will be used for better performance and features.

Through SiriKit there is are more frameworks that can be utilised for one of the applications features like Intents and IntentsUI. SiriKit handles user requests for the application, allowing the

implementation of extensions that integrate services with Siri and Maps. A feature that will utilise this technology is adding custom reminders or an extra entry in the TODO list for the companion software which will be useful for the user so they would not have to manually type out and list what goals they want to achieve.

Another framework that will be useful for the companion application is UserNotifications and UserNotificationsUI. The frameworks will make it possible to schedule local notifications for delivery and respond to user selected actions. Since the application has a feature serves as a reminder for what tasks they need to complete, they can set up a specific time and date that the event/reminder occurs so they can be reliably notified on the day. Other uses for it are push notifications for completion such as the daily checklist, so if the user has not done their daily checklist list yet and it is late in the evening, it can then remind the user so they will not miss out. It can also be useful for alerting the user of upcoming events like villagers' birthdays and even critters that have not been caught yet that will leave for in the next week.

Interface Design and Storyboard Mock-ups

Please refer to the attached PDF of artboards for more details.

To promote good usability the user interface will use some of the Human Interface Guidelines provided by Apple for their iOS applications. They provide UI Elements for use such as bars, views and controls to help match the iOS design language.

As seen in 'Figure 1' the home screen the element stays within the layout guides and safe area defined by UIKit which promotes good usability. Additionally, the colours considered for the application were for a variety of reasons. First there are different colours for each category tab to separate them visually and make it more pleasing to look at. Each colour used is a system colour provided by Apple which already has high contrast support as well as support for light and dark mode. Thus, the 'Home' view in 'Figure 1' will end up looking like the 'Home' view in 'Figure 2' when the device is in dark mode.

In 'Figure 1' the 'Home' title is within the navigation bar which is a conscious design because the Human Interface Guidelines state that the titles in the navigator should provide extra emphasis on context, and as shown the 'Home' title will make it clear which section the user is in; also the 'Southern Hemisphere' title will provide suggest the information provided will be tailored to users in the Southern Hemisphere which will be useful for the 'Critters Available this month' feature within the 'Home' tab.

Another part to point out is the simplicity of the navigation bar and how over-crowding with too many controls were avoided to aid usability and follow Apple's HIG. This can be seen in 'Figure 3' where there is enough space between each control. It uses the standard back button to pop back to the previous view which was done purposefully so the user knows that the button will let them retrace their steps through the hierarchy view.

Moving onto the tab bars, these were made so it appears in every context except for the 'Island Editor' and 'Tune Creator' features due to those functionalities providing a separate experience which is an acceptable reason when referring Apple's HIG. Furthermore, it follows the HIG because it avoids having too many tabs and is strictly for navigation.

For views, there are action sheets for filtering and setting functions. The HIG states that destructive choices must be prominent, and scrolling is avoided. These are all followed as seen in 'Figure 4'. An alternative view Alerts was also used in which provided feedback to the user if the image was saved successfully to their Photo's application. Tables were another view used to

