

TRAILZ

The Software Requirements Specification for the Trailz Hiking and Fitness Application

CS 364 – Spring Semester 2020

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1. INTRODUCTION

1.1. Purpose

1.1.1. Trailz, referred to in the document as “The app”, is a mobile device Application that allows individuals to share, view and rate various hiking Trails using the app. The app improves the hiking and preparation for a given hiking Trail by allowing individuals to share their experiences and recommendations regarding said Trail, providing a Trail description, a Trail map, safety guidelines and points of interest.

1.2. Scope

1.2.1. Goals and Objectives

1.2.1.1. The app will be for Users who are new to hiking or are looking for hiking Trails to use. There are several individuals who are looking for help in finding information on Trails, such as which Trails to hike on, what to bring, what to be cautious of, and different points of interest along the Trail. There are also several individuals that are willing to share the information they have about these topics and questions. This app seeks to provide a platform to spread and share the information by having all the needed information about hiking in a single consolidated mobile Application.

1.2.2. Include

1.2.2.1. The app will include a graphical User interface (GUI), a database of Trails, and information attached to each Trail, such as Difficulty level as rated by the community, points of interest, Amenities, and a map of the Trail. The app shall provide the ability to:

1.2.2.2. The app shall provide the ability for users to:

- Login/register
- Exercise
- Trail information
- Map

1.2.2.2.1. Social

1.2.3. Exclude

1.2.3.1. N/A

1.2.4. Benefits

1.2.4.1. The app is a tool that shall help the User find and/or share information about hiking Trails, general information about hiking and safety information.

1.2.4.2. The app also shall allow the User to coordinate and chat with others.

1.2.5. Requisites

1.2.5.1. In order to use the app, the following is required:

- 1.2.5.1.1. Personal unique email address
- 1.2.5.1.2. Cellular data or Internet connectivity
- 1.2.5.1.3. 75 MB or more free space on a mobile device to store the system's data
- 1.2.5.1.4. A mobile device running Apple iOS version 13 or Android 10 OS

1.3. Product Overview

1.3.1. Product perspective

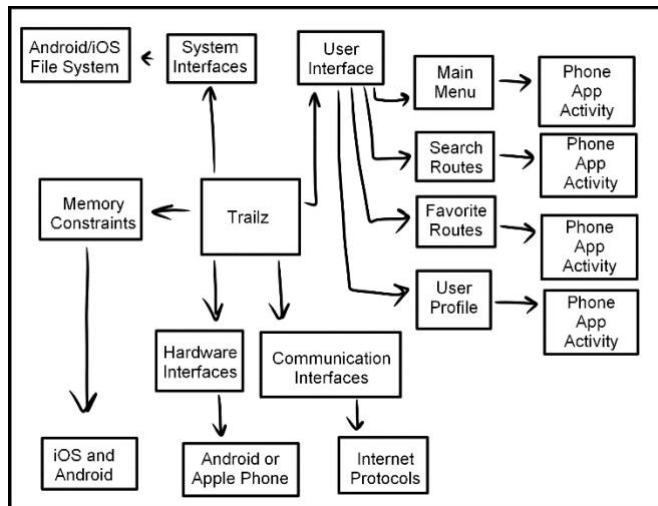


Figure 1. Product component overview

1.3.1.1. System Interface

- 1.3.1.1.1. A Google Firebase database will be used for saving and retrieving User data in the cloud.

1.3.1.2. User Interface

- 1.3.1.2.1. The User will interact with the app through a GUI (graphical User interface)

1.3.1.3. Hardware Interface

- 1.3.1.3.1. The touchscreen of a mobile device will be used to allow the User to input information.

1.3.1.4. Software Interface

- 1.3.1.4.1. External websites containing routing and GPS information shall be accessed.

1.3.1.5. Communications Interfaces

- 1.3.1.5.1. Email shall be used
- 1.3.1.5.2. Social media messaging shall be used
- 1.3.1.5.3. TCP/IP protocols shall be used

1.3.1.6. Memory Constraints

- 1.3.1.6.1. Memory constraints shall be determined by Google Android [1] or Apple iOS [2] performance guidelines.

1.3.1.7. Operations

- 1.3.1.7.1. N/A

1.3.1.8. Site adaptation requirements

- 1.3.1.8.1. N/A

1.3.2. Product Functions

- 1.3.2.1. The system shall store and retrieve routes.
- 1.3.2.2. The system shall store and retrieve User-made reviews, Comments, routes, and warnings.
- 1.3.2.3. The system shall provide an interface to plan routes.
- 1.3.2.4. The system shall facilitate sharing routes electronically.
- 1.3.2.5. The system shall allow User authentication.

1.3.3. User characteristics

- 1.3.3.1. Someone who performs outdoor activities/sports regularly
- 1.3.3.2. Someone who would like to find a route to perform an activity and wishes to save their route to save time.
- 1.3.3.3. Someone looking for new activity routes to follow
- 1.3.3.4. Someone looking to share their thoughts on these routes with others

1.3.4. Limitations

- 1.3.4.1. Regulatory policies
 - 1.3.4.1.1. N/A
- 1.3.4.2. Hardware Limitations
 - 1.3.4.2.1. The system shall only operate on mobile devices such as smart phones and tablets.
- 1.3.4.3. Interfaces to other Applications
 - 1.3.4.3.1. N/A
- 1.3.4.4. Parallel operation
 - 1.3.4.4.1. N/A
- 1.3.4.5. Audit functions
 - 1.3.4.5.1. N/A
- 1.3.4.6. Control functions
 - 1.3.4.6.1. N/A
- 1.3.4.7. Higher-order language requirements
 - 1.3.4.7.1. N/A
- 1.3.4.8. Signal handshake protocols
 - 1.3.4.8.1. N/A
- 1.3.4.9. Quality Requirements
 - 1.3.4.9.1. N/A
- 1.3.4.10. Criticality of the Application
 - 1.3.4.10.1. N/A
- 1.3.4.11. Safety and security considerations
 - 1.3.4.11.1. The system shall store authentication credentials using Google Firebase FirebaseAuth.
- 1.3.4.12. Physical/Mental considerations
 - 1.3.4.12.1. N/A

1.4. Definitions

Term	Definition
Admissions Fees	The price paid for the right or permission to enter a Trail.
Amenities	Amenities is defined as: <ul style="list-style-type: none"> • Restrooms • Trailhead/Map • Water fountains • Fire pits • Trail markers • Information centers • Trash cans • Campsites • Picnic tables • Illuminated Trails
Application	A program that Users may utilize to perform specific tasks.
Card	A Card is a group of information within a small area, with a border – almost like a post-Card on the screen. This information may include a background image, hike details, ratings, and fitness tracking.
Cloud Storage	A service provided by large internet consumer companies where data is stored in globally accessible locations called Buckets (not databases).
Comment	A block of text information provided by a User related to a Trail Informational Subsection.
Comment Rating System	A System where Users may vote for or against specific Comments or report them for inappropriate content. Comments that are highly rated are displayed first.
Comment System	A Comment System is a persistent system that Users may provide Comments attached to some aspect of the Trailz app, be it general Comments on a Trail or a specific informational subsection. The Trailz app will save and display Comments in their appropriate locations. The Comment System is to be paired with the Comment Rating System.
Cross Platform Compatible	Cross Platform Compatibility means that your Application/website works on different platforms/devices. Examples are desktop computers, laptops, tablets, smartphones, etc.
Current Location	The current geographical area that the User is using the app from.
Difficulty	A Trail that requires certain amount of strength, stamina, or a level of commitment that is determined by a numerical value between 1 and 10, 10 being the hardest Difficulty.
Disability Accessible	Public accommodation for people of any age or physical condition to participate in the Trail.
Edible Plant	A plant suitable by nature to be fit or safe to eat.
Elevation	The height above a given level, especially sea level.
Event Host	The User who creates a planned social occasion in the Application. They can edit and share the event location, time and date.

Fab Button	Floating action button – a button which performs the most common action on a screen. Typically, a Fab Button is displayed as a circular shape with an icon in its center.
Fee	To make a payment to someone in return for services.
Grade	The incline of the Trail path.
Hazards	Threats to personal safety.
Hiking Equipment	The equipment taken on outdoor trips according to the duration, distance, and environment. Hikers may take with them equipment ranging from bug spray, water, hiking boots, sunscreen, and hat.
Hunting Location	A place or area used for hunting.
Image Card-Button	A button which does not appear the same as a standard button. Image Card-Buttons appear as images, with or without text inside of them, which may be clicked like a button. Image Card-Buttons are usually larger than regular buttons as well.
Instant Messaging	A type of online chat which offers real-time text transmission within the Application.
Irrelevant Warnings	Warnings which have previously impacted the Trail, but do not pertain to it anymore. Users should be aware of these warnings in case they ever become relevant again.
Long Pressing	When the User touches the screen and keeps their finger pressed down in a specific place for two or more seconds.
Map Window	The box which encompasses the map for the Trail. This window is small yet shows the full Trail to the User
Modal	An in-app popup which notifies the User of important information or necessary pending actions. Pending actions may include the User toggling location tracking within the app's settings.
Bottom Navigation Panel	A section of graphical User interface which aids the User to accessing the Application's features, including: the app's home page, settings, hikes, as well as all the other app pages.
Offline Usability	When there is no cell phone connection, data will be stored locally on the phone to be uploaded to the servers once a connection becomes available.
Parking Regulations	Parking lot rules or directions in which all vehicles must abide by.
Photos	A representation of a Trail or scene.
Point of Interest	A specific point location that someone may find useful or interesting.
Poisonous Plant	A different group from plants which cause illness if eaten in very large amounts or when touched can cause illness.
Predatory Wildlife	Animals that may potentially present a danger to the health or welfare of the people.
Profile Owner	A User who has signed up for the social aspect of a profile page.
Push Notification	An automated message sent by the Application to the User notifying them while the Application is not open.

Registration	The process of creating a new User in the Application
Relevant Warnings	Warnings which still pertain to the Trail. A relevant Warning means that the Warning is still active, and readers should be aware of it.
Safety Concerns	An important identified risk, important potential risk or important missing information.
Season	Any of the four divisions of the year (spring, summer, fall, and winter) marked by different weather patterns and daylight hours.
Terrain	The arrangement of the physical features of an area
Thread	The conversation history. A list of messages sent until that point in time.
Trail	A geographical path with a predefined start and finish that is in a natural setting of some kind.
Trailhead	The geographical starting point of a Trail. Often accompanied by a map or marker to indicate the Trail's location.
Trailz	The name given to the Application that this document describes.
Trail Information Subsections	Trail Information must have the following informational categories related to each Trail: <ul style="list-style-type: none"> • General Information • Emergency Contacts • Points of Interest • Suggested Items to Bring • Traversal • Safety Guidelines • Amenities
Two-Factor Authentication	Another layer of security which protects the User's account beyond only a Username and password. This usually includes an email or text which contains a verification code that is entered in the Application before the User has access to their personal information.
Warning	A Trail Warning is created by Users to caution other Users of obstacles, potential dangers, animals, weather, avalanches, etc.
Weather Forecast	A prediction of what the weather is likely to be for the next hour or few hours.
User	An individual who possesses the Application and desires to receive some benefit from its use.

