

**GNG2101**

Introduction to Product Development  
and Management for Engineers  
and Computer Scientists

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**Project Deliverable D: Detailed Design, Prototype 1, BOM, Peer**

Group B-14: Personal Safety

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## **Abstract**

The purpose of this report is to analyze and test the prototype that was created for this deliverable after implementing the feedback received from the client. Along with this, we were able to create a Bill of Materials (BOM) needed for the project.

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## Introduction

Prototyping is an important part of the design process. A prototype is a working model of our product created for the purpose of demonstrating our concepts. We presented the client with our design concepts during the meeting. We improved our design concepts and created a low fidelity prototype based on the feedback we received.

Using our knowledge from SEG2105 on app design, we created a prototype which was heavily based on our user interface. We have included annotated diagrams on each page of our app explaining their functionality. Our prior experience in testing programs and web developments was used to create a list of criteria for testing our prototype. We asked average users to rate our designs on a scale by providing them the list.

After creating our prototype, we were able to better understand the kind of materials we would require for the final product which we listed in our report along with its cost. This report also outlines our goal for the future client meeting.

## Client Feedback

During our second meeting with our client, we were able to show her our first prototype. We received the following feedback:

- Does not care about the design as long as it is simple and intuitive.
- Found design intuitive as we were explaining it.
- Commented that the font size was perfect for her.
- Expressed desire for a user manual/instructions, noting she may forget some functionalities.
- Add delete contacts button.
- Look into calling 911 and make it a two step process (ex: "Click here to confirm 911 call").
- Have an option for the app to wait a certain amount of time when the user's phone dies. Have an option to send emergency contacts a message notifying them that the user's phone is out of battery.
- Have the app automatically detect location and allow the user to turn it off/on
- Allow the user to choose their "go-to" emergency contacts and be able to edit it - Include this in the "My Profile" page.
- Create another page for when the user clicks "alert emergency contacts" and double check with the user.
- Set a notification that checks in with the user everyday at the same time (also allow the user to edit this time) - Include this in the "My Profile" page.
- Add an instructions page.
- Use different colours for daily check-ins.
- She prefers the colors olive green, orange, blue and turquoise. But also reiterated that the design was not significant to her.

