

Université de Bordeaux

SOFTWARE REQUIREMENT SPECIFICATION

GROWING PLANT APPLICATION

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1. Introduction

Nowadays, as the pollution is growing fast, tree planting has become very popular and familiar to everyone because of their benefits. However, for a person who has no experience in planting, planting is not easy because of the lacking of accurate and specific instructions. They can find lots of information or guidelines in the internet but there are no step-by-step guideline process or reminder to help planter to keep track their plant. Besides, this information may not be effective for planting because it may be written by amateur planters and evaluate by professional planters. Moreover, users need a to-do lists to remind them which they should do on time.

Therefore, Growing Plant Application (GPA) is developed to help all planters (especially new planters) have all information, guideline and process to grow their favourites trees. Besides it also has reminder function to help planters to keep track their plant or alert them to do task. Planters can create many notes for notifications and the GPA will notify them on the picked day.

This software is a mobile application and can be hosted on CH Play and Apple store. It also provides a clean and user-friendly interface to the users.

2. Objectives

- Helps users to find the detailed information of trees.
- Helps users to set up the planting environment's information.
- Automatically suggests the planting's process in step-by-step for users or let users set up the planting's process manually.
- Helps users to modify the planting's process.
- Helps users to set up reminder for each necessary action in the planting process and notify them on times
- Helps users to capture pictures of trees which they want to save.
- Assists in the smooth interaction between users and administrators for supporting.

3. Requirement

3.1.Functional Requirement

- The application should provide the tree's information with the highest percent of correctness for users. In case users find a special tree that has not existed in the application's database, it should surf on the internet and return the result to users with the smallest waiting time.
- The application should have ability to advise the most suitable tree to users for planting base on the environment's information of users.
- The application should have ability to advise the best planting's process for users to plant. This process should provide specific actions and the timeline for each action.
- The application should have ability to remind users to complete actions when it is on time.
- The application should have a large data storage to save all user's pictures that users upload.
- The application should have a support channel (such as email or chatting) between clients and administrators for supporting.
- The application must be easy to install from both Appstore (IOS) and CH Play (Android)
- The application should have an administration portal for administrators to manage this application and set up / modify the master data.

3.2.Non-functional requirements

3.2.1. Safety requirements

The application should back up the database and transactions log every night to archival storage for restoring due to catastrophic failure, such as a disk crash, hardware failure... or redoing the operations of committed transactions from the back up log, up to the time of failure.

3.2.2. Security requirements

The application should choose a security host for uploading application's database. Moreover, the application must have strong authentication method to secure user's account and information.

3.2.3. Software quality attributes

- **Availability:** the application must be available all the time (24/7) for using.
- **Correctness:** the application should have ability to keep track the history of user's action in application and should have reports for monitoring.
- **Maintainability:** in case the application needs to be maintained, the maintenance should be easy and fast to make sure the application's availability.

Usability: the application must satisfy at least 50 concurrency users.

3.3.Hardware Requirements

- The application must run well on all of mobile device (both Android's device and IOS's device)

3.4.Software Requirements

- **Front end:** React Native, HTML, Java script, CSS
- **Back end:** ASP.NET Core
- **Database:** Microsoft SQL Server
- **Operating System:** Android and IOS

3.5.WaterFall Model

- The application should be developed by following the Waterfall model. The waterfall model is a sequential process in which progress is seen as flowing steadily (like a waterfall). It includes
 - Requirements
 - Design
 - Development
 - Testing
 - Deployment
 - Maintenance
- With the Waterfall model, if the project failures are detected at the beginning stage, it takes less effort (also time and money) to correct this error because in the waterfall model phases to be properly sealed first before proceeding to the next stage.

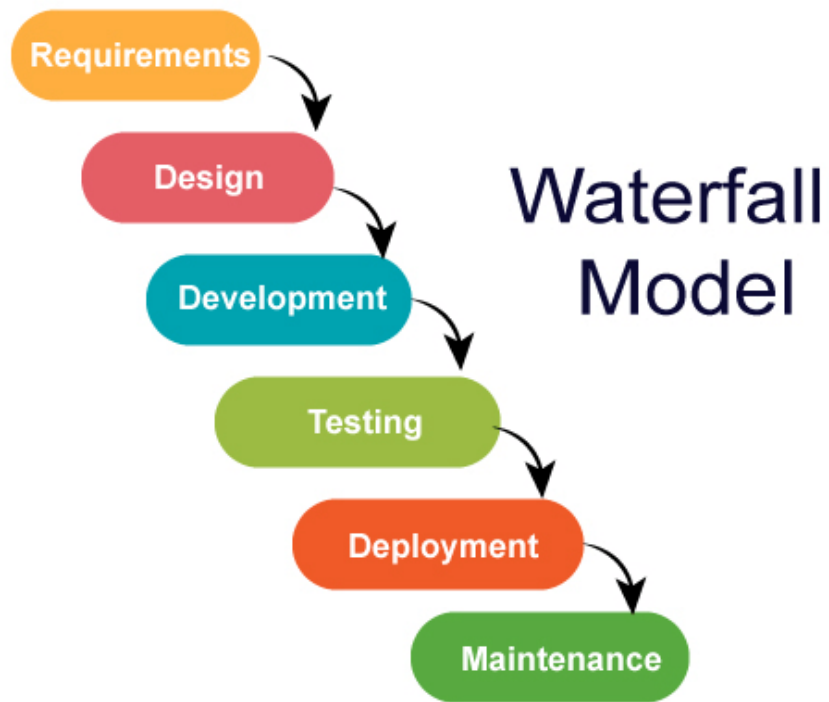


Figure 3.1 Waterfall model

4. System Architecture

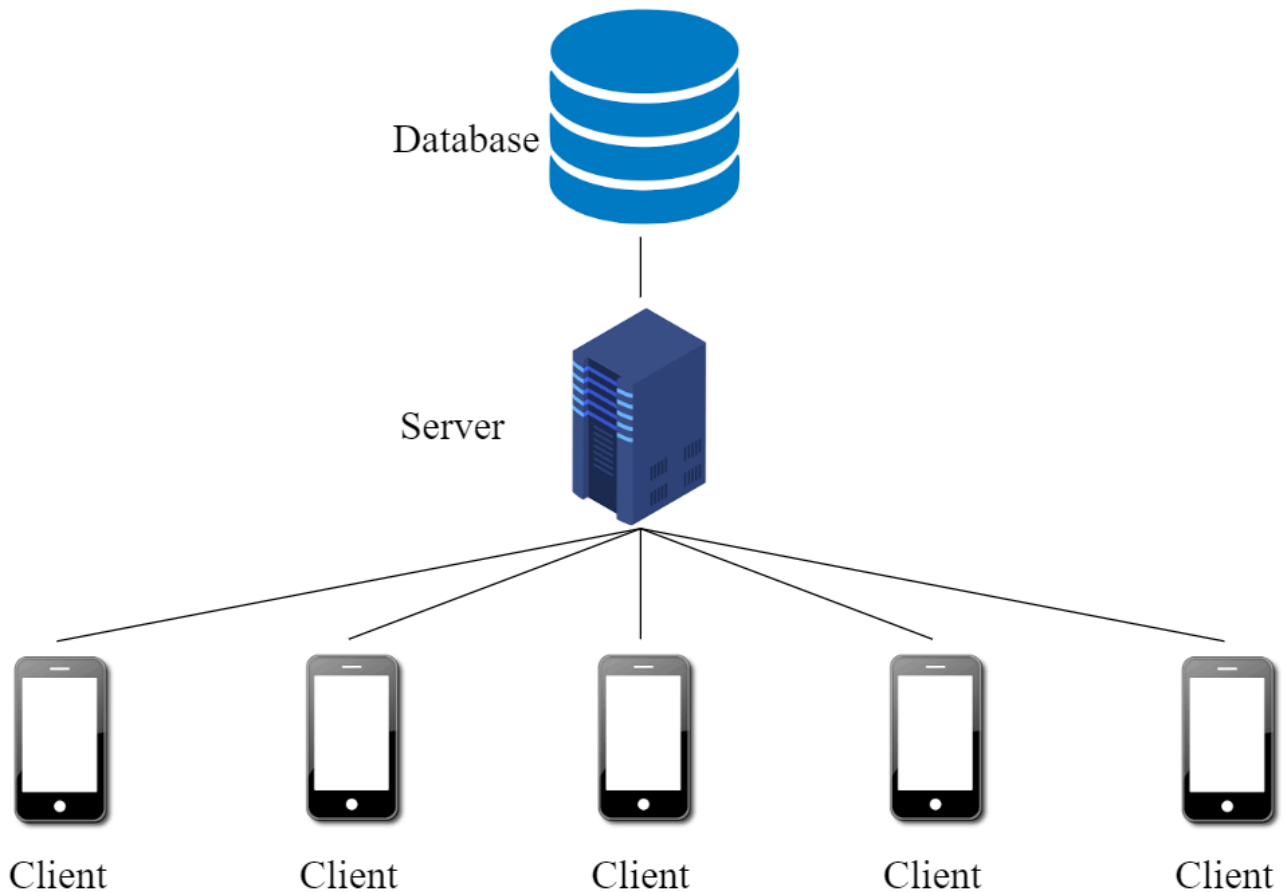


Figure 4.1 Client-Server-Database model.

- The application follows the Client-Server-Database model, which is a distributed application structure that partitions task or workloads between the providers of a resource or service (called Server) and the service requesters (called Clients).
 - o Clients can use this application in their mobile phone to communicate with the Server (for data synchronization) but they must have an internet connection.
 - o Server can be a hosting server machine or personal computer which have strong hardware. It has to be available all time (24/7) and running one or more server programs which share their resource with clients or do tasks as clients requests.
- This model can help the application to have more flexibility, usability, scalability and interoperability.

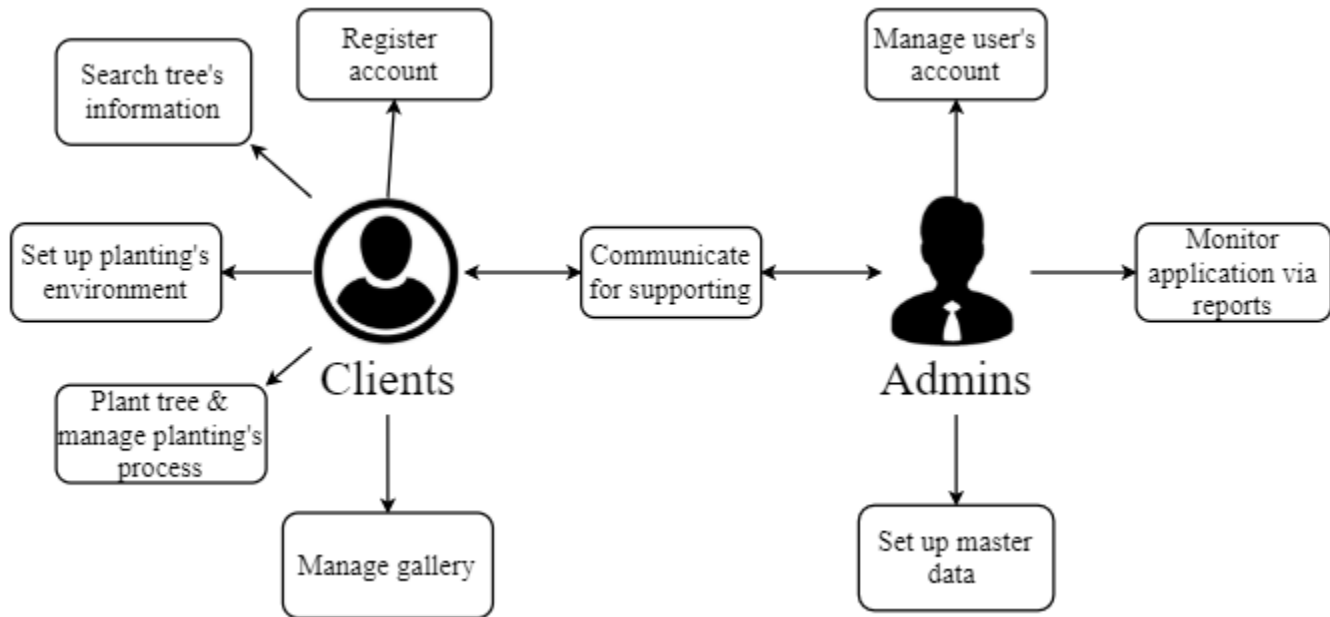


Figure 4.2 Client and Admin's main functions.

- The application will have two main type of Users: Clients and Admins.
 - o **Clients:** there are customers who using this application. They can:
 - Register a new account (in case of new member)
 - Search tree's information
 - Set up their planting's environment
 - Plant tree and manage planting's process
 - Choose a tree and plant it
 - Create planting process.
 - Add / modify / delete actions in the planting's process
 - Manage gallery
 - Upload new picture
 - Delete unnecessary picture
 - Communicate with admins for supporting
 - o **Admins:**
 - Manage user's account
 - Active / De-active account of users
 - Set up master data (such as tree's information, action's detail, environment's detail...)

