

## **Lab 4 Deliverables : Implementation, Testing and Preparation for Demo**

### **Testing**

1.1 Black Box Testing

1.2 White Box Testing

### **Demo Script**

**Source Code (uploaded onto github repository)**

## 1. Testing

### 1.1 Black Box Testing

#### Login Functionality

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/Fail	Notes
EC1	Verify successful login with valid email and password	Ensure the login functionality works correctly for valid credentials	User has registered for a user account on the website	Email: jwong165@e.ntu.edu.sg Password: SC2006pwd!02	User is able to log in successfully	1. Navigate to the website's login page  2. Enter the email and password  3. Click on the Log In button	User is logged in successfully	Pass	The user's email and password is added to the database successfully
EC2	Verify error message when email is invalid	Ensure the error message is displayed when the email is invalid	User has registered for a user account on the website	<b>Email: jwong165</b> Password: SC2006pwd!02	Error message "Email has to be valid" is displayed  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	1. Navigate to the website's login page  2. Enter the invalid email and valid password  3. Click on the Log In button	Under the email section, "Email has to be valid" is displayed in red  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	Pass	

B1	Verify error message when email is empty	Ensure the error message is displayed when the email field is left empty	User has registered for a user account on the website	<b>Email: (empty)</b> Password: SC2006pwd!02	Error message: "Email is required." is displayed  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	1. Navigate to the website's login page  2. Leave the email field empty  3. Enter a valid password  4. Click on the Log In button	Under the email section, "Email is required." is displayed in red  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	Pass	
B2	Verify error message when password is empty	Ensure the error message is displayed when the password field is left empty	User has registered for a user account on the website	Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> <b>Password: (empty)</b>	Error message: "Password is required." is displayed  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	1. Navigate to the website's login page  2. Enter a valid email  3. Leave the password field empty  4. Click on the Log In button	Under the password section, "Password is required." is displayed in red  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	Pass	

B3	Verify error message when password is wrong	Ensure the error message is displayed when the password field is wrong	User has registered for a user account on the website	Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , <b>Password: SC2006</b>	Error message: "Password is wrong. Please try again." is displayed  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	1. Navigate to the website's login page  2. Enter a valid email  3. Enter the wrong password  4. Click on the Log In button	Error message: "Password is wrong. Please try again." is displayed  Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."	Pass	
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## Register Functionality

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify successful sign up with valid information	Ensure the sign up functionality works correctly for valid inputs	User clicks on the sign up button and is on the sign up page	Name: Jeannie, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , OTP: 5233, Password: SC2006pwd!02 Re-Enter Password: SC2006pwd!02	User has signed up successfully for a user account and is logged in into the website	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields  3. Click Next to continue entering the inputs for the required fields (password and re-enter password)  4. Click on the Sign Up button	User has signed up successfully for a user account and is logged in into the website	Pass	
EC2	Verify error message when Password and Re-Enter Password do not match	Ensure the error message is displayed when the password and re-enter	User clicks on the sign up button and is on the sign up page	Name: Jeannie, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , OTP: 5233, <b>Password:</b>	Error message: "Password has to match" is displayed  Error message (on	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for	Error message: "Password has to match" is displayed in red  Error message (on the bottom left of the page):	Pass	

		password fields do not match		<b>SC2006pwd!02 Re-Enter Password: SC2006pwd02</b>	the bottom left of the page): “Registration Unsuccessful. Something went wrong. Please try again.”	all the required fields  3. Click Next to continue entering the inputs for the required fields (password). However, for the re-enter password field, enter an invalid input  4. Click on the Sign Up button	“Registration Unsuccessful. Something went wrong. Please try again.”		
B1	Verify error message when Name is empty	Ensure the error message is displayed when the name field is left empty	User clicks on the sign up button and is on the sign up page	<b>Name: (empty)</b>	Error message: “Name is required” is displayed	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields, except for the name field which is to be left empty	Error message: “Name is required” is displayed in red	Pass	

B2	Verify error message when Email is empty	Ensure the error message is displayed when the email field is left empty	User clicks on the sign up button and is on the sign up page	Name: Jeannie, <b>Email:(empty)</b>	Error message: "Email is required" is displayed	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields, except for the email field which is to be left empty	Error message: "Email is required" is displayed in red	Pass	
B3	Verify error message when Email is invalid	Ensure the error message is displayed when the email field contains an invalid email address	User clicks on the sign up button and is on the sign up page	Name: Jeannie, <b>Email: jwong165 (invalid email address)</b>	Error message: "Email has to be valid" is displayed	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields, except for the email field which has an invalid email address format	Error message: "Email has to be valid" is displayed in red	Pass	

B4	Verify error message when OTP is empty	Ensure the error message is displayed when the OTP field is left empty	User clicks on the sign up button and is on the sign up page	Name: Jeannie, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , OTP: <b>(empty)</b>	Error message: "OTP is required" is displayed	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields, except for the OTP field which is to be left empty	Error message: "OTP is required" is displayed in red	Pass	
B5	Verify error message when password is empty	Ensure the error message is displayed when the password field is left empty	User clicks on the sign up button and is on the sign up page	Name: Jeannie, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , OTP: 5233, <b>Password: (empty)</b>	Error message: "Password is required" is displayed  Error message (on the bottom left of the page): "Registration Unsuccessful. Something went wrong. Please try again."	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields  3. Click Next and leave the password empty  4. Click on the Sign Up button	Error message: "Password is required" is displayed in red  Error message (on the bottom left of the page): "Registration Unsuccessful. Something went wrong. Please try again."	Pass	