# Design Concepts

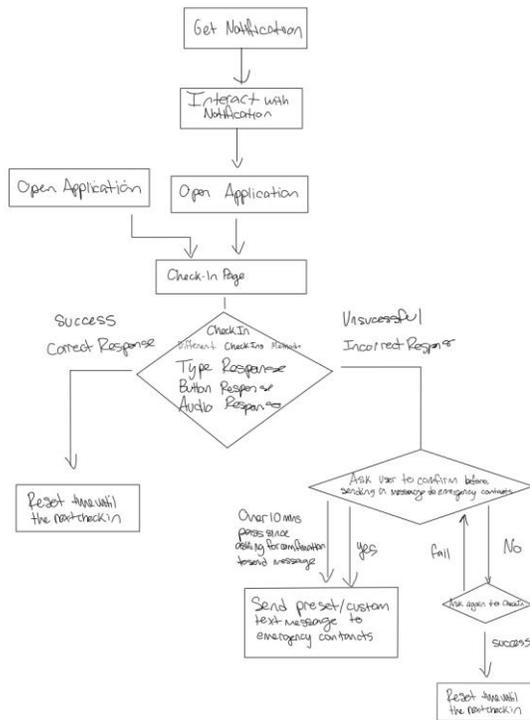


Figure 1: Case: User Attempts to Check In

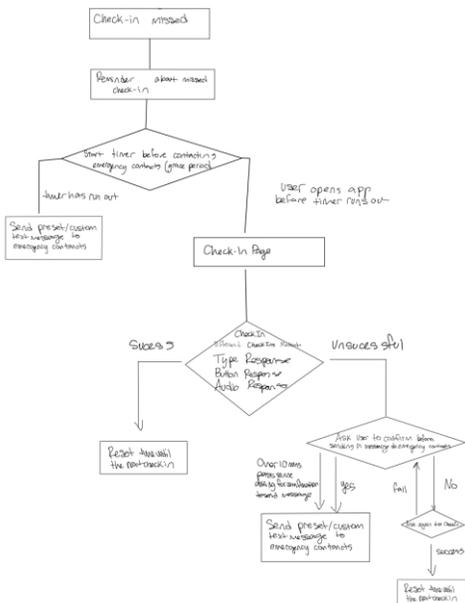


Figure 2: Case: Missed Check-In

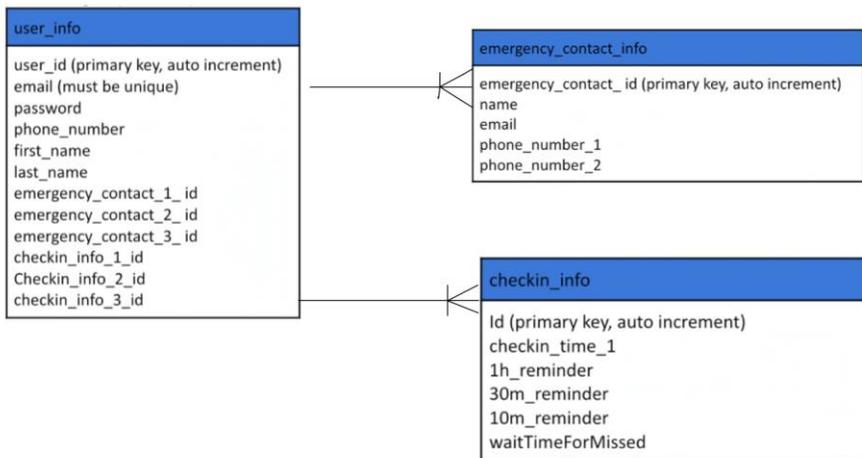


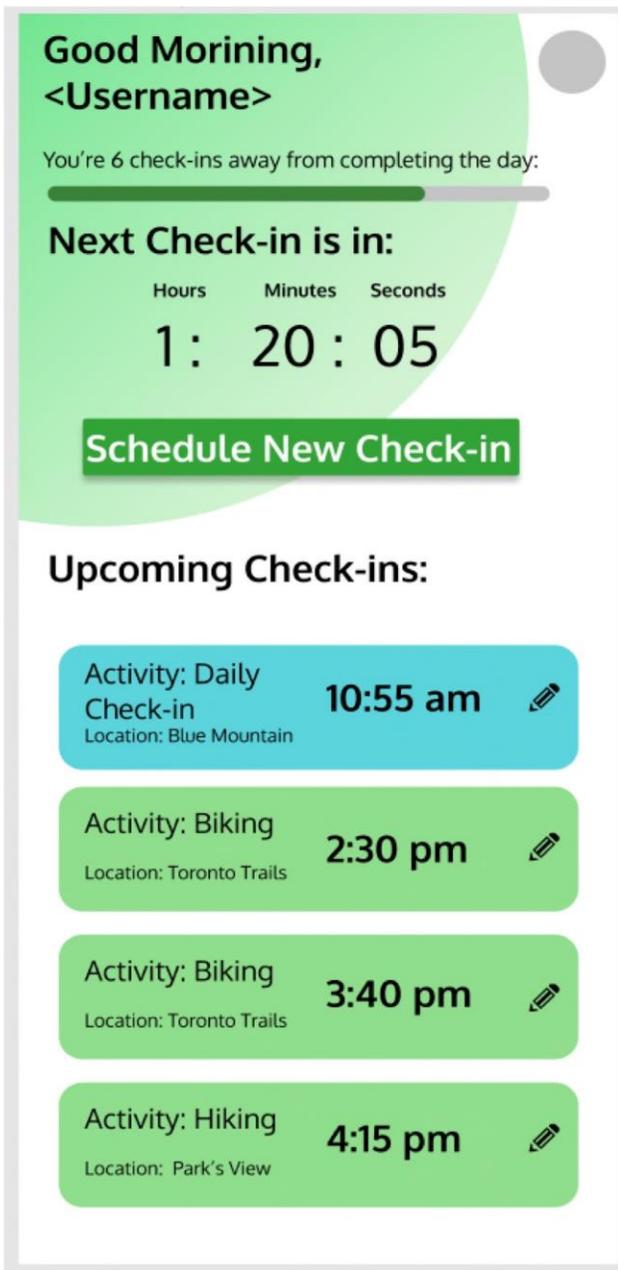
Figure 3: Database Design 2 (relational)

## Critical Product Assumptions

- We are assuming that all the functionalities listed above will be implemented in the final product.
- For the user interface satisfaction rating, all our users will be using the same scale (1-10) to rate the UI.
- The design concepts are based on building an iOS application so that it can be compatible with the user's device
- We are assuming that the coded user interface will resemble our prototype's

# Prototype

## Home Screen - Default View



← leads to profile screen

progress bar

count down until next check in

← leads to Create New Checkin screen

← daily check ins are a different colour than one time check ins

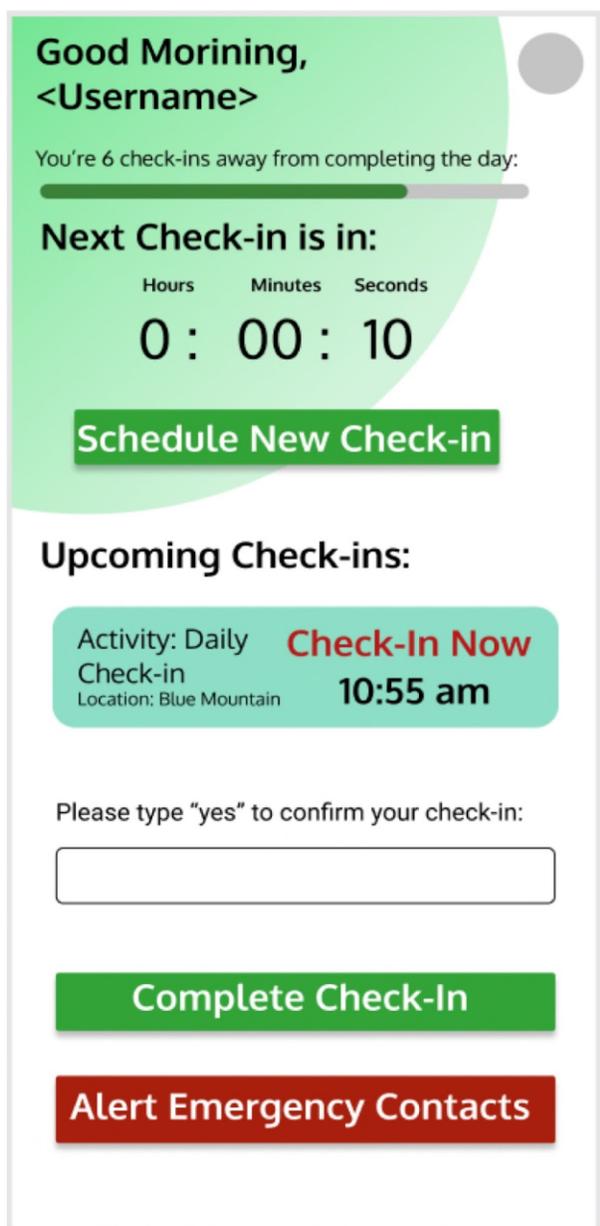
tap on any check-in within ~20m of the check in time, it will change colour and change to

Home Screen - Completing a Check-In view

Figure 4: Default Home screen view

## Home Screen-Completing a Check-In View

Result of tapping on check-in within a predetermined time of the check in.  
(typed response)



← leads to profile screen

progress bar

count down until next check in

← leads to Create New Checkin screen

← selected check in changes colour.

