# Team 2 Sprint 1 Planning Document

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# Sprint Overview

In this sprint, we plan on setting up the database, classes, and the basic backend and UI frameworks that will scale up for the future sprints and final release. This sprint will set up the future of the project, so it is important that all code written is scalable and easily integratable among the different components of the higher level architecture. Meanwhile, existing functional parts of the project should be properly operable using a graphical user interface

# Risks and Challenges

In this sprint, there are a few areas where we might struggle. Firstly, none of us have ever worked with Firebase before, and we plan to use it for our database requirements. While much of the example code seems fairly intuitive, it's hard to say what parts, if any, will actually be easy to implement. We also might run into trouble working with a C++ backend communicating with an HTML frontend. We don't have very much experience working with C++ server connections, and we might need to learn about optimal methods. Thirdly, none of us have worked extensively with HTML recently, and we might need to relearn some techniques to make a more functional web-app.

**Scrum Master:** Annalycia Melendez

**Meeting Schedules:** Tuesdays/Thursdays (4:15-4:45) and Sundays (12:00-1:00)

# Current Sprint Details

## User Story #1

As a general user, I would like to be able to make an account.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Set up User Class along with a couple helpful methods | 1 | Dylan |
| 2 | Setup Firebase database and work on integrating account creation. | 4 | Dylan |
| 3 | Debug Firebase and User Class setup | 2 | Dylan |
| 4 | Create GUI for sign-up page and integrate it to backend | 2 | Annalycia |

### Acceptance Criteria

☐ Given the User Class is setup correctly, we should be able to create an instantiation of a user, and edit its fields with simple getters and setters.

☐ Given the User database is set up correctly, we should be able to securely create and store User objects.

☐ Given the sign-up page is implemented properly, when the user correctly enters their new account information, they will be sent to the map GUI page.

☐ Given the sign-up page in implemented properly, when given information does not fulfill requirements, the related text entry elements will be cleared and an error message will be shown.

☐ Given the sign-up page is implemented properly, when the user enters account information that already exists, they will be prompted to go to the sign-in page.

## User Story #2

As a general user, I would like to be able to log in.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Set up methods for signing in in the User Class and integrate it to Firebase | 2 | Dylan |
| 2 | Debug Login Integration | 2 | Dylan |
| 3 | Create UI for sign-in page and connect it to backend | 2 | Annalycia |

### Acceptance Criteria

☐ Given the User Class is set up correctly, we should be able to call a login function that authenticates the user through Firebase.

☐ Given the sign-in page is implemented properly, when the user enters existing account information, they will be sent to the map page.

☐ Given the sign-in page is implemented properly, when the user enters incorrect information, the GUI will put up an error and prompt the user to re-enter their information.

☐ Given the sign-in page is implemented properly, when the user enters a username/email that is not in the system, they are prompted to go to the sign-up page.

## User Story #3

As a general user, I would like to be able to edit account details

| # | Description | Estimated time (Hrs.) | Owner |
|---|-------------|----------------------|-------|
| 1 | Set up methods in the User class for editing and Integrate the account editing with Firebase | 2 | Dylan |
| 2 | Debug User editing integration | 2 | Dylan |
| 3 | Create UI for user settings | 2 | Annalycia |

## Acceptance Criteria

☐ Given the User Class is set up correctly, we should be able to call functions on a User object to change its data.

☐ Given the User database is set up correctly, we should be able to call a function to update the given user in the database.

☐ Given the user settings page is implemented properly, when the user clicks to edit their account information, the page will save the new information entered.

☐ Given the user settings page is implemented properly, when the user enters an email or username that is already in the system, the page will give them an error message and prompt them to enter different information.

## User Story #4

As a general user, I would like to be able to delete my account.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Set up method for deleting account in the User Class and integrate it to Firebase | 2 | Dylan |
| 2 | Debug User Deletion Integration | 2 | Dylan |
| 3 | Add delete account functionality to settings page | 1 | Annalycia |

### Acceptance Criteria

☐ Given the User Class is set up correctly, we should be able to call a function on a user and have it be removed from the Firebase user database.