B6	Verify error message when password does not meet requirements	Ensure the error message is displayed when the password field does not meet the requirements	User clicks on the sign up button and is on the sign up page	Name: Jeannie, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> , OTP: 5233, <b>Password: 12345,</b> <b>Re-Enter Password: 12345</b>	Error message: "Password has to be at least 8 characters long" is displayed  Error message (on the bottom left of the page): "Registration Unsuccessful. Something went wrong. Please try again."	1. Click on the Sign Up button and navigate to the Sign Up page  2. Enter valid input data for all the required fields  3. Click Next to continue entering the inputs for the required fields (password and re-enter password) - enter passwords which does not meet requirements  4. Click on the Sign Up button	Error message: "Password has to be at least 8 characters long" is displayed in red  Error message (on the bottom left of the page): "Registration Unsuccessful. Something went wrong. Please try again."	Pass	
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### Forgot Password Functionality

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify successful reset password with valid email	Ensure the forgot password functionality works correctly for a valid email address	User has registered for a user account on the website	Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> (registered email)	User is sent an email with a link to reset password  The message : "Password Changed. Don't forget next time!" will be displayed at the bottom left of the page	1. Navigate to the website's login page  2. Click on Forgot Password  3. Enter valid email address registered on the website  4. Click on the Reset Password button	User is sent an email with a link to reset password  The message : "Password Changed. Don't forget next time!" will be displayed at the bottom left of the page	Pass	
B1	Verify error message when email field is empty	Ensure the error message is displayed when the email field is left empty	User is on the "Reset your password" page	<b>Email : (empty)</b>	Error message "Email is required." is displayed	1. Navigate to the website's login page  2. Click on Forgot Password  3. Leave the email field empty	Error message "Email is required." is displayed in red	Pass	

B2	Verify error message when email field is invalid	Ensure the error message is displayed when the email field contains an invalid email address	User is on the "Reset your password" page	<b>Email : jwong165 (invalid email)</b>	Error message "Email has to be valid." is displayed	1. Navigate to the website's login page  2. Click on Forgot Password  3. Enter a invalid email address	Error message "Email has to be valid." is displayed in red	Pass	
B3	Verify user is able to login into existing user account with new password	Ensure the forgot password functionality works correctly for a valid email address, the user is able to reset password which matches the requirements and is able to login into the existing user account with a new password	User has registered for a user account on the website	Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a> (registered email) Current Password : SC2006pwd!02 <b>Reset Password: SC200602!</b>	User is able to reset password successfully and login into the existing user account with a new password  The message : "Password Changed. Don't forget next time!" will be displayed at the bottom left of the page  An alert box stating that	1. Navigate to the website's login page  2. Click on Forgot Password  3. Enter a valid email address  4. Click on the Reset Password button  5. Click on the reset password link in the email  6. Type in a new password	User is able to reset password successfully and login into the existing user account with a new password  The message : "Password Changed. Don't forget next time!" will be displayed at the bottom left of the page  An alert box stating that "Password changed. You can now sign in	Pass	

					<p>“Password changed. You can now sign in with your new password.”</p>	<p>which matches the requirements (uppercase, lowercase characters, with numbers and symbols which is at least 8 characters long)</p> <p>7. Click on save</p> <p>8. Navigate to the login page</p> <p>9. Enter the existing email address and new password</p> <p>10. Click login</p>	<p>with your new password.”</p>		
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### View Profile Functionality

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify that the user is able to access his profile and able to click on the link to authenticate his user account with Strava API	Ensure that the profile page is accessible and the link is working	User is on the profile page	Click on the link 'Authenticate with Strava'	User is able to access the profile page and click on the link which will redirect him to Strava API	<ol style="list-style-type: none"> <li>1. Select the profile option in the menu</li> <li>2. Click on the 'Authenticate with Strava' link</li> <li>3. User will be redirected to the Strava API page</li> </ol>	User is able to access the profile page and click on the link which will redirect him to Strava API	Pass	
EC2	Verify that the user is able to connect his user account to Strava API	Ensure that the user account on PeakVisor is able to connect to Strava API	User is on the profile page	<ol style="list-style-type: none"> <li>1. Click on the link 'Authenticate with Strava'</li> <li>2. Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.sg</a>, Password: SC2006pwd!02</li> <li>3. Click Log In</li> <li>4. Click Authorize</li> </ol>	The user can click the link to authenticate his account with Strava API, log in using his email address and password, and grant PeakVisor permission to connect to Strava API	<ol style="list-style-type: none"> <li>1. Select the profile option in the menu</li> <li>2. Click on the 'Authenticate with Strava' link</li> <li>3. User will be redirected to the Strava API page</li> <li>4. Enter the email and password</li> <li>5. Click Log In</li> <li>6. Click Authorize when asked to authorize PeakVisor to connect to</li> </ol>	The user can click the link to authenticate his account with Strava API, log in using his email address and password, and grant PeakVisor permission to connect to Strava API	Pass	

						Strava			
B1	Verify that the user is able to view his previous hiking details	Ensure that the user's previous hiking details and statistics are displayed on the page	User is on the profile page and User account is connected to Strava API	1. Click on the link 'Authenticate with Strava'  2. Click Authorize	User is able to view his previous hiking details and their statistics	1. Select profile option in the menu  2. Click on the 'Authenticate with Strava' link  3. User will be redirected to the Strava API page  4. Click Authorize when asked to authorize PeakVisor to connect to Strava  5. User will be redirected back to the PeakVisor website where he can view his previous hiking details	User is able to view his previous hiking details and their statistics	Pass	