User can now complete the check-in

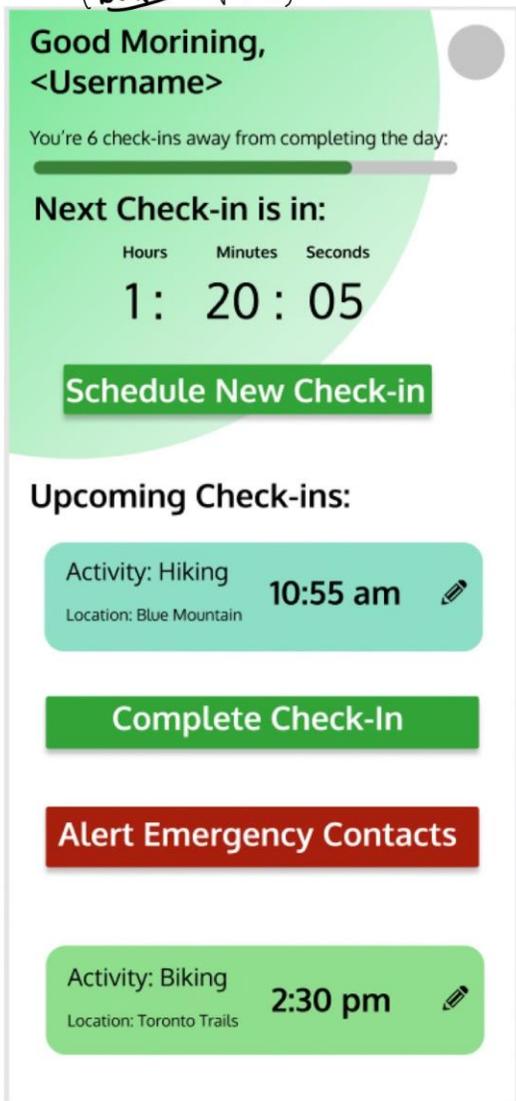
← completes check in, resets timer if needed

← leads to Confirm Alerting Emergency Contacts screen

Figure5: Home screen view when completing a check in within the check in time frame

## Home Screen-Completing a Check-In View

Result of tapping on check-in  
(button response)



← leads to profile screen

progress bar

count down until next check in

← leads to Create New Checkin screen

← selected check in changes colour.

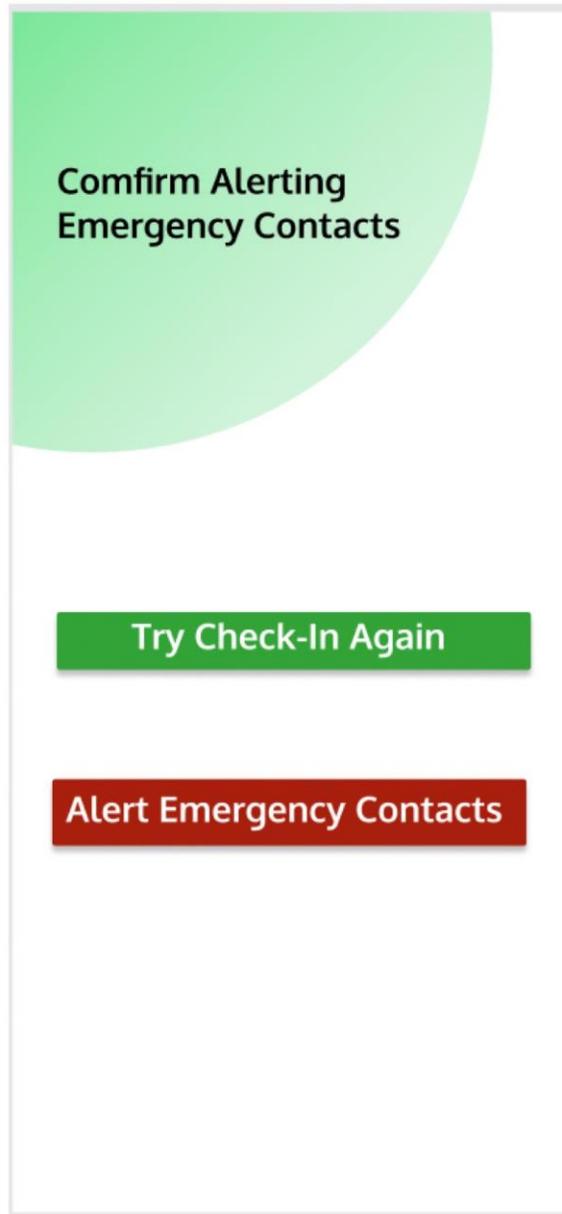
← completes check in, resets timer if appropriate

← leads Confirm Alerting Emergency Contacts screen

← tap on an other event to minimize the check in options. Results in Home Screen View.

Figure6: Home screen view when completing check in outside of the check in time frame

