GNG2101 Report: Deliverable D.1

Detailed design, Prototype I, BOM

Submitted by

[A03, Team 15]

[Jonathan Florus, 300178425]

[Laura Godfrey, 300082954]

[Mashal Joyaa, 300082650]

[Bonnie Lin, 300162118]

[Quinn Murnaghan, 300168522]

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University of Ottawa

Abstract

This report highlights the details involved with creating the first prototype for the personal safety application. The conceptual designs generated by the team are presented to the client for feedback. The feedback is then used to update the team design. The team then created their first prototype after listing significant product assumptions. The team also created additional prototypes corresponding with defined objectives. Testing was carried out with an established purpose and the results were compared to the target specifications. The team also planned what they intend to discuss in the next client meeting. Moreover, the team provided a bill of materials for the prototype.

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List of Acronyms

Acronym	Definition
App	Application
UI	User interface
GPS	Global positioning system

1 Introduction

The client is in need of a personal safety application which can be used to automatically notify the user's contacts in cases of emergencies. The team has noted the client's needs, broken down the application into subsystems, and finalized conceptual designs. Subsequently, the team will propose their solutions to the client. The team will take note of the client's feedback and also pay attention to non-verbal cues that could express additional information needed for the creation of the application. Moreover, the team will update their original design to adhere to the suggestions made by the client. Group members will then identify critical product assumptions. In order to test the generated list of assumptions, the team will create their first prototype of the personal safety application. The team will define the purpose of the prototype as well as what aspects of the application they plan to test. The results from testing the prototype will be compared with the previously produced list of target specifications. Furthermore, the team will plan what they intend on demonstrating for the client during the next meeting, as well as creating a bill of materials.

2 Second Client Meet

2.1 Client Feedback

During the client meeting, the team introduced the main points of the conceptual designs that were previously generated. The team showed the client the homepage of the application which included a check-in button, a button to commence a timed activity, and an emergency call button, as well as a button for a drop down menu. The buttons are indicated with icons, which the client thought were adequate as she was able to identify the functionality of most of them; however, some were slightly unclear to the client as the figures in the buttons seemed interpretative. The team informed the client that the buttons will have words associated with them in later prototypes, which the client thought was a good idea. The group asked for feedback about the overall layout of the UI, such as the button size, the button placement, and the colour scheme. The client thought the button sizes were good, especially the check-in button since it took up the most space on the homepage and that is the feature she would be using the most. She also stated that the colours were distinguishable so that she has no trouble differentiating between them. The team also asked the client more specific questions regarding her vision for the application. She commented that she felt approximately two confirmation notifications before the application sends an alert to the user's contacts would be enough; 30 minutes between these two notifications and 10 minutes before the notification stating that a text will be sent out to the user's contacts were ideal time frames proposed by the client. The client also stated that about 30 minutes after not responding to a check-in notification would she want a followup check-in, as she could be in the process of doing an activity that could keep her away from her device and she would like to avoid unintentionally alerting her contacts. It was mentioned by the team that in the case of an emergency, 30 minutes may be a long time; however, the client stated that the main idea of the application is that she is not without assistance for an entire day. She also proposed that these time intervals could be customizable in the case that different users would like a quicker followup check-in notification, or a slower one. The client also requested that the check-in should not simply be a button that the user can tap, but it should require written confirmation to ensure the user is of sound mind. The client also requested that written confirmation is required before the user decides to turn off the functionalities of the app in order to avoid accidentally sending an automatic text to her contacts. The team also proposed the absence of GPS tracking during a timed activity, given time constraints; the user was hesitant on this idea, but reacted positively to the suggestion that the user could enter their location before beginning an activity, such as a hike, and if the user requires assistance, then the application can use the recorded location and add that into the message that would be sent out to their contacts.