- Add new data
- Modify existed data
- Delete unnecessary data
- Monitor application via reports
- Communicate with admins for supporting

5. Design and Implementation

5.1. Product Features

GPA will be integrated with modules as following such as:

- **Tree's information**
 - Search tree's information:
This function helps users to search the detail information of tree (include tree's picture). Besides, they can also find the guide for planting of this tree to help them planting easier.
 - Favourite trees:
This function helps users to mark the tree that they like most. This will help application to sort the list of trees to show.
- **Planting environment**
 - Set up Garden:
This function helps users to set up their garden's information. This information will help an application to automatically advise the most suitable trees for planting and it includes:
 - Humidity
 - Temperature
 - Light
 - Position (indoor, outdoor)
 - Size
- **Tree's planting process**
 - Set up new Process:
This function helps users to set up manually the planting process or application will create it automatically. This process includes lots of actions with action's detail and action's doing time. In case users choose the manual setup, they have to add actions for the process themselves.
 - Modify exists process:
Users can modify the process at any time during the process's time. The process's time will be calculated by the day which users choose to plant a tree to the harvest day of this tree.
- **Gallery**
 - Create and modify gallery:
When users choose tree for planting, the application will also create a gallery for users. Users can capture many tree's pictures as they want.
 - Upload picture:
This function helps users to upload pictures that they want.
- **Support Channel**
 - This function creates the smooth interaction between users and administrators for supporting. This should be a chat channel and should have ability for transferring file or pictures

- **User authentication**
 - Login:
Users have to use their user and password to login in to the application to use. They have to input correctly their information.
 - Modify user's profile:
This function allows user to
- **Administrator management**
 - This function helps the administrators manage the application and set up the master data for this application. It includes:
 - Users management
 - Tree's information management
 - Tree's planting process management
 - Gallery management
 - Support channel management