# Confirm Alerting Emergency Contacts screen

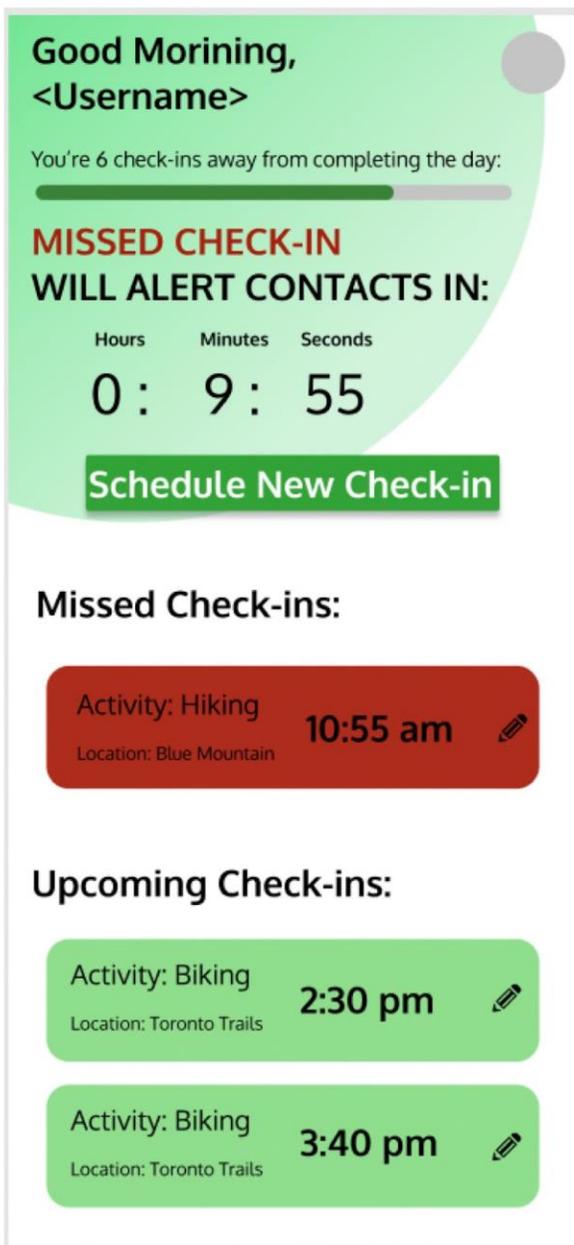


← Returns user  
back to  
Completing a Check-In View

← Alerts user's  
emergency contacts  
of their request/  
status and location

Figure7: User view when confirming to alert emergency contacts

# Home Screen View - Missed Check-In



← leads to profile screen

Once a check-in is missed, a 10 minute counter begins, giving the user a final chance to check in

← leads to Create New Checkin screen

← selected check-ins change colour. Tap on checkin for it to expand and to complete check-in (view Result of tapping on check-in)

Figure 8: Home Screen View - Missed Checkin

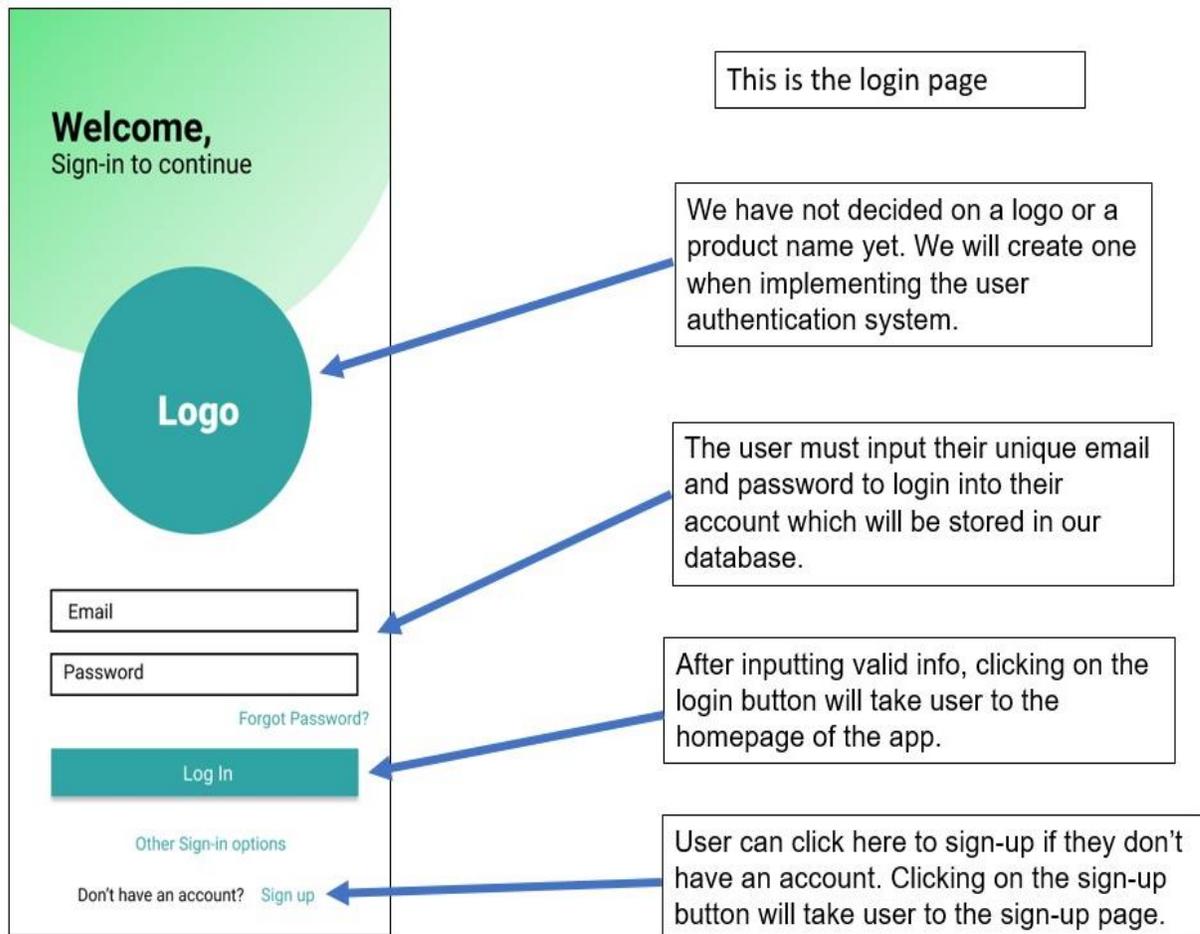


Figure 9: Login screen

**Create Account,**  
Sign-up to get started

Name\*

Phone number\*

Email\*

Password\*

Create Account

Already have an account? [Sign in](#)

This is the sign-up page that will appear when the user clicks on the sign-up option on the login page.

The user is asked to put in their name, phone number, email, and password. All of it is mandatory information. This will be stored in our database as a way to identify the client.

After inputting valid information, the user can click the create account button and it will take them to another page to finish setting up their account.

If the user accidentally clicked the sign-up button and has an account, they can return to the login page by clicking sign-in.

Figure 10: Sign-up page 1

**Set up profile,  
personalize your account**

Emergency Contact 1: [Open contacts](#)

Name\*

Phone number\*

Email (optional)

Emergency Contact 2: [Open contacts](#)

Name\*

Phone number\*

Email (optional)

[Add more emergency contacts](#)

Next

This is the second part of signing up. This page appears only after creating an account.