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- 2.2. [2] "App Programming Guide for iOS," Using 2D and 3D Transforms, 27-Mar-2017. [Online]. Available:

<https://developer.apple.com/library/archive/documentation/iPhone/Conceptual/iPhoneOSProgrammingGuide/PerformanceTips/PerformanceTips.html>. [Accessed: 10-Feb-2019].

3. SPECIFIC REQUIREMENTS

3.1. External Interfaces

3.1.1.N/A

3.2. Functions

3.2.1. Views and displays

This section describes requirements related to the User interface of the app

3.2.1.1. The app shall have the following screens:

- Browse screen
- Trail Description screen
- Additional Information screen
- Emergency Contact Information screen
- Safety Guidelines screen
- Points of Interest screen
- Amenities screen
- Settings screen
- Map screen
- Login screen
- Home screen
- Forgot my Password screen
- Register screen
- Messages screen
- Friends screen
- People Picker screen
- Leave Comment screen
- Edit Profile screen
- Community Forum screen
- Drop-pin Map screen
- Scavenger Hunt screen
- My Hikes Screen
- Filter screen
- Map Legend screen
- All Trails screen

3.2.1.2. The Bottom Navigation Panel shall have the following four icons:

- House icon
- Browse icon
- Chat icon
- Map icon

3.2.1.3. Upon tapping the “Browse” icon on the Bottom Navigation Panel, the app shall navigate the User to the Browse screen

3.2.1.4. Upon tapping the “Chat” icon on the Bottom Navigation Panel, the app shall navigate the User to the Messages screen

3.2.1.5. Upon tapping the “House” icon on the Bottom Navigation Panel, the app shall navigate the User to the Home screen

3.2.1.6. Upon tapping the “Map” icon on the Bottom Navigation Panel, the app shall navigate the User to the Map screen

3.2.1.7. The Settings screen shall have the following sections:

3.2.1.7.1. General section

3.2.1.7.2. Map section

3.2.1.8. The Browse screen shall have the following section:

3.2.1.8.1. Suggested Trails

3.2.1.9. Each Trail Description screen shall have the following sections:

3.2.1.9.1. Weather section

3.2.1.9.2. General Information section

3.2.1.9.3. Traversal section

- 3.2.1.10.** Each Trail Description screen shall have the following buttons:
- Additional Information
 - Emergency Contact Information
 - Safety Guidelines
 - Points of Interest
 - Amenities
 - Community Forum
 - Scavenger Hunt (for easy and moderate Trails only)
- 3.2.1.11.** The My Hikes screen shall have the following tabs:
- Current Hike tab
 - History tab

3.2.2. [Login and Registration](#)

This section describes requirements related to User authentication and how users will create accounts for use with the app

- 3.2.2.1.** The app shall display two text fields for Username and password, respectively, in the Login screen
- 3.2.2.1.1.** The password field shall require eight or more characters that include at least one capital letter, one special character, and one number
- 3.2.2.1.2.** Upon inputting the correct Username and password, the app shall navigate the User to the Home screen
- 3.2.2.1.2.1.** The Home screen icon is located on the app's Bottom Navigation Panel
- 3.2.2.2.** The app shall have a "Forgot my password" button on the Login screen
- 3.2.2.2.1.** Upon tapping the "Forgot my password" button, the app shall navigate the User to the Forgot my Password screen
- 3.2.2.2.2.** The Forgot my Password screen will prompt the User to enter in the User's email address
- 3.2.2.2.2.1.** If the email address is a registered email address, a Two-Factor Authentication email is sent to the User with a 6-digit numeric code, and the Forgot my Password screen prompts for that code
- 3.2.2.2.2.1.1.** If the email address is not a registered email address, the app shall display a message indicating that the email address has not been registered
- 3.2.2.2.2.2.** If the User enters in the correct code from 3.2.2.2.2.1, the Forgot my Password screen will prompt the User to create a new password that follows the password guidelines as mentioned in 3.2.2.1.1
- 3.2.2.2.2.2.1.** If the User does not enter the correct code, the app shall re-prompt the User for the code up to four times
- 3.2.2.2.2.2.2.** If the User does not type the correct code after four times, the app shall navigate the User back to the Login screen
- 3.2.2.2.3.** Once the User types in a valid password that follows the password guidelines from 3.2.2.1.1, the app will display a message indicating that the User's password was changed

- 3.2.2.2.4. The app will display a “Return to the login page” button. If pressed, the app shall navigate the User back to the Login screen
- 3.2.2.3. The app shall display a “Register for an account” button on the Login screen
 - 3.2.2.3.1. Upon tapping the “Register for an account” button, the app shall navigate the User to the Register screen
 - 3.2.2.3.2. The Register screen shall prompt the User for the following User information:
 - First name
 - Last name
 - Email address
 - Password that follows the password guidelines in section 3.2.2.1.1
 - 3.2.2.3.3. The Register screen shall display a “Register” button at the bottom of the screen
 - 3.2.2.3.4. If the User taps on the “Register” button without providing all the information in 3.2.2.3.2, the app shall detect the absence and re-prompt the User for it
 - 3.2.2.3.5. If the User taps on the “Register” button with all the fields in 3.2.2.3.2 filled out, the app shall navigate the User to the Home screen
 - 3.2.2.3.5.1. If the app navigates the User to the Home screen for the first time, the app shall display a Modal asking for permissions to track the User’s location
 - 3.2.2.3.5.2. After 2 seconds of landing on the Home screen for the first time, the app shall spotlight the User’s profile icon at the top right of the Home screen
 - 3.2.2.3.5.3. The spotlight shall display a message indicating to the User to finish completing the User’s profile. A tap on the screen dismisses the spotlight
 - 3.2.2.3.5.4. After the User dismisses the first spotlight, a second spotlight appears on the Browse button icon indicating that a User may browse Trails here. A tap on the screen dismisses the spotlight

3.2.3. [Exercise](#)

This section describes requirements related to the features of the app that will help users to be accountable and exercise

- 3.2.3.1. If the User did not deselect app notifications on the User’s device settings, the app shall send a Push Notification every Thursday of each week that suggests a list of hiking Trails that the User has never started of each week that suggests a list of hiking Trails that the User has never started
 - 3.2.3.1.1. Upon tapping the Push Notification, the app shall launch and navigate the User to the Browse screen under the “Suggested Trails” section

- 3.2.3.1.2.** If the app has launched prior to the User tapping on the Push Notification, then the app shall navigate the User to the Browse screen under the “Suggested Trails” section
- 3.2.3.1.3.** The User may also enable and disable notifications on the app’s Settings screen under the General section
- 3.2.3.2.** The app shall display a “Start” button on each Trail’s Trail Description screen
- 3.2.3.2.1.** Upon tapping the “Start” button on the Trail Description screen, the app shall navigate the User to the Current Hike tab of the My Hikes screen
- 3.2.3.2.2.** The Current Hike tab of the My Hikes screen shall display the following and update in real time on the Current Hike Card:
- A stopwatch timer incrementing every millisecond, displayed in the following format: 00:00:00
 - The User’s step count
 - The User’s speed, measured in MPH or KPH
 - The User’s hike path
- 3.2.3.2.3.** The Current Hike tab of the My Hikes screen shall display the following on the Current Hike Card and update in real time if the User has inputted the User’s age, weight, and height in the User’s Profile screen:
- A numeric aggregation of calories the User has burned
- 3.2.3.2.4.** The Current Hike tab of the My Hikes screen shall also display a “Stop” button and a “Save” button on the Current Hike Card
- 3.2.3.3.** Upon tapping the “Stop” button on the Current Hike tab of the My Hikes screen on the Current Hike Card, the app shall stop updating the following data:
- The stopwatch timer
 - The User’s step count
 - The User’s speed, measured in MPH or KPH
 - The User’s hike path
 - The numeric aggregation of calories the User has burned (if the User preceded the hike by inputting the User’s weight, age, and height in the User’s Profile screen)
- 3.2.3.4.** Upon tapping the “Stop” button, a Modal appears in the Current Hike tab of the My Hikes screen prompting the User to rate the hike from 1 star to 5 stars
- 3.2.3.4.1.** Upon tapping any star on the Modal, the app navigates the User to that Trail’s Leave Comment screen where the selected star rating is auto populated (refer to 3.2.4.12 for additional Leave Comment functionality)
- 3.2.3.5.** After tapping the “Stop” button on the Current Hike tab of the My Hikes screen on the Current Hike Card, the app shall display the following:
- The stopped time from the stopwatch timer, displayed in the following format: 00:00:00
 - The average speed the User hiked, measured in MPH or KPH
 - The User’s total step count

- The numeric total of calories the User has burned (if the User preceded the hike by inputting the User's weight, age, and height in the User's Profile screen)
 - An Image Card-Button of the User's recorded hike path
- 3.2.3.6.** Upon tapping the "Save" button on the Current Hike tab of the My Hikes screen on the Current Hike Card, the Current Hike Card shall disappear and move to the History tab of the My Hikes screen
- 3.2.3.6.1.** The History tab of the My Hikes screen shall display the same information from 3.2.3.5 on each History Card
- 3.2.3.6.2.** Each History Card shall not display the "Save" and "Stop" buttons
- 3.2.3.6.3.** The History tab of the My Hikes screen shall display each History Card in a descending order by date
- 3.2.3.6.4.** The History tab of the My Hikes screen shall display up to 10 History Cards
- 3.2.3.6.4.1.** If the User has hiked more than 10 hikes, the History tab of the My Hikes screen shall display a "See more" button under the list of History Cards.
- 3.2.3.6.4.2.** Upon tapping the "See more" button (see 3.2.3.6.5.1) on the History tab of the My Hikes screen, the app shall navigate the User to the All Trails screen.
- 3.2.3.6.5.** The All Trails screen shall display the following:
- A complete history of each hike the User went on (displayed as History Cards)
 - A "Sort" icon in the screen header
- 3.2.3.6.5.1.** The History Cards shall be displayed in a descending order by date by default
- 3.2.3.6.5.2.** Upon tapping the "Sort" icon in the All Trails screen, the app shall display a dropdown Modal with the following options:
- Date
 - Trail name
 - Difficulty
 - State
- 3.2.3.6.5.2.1.** Upon tapping any selection in the dropdown Modal, the dropdown Modal disappears, and the app navigates the User to the All Trails screen
- 3.2.3.6.5.2.2.** Upon tapping the "Date" selection from 3.2.3.6.7.2, the All Trails screen shall display each History Card in a descending order by date
- 3.2.3.6.5.2.3.** Upon tapping the "Trail name" selection from 3.2.3.6.7.2, the All Trails screen shall display each History Card in an alphabetical order by Trail name
- 3.2.3.6.5.2.4.** Upon tapping the "Difficulty" selection from 3.2.3.6.7.2, the All Trails screen shall display each History Card in an alphabetical

order by Trail name that is grouped by Trail Difficulty, starting with the easy Difficulty