☐ Given the user settings page has proper delete account functionality, when a user attempts to delete their account, the page will give them a confirmation pop-up.

☐ Given the user settings page has proper delete functionality, when a user deletes their account, they will be sent to the sign-up page.

☐ Given the user settings page has proper delete functionality, when a user deletes their account, their information will be deleted from the database and they will be unable to sign-in from that username or email.

## User Story #5

As a general user, I would like to be able to change my username/password on the login page from an email if forgotten.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Setup Methods for email verification account changing | 1 | Dylan |
| 2 | Setup Firebase to send email verification for account changes | 2 | Dylan |
| 3 | Debug Email link to change User details | 3 | Dylan |
| 4 | Create pop-up for email verification link | 2 | Annalycia |
| 5 | Create page for email link to change username and/or password | 2 | Annalycia |

## Acceptance Criteria

☐ Given the User database is set up correctly, we should be able to call a function on a User object and have Firebase send an email to the user with a link to the reset page.

☐ Given the User class is set up correctly, when the user doesn't see an email sent, the function should be able to be called multiple times in succession.

☐ Given the email verification pop-up is properly implemented, when the user enters their email, they will be sent a link for them to reset their email.

☐ Given the change username/password page from the email link is properly set up, when a user changes their information in the page, their information in the Firebase database will be updated with that new information.

☐ Given the change username/password page from the email link is properly set up, when the user enters a username that is already in the system, the page will give an error message and prompt them to enter a different username.

# User Story #6

As a general user, I would like to be able to schedule events.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Create Event class with methods and helper functions | 3 | Cody |
| 2 | Integrate the Event class with Firebase for | 2 | Cody |

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| | getting and setting | | |
| 3 | Connect Event Class with User Class | 2 | Cody |
| 4 | Debug Event Class and implement Unit Tests | 5 | Cody |
| 5 | Create UI for Event pop-up | 2 | Annalycia |

**Acceptance Criteria**

☐ Given that the Event Class is successfully implemented it should successfully create an instance of an Event with the necessary methods.

☐ Given that the Event Class is successfully integrated with Firebase it should successfully send and receive data with zero errors.

☐ Given that there is success integration between the User and Event Class, there should only be successful communication between the classes with the getting and setting.

☐ Given the event pop-up is properly implemented, when the user creates a new event, the event will be added to their calendar.

☐ Given the event pop-up is properly implemented, when the user creates a new event, event invites will be sent to the attendees' mailboxes.

# User Story #7

As a general user, I would like to be able to share events with friends.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|

| 1 | Implement the sharing of events between friends methods | 3 | Cody |
|---|---|---|---|
| 2 | Integrate the sharing with Firebase | 2 | Cody |
| 3 | Debug and implement Unit Tests | 5 | Cody |
| 4 | Create a mailbox pop-up to accept event invitations | 2 | Annalycia |

## Acceptance Criteria

☐ Given that the event sharing methods are implemented correctly, the instance of Event should correctly handle event sharing on the backend.

☐ Given that the sharing is integrated, the database should correctly reflect the sharing of Events and should send the correct data.

☐ Given that the mailbox pop-up is implemented properly, when the user accepts an event invitation, the invitation will no longer show up in their mailbox.

☐ Given that the mailbox pop-up is implemented properly, when the user accepts an event invitation, the event will be added to their calendar.

☐ Given that the mailbox pop-up is implemented properly, when the user is in the pop-up, they will not be able to click outside of the pop-up.

# User Story #8

As a general user, once logged in, I would like to be able to access the Account, Schedule, and Interactive Maps pages.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Create link between each GUI page | 1 | Annalycia |
| 2 | Deciding on style for application and relearning HTML | 2 | Annalycia |
| 3 | Debugging and testing all GUI pages | 5 | Annalycia |
| 4 | Debugging and testing all GUI pop-ups | 4 | Annalycia |

## Acceptance Criteria

☐ Given the GUI pages are correctly linked, when the user clicks on icons in the navigation bar (map, calendar, settings), the screen should change to that page.