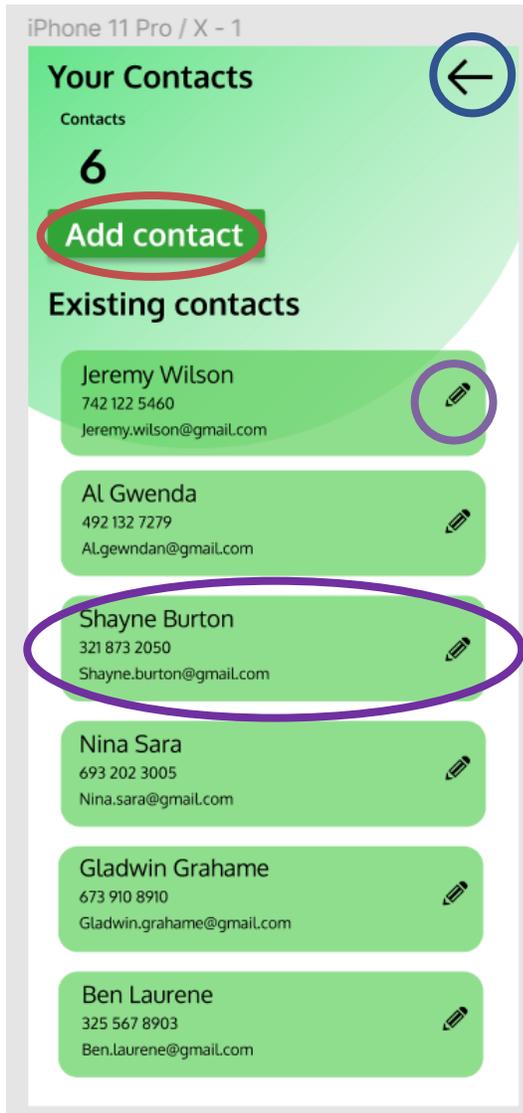
The user must input two emergency contact. They must input their names and phone numbers, but email is not mandatory.

They have the option to import information from the phone's contact list.

The user has the option to add more emergency contacts if they wishes.

After inputting at least two valid emergency contacts, the next button will be available for the user to click. Upon clicking it, the account set-up process will be completed, and user will be taken to the home page.

Figure 11: Sign-up page 2



- BLUE: Goes back to the “my profile” page.
- ORANGE: Goes to the “add contact page”.
- PURPLE: Pushes the 2 contacts out of the page (if they exist) and allows the user to delete or deactivate a contact.
  - o Deactivate: the contact will not receive emergency messages
  - o Delete: the contact is removed from the contacts
- YELLOW: Allows you to edit the contact’s information.
- CYAN: Hides the deactivate and delete buttons and shows the contacts that were pushed down when the item was clicked before.
- PINK: deactivate contact
- RED: delete contact

Figure 12: Contacts page

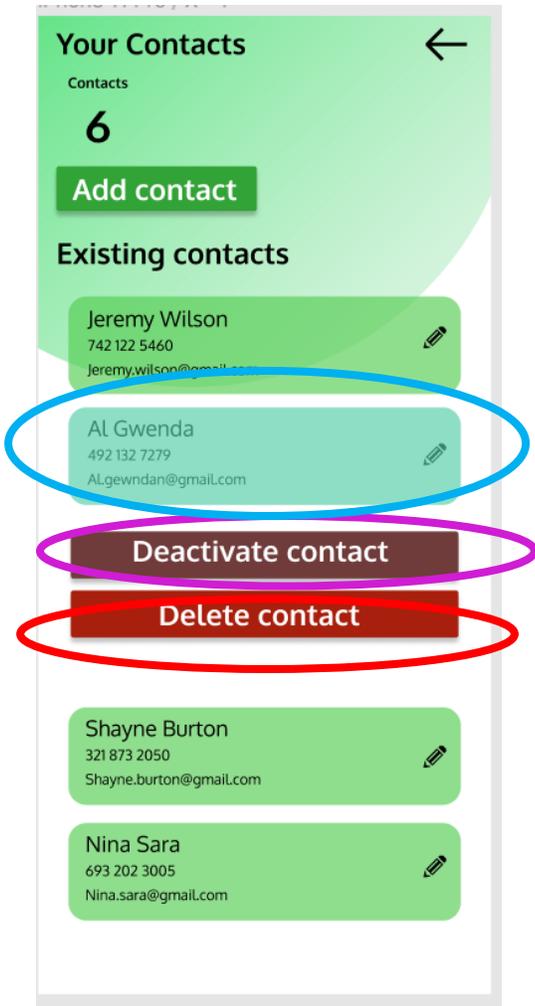


Figure 13: Contacts page - Contact Selected

The image shows a mobile application screen for creating a contact. The screen has a light green header with the title "Create a contact" and a back arrow icon in a blue circle. Below the header are three text input fields: "Name:", "Phone number:", and "Email:". At the bottom of the form is a green button labeled "Create". Colored circles are drawn around these elements: a blue circle around the back arrow, a yellow circle around the Name field, an orange circle around the Phone number field, a purple circle around the Email field, and a cyan circle around the Create button.

- BLUE: goes back to the "your contacts" page.
- YELLOW: Enter phone number.
- ORANGE: Enter name.
- PURPLE: Enter email.
- CYAN: create contact and return to the contacts page.