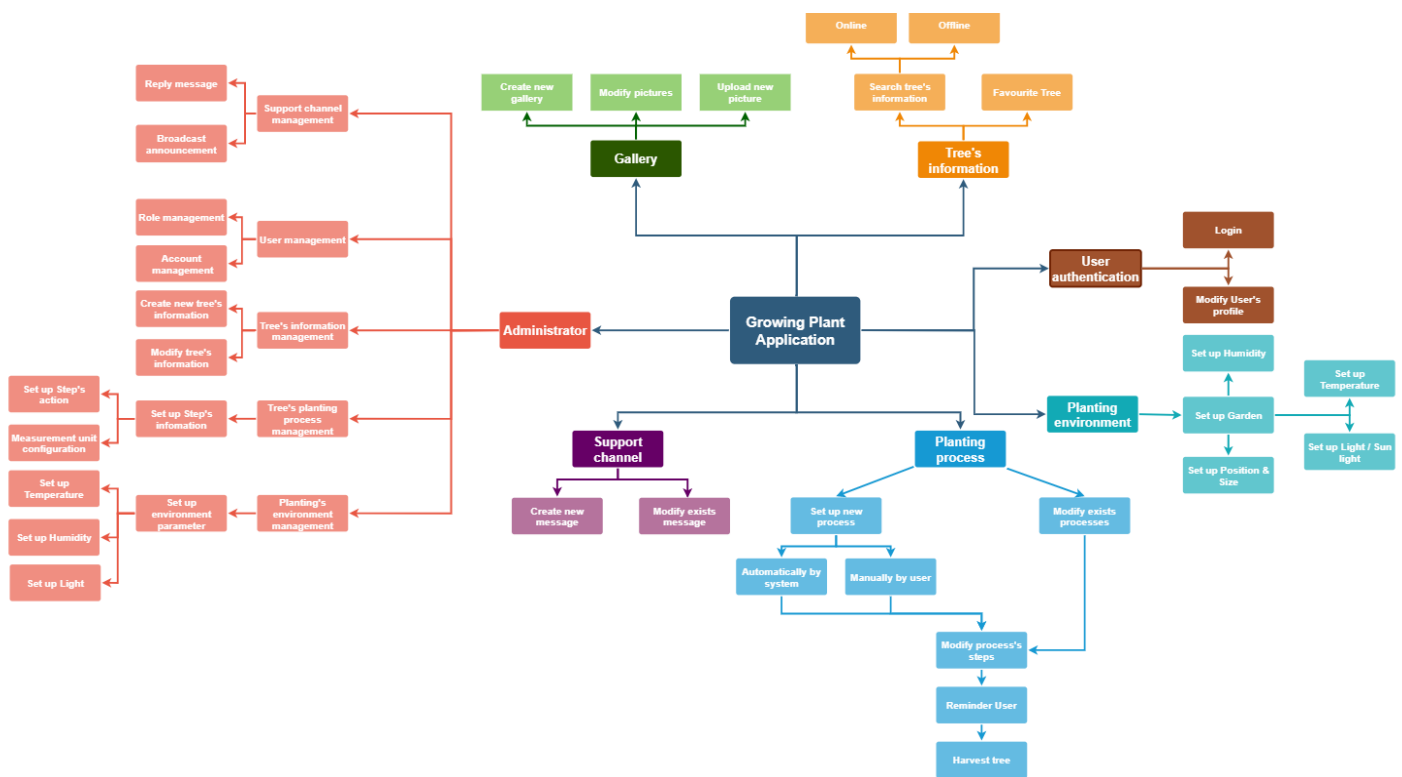


Figure 5.1 Application's features

5.2. Class diagram design

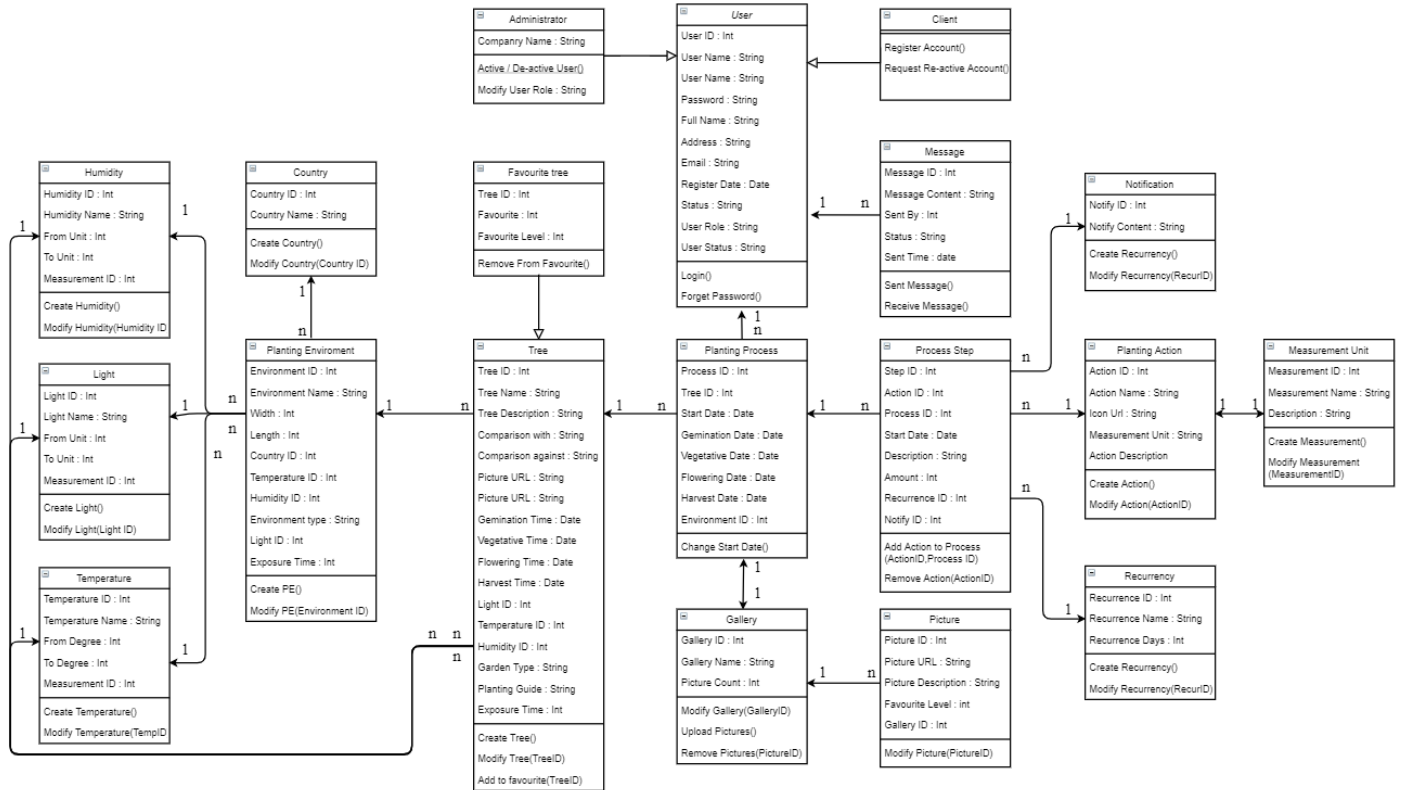


Figure 5.2 Class diagram of the Application

5.3. Use case diagram

5.3.1. Interaction between Clients and the Application

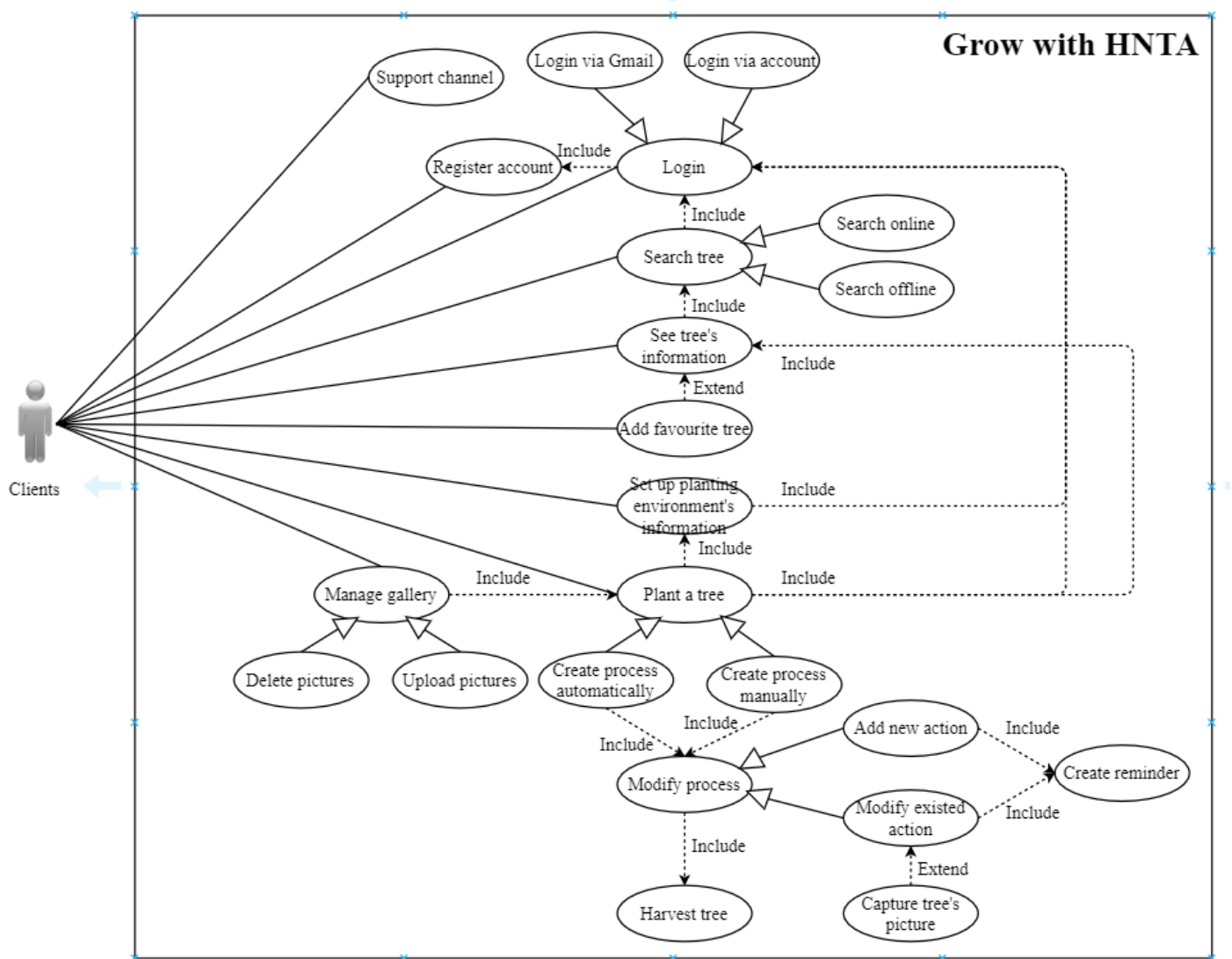


Figure 5.3 Interaction between Clients and the Application

5.3.2. Interaction between Administrators and the Application

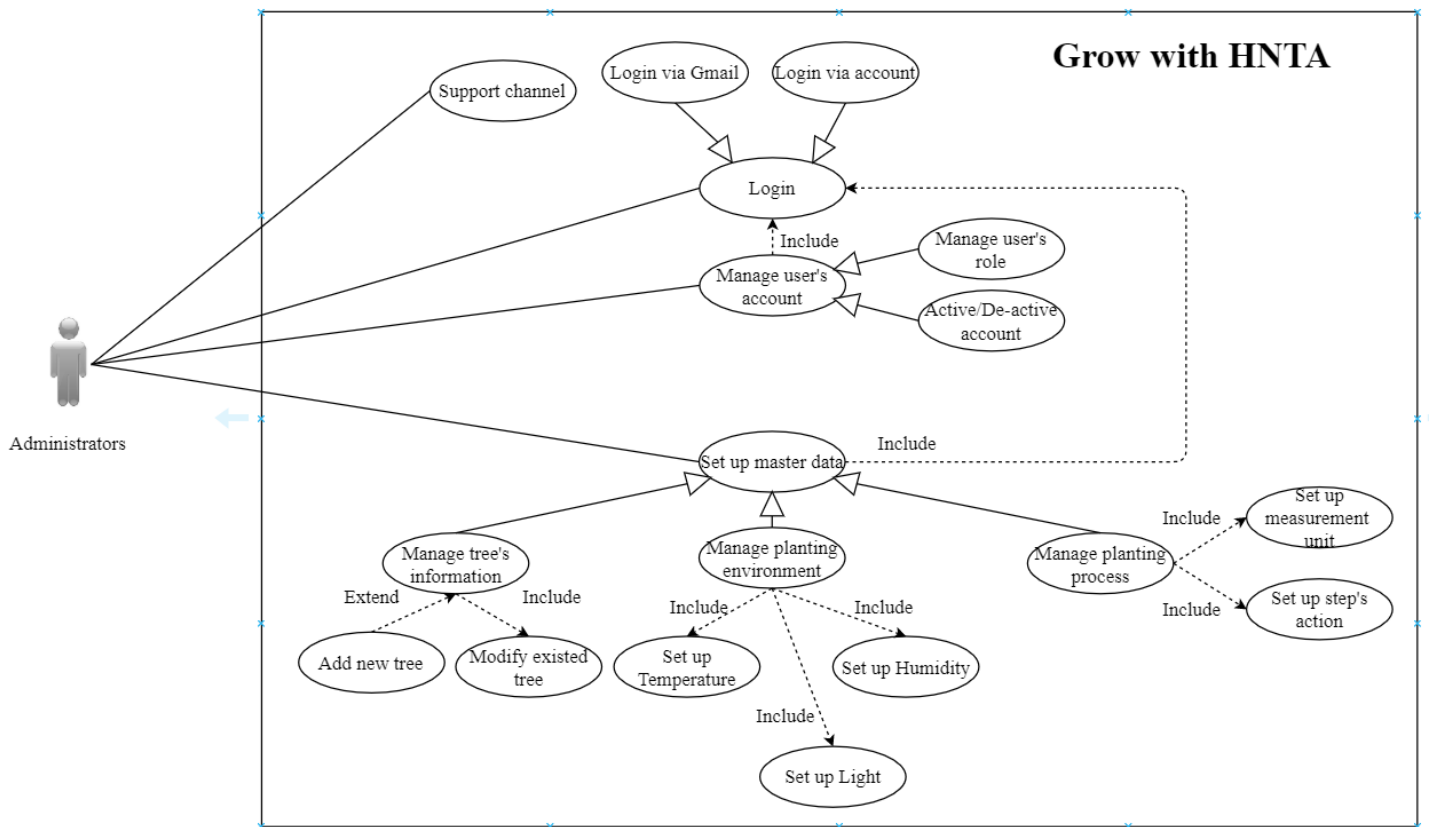


Figure 5.4 Interaction between Administrators and the Application

5.3.3. Interaction between Administrators, the Application and Clients

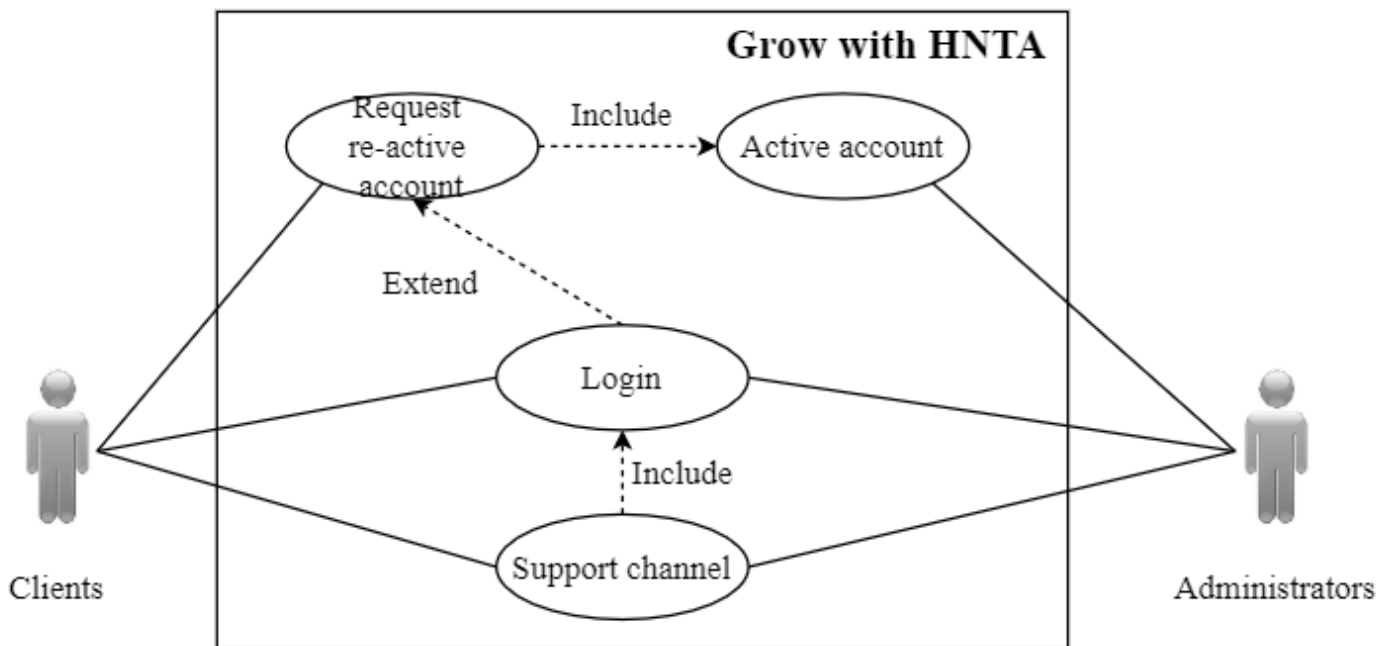


Figure 5.5 Interaction between Administrators, Clients and the Application

5.4. Sequence diagram

5.4.1. Clients - Register new account

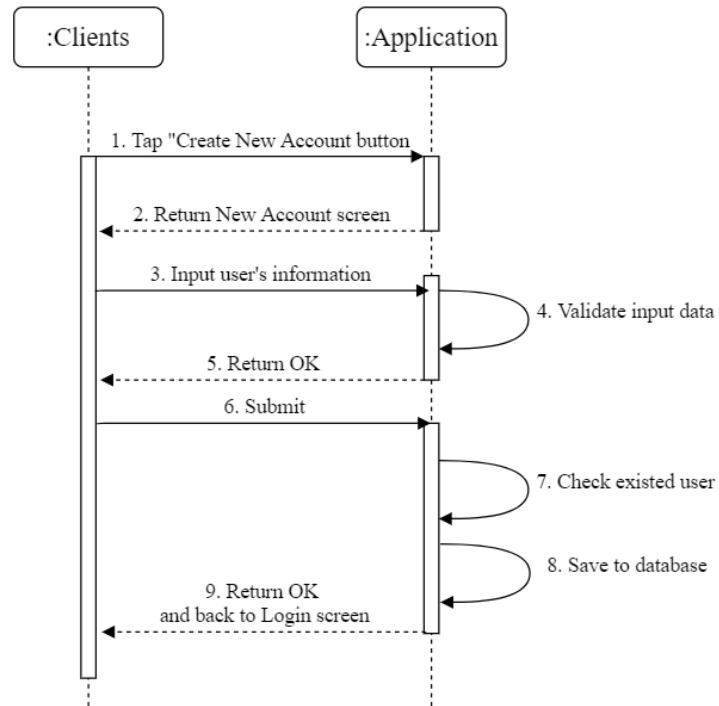


Figure 5.6 Sequence Diagram - Register new account

5.4.2. Clients – Forgot password

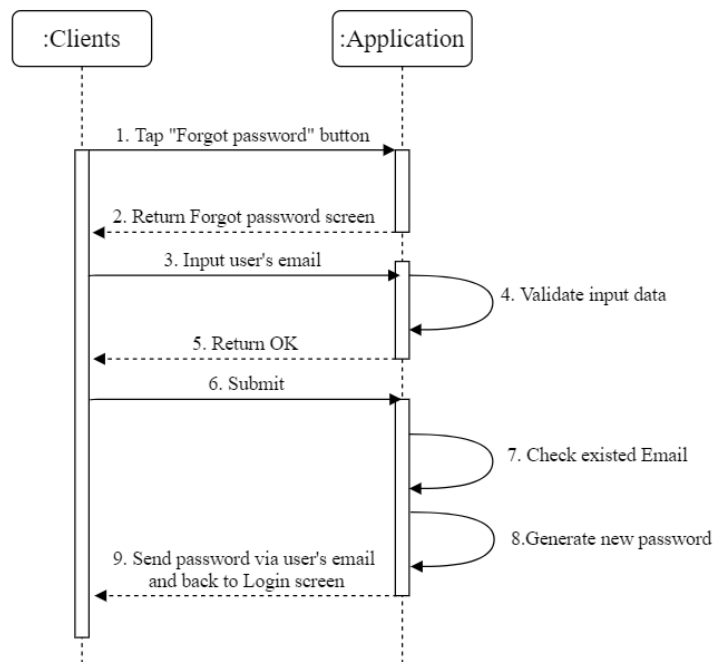


Figure 5.7 Sequence Diagram – Forgot password

5.4.3. Clients - Login

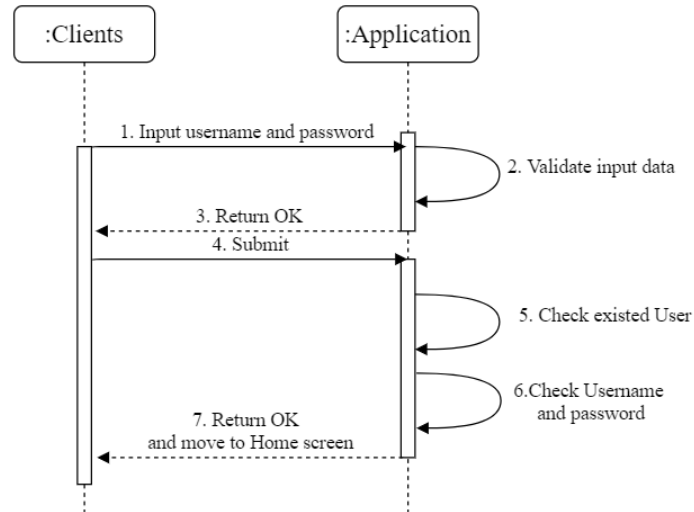


Figure 5.8 Sequence Diagram – Forgot password

5.4.4. Clients – Search & See tree's information

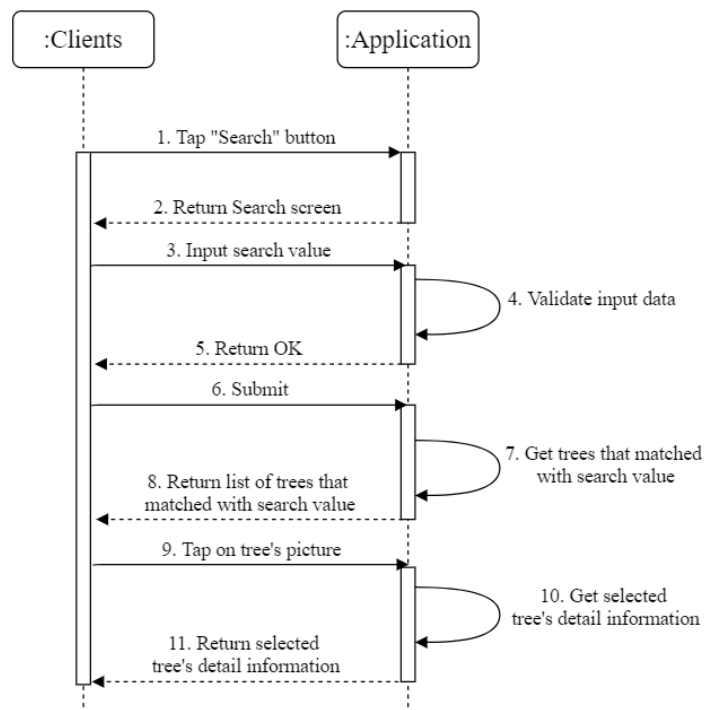


Figure 5.9 Sequence Diagram – Search & See tree's information

5.4.5. Clients – Set up Planting Environment’s information

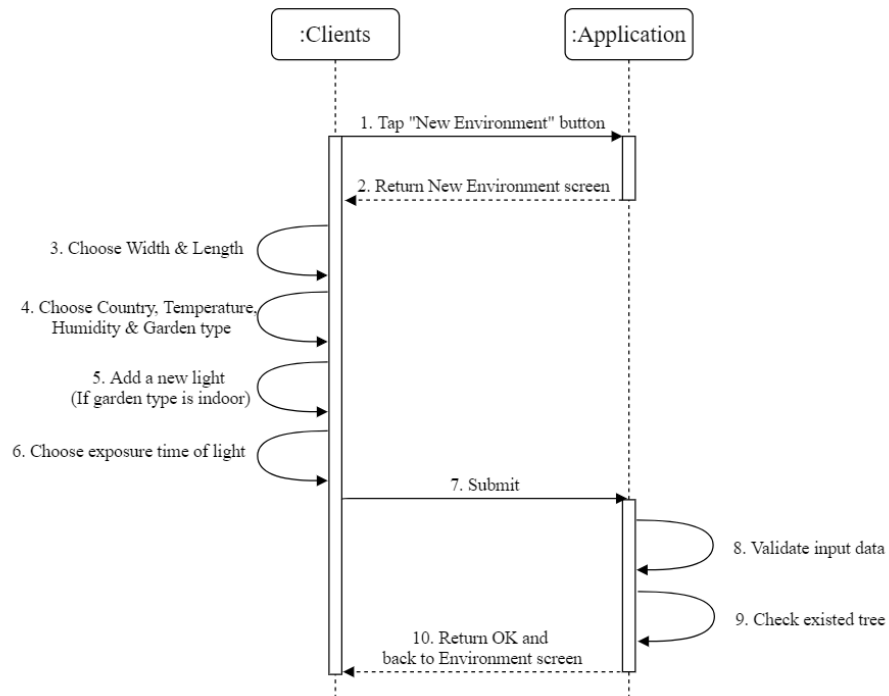


Figure 5.10 Sequence Diagram – Set up Planting Environment’s information

5.4.6. Clients - Plant a tree

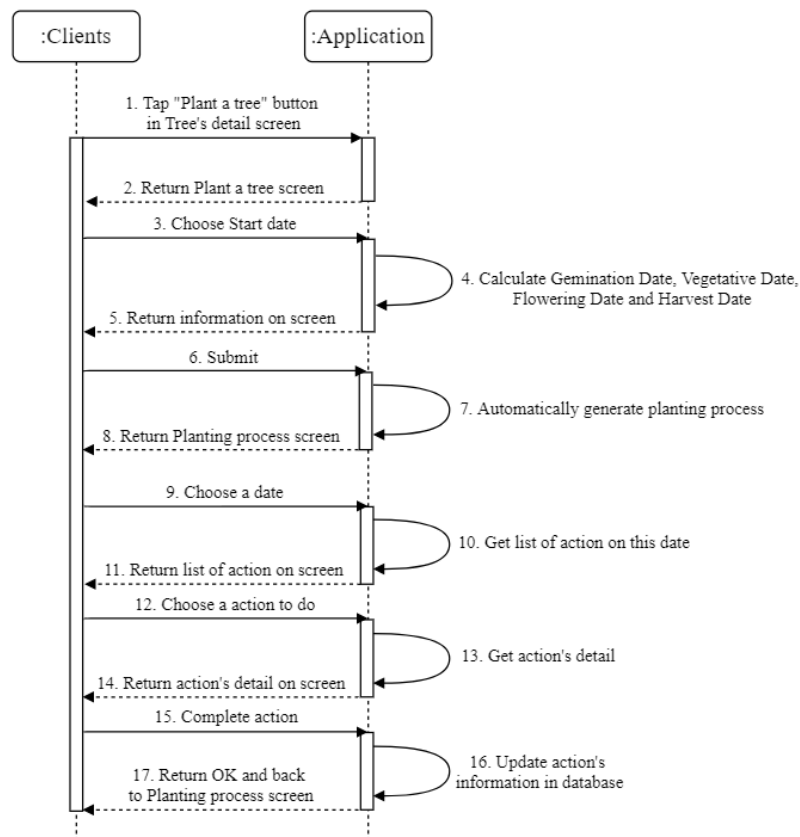


Figure 5.11 Sequence Diagram – Plant a tree

5.4.7. Clients – Add new action to Planting process

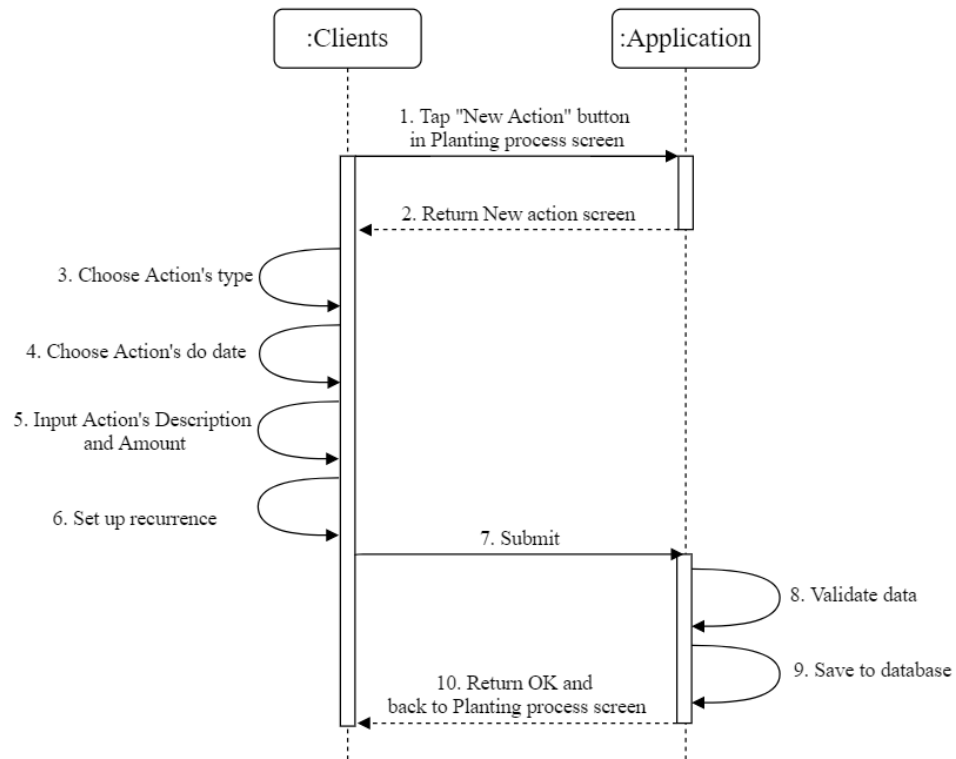


Figure 5.12 Sequence Diagram – Add new action

5.4.8. Clients – Upload pictures

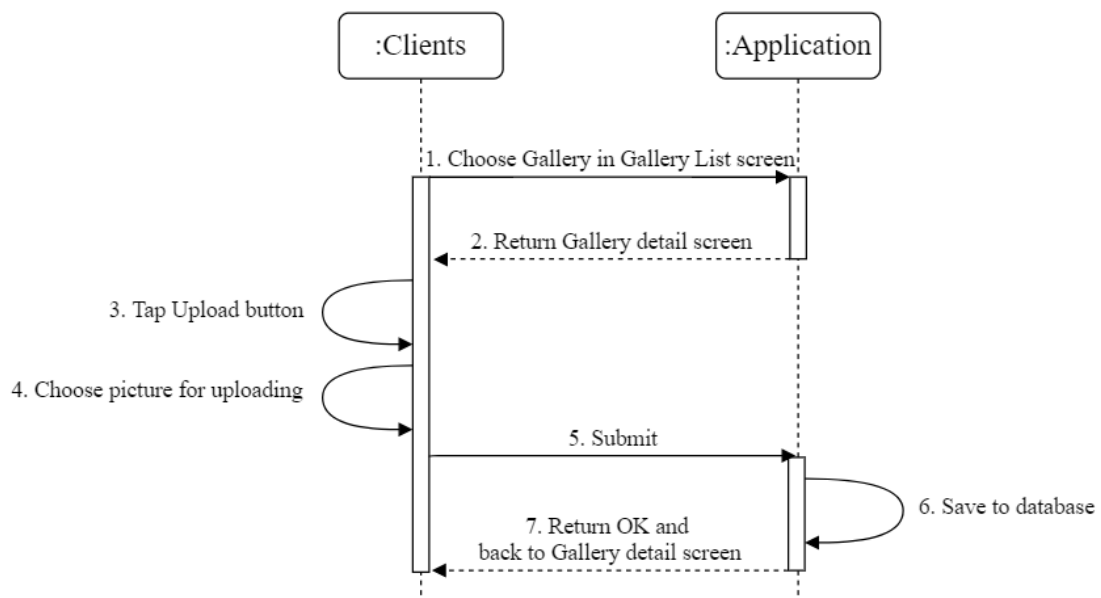


Figure 5.13 Sequence Diagram – Upload Picture

5.4.9. Support Channel

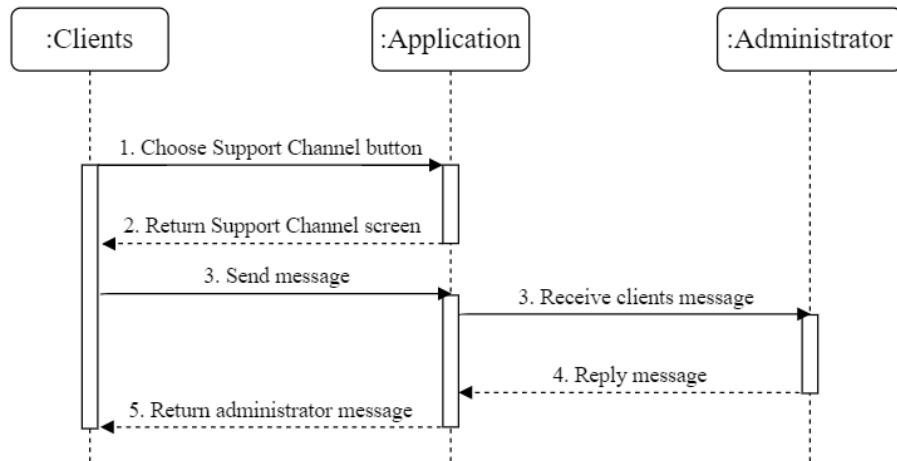


Figure 5.14 Sequence Diagram – Support Channel

5.4.10. Administrator – User Management

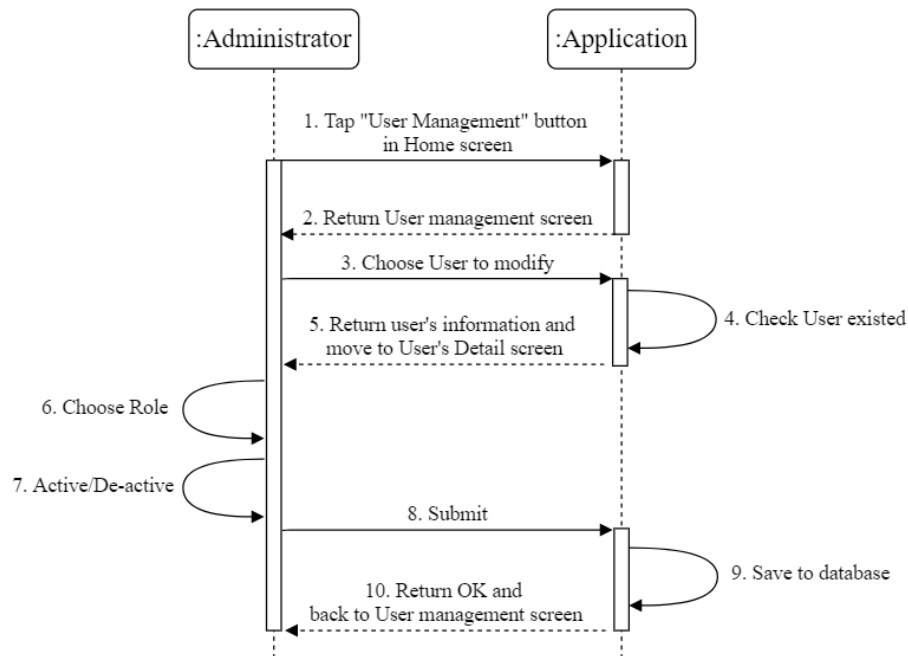


Figure 5.15 Sequence Diagram – Administrator User Management

5.4.11. Administrator – Set up Temperature

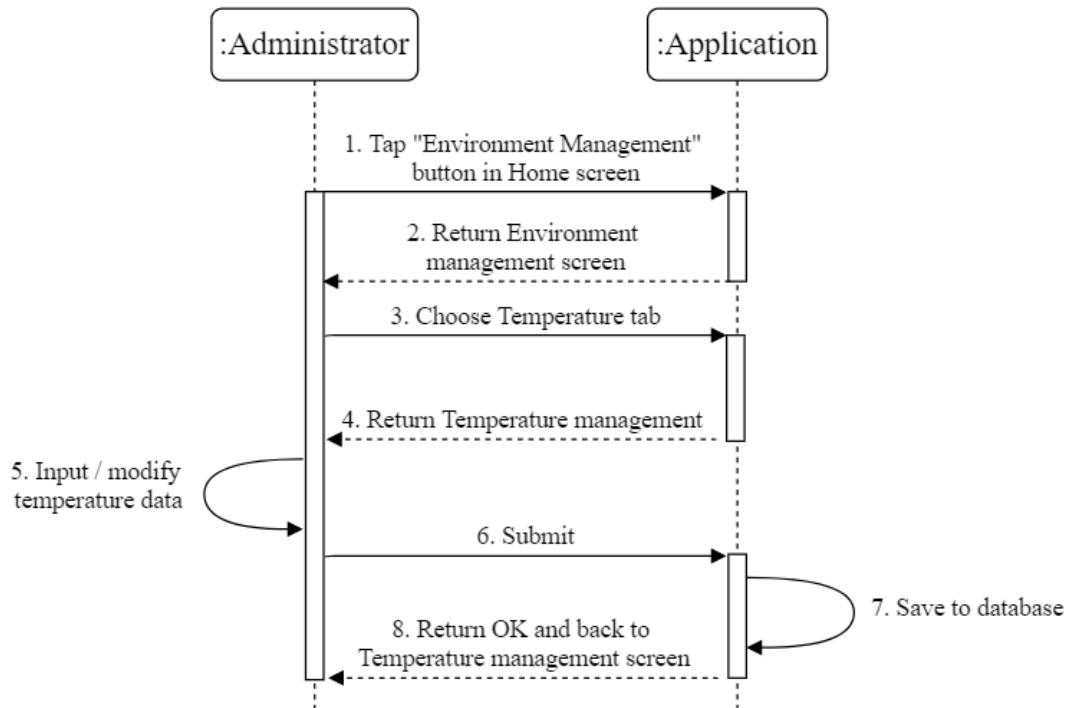


Figure 5.16 Sequence Diagram – Administrator set up Temperature

5.4.12. Administrator – Set up Humidity

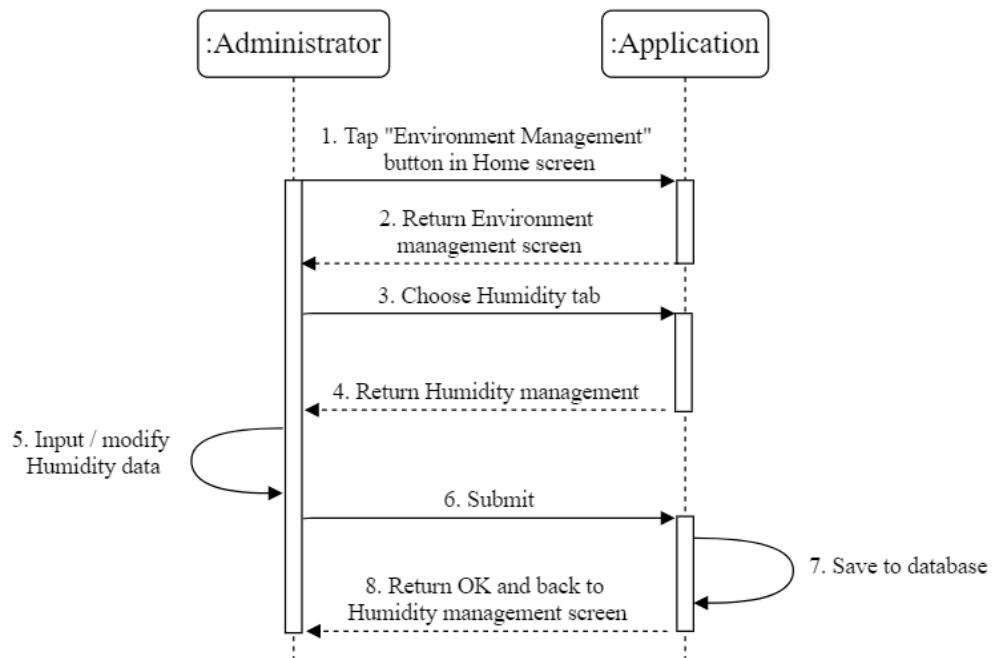


Figure 5.17 Sequence Diagram – Administrator set up Humidity

5.4.13. Administrator – Set up Light

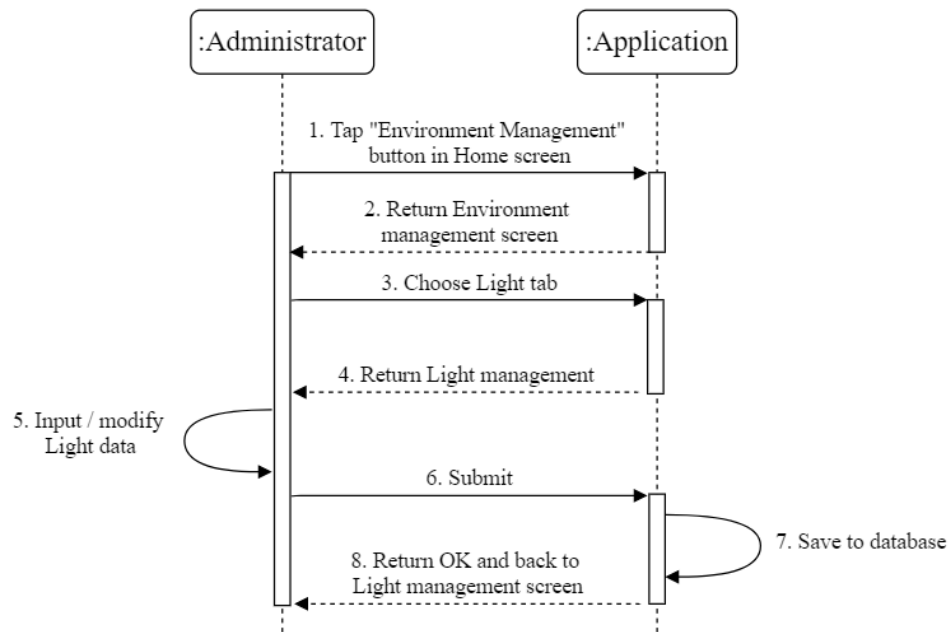


Figure 5.18 Sequence Diagram – Administrator set up Light

5.4.14. Administrator – Add new tree

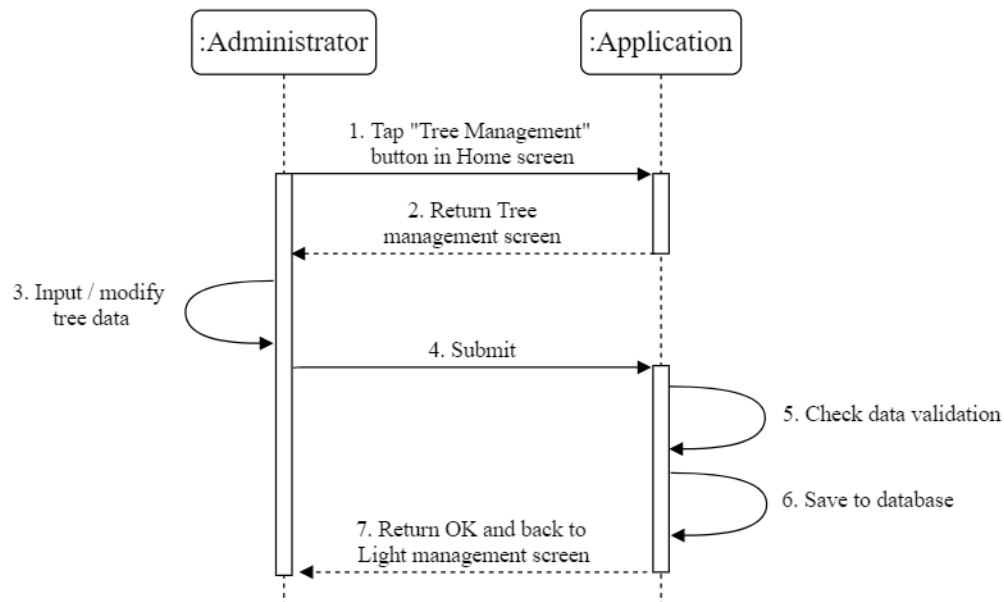


Figure 5.19 Sequence Diagram – Administrator add new tree

6. Mock-up Design

6.1.Application Icon

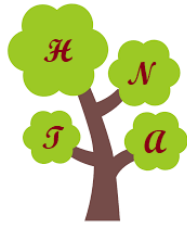


Figure 6.1 Application's Icon

6.2.Home screen

6.2.1. Requirements

This screen will show when users login successfully into the application. It will save user's information into session.

6.2.2. Mock-up

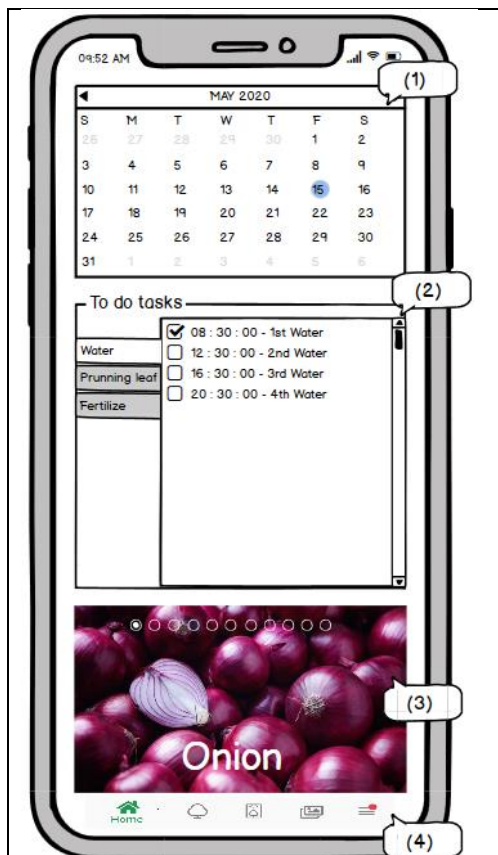


Figure 6.2 Application's Home screen

(1) Calendar:

This is a Calendar selector that users can choose a day that they want to see its tasks. When users choose a day, the data in "To do task" will automatically updated base on the user's selection.