2.2 Updated Design

The flowcharts demonstrate the overall updated concept and its subsystems based on the client feedback. Following the process indicated in the overall conceptual design, the check-in

function subsystem is one of the first to be utilized as it requires the user to enter their preferred check-in time. Subsequently, the daily reminder notification subsystem is then implemented as the client requires notifications to be sent to her device to remind her to check-in. The check-in subsystem is then required to follow through the steps of ensuring the client is safe. If the client has gotten into an accident and is in need of assistance, the emergency text system is activated. Moreover, if the user decides to use the timed feature for an activity such as a hike, the hiking system subsystem is triggered. The hiking subsystem requires the use of the emergency text system if the user experiences an accident during the activity. Additionally, the user may also choose to turn off the application for a certain period of time, in which case the application will begin operating the turn-off function subsystem. This subsystem affects the entire application as it shut downs all the associated subsystem functionalities.

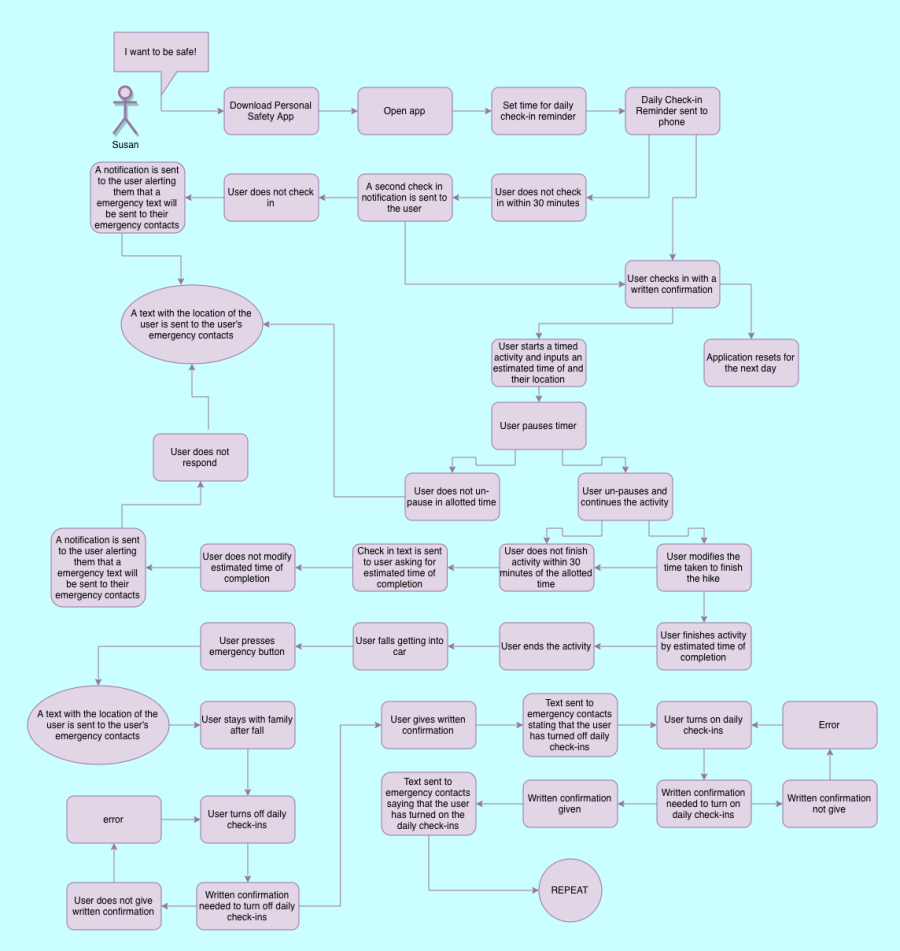

Figure 2.2.1: Overall Concept

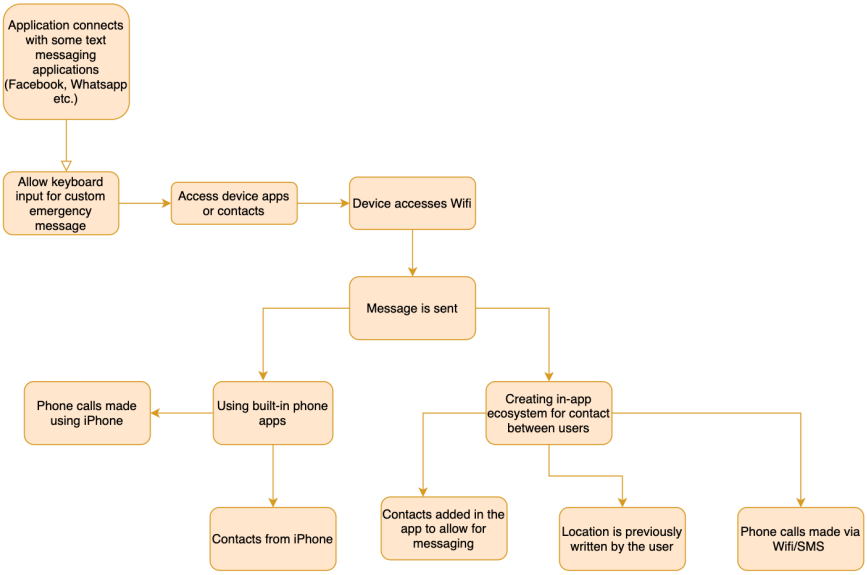

Figure 2.2.2: Emergency Text Subsystem

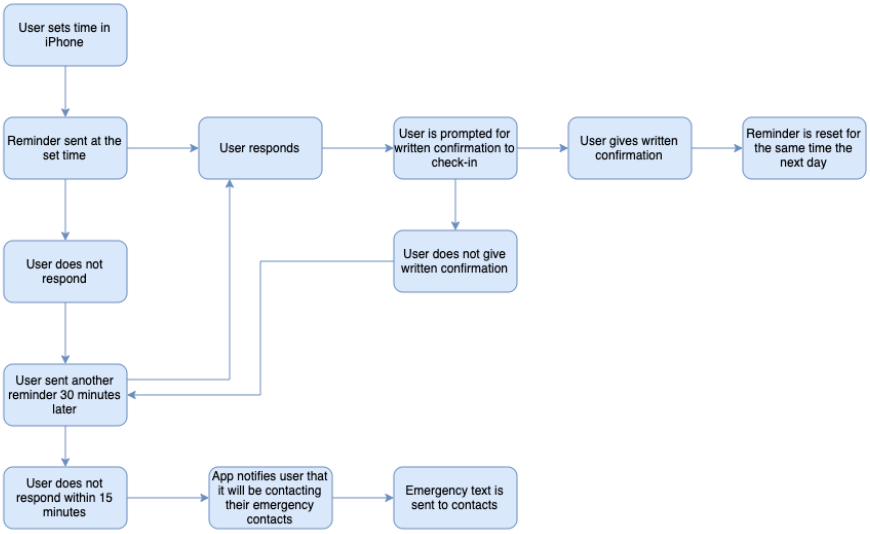

Figure 2.2.3: Check-in Function Subsystem

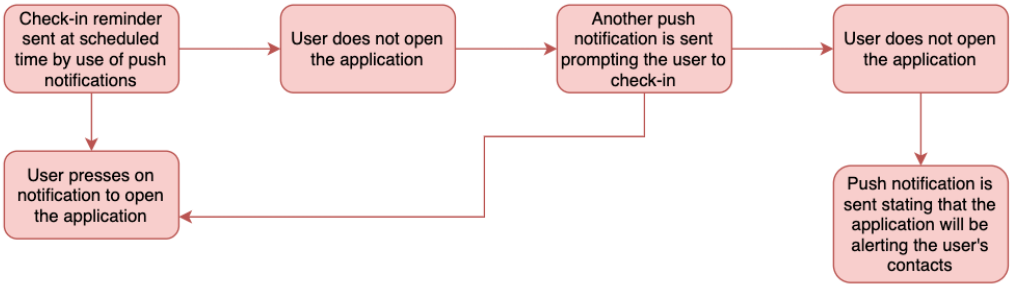

Figure 2.2.4: Daily Reminder Notification Subsystem

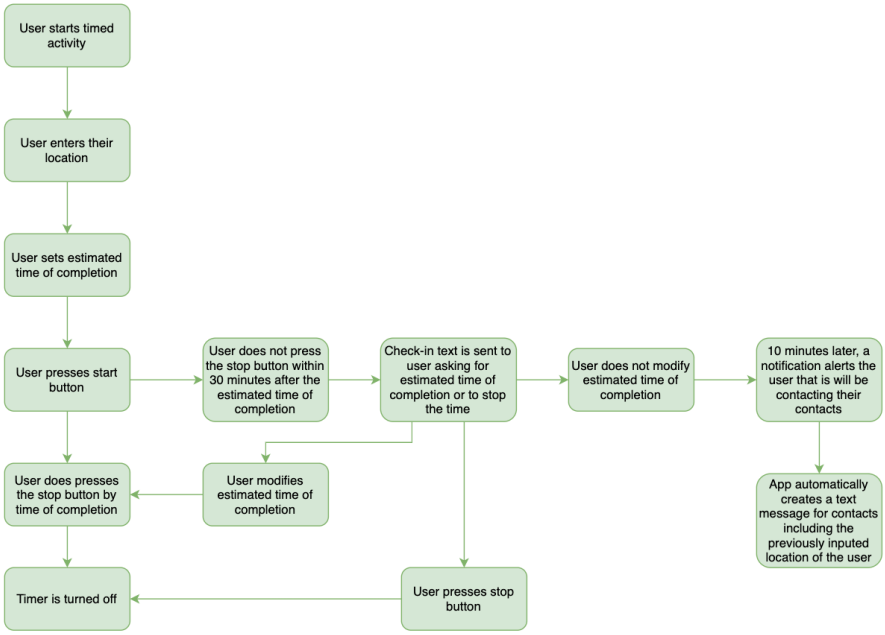

Figure 2.2.5: Hiking System Subsystem

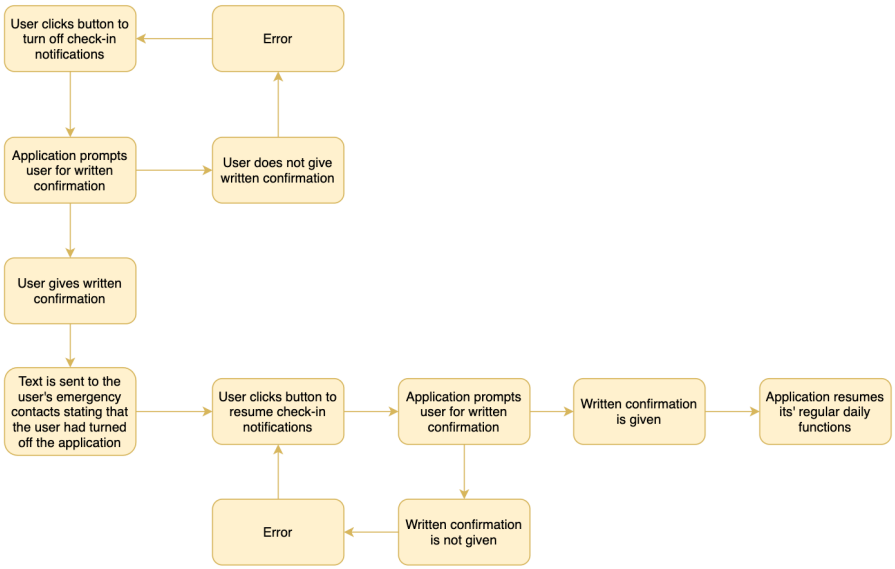

Figure 2.2.6: Turn-off Function Subsystem

3 Prototype I

3.1 Prototype Assumptions

As the project concerns the development of a software application, the specifications do not include many numerical target values. It mainly focuses on the implementation of various critical functionalities requested by the client and their level of performance. The first main assumption is a working homepage. The homepage should include three buttons, one for the user to check-in, one to begin a timed activity, and one to call the user's contacts in cases of emergencies. These buttons should all have the ability to allow the user to tap on them and can redirect the user to a different screen. After tapping the check-in button, a message should follow up requesting written confirmation from the user. After pressing on the activity button, the user should be redirected to a screen showing all the features within the activity function. Furthermore, a written confirmation following the activation of the emergency button should be displayed. Along with the main buttons on the homepage, there should be a drop down menu available for the user to access other features, such as general settings, a feature to modify check-in times, and a function to turn off the app.