## Manage Profile Functionality

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify successful editing of user account details	Ensure that the user is able to edit his user account details and the updated user account information will be displayed and enabled after the user edits it	User is on the Account Settings page	<b>Name: Jean (edited)</b> Strava: Not Connected, Email: <a href="mailto:jwong165@e.ntu.edu.sg">jwong165@e.ntu.edu.s</a> <b>Change Password: SC2006password!02 (edited)</b>	Updated user account details will be displayed and user can login with updated details  A prompt saying 'A password reset email has been sent to you Check your email!' will be displayed in green at the side. An alert box stating that "Password changed. You can now sign in with your new password.	1. Select the settings option in the menu  2. Click on edit under the name field and edit the name  3. Click on save under the name field to save changes  4. Click on the change password button - an email will be sent to the user's inbox 5. Click on the reset password link in the email  6. Type in a new password which matches the requirements	Updated user account details will be displayed and user can login with updated details  A prompt saying 'A password reset email has been sent to you Check your email!' will be displayed in green at the side.  An alert box stating that "Password changed. You can now sign in with your new password.	Pass	Name and Password for the particular user account will be updated onto the database

						(uppercase, lowercase characters, with numbers and symbols which is at least 8 characters long)  7. Click on save  8. Navigate to the login page  9. Enter the existing email address and new password  10. Click login			
EC2	Verify that the user is able to delete his user account	Ensure that the user is able to delete his user account and user account will be removed after 7 days	User is on the Account Settings page	Click on Delete Account	User will be automatically logged out of their user account and it will be removed from the database after 7 days	1. Select the settings option in the menu  2. Click on delete account	User will be automatically logged out of their user account and it will be removed from the database after 7 days	Pass	User account will be removed from the database after 7 days



B1	Verify error message when name is empty	Ensure the error message is displayed when the name field is empty	User is on the Account Settings Page	<b>Name: (empty)</b>	Error message "Name is required." is displayed	1. Select the settings option in the menu  2. Click on edit under the name field and leave it empty  3. Click on save under the name field to save changes	Error message "Name is required." is displayed in red	Pass	
B3	Verify error message when name is invalid	Ensure the error message is displayed when the name field is invalid	User is on the Account Settings Page	<b>Name: 123jean (invalid name)</b>	Error message "Name is invalid." is displayed	1. Select the settings option in the menu  2. Click on edit under the name field and enter an invalid input  3. Click on save under the name field to save changes	Error message "Name is invalid." is displayed in red	Pass	

### **View Trails Functionality**

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify that specific information of the trail will be displayed when the user selects it	Ensure that information of the trail selected will be displayed	User is on the Trails Page	Select a specific trail - e.g. 'Macritchie Nature Trail'	General information, address, bearings and rating of the specific trail will be displayed	1. Select Trails at the top of the website  2. Select 'Macritchie Nature Trail'	General information, address, bearings and rating of the specific trail is displayed	Pass	

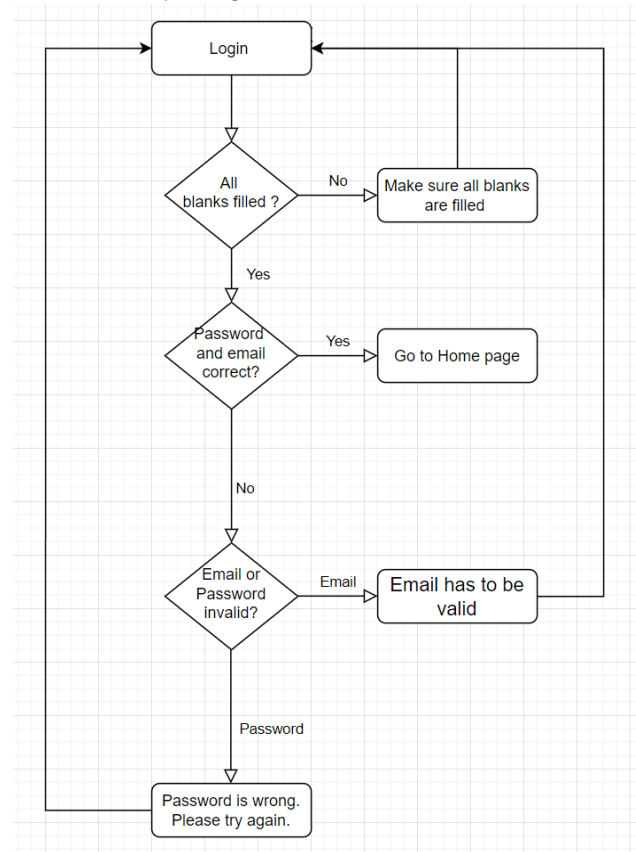
### **View Events Functionality**

Test Case ID	Test Case Description	Test Objective	Preconditions	Inputs	Expected outcome	Test Steps	Actual outcome	Pass/ Fail	Notes
EC1	Verify that specific information of the event will be displayed when the user selects it	Ensure that information of the event will be displayed when it is selected	User is on the Events Page	Select a specific event - e.g. '1D Gunong Arong Hike'	Details of the event (date/time, location, attendees etc;) will be displayed and user can join the event	1. Select Events at the top of the website  2. Select '1D Gunong Arong Hike'	Details of the event (date/time, location, attendees etc;) will be displayed and user can join the event	Pass	