(2) To do Tasks:

This element will show all tasks of the date which is selected by User in Calendar (1). It includes

- Task name
- Task time
- Task description

When user tap on it, it will move to Tree's planting process screen.

(3) Picture:

This element will show a list of pictures of some new or popular trees in system. User can scroll for many pictures. When user tap on it, it will move to Tree's information screen.

(4) Button Control:

This element contains the list of buttons, when user tap on it, it will:

- **Home:** move to Home Screen
- **Trees:** move to Tree's planting process for Users
- **Environment:** move to User's planting environment
- **Gallery:** move to Gallery
- **More:** move to Other Buttons screen

6.3. Other Buttons screen

6.3.1. Requirements

This screen will show when users tap on Button Control in the Home Screen into session.

6.3.2. Mock-up

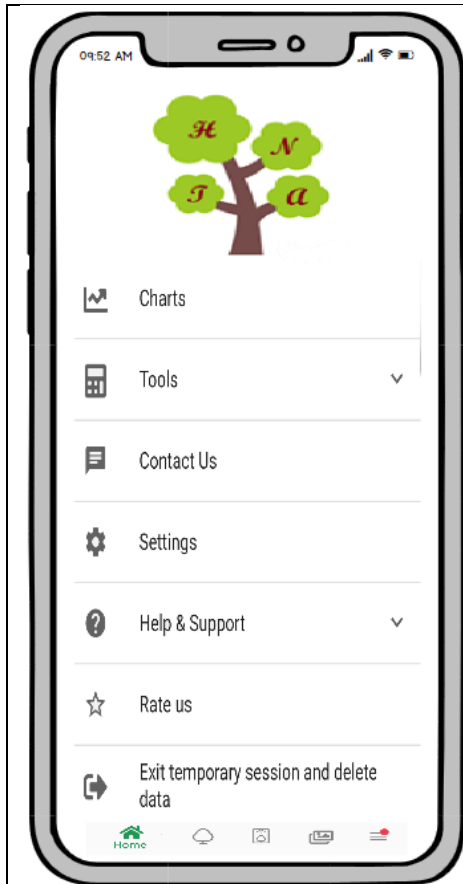


Figure 6.3 Other Button screen

(1) **Charts:**

This is reports that help users to have an overview of their garden.

(2) **Tools:**

This is some tools (such as Calculator, exchanger ...) to help users in doing calculation cases

(3) **Contact Us:**

This element will show the Developer team's information

(4) **Setting:**

This element only shows if the current user is administrator role. When admin tap on it, the application will move to Administrator screen

(5) **Help & Support**

This element helps Users to contact with the administrators for supporting. When user tap on it, it will move to Support Channel screen

(6) **Rate us:**

This element will help Users to rate the application

(7) **Exit temporary session and delete data:**

This element will help user to back to Login screen and clear all data of the current session.

6.4. User login screen

6.4.1. Requirement

- This screen will show whenever the application launch, users have to login to use this application.
- After users login successful, the application will show Home screen and save the current account and user's information into session.

6.4.2. Interface mock-up



Figure 6.4.1 Login screen

(1) Username & Password:

There are textbox “Username” & textbox “Password” that allow user to input Username and password to login into the application.

(2) Forgot Password:

This element helps users to get back their password in case they forgot it. When users tap on it, the applications will show a mini screen “Forgot password”.

In the “Forgot password” screen, Users have to input Username and this must be existed in the application. After that, the application will send email with new password into user’s email.



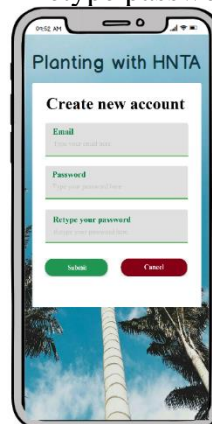
Figure 6.4.2 Forgot password screen

(3) Create new account:

This element helps users to create an account and password in case they have not had it (new users). When users tap on it, the applications will show a mini screen “New User”.

In the “New user” screen, Users have to input Username and password and retype password. This information must be:

- Username must not be duplicate with the existed username in the application.