Moreover, the team identified the necessary components required to develop the application. The team must use Xcode in order to develop software suitable for the client's iPhone and tablet. The team also requires the use of Android Studios for the production of the application. Additionally, team members must install Flutter in order to begin the coding process. These three softwares are required for each member of the team.

3.2 Prototype Development

The team created three different prototypes corresponding with different objectives. The prototypes were developed and tested in order to compare with the target specifications that were previously developed. As the team is working on a software product, the specifications relied mainly on the implementation of certain working features, rather than on numerical values; thus, the testing phase of the prototypes did not produce specific values that were then compared to the target specifications, but rather to ensure the prototype was able to fulfill the features requested by the client.

Prototype 1:

Prototype one focused on the development of the user interface elements as specified by the client during client meet one. The main focus was having one large button for the client to check in, and two smaller buttons to enable hike mode and emergency features. A secondary goal was to write the app such that it would be able scale up and down depending on the size of the screen the application was being used on. On the left is a tablet scaled down and on the right is a phone, the emulation software takes into account the screen size of both devices to give developers an accurate depiction of what their application will look like. Overall, as a team the goals set for prototype one were accomplished.

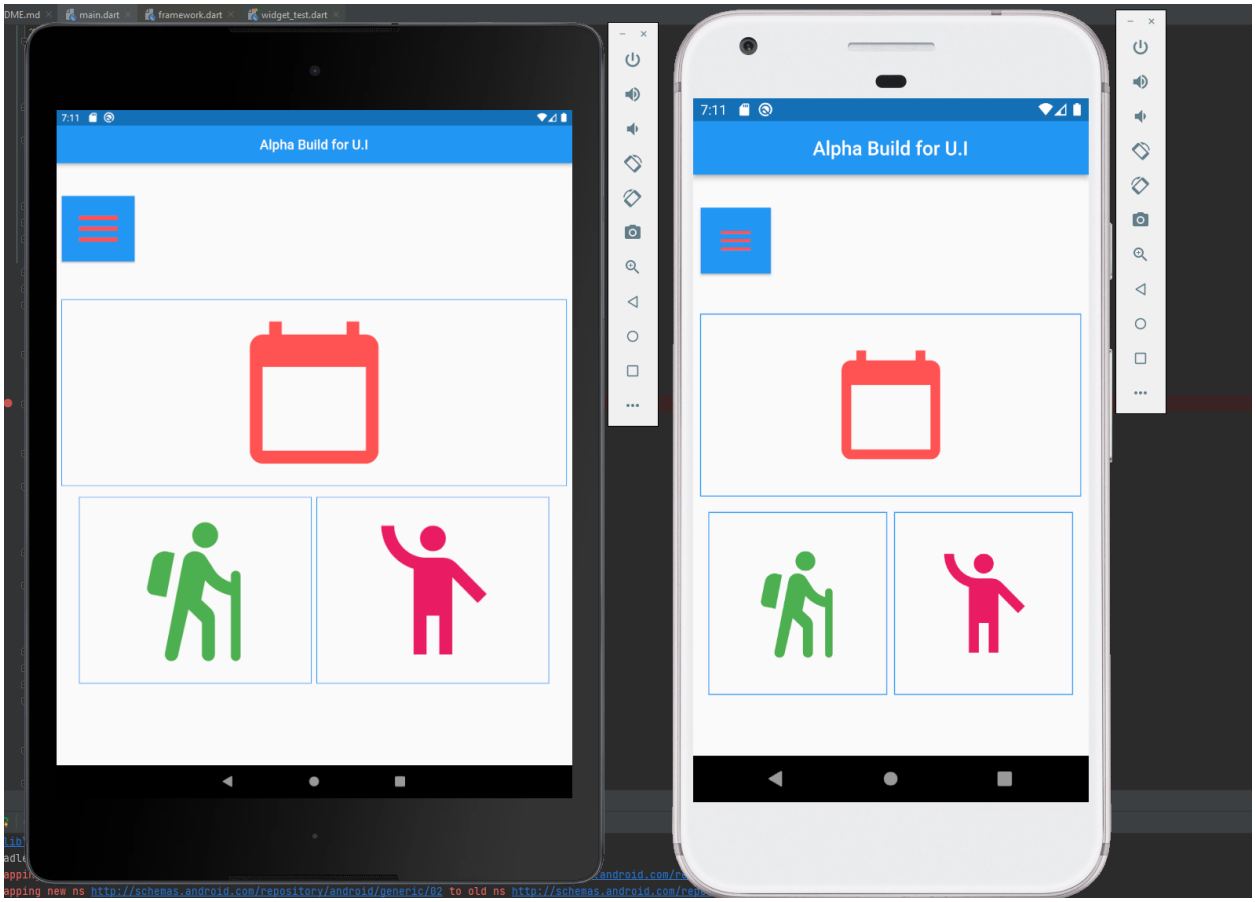

Figure 3.2.1: Prototype I

Prototype 2:

After client meet two, the client made some critiques on the user interface, she did not require different colored buttons, she preferred light colors against dark colors and did not mind having a smaller menu button inorder to navigate option menus, and finally she wanted the buttons to be labeled. This prototype focused on the drop-down menu and the creation of icons with text underneath. An issue occured with creating the check-in button during the creation of this prototype so it was not completed.

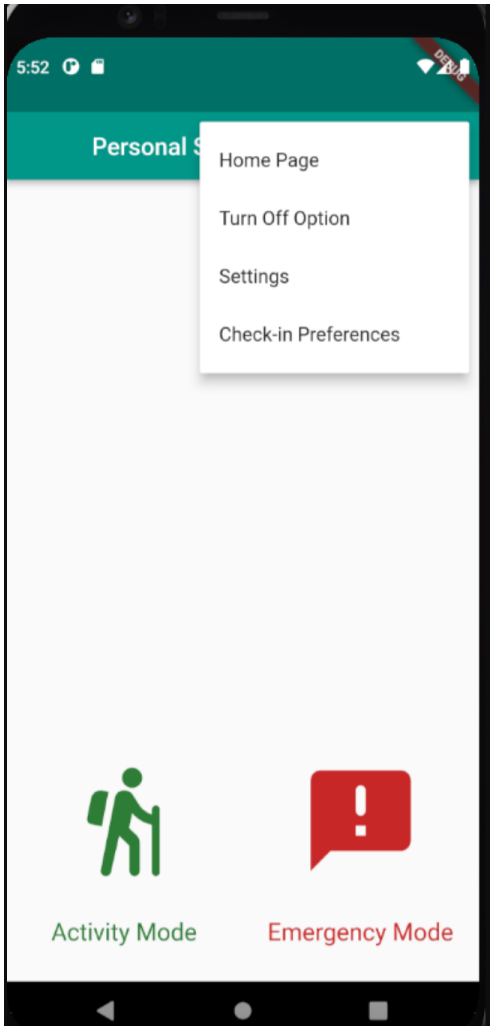

Figure 3.2.2: Prototype II

Prototype 3:

This is the final iteration of the user interface for the client, and meets all the requirements outlined by the client. It possesses buttons that are ready to implement followup pages, as well as clearer icons and text to indicate the functions of each button. The prototype also kept the general design from the first prototype shown to the client, as the client seemed to react positively to the overall layout.