- 3.2.3.6.5.2.5.** Upon tapping the “State” selection from 3.2.3.6.7.2, the All Trails screen shall display each History Card in an alphabetical order by Trail name that is grouped by state name in alphabetical order
- 3.2.3.7.** Upon tapping the Image Card-Button of the User’s recorded hike path on the Current Hike or History tabs of the My Hikes screen, the app shall navigate the User to the Map screen and display the hike path
- 3.2.3.8.** The app shall display an empty star icon at the top right of each Trail Description screen
 - 3.2.3.8.1.** Upon tapping the empty star icon, the icon’s background will display yellow, and the star will become a filled star icon
 - 3.2.3.8.1.1.** Upon tapping the empty star border icon, the associated Trail shall append to the User’s favorite list under the Favorites section on the Profile screen
- 3.2.3.9.** The app shall display the approximate number of steps of the whole Trail on each Trail Description screen under the General Information section
- 3.2.3.10.** Upon tapping the “Start” button on the Trail Description screen, and if the User allowed the app to track the User’s location (refer to 3.2.6.11), the app shall save the User’s Current Location in the local database
 - 3.2.3.10.1.** The starting location shall be used to determine the User’s progression on the Trail continuously throughout hike

3.2.4. [Trail Information](#)

This section describes requirements related to the information relevant to each Trail that will help users to make informed decisions

- 3.2.4.1.** The app shall navigate to the Additional Information screen upon tapping the “Additional Information” button in the Trail Description screen
 - 3.2.4.1.1.** The Additional Information screen shall display the following data:
 - Trail Admissions Fees
 - Season-specific hours of operation
 - Parking regulations
 - Additional Fees
- 3.2.4.2.** The app shall display a photo of the Trailhead under the General Information section of the Trail Description screen
 - 3.2.4.2.1.** The Trail Cards on the Browse screen shall display a photo of the Trailhead and the Trail’s name
- 3.2.4.3.** The app shall display the length of the Trail in miles or kilometers under the General Information section of the Trail Description screen
 - 3.2.4.3.1.** The app will default to miles or kilometers depending on the device’s location

- 3.2.4.3.2.** The User may toggle between miles or kilometers in the General section of the Settings screen
- 3.2.4.4.** The app shall display the Trail's Difficulty under the General Information section of the Trail Description screen
- 3.2.4.4.1.** The Difficulty shall consist of three tiers: easy, moderate, and hard
- 3.2.4.5.** The app shall indicate if the Trail is Disability Accessible under the Traversal section of the Trail Description screen
- 3.2.4.6.** The app shall display the Trail's Grade of hills and change in Elevation under the Traversal section of the Trail Description screen
- 3.2.4.7.** The app shall navigate to the Emergency Contact Information screen upon tapping the "Emergency Contact Information" button on the Trail Description screen.
- 3.2.4.7.1.** The Emergency Contact Information screen shall display the following local park ranger contact information:
- 3.2.4.7.1.1.** Name
- 3.2.4.7.1.2.** Phone Number(s)
- 3.2.4.8.** The app shall navigate to the Safety Guidelines screen upon tapping the "Safety Guidelines" button on the Trail Description screen.
- 3.2.4.8.1.** The Safety Guidelines screen shall display the following sections:
- Predatory Wildlife
 - Dangerous Plant life
 - Edible Plant life
 - Hiking Equipment
- 3.2.4.8.2.** The Predatory Wildlife section shall display the following data:
- A photo of each predator
 - A textual description of the predator
 - A textual description of the Predator Warning Signs
- 3.2.4.8.3.** The Edible Plant Life section shall display the following data:
- A photo of each Edible Plant
 - A textual description of each Edible Plant description of each Edible Plant
- 3.2.4.8.4.** The Dangerous Plant Life section shall display the following data:
- A photo of each dangerous plant
 - A textual description of each dangerous plant
- 3.2.4.8.5.** The Hiking Equipment section shall display the following data:
- A photo of each piece of Hiking Equipment
 - A textual description of each piece of Hiking Equipment Hiking Equipment
- 3.2.4.9.** The app shall show an alert on a Trail Card that alerts the User about Hunting Locations on the Trail under the Safety Guidelines section.
- 3.2.4.10.** The app shall navigate to the Points of Interest screen upon tapping the "Points of Interest" button on the Trail Description screen
- 3.2.4.10.1.** The Point of Interest screen shall display the following:

- The name of the Point of Interest
 - Photo of the Point of Interest
 - A history of the Point of Interest
- 3.2.4.11.** The app shall navigate to the Amenities screen upon tapping the “Amenities” button on the Trail Description screen
- 3.2.4.11.1.** The Amenities screen shall display a list of the Amenities
- 3.2.4.12.** The app shall provide a Comment System on the Trail Description screen
- 3.2.4.12.1.** The Comment System shall display a “Leave Comment” button
- 3.2.4.12.1.1.** Upon tapping the “Leave Comment” button, the app shall navigate the User to the Leave Comment screen
- 3.2.4.12.1.2.** The “Leave Comment” screen shall display a 5-star rating system and an open text field for textual Comments
- 3.2.4.12.1.2.1.** If the User has already Commented or rated the Trail, the Leave Comment screen shall allow the User to edit or delete the rating and Comment by tapping on the vertical ellipses button and selecting “Edit” or “Delete”
- 3.2.4.12.1.2.2.** Upon tapping the “Delete” button, the app shall navigate the User to the Trail Description screen and the Comment and rating shall be deleted
- 3.2.4.12.1.2.3.** Upon tapping the “X” icon in the header of the Leave Comment screen, the app shall navigate the User to the Trail Description screen
- 3.2.4.12.1.2.4.** Upon tapping the checkmark icon in the header of the Leave Comment screen, the app shall navigate the User to the Trail Description screen
- 3.2.4.12.1.2.5.** The new Comment shall be displayed at the top of the Comment System on the Trail Description screen in a different color from the Comments of other Users
- 3.2.4.12.2.** The app shall display a list of 6 Comments (refer to 3.2.4.12.1.2.5) on the Trail Description screen with a “Read more” button below the list the list
- 3.2.4.12.2.1.** Upon tapping the “Read more” button, the app shall append 6 more Comments to the list
- 3.2.4.12.3.** A User may post a Comment on the Comment System by tapping the “Post” button
- 3.2.4.12.4.** Upon tapping the “Post” button, the app shall display the read-only version of the rating/Comment at the top of the truncated list of ratings/Comments
- 3.2.4.12.5.** The app shall display a message to indicate if there are no Comments yet for that specific Trail
- 3.2.4.13.** The app shall provide a Comment Rating System that Users can use to determine the accuracy of other Comments on the Trail Description screen
- 3.2.4.13.1.** The User may report a Comment by tapping on the “Report Comment” button underneath the Comment

3.2.4.14. The app shall display the following four-day Weather Forecast data in the Weather section of Trail Description screen:

- Four icons (one icon for the current day and 3 days after) to indicate either sunny, partly cloudy, rainy, snowy, or windy
- Four high/low temperature pairs (one pair for each day) to indicate temperature range
- The temperature data in the four-day Weather Forecast shall be measured in degrees Fahrenheit or in degrees Celsius
- The app will default to Fahrenheit or Celsius depending on the device's location
- The User may toggle between Fahrenheit or Celsius in the General section of the Settings screen

3.2.5. Map

This section describes requirements related to the map and navigational features of the app with the intent of helping users to find a Trail and then to be able to hike it from start to finish

3.2.5.1. The app shall have an interactive Map Window on the Map screen

3.2.5.2. The app shall display the following data on the Map screen and update in real time:

- The current altitude of the User's device measured in feet or meters (see 3.2.5.2.1 and 3.2.5.2.2) above sea level
- The User's profile icon at the User's Current Location

3.2.5.2.1. The User's device location shall determine if the altitude is measured in feet or meters by default

3.2.5.2.2. The User may toggle between feet or meters in the General section of the Settings screen

3.2.5.3. The Map Window of the Map screen shall display each Trail as a colored line

3.2.5.3.1. The color of each Trail-line shall be determined by the Difficulty Rating System of the Trail of the Trail

3.2.5.3.1.1. Trails with a Hard Difficulty Rating shall display an orange Trail-line

3.2.5.3.1.2. Trails with a Moderate Difficulty Rating shall display a yellow Trail-line

3.2.5.3.1.3. Trails with an Easy Difficulty Rating shall display a green Trail-line

3.2.5.4. Upon Long Pressing the colored Trail on the Map Window of the Map screen, the app shall navigate the User to the Trail Description screen Description screen

3.2.5.5. The Map Window of the Map screen shall display the Trailhead icon at the Trailhead of the Trail

3.2.5.6. The app shall display a search bar on the Map screen

3.2.5.6.1. The app shall center the Map Window on the Map screen to the Trailhead of the Trail the User searched for by name in the search bar