- Password must be more than 8 character, have at least 1 number, 1 lower character, 1 upper character.
- Retype password must be the same as Password



6.5. Tree's information – Search Screen

6.5.1. Requirement

- This screen will show whenever users tap on the Plant Picture in Home screen.

6.5.2. Interface mock-up

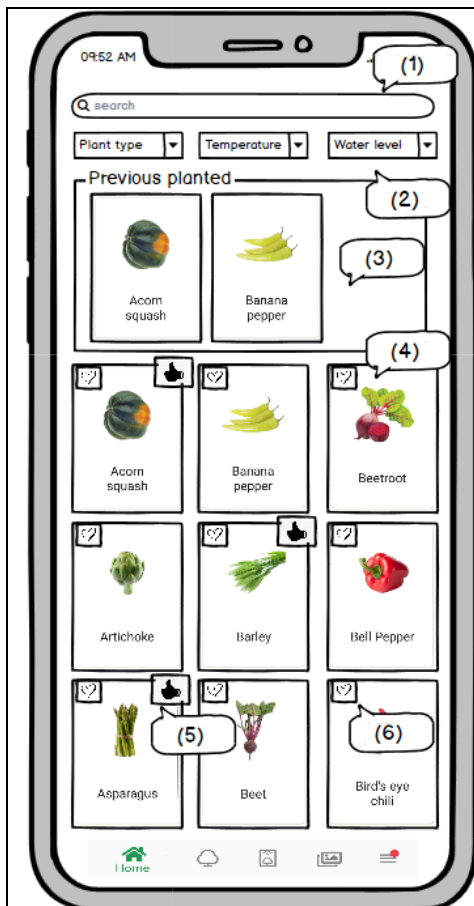


Figure 6.5 Search screen

(1) Search input:

This is a textbox that users can input value for searching plant in the system. Application must show all plants that contain the search value.

(2) Search filter:

There are 3 combo-boxes that help users to filter the plant as they want:

- **Plant type:** Filter by types of Plants (ex: Herbs, Shrubs, Trees, Climbers, Creepers ...)

- **Temperature:** Filter by temperature that is the most suitable for plants (ex: hot, cold ...)

- **Water level:** Filter by water level that is the most suitable for plants

When users change the value in combo-box, the Plants (4) will show all plants that match with the filter conditions.

(3) Previous planted:

This element shows the last 3 plants that users planted before. When users tap on pictures, it will move to Plant's Detail Information screen with the selected plant information.

(4) Plants:

This element will show all of plants which is matched with user's search value and user's filter value. It will sort by favourite. When users tap on pictures, it will move to Plant's Detail Information screen with the selected plant information.

(5) Suggestion for planting:

This element shows suitable plants, which are suggested by the application for users to choose.

(6) Favourite plants:

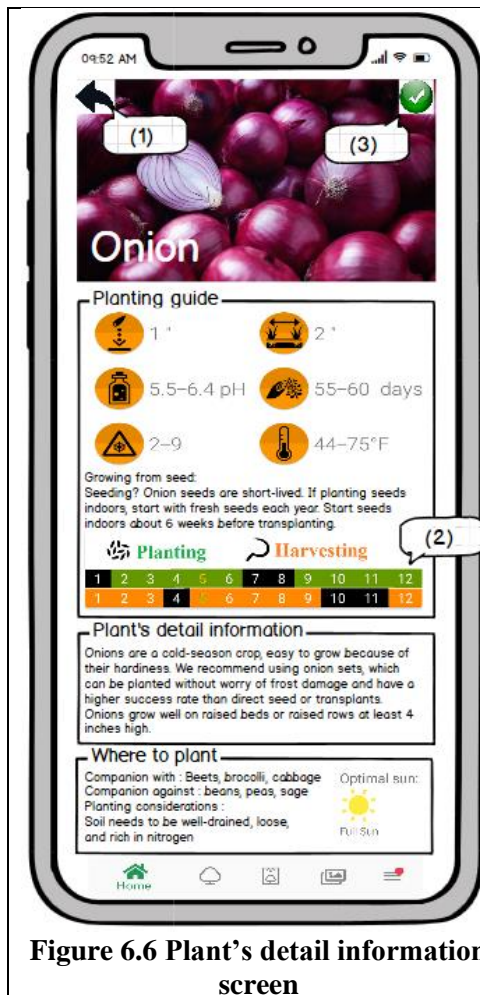
This is a function to help users to pick the plants that users like most. User can tap more on this element to increase the favourite level.

6.6. Tree's Information - Plant's detail information

6.6.1. Requirement

This screen will show whenever users tap on the Plant Picture in Search screen. The plant detail information loads from the database (if exists) or get from the internet (if not exists in database)

6.6.2. Interface mock-up



(1) **Back button:**

This is a button that will move back to the previous screen when users tap on it.

(2) **Timeline Suggestion:**

This is a timeline suggestion of planting for users. The planning time suggestion starts from the current date to the next 2 week (14 days) and the Harvesting time suggestion will be calculated bases on the plant's time life

Example:

- The planting time suggestion is from 1st to 12th of the current month and plant need 30 days to growth
=> The harvesting time suggestion is from 1st to 12th of the next month

(3) **Plant button:**

This is a button that will move to **Plant New Tree** screen if users already choose the slot in garden to plant.

If not, this will move to the **Garden Planting** screen for users to choose the empty slot to plant with the data of selected tree. After that, it moves to the **Plant New Tree** screen

6.7.Planting environment - List of Garden screen

6.7.1. Requirement

This screen will show whenever users tap on the Environment button in Main screen.