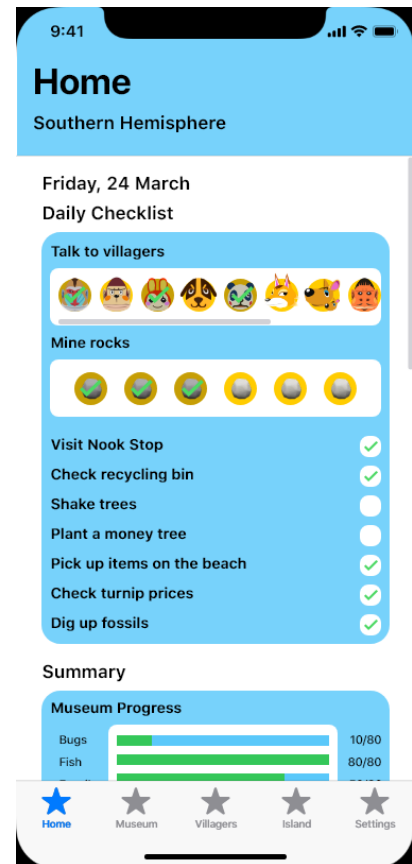


Figure 1: Home Screen

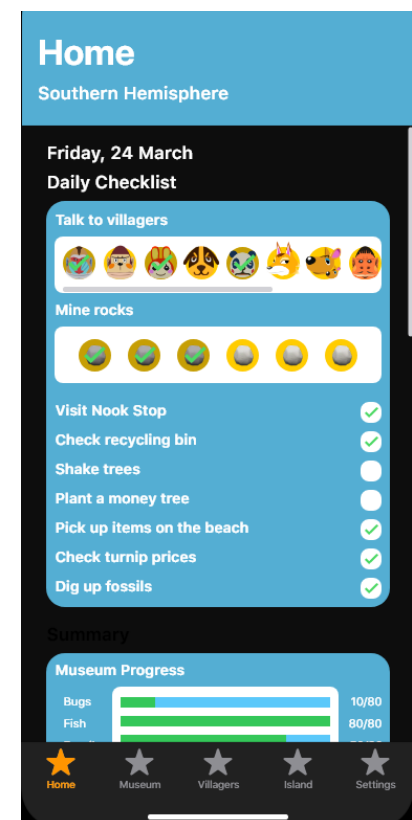


Figure 2: Home - Dark Mode

convey information as seen in 'Figure 5' the 'Goals' panel will contain table rows for each goal. It will be like the basic (default) row but instead of having an icon there will be colours to represent priority and once again the colour for this are system colours. The colour choice for this were red, orange and yellow to represent emergency where red is the most important and yellow is the least.

For navigation the app uses a combination of hierarchical navigation and content-driven/experience-driven navigation as defined in Apple's Human Interface Guidelines. Each category tab on the bottom bar will have multiple content tabs on screen to choose. These make up the hierarchical navigation as for the content-driven navigation on the 'available critters this month' feature will show the bugs/fishes page view. Please refer to the PDF chart attached to see the navigation structure.