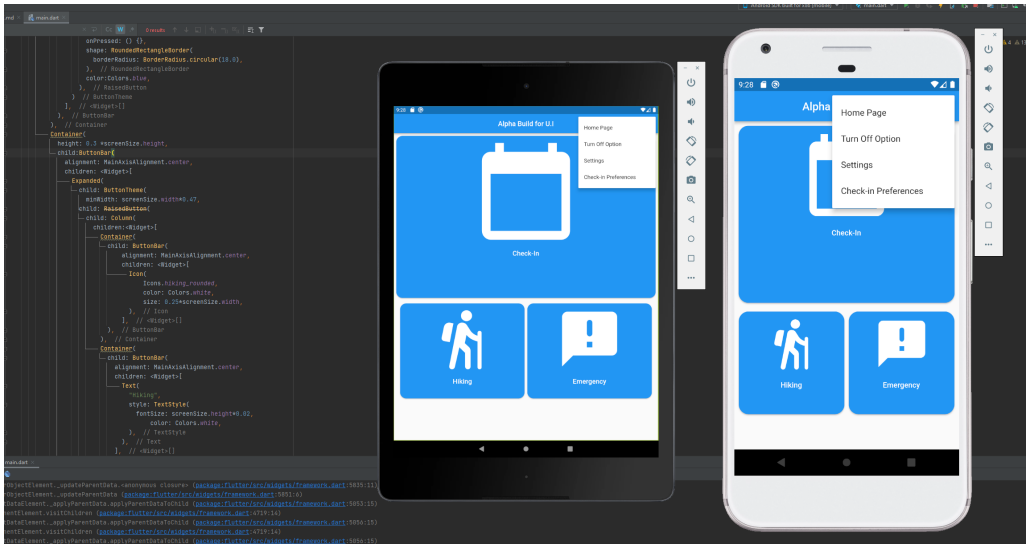

Figure 3.2.3: Prototype 3

3.3 Prototype Testing

Specific test objectives were created and prototypes were made in order to test these assumptions. Most of the objectives were focused on the homepage as the team mainly wanted to have a basic visual prepared for the second client meeting, and subsequently the team could build off the feedback given for the homepage. The team made two other prototypes in attempts to satisfy the client's needs, but since the group will not be meeting with the client during the production of these prototypes, testing for aspects such as the ease of use and the level of button visibility were decided as a team. In a general sense, testing for the prototypes included ensuring the code was able to compile, and that the user interface was able to be viewed on multiple devices. Lastly, each button has a built-in animation which was successfully triggered by clicking on them with a mouse. Next, the drop down menu works as expected on both devices as well.

Test objective	**Target specification to be compared with**	**How the prototype attempts to meet the specification**	**Results**
Test if the application has functional buttons	Application has a check-in, hiking, and emergency feature	The team coded 4 buttons on the homepage; the check-in button, the hiking feature, the emergency button, and the menu button	The team was able to include buttons in the application with the addition of animations when a user taps on them; however, the team has yet to test how the buttons will redirect the users to a different page
Test if the application is	Application is easy to	The team included	The client recognized

understandable to the client	understand	icons for each button that corresponded to their functions.	the function of most buttons; however, the client thought the “call for help” button was unclear
Test if the application is easily visible to the client	Application has contrasting colours	The prototype displays the homepage with contrasting colours, such as vibrant shades of blue, green, pink and red on a white background	The client was content with the overall layout; however, the client mentioned that she preferred light against dark shades rather than highly contrasting colours
Test if the application has large enough button sizes for the client/Test if the different button sizes appropriately relate to its importance (ie. larger buttons for more important features)	Application’s main focus is a check-in function	The prototype displays a check-in button larger than the activity button and emergency button	The client was content with the sizes of the button, especially the larger size of the check-in function
Test if the display is appropriately modified when switching devices	Client would like to use the application on her iPad and iPhone	The application is written to be able to be viewed both on a tablet and on a mobile phone	The emulator showed that the display of the application was able to be scaled up and down from a tablet and a mobile phone

Table 3.3.1: Prototype I Test Objectives

Test objective	**Target specification to be compared with**	**How the prototype attempts to meet the specification**	**Results**
Test if buttons can have written text associated with them	Application is easy to understand	The application has written text associated with the activity and emergency buttons	The team was able to code text with the icons; however, the team was yet to prove that coding for text to appear with actual functioning buttons was possible
Test if a more muted colour scheme would	Application has contrasting colours	The prototype uses the same colour scheme as	Team members reviewed the new

make the application visible for the user		before, but has darker shades	colours and agreed that they better represented what the client meant when she said she would prefer darker shades against light shades