- 3.2.5.6.2.** The app shall center the Map Window on the Map screen to the city the User searched for by name in the search bar
- 3.2.5.6.2.1.** The app shall display the Trails in the city, which the User searched for by name in the search bar, on the Map Window of the Map screen
- 3.2.5.7.** The app shall display a filter icon in the header of the Map screen
- 3.2.5.7.1.** Upon tapping the filter icon, the app shall navigate the User to the Filter screen
- 3.2.5.7.1.1.** The User may select the following data to be displayed on the map through the Filter screen:
- Scenic overlooks
 - Waterfalls
- 3.2.5.7.1.2.** The app shall display the data in 3.2.5.7.1.1 as icons overlaying the Map Window on the Map screen
- 3.2.5.8.** Upon Long-Pressing any icon on the Map Window of the Map screen, the app shall display the 10-digit longitude and latitude of that icon
- 3.2.5.9.** The app shall display a legend icon in the header of the Map screen
- 3.2.5.9.1.** Upon tapping the legend icon on the Map screen, the app shall navigate the User to the Map Legend screen
- 3.2.5.9.2.** The Map Legend screen shall display each icon followed by the corresponding meaning
- 3.2.5.10.** The app shall display a map type icon in the header of the Map screen
- 3.2.5.10.1.** Upon tapping the map type icon on the Map screen, a Modal dropdown shall appear with two buttons: “Default” and “Satellite”
- 3.2.5.10.2.** Upon tapping the Default button, the app shall alter the Map Window type of the Map screen to Default view
- 3.2.5.10.3.** Upon tapping the Satellite button, the app shall alter the Map Window type of the Map screen to Satellite view
- 3.2.5.11.** The app shall display a “Directions” button on the Trail Description screen
- 3.2.5.11.1.** Upon tapping the “Directions” button on the Trail Description screen, the Google Maps app shall open to provide directions for the User to the trailhead
- 3.2.5.11.2.** Upon tapping the “Directions” button on the Trail Description screen and the User does not have Google Maps installed, a pop-up Modal appears indicating that Google Maps must be installed to use this feature
- 3.2.5.12.** The app shall display a “Search for Trails” button on the Map Window of the Map screen
- 3.2.5.12.1.** Upon tapping the “Search for Trails” button, the app shall display up to 20 Trails in the area
- 3.2.5.13.** The Map Window of the Map screen shall be zoomable.
- 3.2.5.13.1.** The Map Window of the Map screen shall adjust resolution based on the level of zoom.
- 3.2.5.13.2.** The resolution shall increase on the Map Window of the Map screen when zooming in

- 3.2.5.13.3.** The resolution shall decrease on the Map Window of the Map screen when zooming out

3.2.6. Social

This section details the requirements related to the social aspects of the app, including sharing User hiking data with friends and public Comments to be shared with all users

- 3.2.6.1.** The app shall provide an Instant Messaging service as a social interactive feature
- 3.2.6.1.1.** Upon tapping the chat icon in the Bottom Navigation Panel, the app shall navigate the User to the Messages screen
- 3.2.6.2.** The app shall allow Users to create a new message Thread on the Messages screen by tapping on the Fab Button at the bottom right corner
- 3.2.6.2.1.** Upon tapping the Fab in the Messages screen, the app shall navigate the User to the People picker screen where the User may select one or more than one person
- 3.2.6.2.2.** Tapping the checkmark at the top right of the People Picker screen shall save and display the conversation Thread and navigate the User to the Messages screen
- 3.2.6.3.** The User may create a new message by typing (the keyboard will be the default of every system, in other words the same keyboard used when typing any kind of text) in the messages text field at the bottom of each Thread, and either tapping on the “Send” icon or tapping the Enter key on the mobile device
- 3.2.6.3.1.** Each message posted will display the read-only version of the message
- 3.2.6.3.2.** The post created by the User shall be displayed on the right $\frac{3}{4}$ of the Thread
- 3.2.6.3.3.** The post created by the User’s friends shall be displayed on the left $\frac{3}{4}$ of the Thread
- 3.2.6.3.4.** Each post shall display a vertical ellipses button
- 3.2.6.3.5.** Upon tapping the vertical ellipses button, a Modal dropdown menu appears displaying an “Edit” button and a “Delete” button
- 3.2.6.3.5.1.** Upon tapping the “Edit” button, the read-only version of the message shall become a text field where the User may edit the Comment
- 3.2.6.3.5.2.** Upon tapping the “Delete” button, the read-only version of the message shall be omitted from the Thread
- 3.2.6.3.5.3.** Only Users who wrote the selected message may delete the selected message
- 3.2.6.4.** Each message Thread will display a vertical ellipses button
- 3.2.6.4.1.** Upon tapping the vertical ellipses button, a Modal dropdown appears with two buttons: “Invite Friends” and “Remove Friends”
- 3.2.6.4.1.1.** If there is only one person in the Thread along with the User, then the “Remove Friends” button is disabled

- 3.2.6.4.1.2. Upon tapping the “Invite Friends” button, the app shall navigate the User to the People Picker screen
- 3.2.6.4.1.3. Upon tapping the “Remove Friends” button, the app shall navigate the User to a filtered People Picker screen displaying the current members in the Thread
- 3.2.6.4.1.4. The app shall display an info message prompting the User to select the friend(s) to be removed
- 3.2.6.4.1.5. The User may tap on people to remove and tap on the checkmark to save
- 3.2.6.4.1.6. Upon selecting those people and tapping on the checkmark, the app shall navigate the User back to the Thread, and a message shall display indicating that those people were removed from the Thread
- 3.2.6.5. The User may include the following information on the User’s Profile screen:
 - 3.2.6.5.1. Profile picture
 - 3.2.6.5.2. 300-character autobiography in the “About Me” text field
 - 3.2.6.5.3. If the User opts out of uploading a profile picture, the app shall save the default avatar determined by the system (placeholder image) as the User’s profile picture
 - 3.2.6.5.4. The Profile screen shall be accessed by tapping on the User’s profile icon at the top right of each screen
 - 3.2.6.5.5. The Profile screen shall display the User’s name at the top of the screen
 - 3.2.6.5.6. The Profile screen shall include a profile picture placeholder, which the User may change by uploading their own picture
 - 3.2.6.5.6.1. Upon tapping the profile picture placeholder, the app shall navigate the User to the Edit Profile screen
 - 3.2.6.5.6.1.1. Upon tapping the checkmark in the Edit Profile screen and uploading a picture (from your local storage, or from a URL), the app navigates the User back to the Profile screen and displays the picture the User set
 - 3.2.6.5.7. The Profile screen shall display a read-only version of a 300-character autobiography under the Profile screen’s About Me section
 - 3.2.6.5.7.1. The About Me section shall display a vertical ellipses button in the top right corner of the section
 - 3.2.6.5.7.2. Upon tapping the vertical ellipses button of the About Me section on the Profile screen, a Modal dropdown appears with the “Edit” button
 - 3.2.6.5.7.2.1. Upon tapping the “Edit” button, the app navigates the User to the Profile Edit screen where the User may edit the text in the About Me section
 - 3.2.6.5.8. The Profile screen shall provide a “Friends” button displaying the string “Friends”
 - 3.2.6.5.8.1. Upon tapping the “Friends” button on the Profile screen, the app navigates the User to the Friends screen
 - 3.2.6.5.8.2. The Friends screen shall display the list of friends the User has.

- 3.2.6.5.8.3. The Friends screen shall have a button to add friends
- 3.2.6.5.8.4. Upon Long Pressing a friend in the list, a trash icon appears in the header of the Friends screen
 - 3.2.6.5.8.4.1. Upon tapping the trash icon, the app shall remove that person from the User's Friend screen
- 3.2.6.6. Upon tapping the "Community Forum" button in the Trail Description screen, the app shall navigate the User to the Community Forum screen
 - 3.2.6.6.1. Upon first-time navigation to the Community Forum screen, a pop-up Modal appears with a message indicating how the forum is to be used
 - 3.2.6.6.2. The Community Forum screen consists of a limited community Comment Thread
 - 3.2.6.6.2.1. Each post includes longitude and latitude coordinates with some User-inputted text
 - 3.2.6.6.3. The User may post Comments to the community Comment Thread by tapping on the Fab Button at the bottom right corner of the Community Forum screen
 - 3.2.6.6.3.1. Upon tapping the Fab Button, the User is navigated to the Drop-Pin Map screen that is centered on the Trailhead of the selected Trail with a pin in the middle of the screen
 - 3.2.6.6.3.2. As the User navigates through the Drop-pin Map screen, the pin stays in the center of the screen
 - 3.2.6.6.3.3. Upon tapping the "Create Post" button at the top header of the Drop-pin Map screen, the app shall navigate the User to the Community Forum screen with the Comment field auto populated with a picture of the dropped pin location
 - 3.2.6.6.3.3.1. The User may add text to the Comment text field
 - 3.2.6.6.3.3.2. The User may post the Comment by tapping on the Post button
 - 3.2.6.6.3.4. In the read-only Community Forum screen, the User may tap on the picture of the dropped pin location in a post
 - 3.2.6.6.3.4.1. Upon tapping the picture of dropped pin location, the app shall navigate the User to the Map screen and display the pin on the map
 - 3.2.6.6.4. Comments on the community chat Thread shall be visible to *all* Users
 - 3.2.6.6.5. Comments on the community chat Thread shall display the posted date
- 3.2.6.7. On Trails with an easy and moderate Difficulty rating, the app shall display a "Scavenger Hunt" button in the Trail Description screen
 - 3.2.6.7.1. Upon tapping the "Scavenger Hunt" button, the app shall navigate the User to the Scavenger Hunt screen
 - 3.2.6.7.1.1. The Scavenger Hunt screen will contain a list of focal points that can be identified on the Trail, such as:
 - Plants

- Animals
- Points of Interest

3.2.6.7.1.2. Each focal point shall contain pictures of focal points for easy identification

3.2.6.7.1.3. Each focal point shall have checkboxes to mark off individual focal points when they are identified

3.2.6.8. The app shall display a toggle under the General section of the Settings screen that allows the User to enable or disable location tracking with Friends

3.2.6.8.1. By default, location tracking toggle in the Settings screen shall be OFF

3.2.6.8.2. When two friends enable location tracking, the User's location shall appear on the friend's Map screen and the friend's location shall appear on the User's Map screen as profile picture icons

3.2.6.8.3. If the User has location tracking enabled, the User's location shall be refreshed every 60 seconds

3.2.6.8.4. The User's displayed location shall be accurate to within 5 meters

3.2.6.8.5. If the User's GPS loses its tracking signal, the app shall record, and display the User's last seen location on the Map screen

3.2.6.8.5.1. If a User taps on the friend's icon on the Map screen, a pop-up Modal appears displaying the following data:

- The friend's name
- The friend's timestamp

3.3. Usability Requirements

3.3.1. N/A

3.4. Performance Requirements

3.4.1. The app shall load Trail Photos in less than 3 seconds of entering a Browse screen

3.4.2. The app shall load Trail Photos in less than 3 seconds of entering a Trail Description screen

3.4.3. The app shall submit User Comments and ratings in less than 3 seconds after the User's submission

3.5. Logical Database Requirements

3.5.1. The app shall have one production server-side NoSQL database and one production client-side database utilizing device local storage