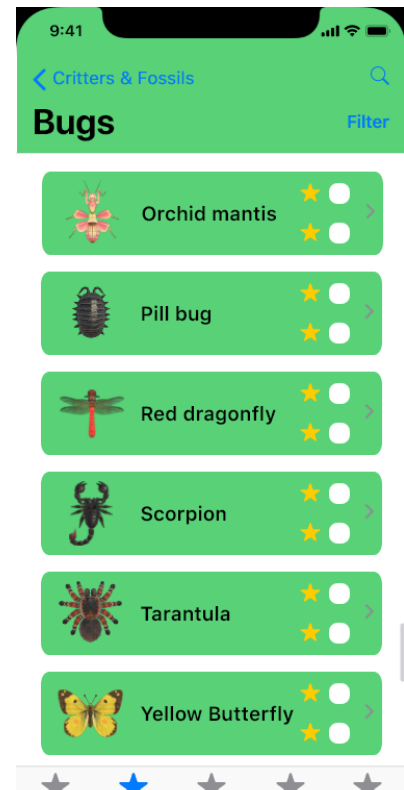


Figure 3: Bugs

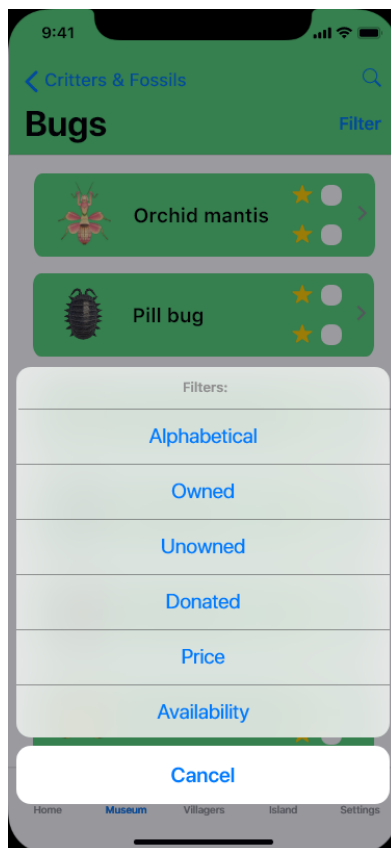


Figure 4: Bugs - Action Sheet

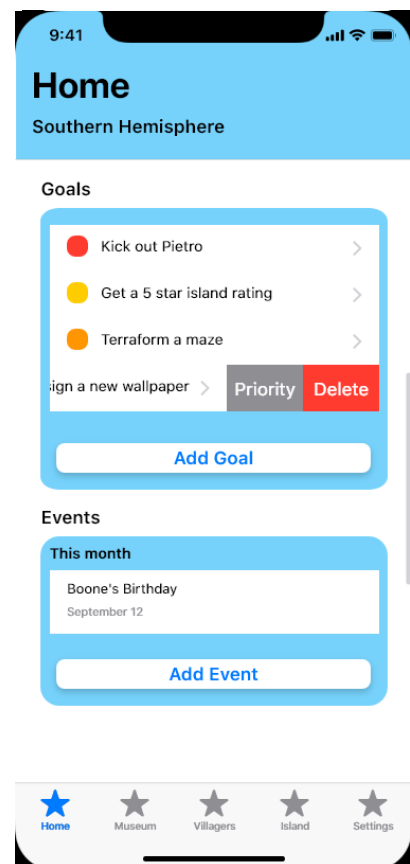


Figure 5: Goals and Events

Scope and Limitations

This application incorporates many features, so it is important make sure that development focuses on the most important features for the application to function well.

The functionalities given high priority for implementation include aspects from each category tab (Home, Museum, Villagers, Island, Settings); these will be part of the minimum viable product:

- To aid progression tracking the most useful are the daily checklist, summary of progression, events and bugs/fish/fossils along with their detailed pages
- Villagers and their detailed pages because players can plan out gifts and it will be linked to the events functionality so that users are reminded of their birthdays.
- An Island Editor which will help differentiate from other applications in the market
- Settings that allow the user have control over the application to suit their needs like changing hemisphere and be able to manage their account

Other functionalities are nice to have but not necessary to make the app to the public in a useful state:

- Dedicated section for available critters will not be as much of a big deal because it can be seen in the museum category through filtering.
- Goals/TO-DO list can be useful but is not as prioritised as the other ones above for progress tracking.
- The recipes functionality will be nice for the user as a reminder of what materials are needed and how to receive them but can be cut out if there is not enough time.
- A tune creator will be convenient not as useful as other functionalities because it does not help with progression.

Finally, there are features that will be eventually implemented into the application but later down the applications lifecycle due to time constraints such as:

- Turnip Calculator which would require algorithms and other graphs to give a useful insight for the user.
- Flower hybrids which requires a lot of information to be put into the database manually.

Estimated Project Timeline

The project development timeline is split so the features consider a part of the minimum viable product will be evenly distributed between each of the two prototype submissions and final submission.

The timeline be like the following:

From 'Week 6' to 'Week 9' the basic layout of the application will be made so the multi-tabbed categories are made. This includes the Museum and Villagers and Settings tab, and which will also have the pages associated within the section so there will be profiles for the bugs, fish, fossils as well as for the villagers. After this has been made there will be filtering options added in to categorise the profiles in a more convenient format. After this has been implemented there will be persistent storage set up locally and on the cloud. This will be implemented alongside the settings tab including changing hemispheres and the login functionality for separate user data storage.

From 'Week 9' to 'Week 12' the home tab will be implemented so that the checklist of daily tasks can be seen along with the summary of progress and events. While creating the events functionality there will also be local notifications implemented together with it. Finally, there will be the 'Island' tab added with the Island Editor as the last feature made in this timeframe.

From 'Week 12' to final submission the features implemented depends on the how well the development process has been. If there are still incomplete functionality from the previous time frame or bugs those will be fixed first. After, other features that were listed as a non-necessity can then be integrated such as the goals, recipes and available critters this month.

However, there can be setbacks that may impact development of the application. One being the recent pandemic impact and restrictions of the COVID-19 which can cause a lot of stress due to self-isolation and if family members are at home, they can be a big distraction. Another impact is the workload from my four other units (overloaded semester) because there are other assignments the balance of focus can setback some of the development; this also applies with balancing other personal commitments. On top of this, the development process may also be impacted due to the features to be realized being a lot harder to implement than originally predicted.