Figure 14: Create/edit contacts page:

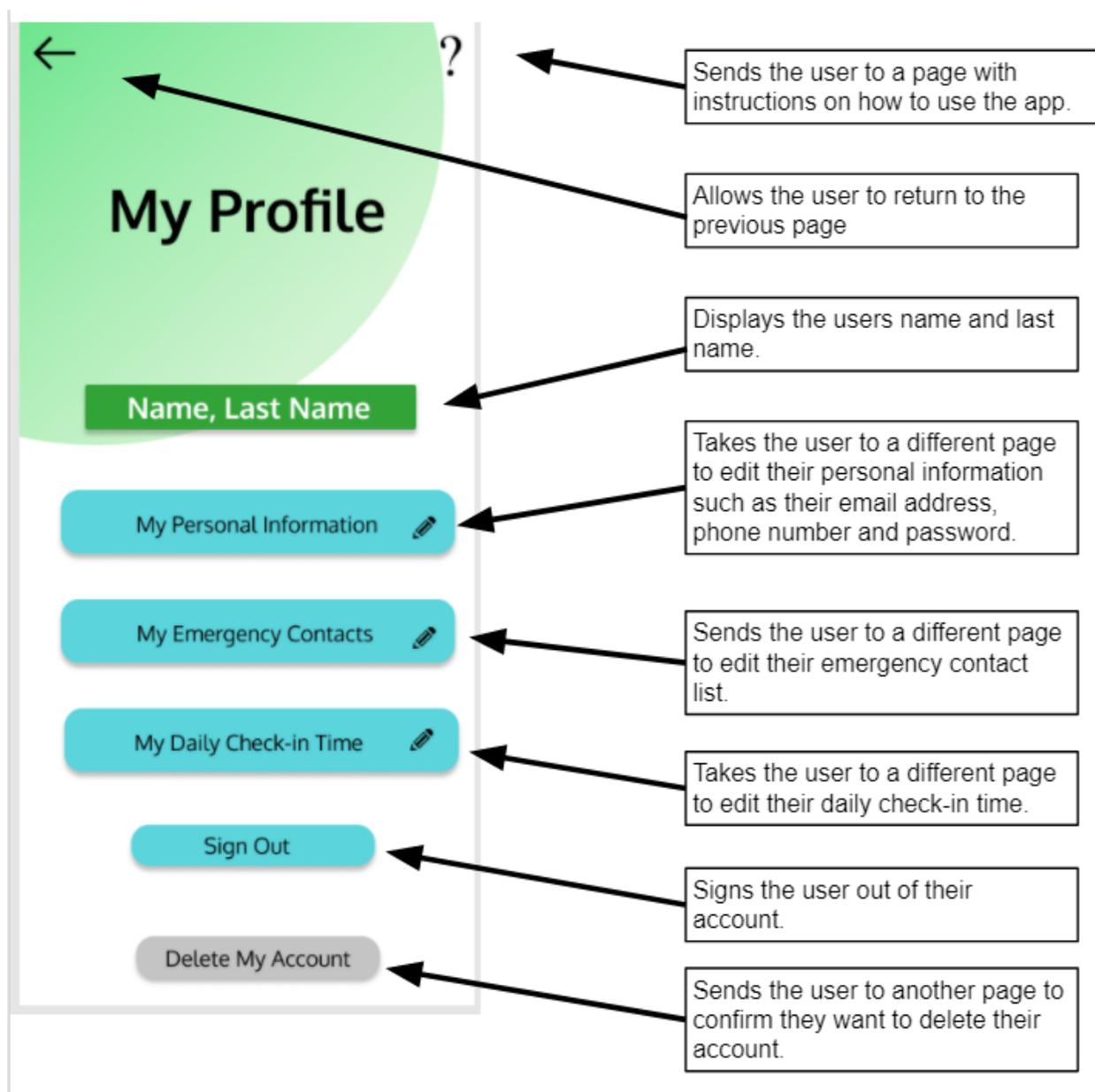


Figure 15: My Profile Page

The image shows a web form titled "Edit your Personal Information" with a green header. The form contains several input fields and a confirmation button. Annotations with arrows point to specific elements:

- An arrow points from a text box to a back arrow icon in the top left corner. The text box contains: "Allows the user to return to the previous page".
- An arrow points from a text box to the main form area. The text box contains: "This page allows the user to change their personal information and confirm it in the end."

The form fields are:

- Name**: Input field labeled "New Full Name".
- Email address**: Input field labeled "New Email Address".
- Phone Number**: Input field labeled "New Phone Number".
- Password**: Two input fields labeled "Old Password" and "New Password".
- Confirm Changes**: A green button.

Figure 16: Edit my personal information page



This page allows the user to change their daily check-in time by moving the arrows of the clock. The time will also be written down digitally in the sentence below.

In the end, the user can confirm their change by clicking the green button.