☐ Given the GUI pages are implemented correctly, when the user clicks any buttons on the pages, the screen should properly respond with pop-ups.

☐ Given the GUI pop-ups are implemented correctly, when the user interacts with the pop-up, they will not be able to click on items outside of the pop-up.

# User Story #9

As a general user, I would like to be able to send friend requests to other accounts.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Set up messages to be able to send and receive friend requests | 2 | Dylan |
| 2 | Debug message integration | 2 | Dylan |
| 3 | Allow mailbox UI to also have friend requests show up | 2 | Annalycia |

**Acceptance Criteria**

☐ Given the User Class is set up correctly, when a user wants to add a friend, there should be a function that can be called on a user id to send a friend request to their messages.

☐ Given the User Class is set up correctly, when the user sends a friend request, and the potential friend updates their page, they should see a new message with a friend request.

☐ Given the User Class and Database is set up correctly, when a friend request is accepted and their page is then updated, both users' friends list should now include each other.

☐ Given the mailbox pop-up UI is implemented properly, when a user enters their mailbox, they will also see friend requests.

☐ Given the mailbox pop-up UI is implemented properly, when a user accepts/denies a friend request, that request will no longer show up in their mailbox.

☐ Given the mailbox pop-up UI is implemented properly, when a user accepts a friend request, the friend will be added to their friend list on the settings page.

# User Story #10

As a general user, I would like to be able to accept or deny friend requests from other accounts, as well as be able to unfriend users.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Add unfriend methods to User Class | 1 | Dylan |
| 2 | Debug unfriend methods | 1 | Dylan |
| 3 | Add friend UI to user settings page to edit friends list | 3 | Annalycia |

**Acceptance Criteria**

- ☐ Given the User Class is set up correctly, when a user wants to add a friend from a request, a function should be able to be called on a User with a user id to add it to their friends list.
- ☐ Given the User Class is set up correctly, when the user accepts a friend request, and the potential friend updates their page, both users' friends list should now include each other.
- ☐ Given the User Class is set up correctly, when the user rejects a friend request, and the potential friend updates their page, neither users' friends list should include each other.
- ☐ Given the friend UI in the user settings page is properly implemented, when the user unfriends another user, that user no longer shows up in their friend list.

# User Story #11

As a general user, I would like to be able to subscribe to and unsubscribe from events.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Create event add and removal | 2 | Cody |

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| | methods to the Event class | | |
| 2 | Integrate event removal and add to Firebase | 2 | Cody |
| 3 | Debug and add unit tests | 4 | Cody |

**Acceptance Criteria**

☐ Given that the create Event and remove Event methods are successfully implemented, then events should be removed and added on the server side without error.

☐ Given that the new methods are successfully integrated in Firebase, then the database should reflect the successful removal and/or addition of Events.

☐ Given that the event add/remove method is successfully implemented, then the events should be added/removed in real time in all User facing screens.

# User Story #12

As a general user, I would like to get directions from my current location/a specified location to my current location/a specified location.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Create Edge and Location classes | 1 | Quinn |
| 2 | Build a K-d tree to approximate locations using Nearest | 4 | Quinn |

| | Neighbor Search | | |
|---|---|---|---|
| 3 | Debug & unit test K-d tree | 4 | Quinn |
| 4 | Implement pathfinding algorithm, with shorter paths sacrificed for indoor paths during bad weather | 8 | Quinn |
| 5 | Debug & unit test pathfinding | 4 | Quinn |

## Acceptance Criteria

☐ Given the K-d tree is correctly implemented, when I give an arbitrary location, I will find the closest existing node.

☐ Given that the pathfinding is correctly implemented, when I select a destination in good weather, I will find the shortest path from the given source.

☐ Given that the pathfinding is correctly implemented, when I select a destination in poor weather, I will sacrifice a slightly shorter path in favor of one which is indoors.

☐ Given that pathfinding is correctly implemented, when I select a destination that is unreachable from the source, I should get an appropriate error.