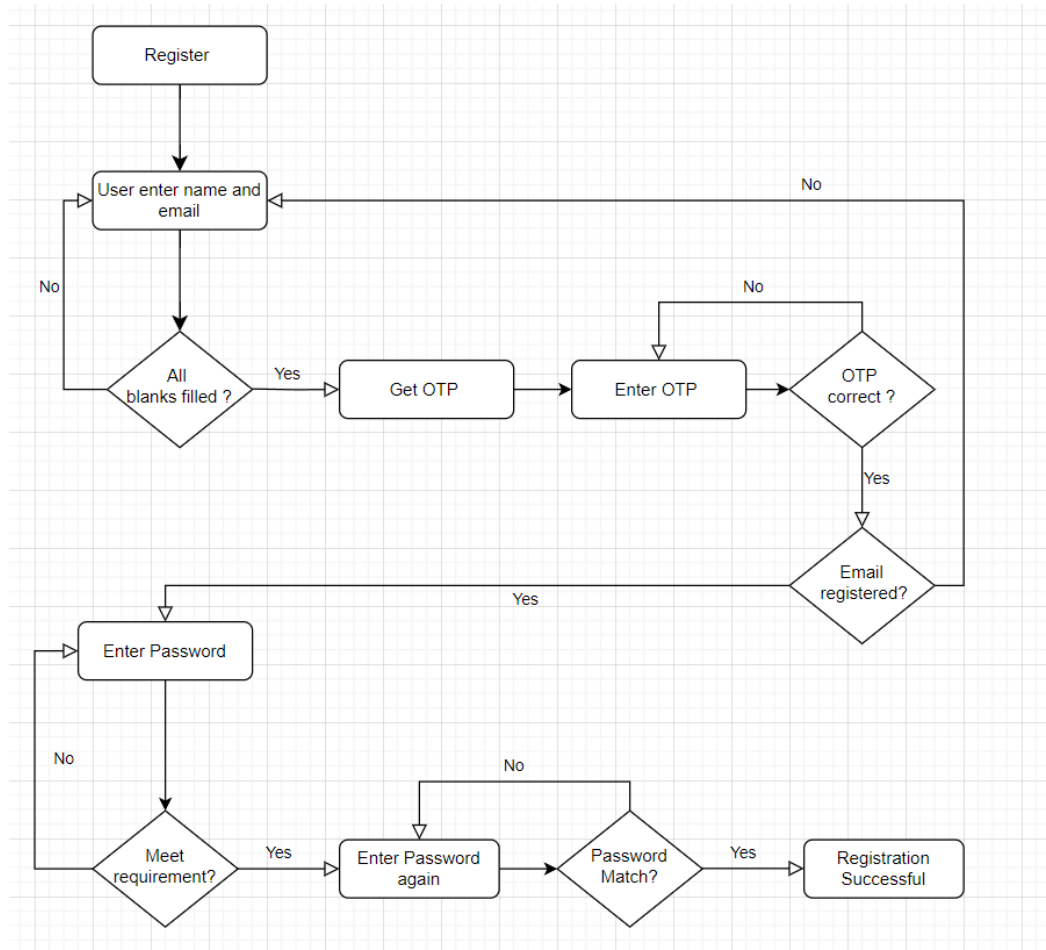
## 1.2 White Box Testing

### Control Flow Diagrams

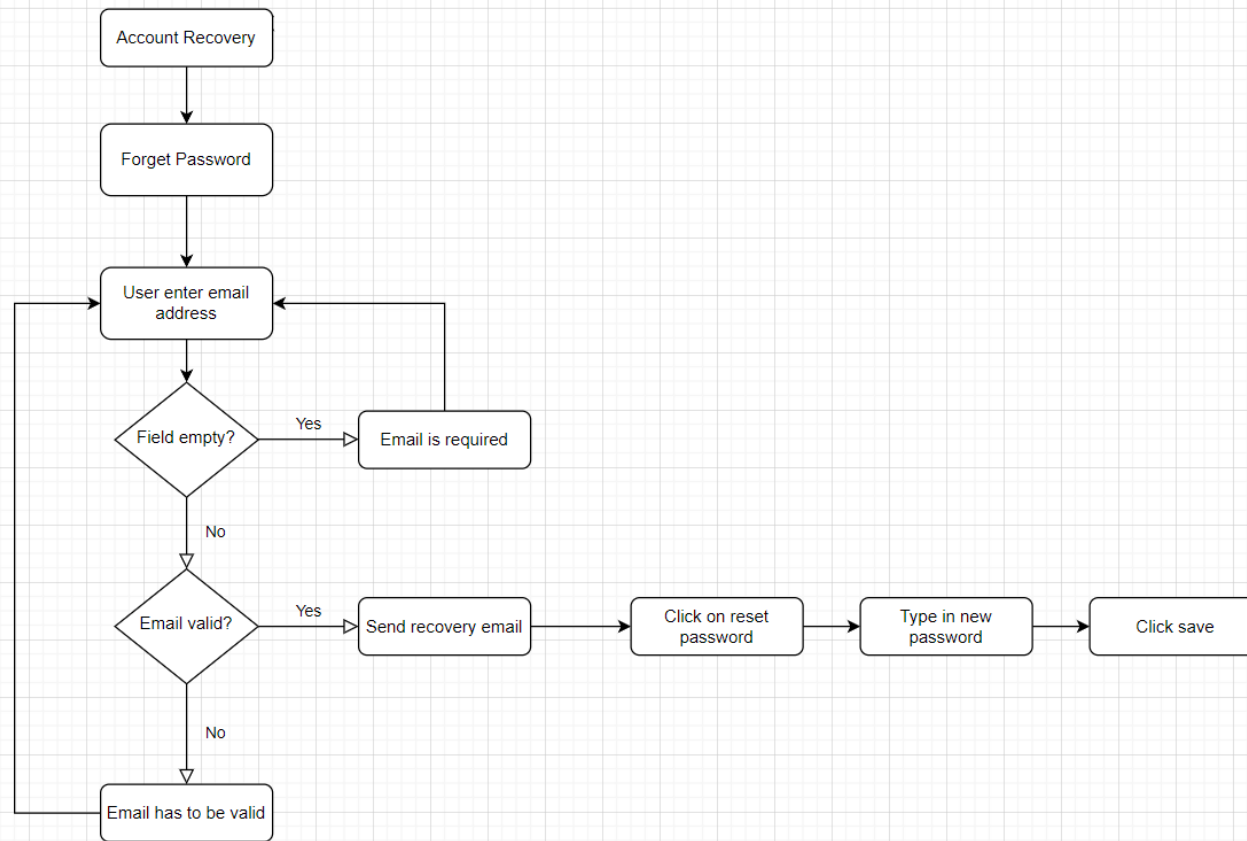
Functionality: Login



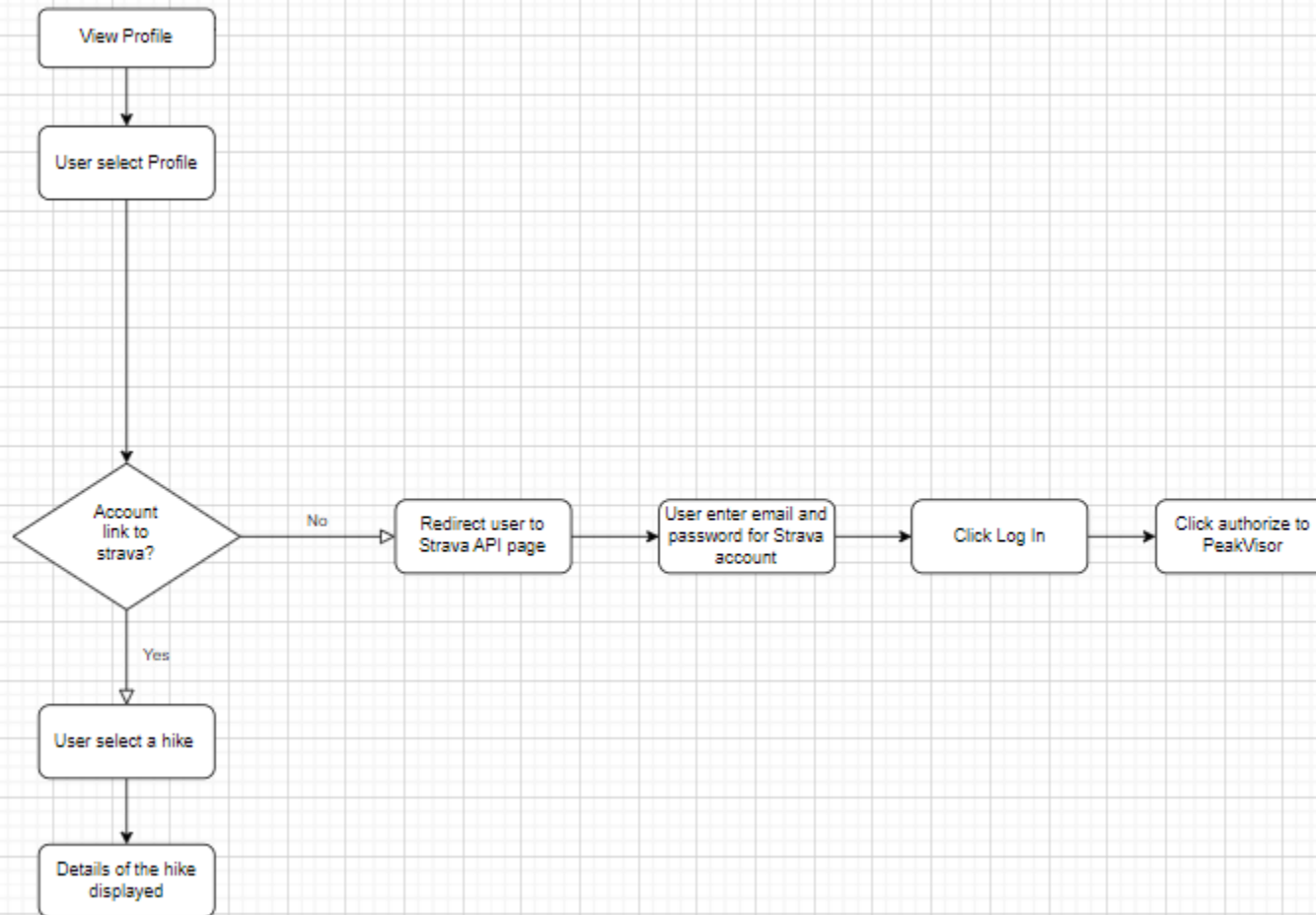
## Functionality: Register



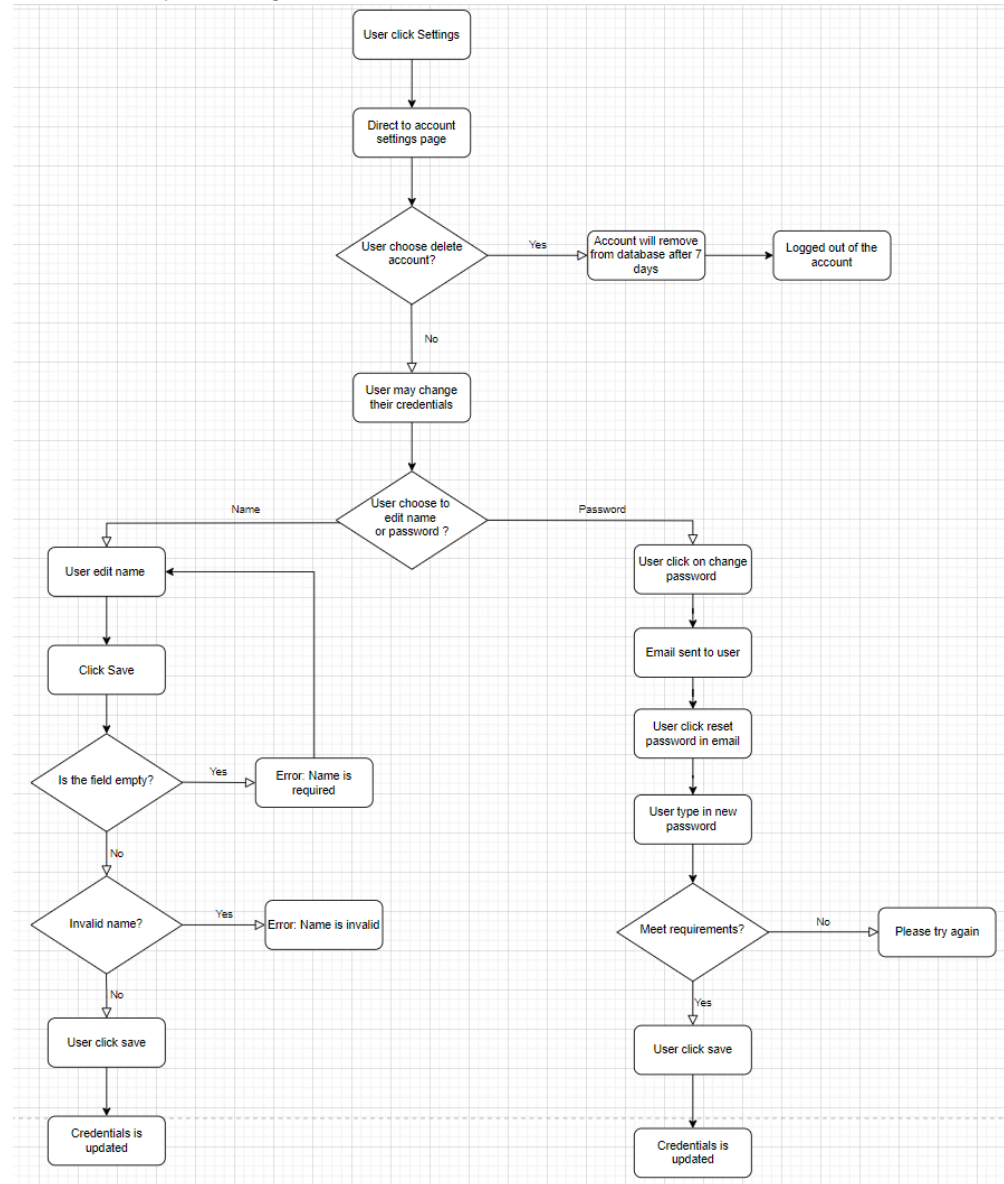
## Functionality: Forgot Password



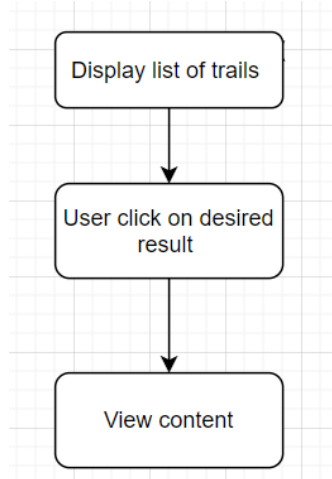
## Functionality: View Profile



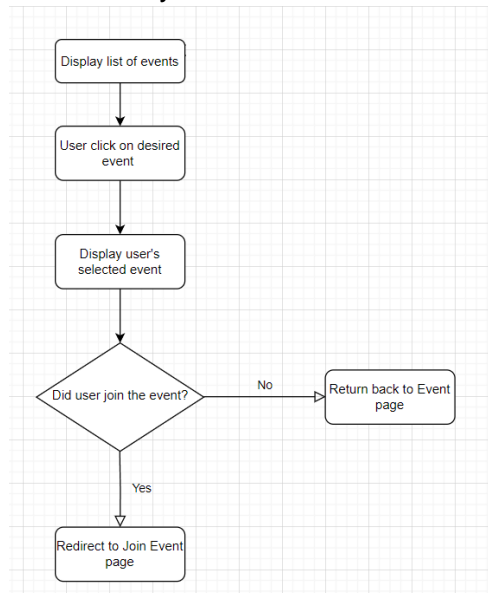
## Functionality: Manage Profile



### Functionality: View Trails



### Functionality: View Events





## **2. Demo Script**

### **Presentation Flow:**

1. Introduction
2. Problem Statement & Application Overview
3. Target Users
4. System Features Overview
5. Live Demonstration (w/ Testing)
6. Software Engineering Concepts (Design Principles, Design Patterns)
7. Conclusion

### **[Introduction]**

Hello professor(s), I am [name] and this is our group [names].