3.5.2. The server-side database shall return and receive requests in JSON formatting

3.5.3. The server-side database shall store information accessible to all Users consisting of:

- User data which shall consist of:
 - The User's Username/display name
 - The User's email
- A unique identifier for the User
- User Comments and ratings associated to Comments
 - Trail data of which each entry shall consist of:
 - A unique identifier for that Trail
 - Trail name
 - Trail description
 - Trail location
 - Images associated with the Trail
 - Amenities associated with the Trail
 - Points of interest associated with the Trail
 - Location data of the Trail

3.5.4. Users shall be permitted to submit Comments, Comment ratings, and Trail ratings

3.5.5. Users shall be permitted editing permissions of their User data as well as Trail ratings, Comment ratings, and Comments submitted by them

3.5.6. The client-side local storage shall store for an individual User: a string containing a unique identifier for the individual User that is secured using a hash

3.5.7. Both client-side and server-side storage shall store for an individual User:

- A list of Trails favorited by the User, with each list item containing the name of the Trail and its unique identifier
- User data containing the User's Username, email, and unique identifier

3.5.8. The app shall have an auto-sync that will push data onto the server-side database

3.5.9. The app shall trigger an auto-sync upon loading the Application

- 3.5.10. The app shall trigger an auto-sync every 30 seconds given changes to the local storage are detected

3.6. Design Constraints

- 3.6.1. The app shall be a mobile Application (for the iOS and Android platforms)
- 3.6.2. The app (on both iOS and Android platforms) should be compatible with 70% of iOS devices and 60% of Android devices (This is affected by operating system updates and manufacturing designs)

3.7. Software System Attributes

3.7.1. Reliability:

- 3.7.1.1. The app shall be available for download and installation on the Google Play Store or the App Store to Users with OS or Android platforms

3.7.2. Availability:

- 3.7.2.1. The app shall rely on the Google Firebase service to handle database access and data syncing with more than a million Users
- 3.7.2.2. The app support offline usage using the Firebase client library; data that is already data shall still be available when the app does not have access to the internet

3.7.3. Security:

- 3.7.3.1. The app shall have login credentials that only the User can access to protect their privacy and save all personal information associated with the Application
- 3.7.3.2. The app shall use a secure TCP/IP connection using SSL
- 3.7.3.3. The app shall give Users a privacy policy to assure Users of data privacy

3.8. Supporting Information

- 3.8.1. N/A

4. VERIFICATION

4.1. External Interfaces

4.1.1. NA

4.2. Functions

4.2.1. Views and displays

4.2.1.1. If the app has the following screens, it passes verification. Otherwise it fails verification

- Browse screen
- Trail Description screen
- Additional Information screen
- Emergency Contact Information screen
- Safety Guidelines screen
- Points of Interest screen
- Amenities screen
- Settings screen
- Map screen
- Login screen
- Home screen
- Forgot my Password screen
- Register screen
- Messages screen
- Friends screen
- People Picker screen
- Leave Comment screen
- Edit Profile screen
- Community Forum screen
- Drop-pin Map screen
- Scavenger Hunt screen
- My Hikes Screen
- Filter screen
- Map Legend screen
- All Trails Screen

4.2.1.2. If the Bottom Navigation Panel has the following four icons, it passes verification. Otherwise, it fails verification

- House icon
- Browse icon
- Chat icon
- Map icon

4.2.1.3. If tapping the “Browse” icon on the Bottom Navigation Panel navigates the User to the Browse screen, it passes verification. Otherwise, it fails verification

- 4.2.1.4. If tapping the “Chat” icon on the Bottom Navigation Panel navigates the User to the Messages screen, it passes verification. Otherwise, it fails verification
- 4.2.1.5. If tapping the “House” icon on the Bottom Navigation Panel navigates the User to the Home screen, it passes verification. Otherwise, it fails verification
- 4.2.1.6. If tapping the “Map” icon on the Bottom Navigation Panel navigates the User to the Map screen, it passes verification. Otherwise, it fails verification
- 4.2.1.7. If the Settings screen has the following sections, it passes verification. Otherwise, it fails verification
 - General section
 - Map section
- 4.2.1.8. If the Browse screen has the following section, it passes verification. Otherwise, it fails verification
 - Suggested Trails
- 4.2.1.9. If the Trail Description screen has the following sections, it passes verifications. Otherwise, it fails verification
 - Weather section
 - General Information section
 - Traversal section
- 4.2.1.10. If each Trail Description screen has the following buttons, it passes verification. Otherwise, it fails verification
 - Additional Information
 - Emergency Contact Information
 - Safety Guidelines
 - Points of Interest
 - Amenities
 - Community Forum
 - Scavenger Hunt (for easy and moderate Trails only)
- 4.2.1.11. If the My Hikes screen has the following tabs, it passes verification. Otherwise, it fails verification
 - Current Hike tab
 - History tab

4.2.2. [Login and Registration](#)

- 4.2.2.1. If the app’s Login screen displays two text fields for Username and password, respectively, it passes verification. Otherwise, it fails verification
 - 4.2.2.1.1. If the password field requires eight or more characters that include at least one capital letter, one special character, and one number, it passes verification. Otherwise, it fails verification
 - 4.2.2.1.2. If, upon inputting the correct Username and password, the app navigates the User to the Home screen, it passes verification. Otherwise, it fails verification

- 4.2.2.1.2.1. If the Home screen is located on the app's Bottom Navigation Panel, it passes verification. Otherwise, it fails verification
- 4.2.2.2. If the app has a "Forgot my password" button on the Login screen, it passes verification. Otherwise, it fails verification
- 4.2.2.2.1. If, upon tapping the "Forgot my password" button, the app navigates the User to the Forgot my Password screen, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2. If the Forgot my Password screen prompts the User to enter in the User's email address, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2.1. If the email address is a registered email address and a two-factor authorization email is sent to the User with a 6-digit numeric code and the Forgot my Password screen prompts the User for that code, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2.1.1. If, the email address is not a registered email address, and the app displays a message indicating that the email address has not been registered, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2.2. If, the User enters in the correct code from 3.2.2.2.2.1, and the Forgot my Password screen prompts the User to create a new password that follows the password guidelines as mentioned in 3.2.2.1.1, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2.2.1. If, the User does not enter the correct code, and the app re-prompts the User for the code up to four times, it passes verification. Otherwise, it fails verification
- 4.2.2.2.2.2.2. If, the User does not type the correct code after four times, and the app shall navigate the User back to the Login screen, it passes verification. Otherwise, it fails verification
- 4.2.2.2.3. If, the User types in a valid password that follows the password guidelines from 3.2.2.1.1, and the app will display a message indicating that the User's password was changed, it passes verification. Otherwise, it fails verification
- 4.2.2.2.4. If the app displays a "Return to the login page" button, and pressing the button causes the app to navigate the User back to the Login screen, it passes verification. Otherwise, it fails verification
- 4.2.2.3. If the app displays a "Register for an account" button on the Login screen, it passes verification. Otherwise, it fails verification
- 4.2.2.3.1. If tapping the "Register for an account" button causes the app to navigate the User to the Register screen, it passes verification. Otherwise, it fails verification
- 4.2.2.3.2. If the Register screen prompts the User for the following User information, it passes verification. Otherwise, it fails verification
- First name
 - Last name
 - Email address

- Password that follows the password guidelines in 3.2.2.1.1
- 4.2.2.3.3. If the Register screen displays a “Register” button at the bottom of the screen, it passes verification. Otherwise, it fails verification
- 4.2.2.3.4. If the User taps on the “Register” button without providing all the information in 3.2.2.3.2, and the app detects the absence and re-prompts the User for the information, it passes verification. Otherwise, it fails verification
- 4.2.2.3.5. If the User taps on the “Register” button with all the fields in 3.2.2.3.2 filled out, and the app navigates the User to the Home screen, it passes verification. Otherwise, it fails verification
 - 4.2.2.3.5.1. If the app navigates the User to the Home screen for the first time, and the app displays a Modal asking for permissions to track the User’s location, it passes verification. Otherwise, it fails verification
 - 4.2.2.3.5.2. If the app spotlights the User’s profile icon at the top right of the Home screen after 2 seconds of landing on the Home screen for the first time, it passes verification. Otherwise, it fails verification
 - 4.2.2.3.5.3. If the spotlight displays a message indicating to the User to finish completing the User’s profile, and a tap on the screen dismisses the spotlight, it passes verification. Otherwise, it fails verification
 - 4.2.2.3.5.4. If the User dismisses the first spotlight, and a second spotlight appears on the Browse button icon indicating that a User may browse Trails, and a tap on the screen dismisses the spotlight, it passes verification. Otherwise, it fails verification

4.2.3. [Exercise](#)

- 4.2.3.1. If the User did not deselect app notifications on the User’s device settings, and the app sends a Push Notification every Thursday of each week that suggests a list of hiking Trails that the User has never started, it passes verification. Otherwise, it fails verification
 - 4.2.3.1.1. If tapping the Push Notification launches the app and navigates the User to the Browse screen under the “Suggested Trails” section, it passes verification. Otherwise, it fails verification
 - 4.2.3.1.2. If the app has launched prior to the User tapping on the Push Notification, and the app navigates the User to the Browse screen under the “Suggested Trails” section, it passes verification. Otherwise, it fails verification
 - 4.2.3.1.3. If the User may also enable and disable notifications on the app’s Settings screen under the General section, it passes verification. Otherwise, it fails verification
- 4.2.3.2. If the app displays a “Start” button on each Trail’s Trail Description screen, it passes verification. Otherwise, it fails verification
 - 4.2.3.2.1. If the app navigates the User to the Current Hike tab of the My Hikes screen upon tapping the “Start” button on the Trail Description screen, it passes verification. Otherwise, it fails verification