# User Story #13

As an admin, I would like to add and edit map locations.

| # | Description | Estimated time (Hrs.) | Owner |
|---|---|---|---|
| 1 | Create map location storage file | 1 | Quinn |
| 2 | Create functionality to add locations | 2 | Quinn |
| 3 | Create functionality to edit existing locations | 2 | Quinn |
| 4 | Debug & unit tests | 4 | Quinn |

### Acceptance Criteria

- ☐ Given that the file is correctly set up, when I input a change, it will persist across server loads.
- ☐ Given that the editing functionality is correctly set up, pathfinding will correctly follow modifications to the map.
- ☐ Given that the location addition is set up correctly, when I add a location, it should go to the correct location in the K-d tree.

# Backlog

## Requirements – Functional

### Accounts

1. ~~As a general user, I would like to be able to make an account.~~
2. ~~As a general user, I would like to be able to log in.~~

3. ~~As a general user, I would like to be able to change account details from the Account page. (Username, Password, etc.)~~
4. ~~As a general user, I would like to be able to delete my account.~~
5. ~~As a general user, I would like to be able to change my username/password on the login page from an email if forgotten.~~
6. ~~As a general user, once logged in, I would like to be able to access the Account, Schedule, and Interactive Maps pages.~~
7. ~~As a general user, I would like to be able to send friend requests to other accounts.~~
8. ~~As a general user, I would like to be able to accept or deny friend requests from other accounts, as well as be able to unfriend users.~~
9. As a user, I would like to be able to report accounts.
10. As an admin, I would like to be able to ban accounts for misconduct.

## Events & planning

11. ~~As a general user, I would like to be able to schedule events.~~
12. ~~As a general user, I would like to be able to share events with friends.~~
13. As a general user, I would like to be able to add locations to events.
14. As an event coordinator, I would like to be able to communicate with event attendees.
15. ~~As a user, I would like to be able to subscribe to and unsubscribe from events.~~

## Interactive Map

16. As a general user, I would like to be able to see my location on the map.
17. As a general user, I would like to be able to select a location on the map and see details about it.
18. As a general user, I would like to be able to navigate the map and snap back to my current location.

19. As a general user, I would like to be able to search within the current location-base.
20. As a general user, I would like to be able to place a pin on the map at a specific location.
21. ~~As a general user, I would like to get directions from my current location/a specified location to my current location/a specified location.~~
22. As a general user, I would like to be able to toggle different map layers (Tunnels, sidewalks, etc.).
23. As a general user, I would like to find nearby vending machines and restrooms.
24. As a commuter, I would like to be able to select my mode of transportation.
25. As a general user, I would like to report blocked paths and closed locations.
26. As a general user, I would like to report a busy area.
27. As a general user, I would like to be able to report temporary POIs (food trucks, events, etc.).
28. ~~As an admin, I would like to be able to add and remove locations.~~
29. ~~As an admin, I would like to be able to edit location details~~

## Avatar customization

30. As a user, I would like to see my avatar on the map.
31. As a user. I would like to be able to customize my avatar.
32. As a user, I would like to earn currency from reports for customization purposes.
33. As a user, I would like to be able to spend currency for extra customization options.
34. As a user, I would like to be able to view the avatars of other users.
35. As a user, I would like to be able to toggle my location visibility for other users.

### Functionality

36. As a user, I would like to be able to report bugs and/or crashes.
37. As a user, I would like to add suggestions for new locations and paths.

## Requirements – Nonfunctional

1. As a developer, I would like to be able to securely store sensitive user data.
2. As a user, I would like pathfinding to be performed in a reasonable time.
3. As a user, I would like the app to have virtually no lag despite user counts.
4. As a user, I would like the app to be functional 24/7.
5. As a developer, I would like the app to be free from bot accounts.
6. As a developer, I would like the app to be safe from spam-based attacks
7. As a developer, I want database queries to be safe from injection.
8. As a developer, I want to maintain a separate front-end and back-end.