6.7.2. Interface mock-up

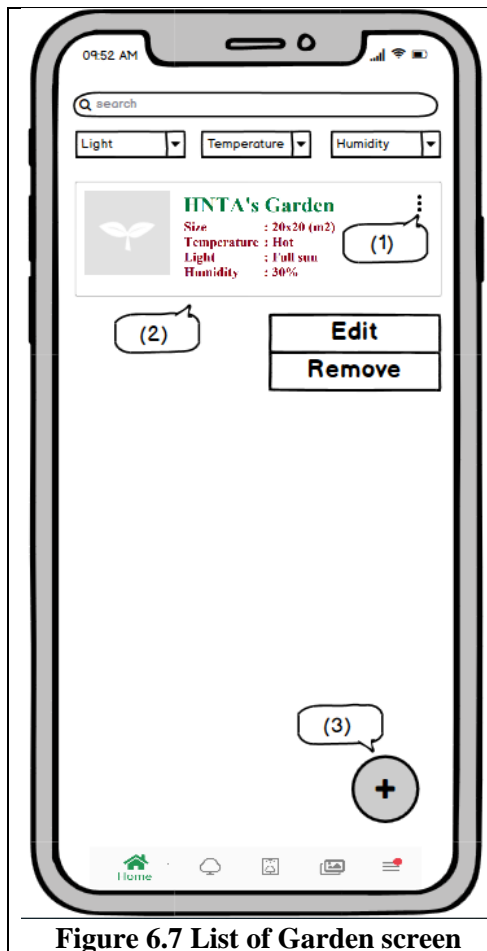


Figure 6.7 List of Garden screen

(1) **More buttons:**

When users tap on this element, it will show the list of buttons:

- **Edit button:** This function allows users to edit Garden information. When users tap on this, it will move to **Garden's Detail Information** screen.

- **Remove button:** This function allows users to remove Garden information. When users tap on this, the application will ask users again for confirmation, then remove the garden.

(2) **Garden information:**

This is a list of gardens, it shows short information of the gardens. The data in list shows base on the search value and filter value that Users input. If these value is null, it will get all Gardens in the application. When users tap on this element, the application will move to **Garden Planting** screen with the information of selected Garden

(3) **New Garden:**

It allows users to create new Garden in the application. When users tap on this element, the application will move to **Garden's Detail Information** screen.

6.8.Planting environment - Garden's detail information

6.8.1. Requirement

This screen will show whenever users tap on the New Garden button in List of Gardens screen.

6.8.2. Interface mock-up

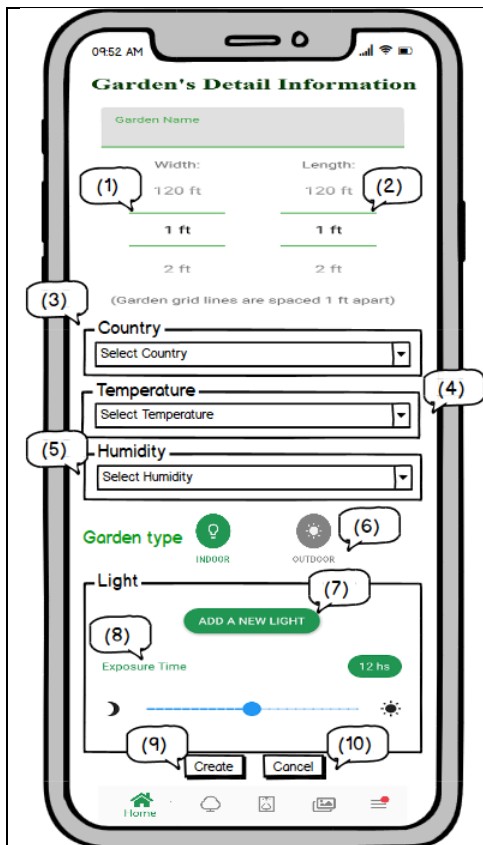


Figure 6.8.1 Garden's detail information screen

- (1) **Width:**
Let users choose garden's width
- (2) **Length:**
Let users choose garden's length
- (3) **Country combo-box:**
Let users choose garden's location. This combo-box include all names of countries in the world and users can choose one to allocate the location of garden.
- (4) **Temperature combo-box:**
Let users choose environment's temperature for garden. This combo-box include:
 - Hot
 - Cold
 - Mild
 - **Input degree:** if users choose this value, application will show a mini screen for users to input exactly the degree of temperature of garden's environment
- (5) **Humidity combo-box:**
Let users choose environment's humidity. This combo-box include:
 - High
 - Low
 - Medium
 - Wet
- (6) **Garden type radio button:**
Let users choose garden's type. It includes Indoor and Outdoor type
- (7) **Add a new light:**
Let users choose garden's light when garden's type is Indoor. When users tap on this, application will show a mini screen to choose the light's description. For light's type, it includes: LED, LEC, HPS, CFL, T5...

	<div><div>New light</div><div>Type▼</div><div>Wattage</div><div>Color Temperature (Kelvins)</div><div>CancelADD</div></div> <p>Figure 6.8.2 Add light screen</p> <p>(8) <u>Exposure time:</u> Let users choose garden’s light exposure time. Users can choose from 0 hour to 24 hours.</p> <p>(9) <u>Create button:</u> When users tap on this, application will save the current garden information and back to the List of Garden screen. If Users choose an exists garden in the List of Garden screen, it will replace by Update Button and Remove Button. - Update Button: When users tap on this, application will save the current garden information and back to the List of Garden screen. - Remove Button: When users tap on this, application will remove the current garden information and back to the List of Garden screen.</p> <p>(10) <u>Cancel button:</u> When users tap on this, application will remove the current garden information and back to the List of Garden screen.</p>
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6.9.Tree’s planting process – Garden Planting

6.9.1. Requirement

This screen will show whenever users tap on the Garden in List of Gardens screen.

6.9.2. Interface mock-up

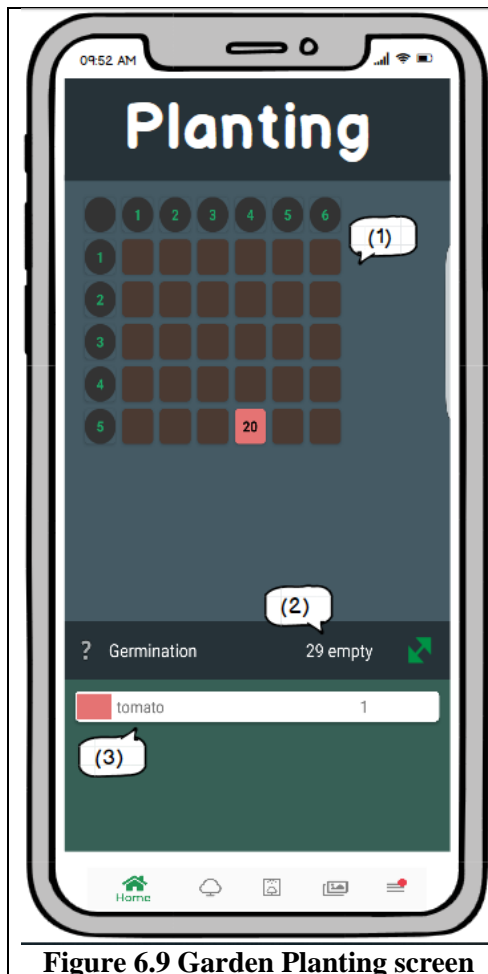


Figure 6.9 Garden Planting screen

(1) Garden planting slot:

This configures by garden's width and garden's length and each slot will have size 1x1. When users want to plant a new tree, they will tap on the empty slot (brown colour). If users already choose a tree in Search screen, application will move to **Planting New Tree** screen, if not, application will move to **Search** screen for user to choose a tree. If they want to control existed tree, they will tap on the slot with numbers (this number is the number of trees that planted before) to move to **Planting Process** screen. Each planted tree will have different colours.

(2) Available slot for planting:

This show the number of empty slots of garden, which can be planted a new tree.

(3) List of Planted trees:

This is a list of planted trees with their amount

6.10. Tree's planting process - Plant New Tree

6.10.1. Requirement

This screen will show whenever users tap on the empty slot (brown colour) in Garden planting screen.

6.10.2. Interface mock-up

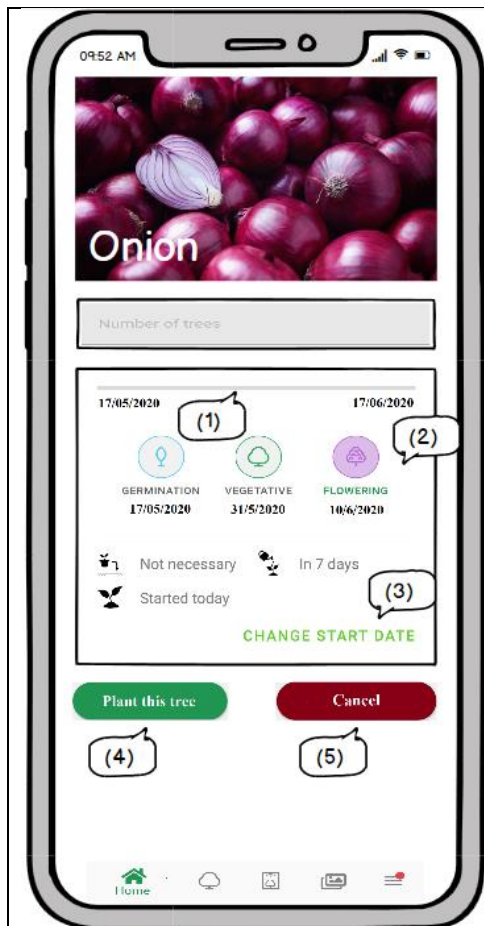


Figure 6.10 Plant New Tree screen

- (1) **Tree's time life:**
This shows the tree's time life from the selected plan date to the harvest date.
- (2) **Main stage of planting:**
This shows the time of three main stages (Germination, Vegetative, and Flowering). This data will be calculated by application base on tree's information.
- (3) **Change start date button:**
This button will help users to change the date they want to start to plant. When users tap on it, application will show the calendar for users to choose the date.
- (4) **Plant button:**
When users tap on this, application will save the current tree's planting information, move to the **Planting Process** screen and create a new Gallery.
- (5) **Cancel button:**
When users tap on this, application will remove the current tree's planting information and back to the Garden planting screen.

6.11. Tree's planting process - Planting Process

6.11.1. Requirement

This screen will show whenever users tap on "Plant this tree" button in Plant new tree screen.

When users tap on "Plant this tree" button in Plant new tree screen, application will show the popup screen to ask users if they want to generate automatically action for the list of actions in Planting process screen or add manually add action to the list of actions in Planting process screen. If users choose "YES", application will generate it automatically then load the Planting process, if "NO", application will load the Planting process

6.11.2. Interface mock-up

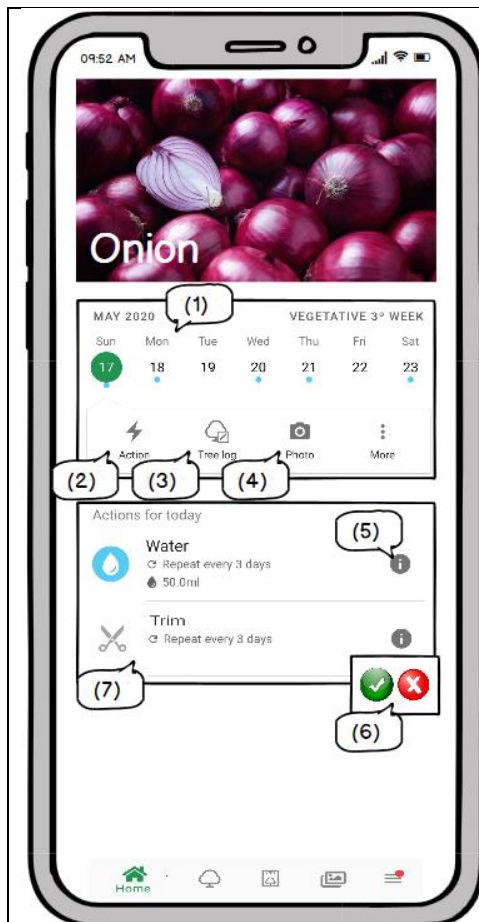


Figure 6.11 Plant Process screen

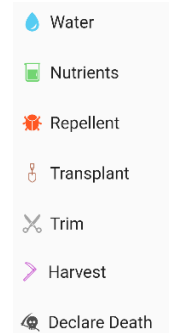
(1) Calendar:

This element shows days of current week (from the current day to next 7 days). If the day has tasks to do, it will be highlighted with blue colour. Users can choose the day in this calendar to see tasks for the selected day.

(2) Action button:

When users tap on it, application moves to “Add new action” for users to choose the action they want to add.

List of action can be set up by administrators.



(3) Tree log button:

This button will help users to review the list of actions of planted tree.

(4) Photo button:

This button helps users to capture pictures of planted tree.




When users tap on it, application open the camera application of the telephone then save the picture into the corresponding gallery

(5) Status button:

This button will show the status of the action.

(6) Done and Not done button:

If status is:

-  : Action has not completed
-  : Action completed (users can choose only this status to complete the action).
-  : Action did not complete (the time passed but still has not completed). Application will automatically mark this status.

(7) Action information:

This element shows the action’s information.

6.12. Tree’s planting process - Add New Action

6.12.1. Requirement

- This screen will show whenever users tap on “Action” button in Planting process screen.