Table 3.3.2: Prototype II Test Objectives

Test objective	**Target specification to be compared with**	**How the prototype attempts to meet the specification**	**Results**
Test how visible a colour scheme consisting of light against dark will be for a user	Application has contrasting colours	The application uses a blue and white colour scheme with shades that are differentiable	The team collectively decided that all the features are fairly visible with the new colour scheme
Test how clear the buttons with icons and associating texts are when representing its functionality	Application is easy to understand	The application uses updated icons for each function and added text	The team collectively decided that the updated icons and text better represented each button's functionality and was able to identify the use of each button
Test if the buttons with icons and text are functional	Application has a check-in, hiking, and emergency feature	The application has buttons with animations appearing when a user clicks on them	The team was able to write the code in order to include buttons; however, the team has yet to attempt to test if the buttons can open up to a new page

Table 3.3.3: Prototype III Test Objectives

4 Client Meet 3

For the third client meeting, the team plans on demonstrating the second prototype to the client. The team will emphasize the changes made according to the feedback received during the second client meeting. Such aspects include the added text to buttons, increased time between check-in notifications if the user does not respond to the first, and emphasis on written confirmations by the user before alerts are sent out or to confirm check-ins. The team will also introduce the functionalities of the application that were not previously shown in the second client meet. The team will aim to create a prototype that showcases a functioning notification

system, hiking function, turn-off function, and more. The team intends to receive additional feedback from the client. Feedback that the team is specifically looking for is comments regarding the ease of use of the application and if the subsystem functionalities meet the expectations of the client. The team hopes to receive enough information about the client's review of the application in order to improve the prototype for design day and the fourth client meeting.

5 Bill of Materials

There are a series of products that will be paramount for the success of the product. To start, the 3 Development platforms that the team will be using are Xcode, Android Studio and Visual Studio Code. For the students on non-apple machines, the choice of using Visual Studio and Android Studio is up to the individual. For the team member who is a Mac user, Xcode will be used for IOS simulations and running tests on pre-owned IOS devices. The language that will be used to write the programs is DOT; however, the team will be primarily using a development kit called Flutter that is written in DOT. Bluestacks will be used for testing various subsystems on an emulated device. Finally, an Apple Development account may be purchased if necessary in order to create a free TestFlight for the client. This will permit the team to send a version of the application that can be used by the client for an indefinite period of time.

The goal of this project is to reduce costs as much as possible, the main issue the team has is launching the application onto the app store. Doing so would cost approximately $140, not including the potential cost to launch the application on the Appstore. Combined, the total cost would exceed $500. As a result, it is very unlikely that the team will be able to purchase an Apple Developer account, and it will only be done if absolutely necessary.

Item Number	Item Name	Description	Quantity	Unit Cost (After Taxes)	Extended Cost (After Taxes)
1	Xcode	Development environment	5	$0	$0
2	Android Studios	Development environment	5	$0	$0
3	Flutter	UI software development kit	5	$0	$0
4	Bluestacks	Android Emulator	1	$0	$0
5	Visual Studio	Development	2	$0	$0

	Code	Environment			
6	Apple Developer Account	Developer Account	1	$137.56	$137.56
7	IOS Devices	Pre Owned Hardware	3	$0	$0
8	TestFlight	Beta Testing Program	1	$0	$0
Total					$137.56

Table 5.1: Bill of Materials

6 Conclusions and Recommendations for Future Work

Overall, the team met with the client and proposed their previously generated conceptual designs for feedback. The team utilized the feedback to update their overall concept as well as their subsystems, identify vital product assumptions, create prototypes, and carry out prototype testing. Moreover, the team identified their tasks in preparation for the next client meeting as well as producing a bill of materials. Moving forward, the next steps are going to focus on adding the necessary subsystems needed for each button to function. Additionally, each button created in this deliverable will need to have the ability to open a new page with an interface that the client can understand. The team will begin to work on the different subsystems and aim to have them functioning for the next client meeting. With all parts functioning, the application can prove to be useful not only for the client, but also for many elderly individuals who would like a sense of security.