Figure 17 : Set a new daily check-in time page

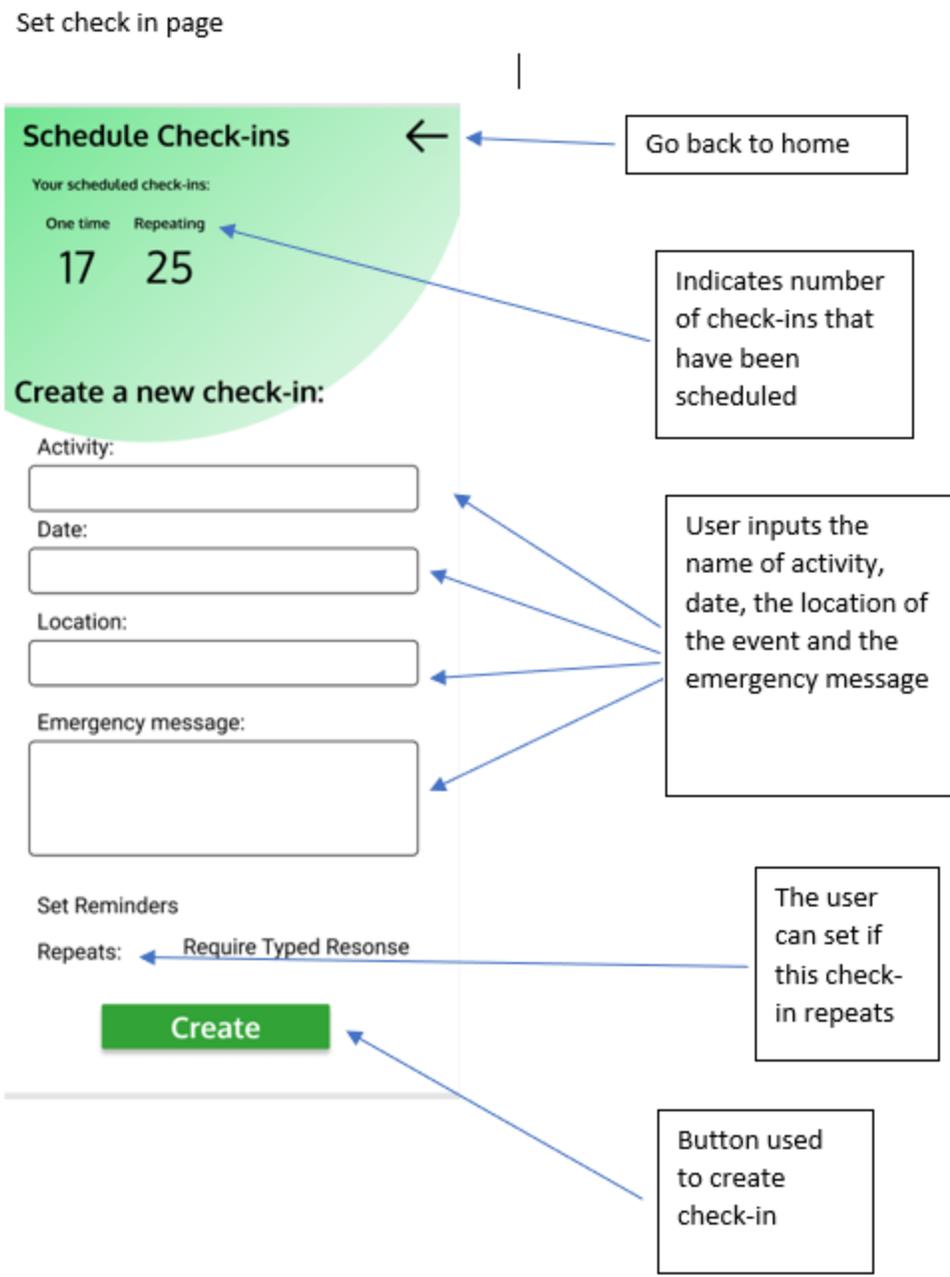


Figure 18 : Schedule check-in time page

## Testing Against Target Specifications

Table 1: Target specifications, acceptable values and ideal values for our tests

| Target Specification   | Marginally Acceptable Values | Ideal values |
|--|------------------------------|--------------|
| The average number of clicks to get from one activity to another is <3 | <4 clicks                    | <3 clicks    |
| The maximum number of clicks to get from one activity to another is <6 | <8 clicks                    | <6 clicks    |
| User interface satisfaction rating                                     | >7                           | >8           |

Test 1: The number of clicks to get from page/function to page/function.

- This test was designed to determine the number of clicks it takes to get from one place to another
- We used the number of clicks to determine the average number of clicks it takes to get from one function/page to another.
- The following is our target specifications for this test:
- Results:
  - The maximum number of clicks to get from one function/page to another: 7.
  - The average number of clicks to get from one function/page to another: 2.73.
  - The average number of clicks to get from the home screen to another activity: 2.23.
  - Our results indicate that the prototype was in the ideal range for the average number of clicks to get from one activity to another at 2.73 clicks. Anything below 3 clicks would be considered ideal for this field.
  - Our results indicate that the prototype was in the marginally acceptable range for the maximum number of clicks at 7 clicks. Anything between 6 clicks and 8 clicks would be considered marginally acceptable.

Table 2: Number of clicks to get from activity listed on the right to completing the activity listed above

|                                     | Home Screen - Default View | Completing a Check-In (Home Screen) | Alert Emergency Contacts | Login | Sign up | View Emergency Contacts | Edit Emergency Contacts | Create new Emergency Contacts | View user profile | Edit personal information | Edit Check -In | Create New Check-In | User manual | Average Amount of Clicks Required |
|-------------------------------------|----------------------------|-------------------------------------|--------------------------|-------|---------|-------------------------|-------------------------|-------------------------------|-------------------|---------------------------|----------------|---------------------|-------------|-----------------------------------|
| Home Screen - Default View          | 0                          | 2                                   | 3                        | 2     | 3       | 2                       | 4                       | 4                             | 1                 | 2                         | 2              | 2                   | 2           | 2.230769231                       |
| Completing a Check-In (Home Screen) | 0                          | 0                                   | 2                        | 2     | 3       | 2                       | 4                       | 4                             | 1                 | 2                         | 2              | 2                   | 2           | 2                                 |
| Alert Emergency Contacts            | 2                          | 1                                   | 0                        | 3     | 4       | 3                       | 5                       | 5                             | 2                 | 3                         | 3              | 3                   | 3           | 2.846153846                       |
| Login                               | 1                          | 3                                   | 4                        | 0     | 4       | 3                       | 5                       | 5                             | 2                 | 3                         | 3              | 3                   | 3           | 3                                 |
| Sign up                             | 2                          | 2                                   | 4                        | 4     | 0       | 4                       | 6                       | 6                             | 3                 | 4                         | 5              | 4                   | 4           | 3.692307692                       |
| View Emergency Contacts             | 2                          | 4                                   | 5                        | 4     | 5       | 0                       | 1                       | 2                             | 1                 | 2                         | 4              | 4                   | 2           | 2.769230769                       |
| Edit Emergency Contacts             | 3                          | 4                                   | 5                        | 4     | 5       | 1                       | 0                       | 3                             | 2                 | 3                         | 4              | 5                   | 3           | 3.230769231                       |
| Create new Emergency Contacts       | 4                          | 6                                   | 7                        | 5     | 7       | 1                       | 2                       | 0                             | 2                 | 3                         | 4              | 6                   | 3           | 3.846153846                       |
| View user profile                   | 1                          | 3                                   | 4                        | 2     | 2       | 1                       | 3                       | 3                             | 0                 | 2                         | 3              | 3                   | 1           | 2.153846154                       |
| Edit personal information           | 2                          | 4                                   | 5                        | 3     | 3       | 2                       | 4                       | 4                             | 1                 | 0                         | 4              | 4                   | 2           | 2.923076923                       |
| Edit Check-In                       | 1                          | 1                                   | 1                        | 1     | 1       | 1                       | 1                       | 1                             | 4                 | 5                         | 0              | 3                   | 5           | 1.923076923                       |
| Create New Check-In                 | 1                          | 1                                   | 1                        | 1     | 1       | 1                       | 1                       | 1                             | 4                 | 5                         | 2              | 0                   | 5           | 1.846153846                       |
| User manual                         | 2                          | 4                                   | 5                        | 3     | 3       | 2                       | 4                       | 4                             | 1                 | 3                         | 4              | 4                   | 0           | 3                                 |
|                                     |                            |                                     |                          |       |         |                         |                         |                               |                   |                           |                |                     |             | 2.727810651                       |

Test 2: Having others rate the app intuitively on a scale of 1-10.