- 4.2.3.2.2.** If the Current Hike tab of the My Hikes screen displays the following and updates in real time on the Current Hike Card, it passes verification. Otherwise, it fails verification
- A stopwatch timer incrementing every millisecond, displayed in the following format: 00:00:00
 - The User's step count
 - The User's speed, measured in MPH or KPH
 - The User's hike path
- 4.2.3.2.3.** If the Current Hike tab of the My Hikes screen displays the following on the Current Hike Card and updates in real time when the User has inputted the User's age, weight, and height in the User's Profile screen, it passes verification. Otherwise, it fails verification
- A numeric aggregation of calories the User has burned
- 4.2.3.2.4.** If the Current Hike tab of the My Hikes screen displays a "Stop" button and a "Save" button on the Current Hike Card, it passes verification. Otherwise, it fails verification
- 4.2.3.3.** If the app stops updating the following data upon tapping the "Stop" button on the Current Hike tab of the My Hikes screen on the Current Hike Card, it passes verification. Otherwise, it fails verification
- The stopwatch timer
 - The User's step count
 - The User's speed, measured in MPH or KPH
 - The User's hike path
 - The numeric aggregation of calories the User has burned (if the User preceded the hike by inputting the User's weight, age, and height in the User's Profile screen)
- 4.2.3.4.** If a Modal appears in the Current Hike tab of the My Hikes screen prompting the User to rate the hike from 1 star to 5 stars upon tapping the "Stop" button, it passes verification. Otherwise, it fails verification
- 4.2.3.4.1.** If the app navigates the User to that Trail's Leave Comment screen where the selected star rating is auto populated upon tapping any star on the Modal, it passes verification. Otherwise, it fails verification
- 4.2.3.5.** If the app displays the following after tapping the "Stop" button on the Current Hike tab of the My Hikes screen on the Current Hike Card, it passes verification. Otherwise, it fails verification
- The stopwatch timer, displayed in the following format: 00:00:00
 - The average speed the User hiked, measured in MPH or KPH
 - The User's total step count
 - The numeric total of calories the User has burned (if the User preceded the hike by inputting the User's weight, age, and height in the User's Profile screen)
 - An Image Card-Button of the User's recorded hike path

- 4.2.3.6.** If the Current Hike Card disappears and moves to the History tab of the My Hikes screen upon tapping the “Save” button on the Current Hike tab of the My Hikes screen on the Current Hike Card, it passes verification. Otherwise, it fails verification
- 4.2.3.6.1.** If the History tab of the My Hikes screen displays the same information from 3.2.3.5 on each History Card, it passes verification. Otherwise, it fails verification
- 4.2.3.6.2.** If each History Card does not display the “Save” and “Stop” buttons, it passes verification. Otherwise, it fails verification
- 4.2.3.6.3.** If the History tab of the My Hikes screen displays each History Card in a descending order by date, it passes verification. Otherwise, it fails verification
- 4.2.3.6.4.** If the History tab of the My Hikes screen shall display up to 10 History Cards, it passes verification. Otherwise, it fails verification
- 4.2.3.6.4.1.** If the User has hiked more than 10 hikes, and the History tab of the My Hikes screen shall display a “See more” button under the list of History Cards, it passes verification. Otherwise, it fails verification
- 4.2.3.6.4.2.** If tapping the “See more” button on the History tab of the My Hikes screen navigates the User to the All Trails screen, it passes verification. Otherwise, it fails verification
- 4.2.3.6.5.** If the All Trails screen displays the following, it passes verification. Otherwise, it fails verification:
- A complete history of each hike the User went on (displayed as History Cards)
 - A “Sort” icon in the screen header
- 4.2.3.6.5.1.** If the History Cards are displayed by default in a descending order by date, it passes verification. Otherwise, it fails verification
- 4.2.3.6.5.2.** If tapping the “Sort” icon in the All Trails screen displays a dropdown Modal with the following options, it passes verification. Otherwise, it fails verification
- Date
 - Trail name
 - Difficulty
 - State
- 4.2.3.6.5.2.1.** If tapping any selection in the dropdown Modal makes the dropdown Modal disappear, and the app navigates the User to the All Trails screen, it passes verification. Otherwise, it fails verification
- 4.2.3.6.5.2.2.** If tapping the “Date” selection from 3.2.3.6.7.2 causes the All Trails screen to display each History Card in a descending order by date, it passes verification. Otherwise, it fails verification
- 4.2.3.6.5.2.3.** If tapping the “Trail name” selection from 3.2.3.6.7.2 causes the All Trails screen to display each History Card in an

alphabetical order by Trail name, it passes verification. Otherwise, it fails verification

4.2.3.6.5.2.4. If tapping the “Difficulty” selection from 3.2.3.6.7.2 causes the All Trails screen to display each History Card in an alphabetical order by Trail name that is grouped by Trail Difficulty, starting with the easy Difficulty, it passes verification. Otherwise, it fails verification

4.2.3.6.5.2.5. If tapping the “State” selection from 3.2.3.6.7.2 causes the All Trails screen to display each History Card in an alphabetical order by Trail name that is grouped by state name in alphabetical order, it passes verification. Otherwise, it fails verification

4.2.3.7. If the app navigates the User to the Map screen and displays the hike path upon tapping the Image Card-Button of the User’s recorded hike path on the Current Hike or History tabs of the My Hikes screen, it passes verification. Otherwise, it fails verification

4.2.3.8. If the app displays an empty star icon at the top right of each Trail Description screen, it passes verification. Otherwise, it fails verification

4.2.3.8.1. If tapping the empty star icon causes the icon’s background to display yellow, and the star becomes a filled star icon, it passes verification. Otherwise, it fails verification

4.2.3.8.1.1. If tapping the empty star icon appends the associated Trail to the User’s favorite list under the Favorites section on the Profile screen, it passes verification. Otherwise, it fails verification

4.2.3.9. If the app displays the approximate number of steps of the whole Trail on each Trail Description screen under the General Information section, it passes verification. Otherwise, it fails verification

4.2.3.10. If tapping on the “Start” button on the Trail Description screen where the User allowed the app to track the User’s location beforehand, and the app shall save the User’s Current Location in the local database, it passes verification. Otherwise, it fails verification

4.2.3.10.1. If the starting location is used to determine the User’s progression on the Trail continuously throughout hike, it passes verification. Otherwise, it fails verification

4.2.4. [Trail Information](#)

4.2.4.1. If the app navigates to the Additional Information screen upon tapping the “Additional Information” button in the Trail Description screen, then it passes verification. Otherwise, it fails verification

4.2.4.1.1. If the Additional Information screen displays the following data, it passes verification. Otherwise, it fails verification

- Trail Admissions Fees
- Season-specific hours of operation
- Parking regulations

- Additional Fees
- 4.2.4.2. If the app displays a photo of the Trailhead under the General Information section of the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.2.1. If the Trail Cards on the Browse screen display a photo of the Trailhead and the Trail's name, it passes verification. Otherwise, it fails verification
- 4.2.4.3. If the app displays the length of the Trail in miles or kilometers under the General Information section of the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.3.1. If the app defaults to miles or kilometers depending on the device's location, it passes verification. Otherwise, it fails verification
- 4.2.4.3.2. If the User may toggle between miles or kilometers in the General section of the Settings screen, it passes verification. Otherwise, it fails verification.
- 4.2.4.4. If the app displays the Trail's Difficulty under the General Information section of the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.4.1. If the Difficulty shall consist of three tiers: easy, moderate, and hard, it passes verification. Otherwise, it fails verification
- 4.2.4.5. If the app indicates if the Trail is Disability Accessible under the Traversal section of the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.6. If the app displays the Trails Grade of hills and change in Elevation under the Traversal section of the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.7. If the app navigates to the Emergency Contact Information screen upon tapping the "Emergency Contact Information" button on the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.7.1. If the Emergency Contact Information screen displays the following local park ranger contact information, it passes verification. Otherwise, it fails verification
- Name
 - Phone Number(s)
- 4.2.4.8. If The app navigates to the Safety Guidelines screen upon tapping the "Safety Guidelines" button on the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.8.1. If the Safety Guidelines screen displays the following sections, it passes verification. Otherwise, it fails verification
- Predatory Wildlife
 - Dangerous Plant life
 - Edible Plant life
 - Hiking Equipment

- 4.2.4.8.2. If the Predatory Wildlife section displays the following data, it passes verification. Otherwise, it fails verification
 - A photo of each predator
 - A textual description of the predator
 - A textual description of the Predator Warning Signs
- 4.2.4.8.3. If the Edible Plant Life section displays the following data, it passes verification. Otherwise, it fails verification
 - A photo of each Edible Plant
 - A textual description of each Edible Plant
- 4.2.4.8.4. If the Dangerous Plant Life section displays the following data, it passes verification. Otherwise, it fails verification
 - A photo of each dangerous plant
 - A textual description of each dangerous plant
- 4.2.4.8.5. If the Hiking Equipment section displays the following data, it passes verification. Otherwise, it fails verification
 - A photo of each piece of Hiking Equipment
 - A textual description of each piece of Hiking Equipment
- 4.2.4.9. If the app shows an alert on a Trail Card that alerts the User about Hunting Locations on the Trail under the Safety Guidelines section, then it passes verification. Otherwise, it fails verification
- 4.2.4.10. If the app navigates to the Points of Interest screen upon tapping the “Points of Interest” button on the Trail Description screen, it passes verification. Otherwise, it fails verification
 - 4.2.4.10.1. If the Points of Interest screen displays the following, it passes verification. Otherwise, it fails verification
 - The name of the Point of Interest
 - Photo of the Point of Interest
 - A history of the Point of Interest
- 4.2.4.11. If the app navigates to the Amenities screen upon tapping the “Amenities” button on the Trail Description screen, it passes verification. Otherwise, it fails verification
 - 4.2.4.11.1. If the Amenities screen displays a list of the Amenities, it passes verification. Otherwise, it fails verification
- 4.2.4.12. If the app provides a Comment System on the Trail Description screen, it passes verification. Otherwise, it fails verification
 - 4.2.4.12.1. If the Comment System displays a “Leave Comment” button, it passes verification. Otherwise, it fails verification
 - 4.2.4.12.1.1. If tapping the “Leave Comment” button navigates the User to the Leave Comment screen, it passes verification. Otherwise, it fails verification
 - 4.2.4.12.1.2. If the Leave Comment screen displays a 5-star rating system and an open text field for textual Comments, it passes verification. Otherwise, it fails verification