Today, we will be presenting to you PeakVisor, a Singapore-based one-stop community platform dedicated to bringing people together to partake in the beauty of hiking among the country's nature trails.

### **[Problem Statement & Application Overview]**

Singapore is a highly-urbanized city-state, but it has its own abundance of nature reserves and parks. Hence, it is not unusual that outdoor hiking has become commonplace (the largest hiking group in Singapore has over 20,000 members!) and is seen as a convenient, accessible, and often cost-free escapade for people in the city. In response to this hiking boom, NPB has spearheaded efforts to revitalize our hiking infrastructure, providing people ample opportunities to engage with nature, for outdoor activities to flourish, and for the like-minded to connect through shared activities.

However, despite the “hiking boom”, there is no centralized hub made to introduce people to the sport of hiking, to discover Singapore’s nature trails, or to participate in shared experiences. While there are online blogs and social media groups for hiking communities, none of these are specifically engineered with the interests of both seasoned hikers and those who wish to begin hiking in mind.

This is where **PeakVisor** comes into play. On our platform, users will be able to explore new nature trails, sign up for community events near them, track their hikes, and join a larger community that aims to enliven appreciation for our nature. With this application, we hope to establish a one-stop digital hub where hikers can plan, track, and share their hiking experiences while interacting more intimately with Singapore's hiking landscape and connecting with their fellow hikers, bringing together our goals of becoming a "City in Nature" and "Smart Nation".