6.12.2. Interface mock-up

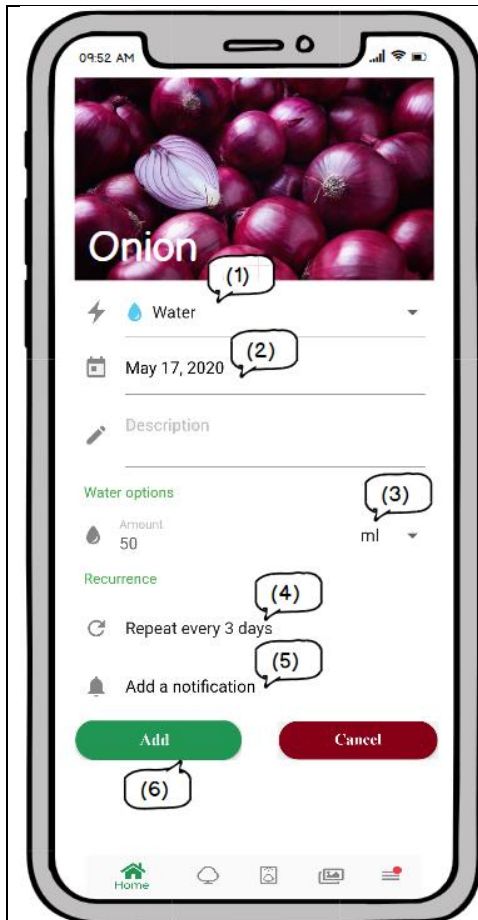


Figure 6.12.1 Add new action screen

(1) **Action type:**

This element shows the list of types of action. Users can choose one type in this combo-box

- Water
- Nutrients
- Repellent
- Transplant
- Trim
- Harvest
- Declare Death

Figure 6.12.2 Action type

(2) **Action start date:**

This element shows the start date of action. Users can tap on this to choose the date.

(3) **Amount information:**

This element shows measure unit and amount which is suitable action. Application will advise this information for users but users can tap on this to input other amount or change the measure unit (change from ml to l). For other type of action (ex: nutrients), measure unit will change automatically to others which is use for this type (ex: change from ml to gr for nutrients).

(4) **Recurrence:**

This element helps to users to define the recurrence of action (ex: the action will repeat in 3 days => recurrence = “repeat every 3 days”). Users can tap on it to change the recurrence. When the recurrence is set, application will notify automatically to users on the day that is set before.

(5) **Add a notification:**

This element helps users to add and set up manually the notification for the action.

(6) **Add/Cancel button:**

- Add button:

When users tap on this, application will save the current action's information and move to the **Planting Process** screen.

- Cancel button:

When users tap on this, application will remove the current tree's planting information and back to the Garden planting screen.

6.13. Gallery - List of Gallery

6.13.1. Requirement

This screen will show whenever users tap on “Gallery” button in Home screen.

6.13.2. Interface mock-up

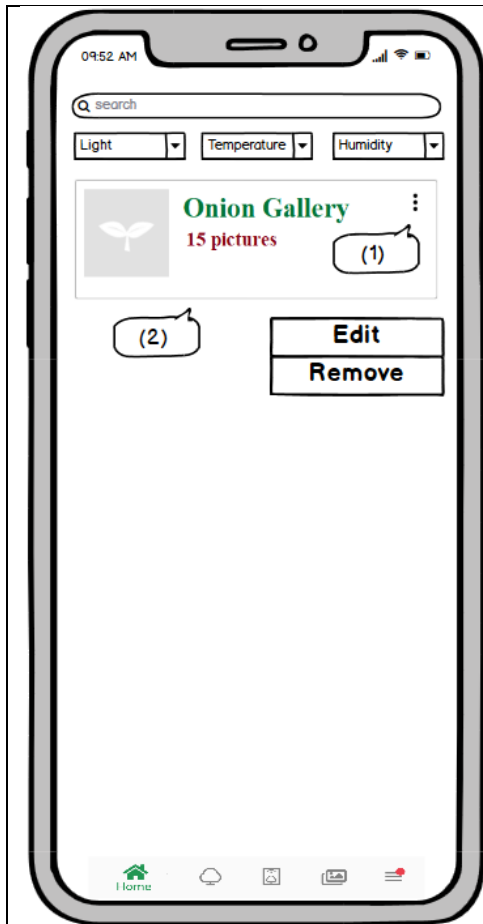


Figure 6.13 List of Gallery screen

(1) More buttons:

When users tap on this element, it will show the list of buttons:

- **Edit button:** This function allows users to edit Gallery's name.

- **Remove button:** This function allows users to remove Gallery. When users tap on this, the application will ask users again for confirmation, then remove the gallery.

(2) Gallery information:

This is a list of galleries, it shows short information of the gallery. The data in list shows base on the search value and filter value that Users input. If these values are null, it will get all gallery in the application. When users tap on this element, the application will move to **Gallery Detail** screen with the information of selected Gallery

6.14. Gallery - Gallery detail

6.14.1. Requirement

This screen will show whenever users tap on "Gallery information" button in List of Gallery screen.

6.14.2. Interface mock-up

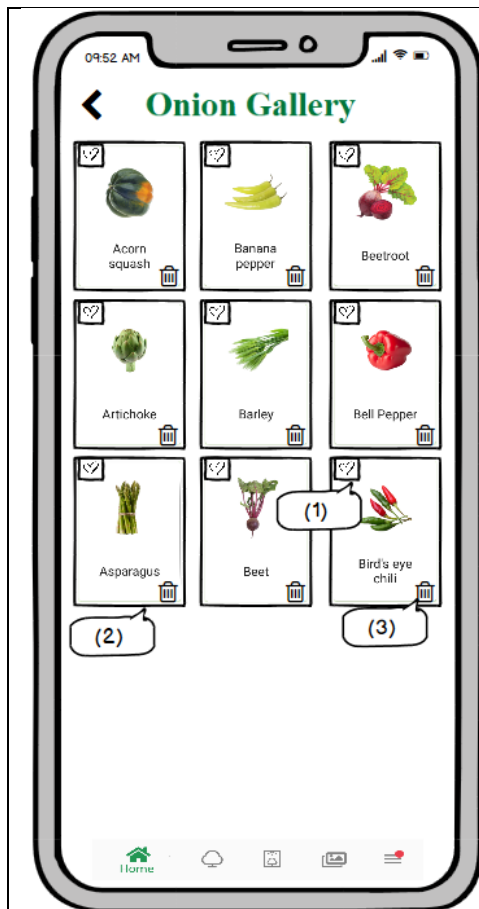


Figure 6.14 Gallery Detail screen

(1) Favourite picture:

This is a function to help users to pick the picture that users like most. User can tap more on this element to increase the favourite level.

(2) Picture:

This element will show all of picture in the gallery. It will sort by favourite.

(3) Remove picture:

This element will help users to delete the selected picture. When users tap on this, application will ask for user's confirmation. If "Yes", application deletes this picture.

6.15. Support channel

6.15.1. Requirement

This screen will show whenever users tap on "Contact us" button in More button screen.

6.15.2. Interface mock-up

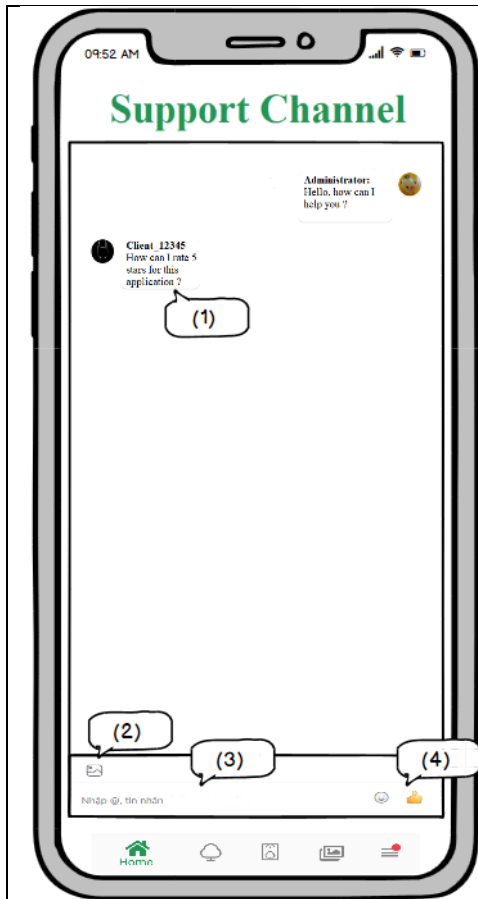


Figure 6.15 Support channel screen

(1) **Sent message:**

This is message between users and administrator.
Application must save these messages to keep track message history for 1 years.

(2) **Attach picture:**

This element let users send a picture in their telephone / laptop / PC or capture a new picture and send it via message.

(3) **Input message:**

This element let users to input a message and then send it to administrator via OK button.

(4) **Emotion icon and Like icon:**

This element let users to send a emotion icon or like icon.

6.16. Administrator - User management

6.16.1. Requirement

This screen will show whenever users tap on “Setting” button in More button screen.
User tab will show first as default.

6.16.2. Interface mock-up

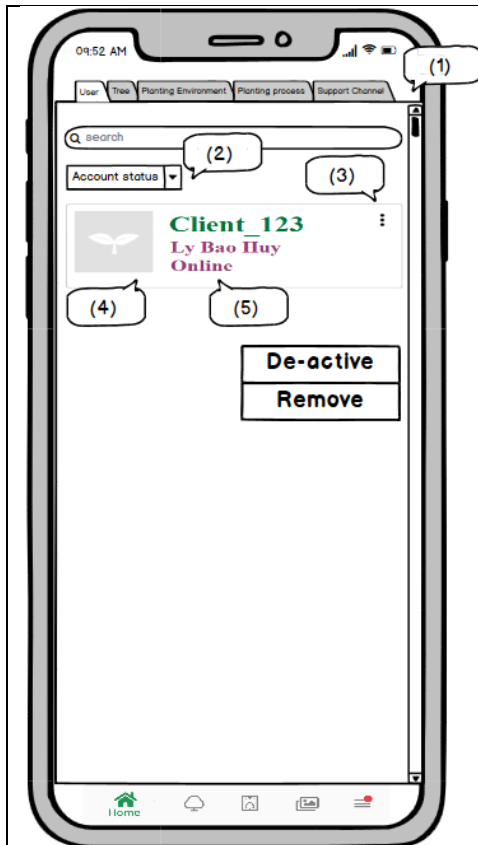


Figure 6.16 Administrator - User management screen

(1) **Administrator Tab:**

There are some tabs doing administrator functions:

- **User:** Use to manage Users in the application
 - **Planting Environment:** Use to set up master data of planting environment for the application
 - **Planting Process:** Use to set up master data of planting process for the application
 - **Support Channel:** Use to contact with clients.
 - **Reports:** Some reports to support admin to have an overview of the application
- Admin can tap on the tab they want to perform an action to load corresponding screen.

(2) **Account status:**

This element let admins filter the list of users to show. It includes:

- De-active
- Online
- Offline

(3) **More button:**

When users tap on this element, it will show the list of buttons:

- **De-active:** This function allows admin to de-active users in case of idling for a long time.
- **Remove button:** This function allows admins to remove Users. When admins tap on this, the application will ask admins again for confirmation, then remove the Users.

(4) **User's avata picture:**

This element shows user's avata picture

(5) **User's status:**

This element shows user's status. It includes:

- Online
- Offline
- De-active

6.17. Administrator – List of Tree management

6.17.1. Requirement

This screen will show whenever admins tap on “Tree” tab in Tab list in Administrator screen.

6.17.2. Interface mock-up

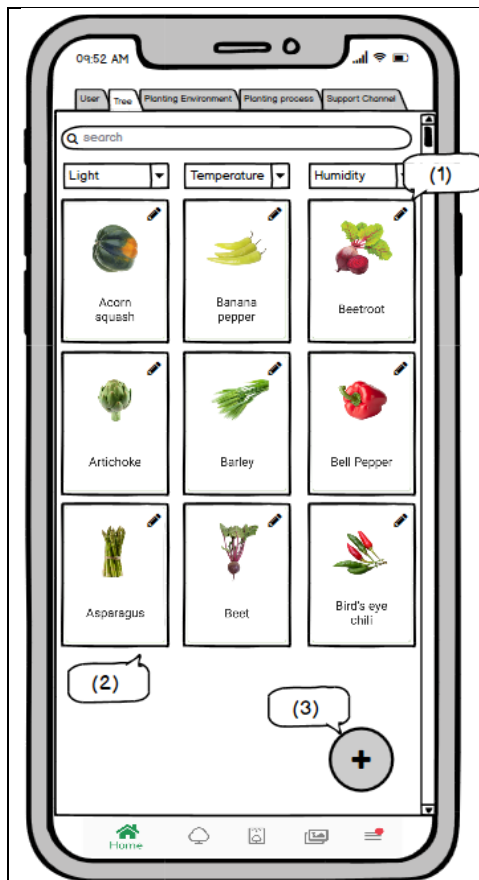


Figure 6.17 Administrator - List of Trees management screen

(1) Edit tree's information:

This element let admins edit tree's information. When user tap on this, the application will move to "Tree Detail" screen with the data of selected tree.

(2) Account status:

This is a list of trees in the application. The data will display base on Search values and Filter values.

(3) Add new Tree button:

This element let admins create a new tree in application. When users tap on this element, the application moves to "Tree Detail" screen.

6.18. Administrator – Add new tree's detail

6.18.1. Requirement

This screen will show whenever admins tap on "Add new tree" button or Edit tree's information button in Tree tab in Administrator screen.

In case admins tap on Edit tree's information button, Delete button will appear in Tree's detail screen for user to delete existed tree.

6.18.2. Interface mock-up

Figure 6.18 Administrator – Add new tree's detail screen

(1) **Comparison with and Comparison against:**

This element let admins choose list of trees that in comparison with new tree or comparison against. When admins tap on this, the application will move to “Search” screen for users choose a tree

(2) **Picture upload:**

This element let admins upload a picture for new tree. When user tap on this, the application will open mini upload screen

(3) **Gemination, vegetative, flowering and harvest time:**

This element let admins choose a time for each stage of planting. It calculates by number of days from previous step. Example:

- Start date = 01/06/2020

- Gemination time = 3 days => Gemination date = Start date + 3 days = 04/06/2020

- Vegetative time = 3 days => Vegetative date = Gemination date + 3 days = 07/06/2020.

(4) **Temperature Combo-box:**

This element let admins choose a temperature which is the most suitable for new tree. It includes

- Hot
- Cold
- Mild

- **Input degree:** if admins choose this value, application will show a mini screen for admins to input exactly the degree of temperature.

(5) **Humidity Combo-box:**

This element let admins choose a Humidity which is the most suitable for new tree. It includes

- High
- Low
- Medium
- Wet

(6) **Picture upload:**

This element let admins choose a Garden type which is the most suitable for new tree. It includes

- Indoor
- Outdoor

(7) **Light combo-box:**

This element let admins choose a light which is the most suitable for new tree. It only shows if Garden type is Indoor and it includes LED, LEC, HPS, CFL, T5...

(8) **Submit and Cancel button:**

This element let admins choose a light which is the most suitable for new tree. It only shows if Garden type is Indoor and it includes LED, LEC, HPS, CFL, T5...