- 4.2.4.12.1.2.1.** If the User has already Commented or rated the Trail, and the Leave Comment screen allows the User to edit or delete the rating and Comment by tapping on the vertical ellipses button and selecting “Edit” or “Delete”, it passes verification. Otherwise, it fails verification
- 4.2.4.12.1.2.2.** If tapping the “Delete” button navigates the User to the Trail Description screen and the Comment and rating shall be deleted, it passes verification. Otherwise, it fails verification
- 4.2.4.12.1.2.3.** If tapping the “X” icon in the header of the Leave Comment screen navigates the User to the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.12.1.2.4.** If tapping the checkmark icon in the header of the Leave Comment screen navigates the User to the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.12.1.2.5.** If the new Comment is displayed at the top of the Comment System on the Trail Description screen in a different color from the Comments of other Users, it passes verification. Otherwise, it fails verification
- 4.2.4.12.2.** **2** If the app displays a list of 6 Comments on the Trail Description screen with a “Read more” button below the list, it passes verification. Otherwise, it fails verification
- 4.2.4.12.2.1.** If tapping the “Read more” button appends 6 more Comments to the list, it passes verification. Otherwise, it fails verification
- 4.2.4.12.3.** If a User may post a Comment on the Comment System by tapping the “Post” button, it passes verification. Otherwise, it fails verification
- 4.2.4.12.4.** If tapping the “Post” button displays the read-only version of the rating/Comment at the top of the truncated list of ratings/Comments, it passes verification. Otherwise, it fails verification
- 4.2.4.12.5.** If the app displays a message to indicate if there are no Comments yet for that specific Trail, it passes verification. Otherwise, it fails verification
- 4.2.4.13.** If the app provides a Comment Rating System that Users can use to determine the accuracy of other Comments on the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.4.13.1.** If the User may report a Comment by tapping on the “Report Comment” button underneath the Comment, it passes verification. Otherwise, it fails verification
- 4.2.4.14.** If the app displays the following four-day Weather Forecast data in the Weather section of Trail Description screen, it passes verification. Otherwise, it fails verification
- Four icons (one icon for the current day and 3 days after) to indicate either sunny, partly cloudy, rainy, snowy, or windy
 - Four high/low temperature pairs (one pair for each day) to indicate temperature range

- The temperature data in the four-day Weather Forecast shall be measured in degrees Fahrenheit or in degrees Celsius
- The app will default to Fahrenheit or Celsius depending on the device's location
- The User may toggle between Fahrenheit or Celsius in the General section of the Settings screen

4.2.5. [Map](#)

- 4.2.5.1. If an interactive Map Window is displayed on the Map screen, it passes verification. Otherwise, it fails verification
- 4.2.5.2. If the app displays the following data on the Map screen and updates in real time, it passes verification
 - The current altitude of the User's device measured in feet or meters above sea level
 - The User's profile icon at the User's Current Location
- 4.2.5.2.1. If the User's device location determines if the altitude is measured in feet or meters by default, it passes verification. Otherwise, it fails verification
- 4.2.5.2.2. If the User may toggle between feet or meters in the General section of the Settings screen, it passes verification. Otherwise, it fails verification
- 4.2.5.3. If the Map Window of the map screen displays each Trail as a colored line, it passes verification. Otherwise, it fails verification
 - 4.2.5.3.1. If the color of each Trail-line is determined by the Difficult Rating System of the Trail, it passes verification. Otherwise, it fails verification
 - 4.2.5.3.1.1. If Trails with a Hard Difficulty Rating display an orange Trail-line, it passes verification. Otherwise, it fails verification
 - 4.2.5.3.1.2. If Trails with a Moderate Difficulty Rating display a yellow Trail-line, it passes verification. Otherwise, it fails verification
 - 4.2.5.3.1.3. If Trails with an Easy Difficulty Rating display a green Trail-line, it passes verification. Otherwise, it fails verification
- 4.2.5.4. If Long Pressing the colored Trail on the Map Window of the Map screen navigates the User to the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.5.5. If the Map Window of the Map screen displays the Trailhead icon at the Trailhead of the Trail, it passes verification. Otherwise, it fails verification
- 4.2.5.6. If the app displays a search bar on the Map screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.6.1. If the app centers the Map Window on the Map screen to the Trailhead of the Trail the User searched for by name in the search bar, it passes verification. Otherwise, it fails verification
 - 4.2.5.6.2. If the app centers the Map Window on the Map screen to the city the User searched for by name in the search bar, it passes verification. Otherwise, it fails verification

- 4.2.5.6.2.1. If the app displays the Trails in the city, which the User searched for by name in the search bar, on the Map Window of the Map screen, it passes verification. Otherwise, it fails verification
- 4.2.5.7. If the app displays a filter icon in the header of the Map screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.7.1. If tapping the filter icon navigates the User to the Filter screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.7.1.1. If the User can select the following data to be displayed on the map through the Filter screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.7.1.1.1. Scenic overlooks
 - 4.2.5.7.1.1.2. Waterfalls
 - 4.2.5.7.1.2. If the app displays the data in 3.2.5.7.1.1 as icons overlaying the Map Window on the Map screen, it passes verification. Otherwise, it fails verification
- 4.2.5.8. If Long Pressing any icon on the Map Window on the Map screen displays the 10-digit longitude and latitude of that icon, it passes verification. Otherwise, it fails verification
- 4.2.5.9. If the app displays a legend icon in the header of the Map screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.9.1. If tapping the legend icon on the Map screen navigates the User to the Map Legend screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.9.2. If the Map Legend screen displays each icon followed by the corresponding meaning, it passes verification. Otherwise, it fails verification
- 4.2.5.10. If the app displays a map type icon in the header of the Map screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.10.1. If tapping the map type icon on the Map screen causes a Modal dropdown to appear with two buttons: “Default” and “Satellite,” it passes verification. Otherwise, it fails verification
 - 4.2.5.10.2. If tapping the Default button alters the Map Window type of the Map screen to Default view, it passes verification. Otherwise, it fails verification
 - 4.2.5.10.3. If tapping the Satellite button alters the Map Window type of the Map screen to Satellite view, it passes verification. Otherwise, it fails verification
- 4.2.5.11. If the app displays a “Directions” button on the Trail Description screen, it passes verification.
 - 4.2.5.11.1. If tapping the “Directions” button on the Trail Description screen opens the Google Maps app to provide directions for the User to the trailhead, it passes verification. Otherwise, it fails verification
 - 4.2.5.11.2. If tapping the “Directions” button on the Trail Description screen, and the User does not have Google Maps installed, causes a pop-up Modal to appear indicating that Google Maps must be installed to use this feature, it passes verification. Otherwise, it fails verification

- 4.2.5.12. If the app shall display a “Search for Trails” button on the Map Window of the Map screen, it passes verification. Otherwise, it fails verification
 - 4.2.5.12.1. If tapping the “Search for Trails” button displays up to 20 Trails in the area, it passes verification. Otherwise, it fails verification
 - 4.2.5.13. If the Map Window of the Map screen is zoomable, it passes verification. Otherwise, it fails verification
 - 4.2.5.13.1. If the Map Window of the Map screen adjusts resolution based on the level of zoom, it passes verification. Otherwise, it fails verification
 - 4.2.5.13.2. If the resolution increases on the Map Window of the Map screen when zooming in, it passes verification. Otherwise, it fails verification
 - 4.2.5.13.3. If the resolution decreases on the Map Window of the Map screen when zooming out, it passes verification. Otherwise, it fails verification
- 4.2.6. [Social](#)
- 4.2.6.1. If the app shall provide an Instant Messaging service as a social interactive feature, it passes verification. Otherwise, it fails verification
 - 4.2.6.1.1. If tapping the chat icon in the Bottom Navigation Panel navigates the User to the Messages screen, it passed verification. Otherwise, it fails verification
 - 4.2.6.2. If the app allows Users to create a new message Thread on the Messages screen by tapping on the Fab Button at the bottom right corner, it passes verification. Otherwise, it fails verification
 - 4.2.6.2.1. If tapping the Fab in the Messages screen navigates the User to the People picker screen where the User may select one or more persons, it passes verification. Otherwise, it fails verification
 - 4.2.6.2.2. If tapping the checkmark at the top right of the People Picker screen saves and displays the conversation Thread and navigates the User to the Messages screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.3. If the User may create a new message by typing text in the messages text field at the bottom of each Thread, and either tap on the “Send” icon or tap the Enter key on the mobile device, it passes verification. Otherwise, it fails verification
 - 4.2.6.3.1. If each message posted displays the read-only version of the message, it passes verification. Otherwise, it fails verification
 - 4.2.6.3.2. If the post created by the User is displayed on the right $\frac{3}{4}$ of the Thread, it passes verification. Otherwise, it fails verification
 - 4.2.6.3.3. If the post created by the User’s friends is displayed on the left $\frac{3}{4}$ of the Thread, it passes verification. Otherwise, it fails verification
 - 4.2.6.3.4. If each post displays a vertical ellipses button, it passes verification. Otherwise, it fails verification
 - 4.2.6.3.5. If tapping the vertical ellipses button causes a Modal dropdown menu to appear displaying an “Edit” button and a “Delete” button, it passes verification. Otherwise, it fails verification

- 4.2.6.3.5.1. If tapping the “Edit” button causes the read-only version of the message to become a text field where the User may edit the Comment, it passes verification. Otherwise, it fails verification
- 4.2.6.3.5.2. If tapping the “Delete button causes the read-only version of the message to be omitted from the Thread, it passes verification. Otherwise, it fails verification
- 4.2.6.3.5.3. If only the Users who wrote the selected message may delete the selected message, it passes verification. Otherwise, it fails verification
- 4.2.6.4. If each message Thread will display a vertical ellipses button, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1. If tapping the vertical ellipses button causes a Modal dropdown to appear with two buttons: “Invite Friends” and “Remove Friends”, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.1. If there is only one person in the Thread along with the User, and the “Remove Friends” button is disabled, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.2. If tapping the “Invite Friends” button navigates the User to the People Picker screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.3. If tapping the “Remove Friends” button navigates the User to a filtered People Picker screen displaying the current members in the Thread, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.4. If the app displays an info message prompting the User to select the friend(s) to be removed, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.5. If the User may tap on people to remove and tap on the checkmark to save, it passes verification. Otherwise, it fails verification
 - 4.2.6.4.1.6. If selecting those people and tapping on the checkmark navigates the User back to the Thread, and a message displays indicating that those people were removed from the Thread, it passes verification. Otherwise, it fails verification
- 4.2.6.5. If the User may include the following information on the User’s Profile screen, it passes verification. Otherwise, it fails verification
 - Profile picture
 - 300-character autobiography in the “About Me” text field
- 4.2.6.5.1. If the User opts out of uploading a profile picture, and the app saves the default avatar determined by the system (placeholder image) as the User’s profile picture, it passes verification. Otherwise, it fails verification
- 4.2.6.5.2. If the Profile screen is accessed by tapping on the User’s profile icon at the top right of each screen, it passes verification. Otherwise, it fails verification
- 4.2.6.5.3. If the Profile screen displays the User’s name at the top of the screen, it passes verification. Otherwise, it fails verification