- This test was designed to determine how well the user can interact with the UI based on their intuition.
- We gave this test to possible average users to retrieve their ratings on the specific items.
- Results
  - Our ideal satisfaction rating for each item was 8 and the marginally acceptable value was 7.
  - For this test, three items had a rating above the ideal value and two items had a rating above the marginally acceptable value. The items that were below the ideal rating were the efficiency of the number of clicks and forgiveness to mistakes.

- The average rating for this test is 8.36, which is above the ideal rating.

Table 3: User Interface Intuitiveness Rating

| User Interface Intuitiveness   |        |        |        |        |        | Averages |
|--|--------|--------|--------|--------|--------|----------|
| A score of 10 enforces Intuitiveness excellently<br>A score of 0 enforces Intuitiveness poorly | User 1 | User 2 | User 3 | User 4 | User 5 |          |
| Interface design is one that is easy to learn  | 8      | 8      | 9      | 10     | 7      | 8.4      |
| Buttons are clear and unambiguous  | 9      | 8      | 9      | 9      | 9      | 8.8      |
| The number clicks to accomplish a task is efficient  | 9      | 8      | 8      | 7      | 7      | 7.8      |
| The interface is consistent across different pages   | 10     | 9      | 10     | 8      | 9      | 9.2      |
| The user interface is forgiving to mistakes  | 7      | 7      | 9      | 7      | 8      | 7.6      |
| Overall Average  |        |        |        |        |        | 8.36     |

### Test 3 : Having others rate the app's UI design

- This test was designed to determine how likable the user interface is for the average user.
- Results
  - Our ideal satisfaction rating for each item was 8 and the marginally acceptable value was 7.
  - For this test, two items had a rating above the ideal value and two items had a rating above the marginally acceptable value. The items that were below the ideal rating were the design's colors and the responsiveness of the UI.
  - The average rating for this test is 7.95, which is above the marginally acceptable rating.

Table 4: User Interface Likeability Rating

| User Interface Likeability   |        |        |        |        |        |         |
|--|--------|--------|--------|--------|--------|---------|
| A score of 10 is a very attractive UI feature<br>A score of 0 is a very bad UI feature | User 1 | User 2 | User 3 | User 4 | User 5 | Average |
| Interface design uses attractive colors  | 8      | 7      | 6      | 5      | 7      | 6.6     |
| User interface is responsive   | 7      | 8      | 9      | 7      | 8      | 7.8     |
| User interface is visually clear   | 9      | 8      | 9      | 8      | 9      | 8.6     |
| The user interface is predictable  | 9      | 8      | 10     | 9      | 8      | 8.8     |
| Overall Average  |        |        |        |        |        | 7.95    |

## **Next Client Meet**

For our next client meeting, our team intends on presenting our improved first prototype, implementing the feedback she gave. We also plan on showing our client our second prototype. For our second prototype, we would like to have a basic version of the application complete that allows the user to set check-in, has the ability to alert emergency contacts, and has a simple user interface.

## Bill of materials

Table 5 : Bill of materials

| Item number | Part or service name      | Description                            | Base price           | Possible price            |
|-------------|---------------------------|--|----------------------|---------------------------|
| 1           | Apple Development Program | Needed to publish apps on the AppStore | \$99 USD / year      | \$99 USD                  |
| 2           | AWS Elastic Beanstalk     | Server hosting                         | Pay for what you use | Indeterminable            |
| 3           | AWS DynamoDB              | Database hosting                       | Pay for what you use | * \$0 / month             |
| 4           | AWS SNS                   | Sms and email api                      | Pay for what you use | * \$0 / month             |
|             |                           |  |                      | \$99/year + monthly usage |

Possible alternatives:

Table 6: Alternative Solutions

| Item number | Part or service name      | Description                            | Base price           | Possible price            |
|-------------|---------------------------|--|----------------------|---------------------------|
| 1           | Apple Development Program | Needed to publish apps on the AppStore | \$99 USD / year      | \$99 USD                  |
| 2           | Heroku                    | Server hosting                         | \$7/month            | * \$0 / month             |
| 3           | MongoDB                   | Database hosting                       | Pay for what you use | ** \$0 / month            |
| 4           | Twilio                    | Sms and email api                      | Pay for what you use | \$0.0075 USD / sms sent   |
|             |                           |  |                      | \$99/year + monthly usage |

\* There is a free tier that is a possible option

\*\* there is a free tier but it is unlikely that it will suit our needs

## D.2 Project Plan Update

Based on feedback and team availability, we have made changes to our project plan by:

- Updating missing tasks and task responsibilities (tasks without a person assigned = the team will work on it together)
- Updating any missing task start and end dates
- Splitting large tasks into smaller sub-tasks
- Updating dates that are no longer accurate
- Updating project milestones and task dependencies

The updated version of our project plan is included as *D2 B14 Project Plan.pdf* as part of this submission.

## Conclusion

Completing this deliverable has given the team more clarity about the project plan. By finalizing the prototypes and determining the costs, we have a clearer idea of where the project is headed.

An issue we have faced during the completion of this deliverable is figuring out which platform we are going to use to develop the application. Consequently, this created issues regarding the Bill Of Material due to the fact that some platforms require subscriptions. Also, the client expressed that she is not very knowledgeable about technology and that having a simple and easy to use interface is important to her. Designing the UI was challenging because we wanted the interface to be user-friendly yet creative.

Overall, the development of this prototype was essential for the success of the project and helped determine the direction of future prototypes.