### **[Target Users]**

We believe that hiking is a universal sport that can be enjoyed by people from all walks of life. As such, our application is not only meant for seasoned hikers and outdoor enthusiasts to connect, but also for beginners who wish to learn more about our nature trails and start their hiking adventure.

### **[System Features Overview]**

Before we begin the live demonstration, let us introduce the system features of the PeakVisor web application. Do note that the application is a prototype in development, and the features are subject to improvements in the future.

### **[show Use Case diagram]**

Our application has three main features in the category of (1) nature trails, (2) community events, and (3) hiking profile. We will explain what these categories are later on. Additionally, as we advertise PeakVisor as a one-stop community platform, we also have supplementary features to support account creation and management.

The diagram here presents an overview of our application for all foreseeable use cases. If they are using our application for the first time, users will have to first register an account, and then log in with their email address and chosen password. Once a user has logged in to our platform, they will be granted access to the suite of features that PeakVisor offers.

First, we have the Trails page, where users can explore our catalog of Singapore's nature trails, learn more about them, and open new doors to their hiking journey. From Bukit Timah to MacRitchie reservoir, many of our natural hills, beautiful parks, and stunning reservoirs are available here. The user has the option to select from any of these places to view more information about them, including a short description, location and bearings data, hiker ratings fetched via the TripAdvisor API, and even what our own AI bot has to say about the place!

Looking to join other hikers on local adventures? We have the Events page, where users can browse through and sign up for community hiking and nature exploration events hosted on Meetup.com, a social media platform for hosting gatherings.

Care to see what you have accomplished so far in your hiking journey? Link your Strava account, and gain access to your Hiking Profile, where users can view concise statistics such as their total distance traveled and number of hiking trips taken so far! Furthermore, users may view their saved trips fetched via the Strava API, which allows for easier management of hiking trips.

To supplement our goal of becoming a one-stop community platform for all hikers, we also support account creation and management features, such as Login, Register, and quality-of-life functions like account recovery and management.

From the use case diagram to the working prototype to testing, we will begin tracing the development of our system features.

[show Sequence diagram for the specific function]

For this demonstration, we will look at how the Login/Register function is implemented using the sequence diagram.

When the user clicks on the Login button on the Home page, they will be redirected to the Login page (LoginUI) and prompted to input their login credentials. If successfully verified, the user is logged in and redirected to their Hiking Profile page. However, if the verification fails and the account does not exist in the database, the user is given the option of registering for a new account, as shown here. The first step of the registration process is entering a valid email address. The system then sends the OTP to the address, and once the correct OTP is entered, the user can enter a new password for their new user account. Finally, they will be logged in and redirected to the Hiking Profile page. This is the entire sequence diagram representation of the login process.

[show Boundary & Control Class diagram]

This is the boundary and control class diagrams, which demonstrates how the Login/Register function interacts with the user and other system features. We can see that the Login and Register pages (boundaries) interface with the system controller, which calls upon the Accounts controller, which is where the verification of credentials is performed and compared against the records from the Accounts database. Evidently, the user's interactions with our application features can be represented by these boundary-control-entity relationships.

### [show System Architecture]

We encapsulated the diagram from before into a three-layered system architecture. The boundary classes representing the user interfaces, which are contained in the presentation layer, are created using the Angular web framework. These components interact with the controllers in the app logic layer. The app logic draws on persistent data from the Firebase database, represented by the entities in the bottom layer.

### [Live Demonstration]

I will be showing you our different interfaces and how to navigate our website.

The website's interfaces are designed such that it is both intuitive and easy to navigate for the user. The information architecture is also laid out in a way that users can find what they are looking for with minimal effort. The website is also responsive and designed to work on a variety of devices and screen sizes, providing a consistent experience across desktop, tablet and mobile. (SE principles / system design - 3 listed)

### [Home Page]

This is the landing page of our website. When you scroll down, it displays information explaining to us about the website and what the website does. If the user is logged into their user account, they will be able to view a brief insight into their hiking statistics.

### [Login Page]

When you click Login on the navigation bar, it will redirect you to the Sign In page. On the Sign In Page, you can enter your registered email and password you have used to create your user account with and click Log In to login into your existing user account.

Email : [jwong165@e.ntu.edu.sg](mailto:jwong165@e.ntu.edu.sg)

Password: SC2006pwd!02

Errors that may occur - There is graceful error handling that informs the user of what went wrong without exposing the system to security risks (SE principles / system design) :

Error message (on the bottom left of the page): "Login Unsuccessful. An error occurred. Please try again."

If you type in an invalid email, the error message "Email has to be valid" will be displayed in red.

Email : **jwong165 (invalid email)**

Password: SC2006pwd!02

If you did not enter your email, the error message "Email is required" will be displayed in red.

Email : **empty**

Password: SC2006pwd!02

If you did not enter your password, the error message "Password is required" will be displayed in red.

Email : [jwong165@e.ntu.edu.sg](mailto:jwong165@e.ntu.edu.sg)

Password: **empty**

If you type in the wrong password, the error message "Password is wrong. Please try again." will be displayed in red.

Email: [jwong165@e.ntu.edu.sg](mailto:jwong165@e.ntu.edu.sg)

Password: **SC2006**

### **[Forgot Password Functionality]**

If you have forgotten your password for your existing user account and would like to reset it, you can click on the "Forgot Password" button. It will redirect you to the "Reset your password" page. On the Reset your password page, you can enter your email address and click "Reset Password".