- 4.2.6.5.4. If the Profile screen includes a profile picture placeholder, which the User may change by uploading their own picture, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.4.1. If tapping the profile picture placeholder navigates the User to the Edit Profile screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.4.1.1. If tapping the checkmark in the Edit Profile screen and uploading a picture (from your local storage, or from a URL) navigates the User back to the Profile screen and displays the picture the User set, it passes verification. Otherwise, it fails verification
- 4.2.6.5.5. If the Profile screen displays a read-only version of a 300-character autobiography under the Profile screen's About Me section, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.5.1. If the About Me section displays a vertical ellipses button in the top right corner of the section, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.5.2. If tapping the vertical ellipses button of the About Me section on the Profile screen causes a Modal dropdown to appear with the "Edit" button, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.5.2.1. If tapping the "Edit" button navigates the User to the Profile Edit screen where the User may edit the text in the About Me section, it passes verification. Otherwise, it fails verification
- 4.2.6.5.6. If the Profile screen provides a "Friends" button displaying the string "Friends", it passes verification. Otherwise, it fails verification
 - 4.2.6.5.6.1. If tapping the "Friends" button on the Profile screen navigates the User to the Friends screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.6.2. If the Friends screen displays the list of friends the User has, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.6.3. If the Friends screen has a button to add friends, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.6.4. If Long Pressing a friend in the list causes a trash icon appears in the header of the Friends screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.5.6.4.1. If tapping the trash icon causes the app shall remove that person from the User's Friend screen, it passes verification. Otherwise, it fails verification
- 4.2.6.6. If tapping the "Community Forum" button in the Trail Description screen navigates the User to the Community Forum screen, it passes verification. Otherwise, it fails verification
 - 4.2.6.6.1. If upon first-time navigation to the Community Forum screen, and a pop-up Modal appears with a message indicating how the forum is to be used, it passes verification. Otherwise, it fails verification

- 4.2.6.6.2.** If the Community Forum screen consists of a community Comment Thread, it passes verification. Otherwise, it fails verification
- 4.2.6.6.2.1.** If each post includes longitude and latitude coordinates with some User-inputted text, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.** If the User may post Comments to the community Comment Thread by tapping on the Fab Button at the bottom right corner of the Community Forum screen, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.1.** If tapping the Fab Button navigates the User to the Drop-Pin Map screen that is centered on the Trailhead of the selected Trail with a pin in the middle of the screen, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.2.** If the User navigates through the Drop-pin Map screen, and the pin stays in the center of the screen, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.3.** If tapping the “Create Post” button at the top header of the Drop-pin Map screen navigates the User to the Community Forum screen with the Comment field auto populated and with a picture of the dropped pin location, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.3.1.** If the User may add text to the Comment text field, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.3.2.** If the User may post the Comment by tapping on the Post button, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.4.** If In the read-only Community Forum screen, the User may tap on the picture of the dropped pin location in a post, it passes verification. Otherwise, it fails verification
- 4.2.6.6.3.4.1.** If tapping the picture of dropped pin location navigates the User to the Map screen and displays the pin on the map, it passes verification. Otherwise, it fails verification
- 4.2.6.6.4.** If Comments on the community chat Thread is visible to *all* Users, it passes verification. Otherwise, it fails verification
- 4.2.6.6.5.** If Comments on the community chat Thread shall display the posted date, it passes verification. Otherwise, it fails verification
- 4.2.6.7.** If Trails with an easy and moderate Difficulty rating causes the app to display a “Scavenger Hunt” button in the Trail Description screen, it passes verification. Otherwise, it fails verification
- 4.2.6.7.1.** If tapping the “Scavenger Hunt” button navigates the User to the Scavenger Hunt screen, it passes verification. Otherwise, it fails verification
- 4.2.6.7.1.1.** If the Scavenger Hunt screen contains a list of the following focal points that can be identified on the Trail, it passes verification. Otherwise, it fails verification
- Plants
 - Animals
 - Points of Interest

4.2.6.7.1.2. If each focal point contains a picture of each focal point for easy identification, it passes verification. Otherwise, it fails verification

4.2.6.7.1.3. If each focal point has a checkbox to mark off individual focal points when they are identified, it passes verification. Otherwise, it fails verification

4.2.6.8. If the app displays a toggle under the General section of the Settings screen that allows the User to enable or disable location tracking with Friends, it passes verification. Otherwise, it fails verification

4.2.6.8.1. If, by default, location tracking toggle in the Settings screen shall be OFF, it passes verification. Otherwise, it fails verification

4.2.6.8.2. If two friends enable location tracking, and the User's location shall appear on the friend's Map screen, and the friend's location shall appear on the User's Map screen as profile picture icons, it passes verification. Otherwise, it fails verification

4.2.6.8.3. If the User has location tracking enabled, and the User's location is refreshed every 60 seconds, it passes verification. Otherwise, it fails verification

4.2.6.8.4. If the User's displayed location is accurate to within 5 meters, it passes verification. Otherwise, it fails verification

4.2.6.8.5. If the User's GPS loses its tracking signal, and the app records and displays the User's last seen location on the Map screen, it passes verification. Otherwise, it fails verification

4.2.6.8.5.1. If a User taps on the friend's icon on the Map screen, and a pop-up Modal appears displaying the following data, it passes verification. Otherwise, it fails verification

- The friend's name
- The friend's timestamp

4.3. Usability requirements

4.3.1. N/A

4.4. Performance Requirements

4.4.1. If the app loads Trail Photos in less than 3 seconds of entering a Browse screen, it passes verification. Otherwise, it fails verification

4.4.2. If the app loads Trail Photos in less than 3 seconds of entering a Trail Description screen, it passes verification. Otherwise, it fails verification

4.4.3. If the app submits User Comments and ratings in less than 3 seconds after the User's submission, it passes verification. Otherwise, it fails verification

4.5. Logical Database Requirements

4.5.1. If the app has one production server-side NoSQL database and one production client-side database utilizing device local storage, it passes verification. Otherwise, it fails verification

4.5.2. If the server-side database returns and receives requests in JSON formatting, it passes verification. Otherwise, it fails verification

4.5.3. If the server-side database stores information accessible to all Users consisting of:

- User data such as:

- The User's Username
- The User's email
- A unique identifier for the User
- User Comments and ratings associated to Comments
- Trail data of which each entry shall consist of:
 - A unique identifier for that Trail
 - Trail name
 - Trail description
 - Trail location
 - Images associated with that Trail
 - Amenities associated with the Trail
 - Points of interest associated with the Trail
 - Location data of the Trail

passes verification. Otherwise, it fails verification

4.5.4. If the app permits Users to submit Comments, Comment ratings, and Trail ratings, it passes verification. Otherwise, it fails verification

4.5.5. If the app permits Users to edit the permissions of their User data as well as Trail ratings, Comment ratings, and Comments they have submitted, it passes verification. Otherwise it fails verification

4.5.6. If the client-side local storage stores for an individual User: a string containing a unique identifier for the individual User that is secured using a hash, it passes verification. Otherwise, it fails verification

4.5.7. If both client-side and server-side storage store for an individual User, it passes verification. Otherwise, it fails verification:

4.5.7.1. An array of JSON objects which each contain data of a Trail favorited by the individual User. The data shall consist of a unique identifier and the name of the Trail

4.5.7.2. A JSON object containing the User's Username, email, and unique identifier string as created by Google's Firebase

4.5.8. If the app has an auto-sync that will push data onto the server-side database, it passes verification. Otherwise, it fails verification

4.5.9. If the app triggers an auto-sync upon loading the Application, it passes verification. Otherwise, it fails verification

4.5.10. If the app triggers an auto-sync every 30 seconds given changes to the local storage are detected, it passes verification. Otherwise, it fails verification

4.6. 4.6 Design Constraints

4.6.1. If the app is a mobile Application (for the iOS and Android platforms), it passes verification. Otherwise, it fails verification

4.6.2. If the app (on both iOS and Android platforms) is compatible with 70% of iOS devices and 60% of Android devices (This is affected by operating system updates and manufacturing designs), it passes verification. Otherwise, it fails verification

4.7. [Software System Attributes](#)

4.7.1. [Reliability:](#)

- 4.7.1.1. If the app is available for download and installation on the Google Play Store or the App Store to Users with OS or Android platforms, it passes verification. Otherwise, it fails verification

4.7.2. [Availability:](#)

- 4.7.2.1. If the app relies on the Google Firebase service to handle database access and data syncing with more than a million Users, it passes verification. Otherwise, it fails verification
- 4.7.2.2. If the app supports offline usage using the Firebase client library; and data that is already data is still be available when the app does not have access to the internet, it passes verification. Otherwise, it fails verification

4.7.3. [Security:](#)

- 4.7.3.1. If the app has login credentials that only the User can access to protect their privacy and it saves all personal information associated with the Application, it passes verification. Otherwise, it fails verification
- 4.7.3.2. If the app uses a secure TCP/IP connection using SSL, it passes verification. Otherwise, it fails verification
- 4.7.3.3. If the app gives Users a privacy policy to assure Users of data privacy, it passes verification. Otherwise, it fails verification

4.8. [Supporting Information](#)

- 4.8.1. N/A

5. APPENDICES

5.1. [Appendix A: Assumptions and Dependencies](#)

- 5.1.1. The following assumptions have been made:

- 5.1.1.1. The app is used on a mobile device
- 5.1.1.2. The mobile operating system of choice is iOS or Android
- 5.1.1.3. The mobile operating system is up-to-date and is updated regularly with each new release
- 5.1.1.4. The device has stable Internet connection
- 5.1.1.5. All accounts created on the app are individual accounts
- 5.1.1.6. The mobile device has at least 30 MB of free storage or access to a cloud data storage

- 5.1.2. 5.1.2. The dependencies are:

- 5.1.2.1. The capability of inputting Trails into the system
- 5.1.2.2. Accuracy of User input when creating new Trail data entries

- 5.1.2.3. The capability of communicating with other Users in the system
- 5.1.2.4. The security of personal information including, but not limited to location of all Users
- 5.1.2.5. The proper work and accuracy of GPS and navigation

5.2. [Appendix B: Acronyms and Abbreviations](#)

Acronym/Abbreviation	Full phrase/meaning
GPS	Global Positioning System is a satellite-based radio navigation system owned by the United States government and operated by the United States Space Force.
GUI	Graphical User Interface is a form of User interface that allows Users to interact with electronic devices through graphical icons and audio indicator such as primary notation, instead of text-based User interfaces, typed command labels or text navigation.
JSON	JavaScript Object Notation is an open standard file format, and data interchange format, that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and array data types.
NoSQL	stands for "not only SQL," is an alternative to traditional relational databases in which data is placed in tables and data schema is carefully designed before the database is built.
SSL	Secure Sockets Layer is a secure protocol developed for sending data securely over the internet.
TCP/IP	Transmission control protocol/Internet protocol used to control the connection of all computer systems to the internet.

Table 2: Acronyms and abbreviations explained