Email: [jwong165@e.ntu.edu.sg](mailto:jwong165@e.ntu.edu.sg)

The message : "Password Changed. Don't forget next time!" will be displayed at the bottom left of the page. The system will send a message to your email with a link to reset your password. When you click on the link, you will be redirected to another page to enter

your new password. You can then type in your new password (with uppercase, lowercase characters, numbers and symbols, at least 8 characters) and click save. There will be an alert box confirming that your password has been changed. It will state "Password changed. You can now sign in with your new password."

#### Errors that may occur:

If you did not enter your email, an error message "Email is required" will be displayed in red.

**Email: empty**

If you enter an invalid email, an error message "Email has to be valid" will be displayed in red.

**Email: jwong165**

#### **[Sign Up Page]**

If you are a new user and would like to create a new user account, you can scroll all the way down on the Sign In page and click on the Sign Up button. You can enter all these valid inputs and click Sign Up to register for a new user account. After the user successfully signs up for a user account, there will be some pages introducing him to the website and he will be automatically logged into his user account.

Name: Jeannie

Email: [jwong165@e.ntu.edu.sg](mailto:jwong165@e.ntu.edu.sg)

OTP : 5014

→ Click on Get OTP

→ The system will send an OTP via the email stated above to your inbox.

Click Next

Password: SC2006pwd!02

Re-Enter Password: SC2006pwd!02

#### Errors that may occur:

**Error message (on the bottom left of the page): "Registration Unsuccessful. Something went wrong. Please try again."**

If you did not enter your name, an error message “Name is required” will be displayed in red.

**Name: empty**

If you did not enter your email, an error message “Email is required” will be displayed in red.

**Email: empty**

If you entered an invalid email, an error message “Email has to be valid” will be displayed in red.

**Email: jwong165**

If you did not enter an OTP, an error message “OTP is required” will be displayed in red.

**OTP: empty**

If you did not enter a password, an error message “Password is required” will be displayed in red.

**Password: empty**

If you enter a short and simple password < 8 characters, an error message “Password has to be at least 8 characters long” will be displayed in red.

**Password: 1234**

If you re-enter a password that does not match the password you previously entered, an error message “Password has to match” will be displayed in red.

**Password: SC2006pw!02**

### **[Trails Page]**

When you click on Trails on the navigation bar, it will direct you to the various parks and trails available for hiking, giving you a range of options to choose from. If you select MacRitchie Nature Trail, it will redirect you to another page displaying all the information you need to know about that specific trail. The general information, address, bearings and rating of the trail will be displayed to you.

### **[Events Page]**

When you click on Events on the navigation bar, it will direct you to various hiking events you can participate in. If you select TRAINING HIKE: Hillview to Mandai, it redirects you to another page where you can view specific information about this event. The date and time, location and other details about the hike will be displayed to you. You can also click on request to join to join this event.

### **[Profile Page]**

When you click on the profile option under the menu, it will direct you to the 'My Hiking Profile' page. There will be a prompt to remind you to link your user account with Strava API. You can click on 'Authenticate with Strava' which will redirect you to the Strava API page. There will be a prompt saying 'Authorize PeakVisor to connect to Strava' and you can click on Authorize to link your user account on PeakVisor with Strava API. This would also allow you to view your previous hiking details and their statistics.

Secure authentication processes are being implemented here, protecting against any security threats. (SE principles / system design)

### **[Account Settings Page]**

If you would like to edit some of your user account settings, you can click on the settings option under the menu. This will direct you to the Account Settings page. On the Account Settings page, there will be the Name, Strava status, Email, Change Password and Delete Account options.

If you would like to edit your name, you can click on the edit button and change your name to something else then click save to save changes.

Name: Jeannie (original)

Name: Jean (edited)

If you enter an invalid name , such as

**Name: 123jean (edited)**

an error message "Name has to be valid" will be displayed in red.



If you would like to change your password, you can click on the 'Change Password' button. A prompt saying 'A password reset email has been sent to you Check your email!' will be displayed in green at the side. You can then go to your email inbox and click on the link to change your password. When you click on the link, you will be redirected to another page to enter your new password. You can then type in your new password (with uppercase, lowercase characters, numbers and symbols, at least 8 characters) and click save. There will be an alert box confirming that your password has been changed. It will state "Password changed. You can now sign in with your new password."

If you would like to delete your user account, you can click on the 'Delete Account' button. This will automatically log you out of your user account.

### **[Logout]**

To logout of your user account, you can click on Menu and click Logout. The user will be automatically logged out of his user account.

### **[Software Engineering Concepts]**

For design patterns, we employed the Factory pattern in our user interface design to dynamically create objects without having to know the object creation logic. This is primarily seen in our Trails and Events pages where the individual trails and events are rendered as by calling on the appropriate object creation logic through a factory method, allowing for loose coupling of code.

The application is developed with Angular web framework which is based on a Component-based architecture similar to the Model-View-Controller (MVC) pattern, with the view in HTML, the model implemented in Typescript, and the controllers as Angular components which react to events triggered through the UI. The main benefit from this is a clear separation of presentation and interaction from the data, allowing for high cohesion and low coupling.

For design principles, we first followed the Don't Repeat Yourself (DRY) principle to reduce code repetition and increase the reusability and maintainability of our codebase by abstracting frequently used functionalities into reusable modules. For example, we have the standard buttons, the Home, Trails, Events, and Menu buttons, which appear at the top of every page.

Finally, we followed the Single Responsibility Principle (SRP) which states that each module should only handle one responsibility. To fulfill this principle, we identified complex functionalities, broke them down into smaller functional units, and assigned controllers to

perform each of these functions without much dependencies. For example, This helps to improve reusability and maintainability of the codebase, fulfills modularity, and also allows for simplified testing and easier debugging of each component.

## **[Conclusion]**

That is the end of our live demonstration.

Thank you for your attention, and we hope that the PeakVisor web application can pave the way to a more intimate, knowledgeable, and connected future of hiking for Singapore.