- Submit button:

When users tap on this, application will save the current

tree's information and move to the **List of tree management** screen.

- Cancel button:

When users tap on this, application will remove the current tree's information and back to the **List of tree management** screen.

6.19. Administrator Planting environment management - Create & modify light

6.19.1. Requirement

This screen will show whenever admins tap on “Humidity” tab in Planting Environment tab in Administrator screen.

6.19.2. Interface mock-up

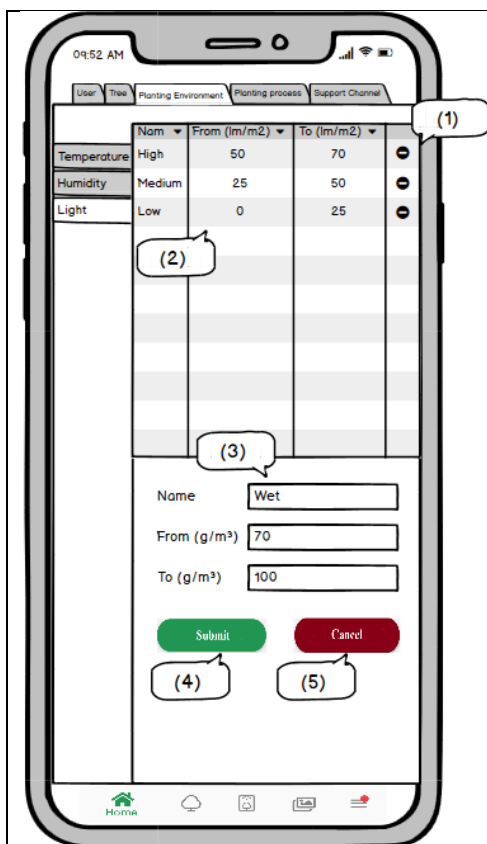


Figure 6.19 Administrator – Create & modify Light screen

(1) **Delete Light:**

This element let admins delete the selected light record. When admins tap on this, the application will show mini screen for admin's confirmation. If “Yes”, delete this record from the application.

(2) **Light data:**

This is light data. Admins can tap on the row that they want to modify and the data will load into below textboxes.

(3) **Light textboxes:**

The data of these textboxes will load if admins tap on a record in the above table. If not, it is blank and admins can input new record into that.

(4) **Submit button:**

When admins tap on this, the application will check if the data in textboxes exists or not, if it exists, application will update the exists data, if it does not exist, insert new data and save it into the application.

(5) **Cancel button:**

Clear all data in all textboxes above

6.20. Administrator Planting environment management - Create & modify humidity

6.20.1. Requirement

This screen will show whenever admins tap on “Humidity” tab in Planting Environment tab in Administrator screen.

6.20.2. Interface mock-up

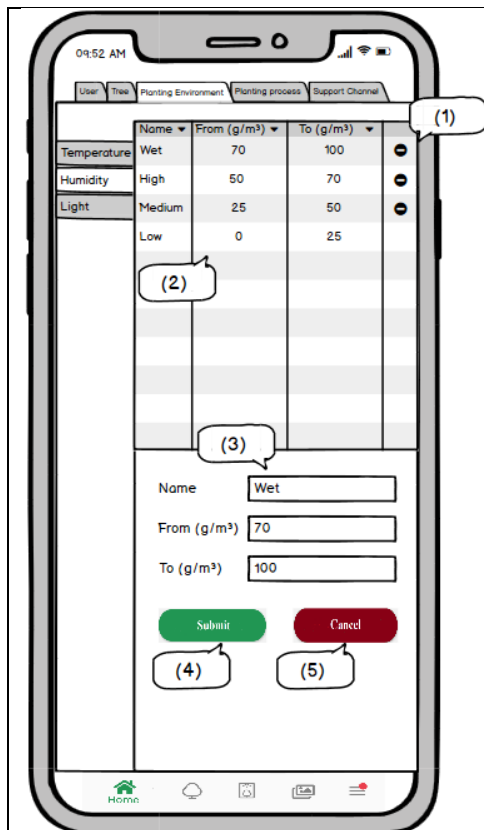


Figure 6.20 Administrator – Create & modify Humidity screen

(1) Delete Humidity:

This element let admins delete the selected humidity record. When admins tap on this, the application will show mini screen for admin's confirmation. If "Yes", delete this record from the application.

(2) Humidity data:

This is humidity data. Admins can tap on the row that they want to modify and the data will load into below textboxes.

(3) Humidity textboxes:

The data of these textboxes will load if admins tap on a record in the above table. If not, it is blank and admins can input new record into that.

(4) Submit button:

When admins tap on this, the application will check if the data in textboxes exists or not, if it exists, application will update the exists data, if it does not exist, insert new data and save it into the application.

(5) Cancel button:

Clear all data in all textboxes above

6.21. Administrator Planting environment management -Create & modify temperature

6.21.1. Requirement

This screen will show whenever admins tap on "Temperature" tab in Planting Environment tab in Administrator screen.

6.21.2. Interface mock-up

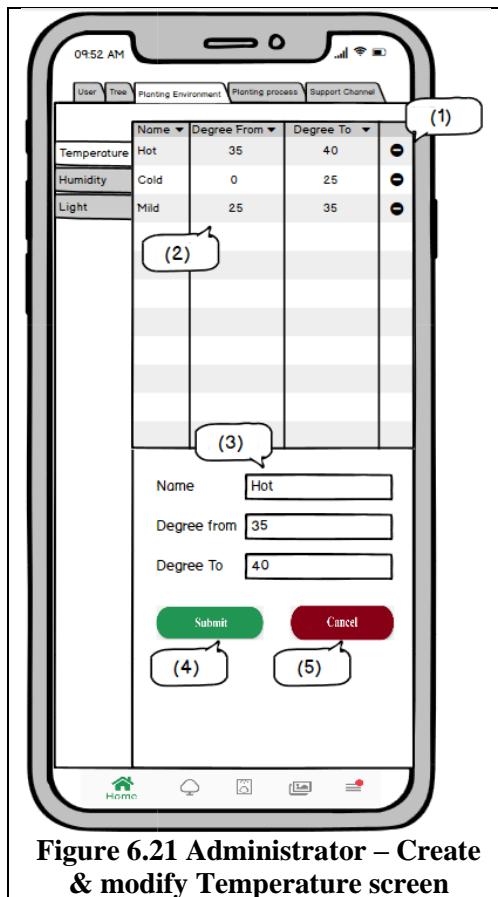


Figure 6.21 Administrator – Create & modify Temperature screen

(1) Delete temperature:

This element let admins delete the selected temperature record. When admins tap on this, the application will show mini screen for admin's confirmation. If "Yes", delete this record from the application.

(2) Temperature data:

This is temperature data. Admins can tap on the row that they want to modify and the data will load into below textboxes.

(3) Temperature textboxes:

The data of these textboxes will load if admins tap on a record in the above table. If not, it is blank and admins can input new record into that.

(4) Submit button:

When admins tap on this, the application will check if the data in textboxes exists or not, if it exists, application will update the exists data, if it does not exist, insert new data and save it into the application.

(5) Cancel button:

Clear all data in all textboxes above

6.22. Administrator Tree's planting process management

6.22.1. Requirement

This screen will show whenever admins tap on Planting Process tab in Administrator screen.

6.22.2. Interface mock-up

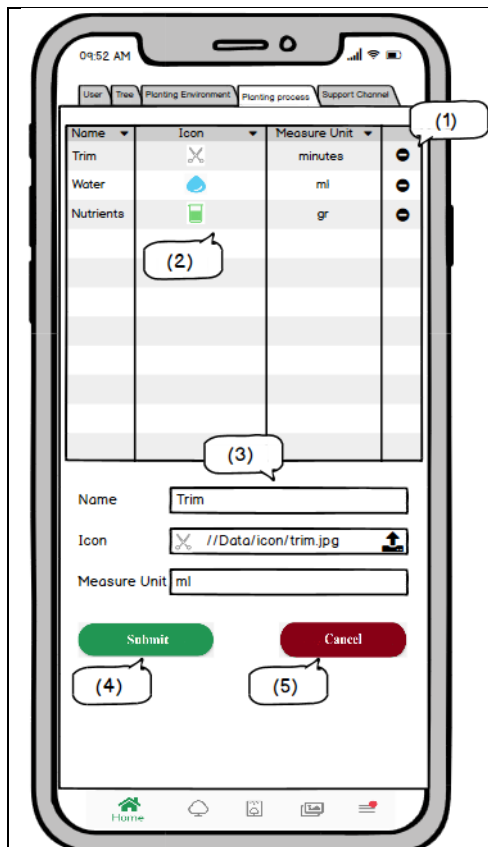


Figure 6.22 Administrator – Create & modify Action screen

(1) Delete action:

This element let admins delete the selected action record. When admins tap on this, the application will show mini screen for admin's confirmation. If "Yes", delete this record from the application.

(2) Action data:

This is action data. Admins can tap on the row that they want to modify and the data will load into below textboxes.

(3) Action textboxes:

The data of these textboxes will load if admins tap on a record in the above table. If not, it is blank and admins can input new record into that.

(4) Submit button:

When admins tap on this, the application will check if the data in textboxes exists or not, if it exists, application will update the exists data, if it does not exist, insert new data and save it into the application.

(5) Cancel button:

Clear all data in all textboxes above

6.23. Administrator - Support channel management

6.23.1. Requirement

This screen will show whenever admins tap on Support Channel tab in Administrator screen.

6.23.2. Interface mock-up

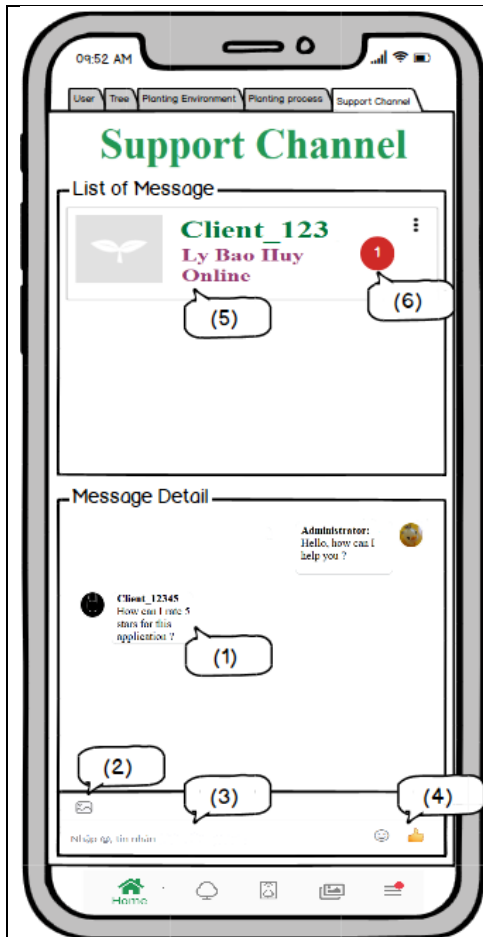


Figure 6.23 Administrator – Support channel screen

(1) Sent message:

This is message between users and administrator.
Application must save these messages to keep track message history for 1 years.

(2) Attach picture:

This element let users send a picture in their telephone / laptop / PC or capture a new picture and send it via message.

(3) Input message:

This element let users to input a message and then send it to administrator via OK button.

(4) Emotion icon and Like icon:

This element let users to send an emotion icon or like icon.

(5) Message list:

This element shows all conversation around 30 days from the current date between users and administrators. It is sorted by unread message and the last message time of conversation. When admins tap on conversation, the application will load messages of this conversation in the Message Detail.

(6) Unread message:

This element shows the number of unread messages between users and administrators

7. Testing and Results

7.1.Common:

7.1.1. Install:

Can the app install by .ipa (iOS) file?

Can the app install on Apple AppStore?

Can the app install by .apk (Android) file?

Can the app install on Google CH Play?

7.1.2. Uninstall:

Can the app remove from app icon?

Can the app remove from app settings?

7.1.3. Operations:

Can launch the app by tapping on app icon?

Can re-launch the app in background mode without reload?

Does app run good with wifi connection?

Does app run good with 3G/4G/5G connection?

What happens if there is a phone calls while app running?

What happens if there is a text message comes while app running?

What happens when the OS is updating?

Does app receive notifications in active mode?

Does app receive notifications in background mode?

Does the state as it before when re-active app in the background mode?

7.2.Tree information:

7.2.1. Search:

Can user search information about a specified tree?

Can user find out the guide for planting of the searched tree?

7.2.2. Favourite:

Can user add some trees to his favourite list?

Is the order of the trees sorted based on favourite? Is it different for each user?

7.3.Planting environment:

7.3.1. Set up garden:

Can user set size for his garden?

Can user set humidity for his garden?

Can user set temperature for his garden?

Can user set light for his garden?

Can user set location for his garden?

Recommend planting garden:

Does app suggest user about the best garden based on his inputted information?

7.3.2. Planting process:

Recommend planting process:

Does app suggest user about planting process based on his chosen tree?

7.3.3. Create personal planting process:

Can user make his own tree planting process manually?

Update existing process:

Can user update/modify the existing process whenever he wants?

7.4.Tree gallery:

7.4.1. Create tree gallery:

Can user create new tree gallery?

Can user add new image into his gallery by using phone's camera to capture?

Can user add image into his gallery by uploading a file from his phone?

7.4.2. Modify tree gallery:

Can user add more image to his existing gallery?

Can user update image in his existing gallery?

Can user delete image in his existing gallery?

7.5.Administrator page:

7.5.1. Admin communicates with user:

Can admin config push notification to specified user?

Can admin send text message to specified user?

Can admin send image to specified user?

7.5.2. User management:

Can admin lock/unlock a user account?

7.5.3. Tree management:

Can admin manage tree list?

7.5.4. Planting process management:

Can admin manage tree planting process?

7.5.5. Tree gallery management:

Can admin manage gallery of trees?

7.6.Non-functionals:

7.6.1. Performance:

How much time the app starts up?

Check battery life and heat of the phone while using the app.

Check how the phone memory increases while using the app.

When the app running parallel with other apps, attempt to switching app to make sure no problem occurs.

The app must not take too much time while loading data.

The app server can handle at least 50 concurrent users.

7.6.2. Usability:

How easy is it for a customer to use?

7.6.3. Availability:

Is the application available 24/7?

7.6.4. Maintainability:

How easy is it for maintenance?

7.6.5. Security:

Are user's profile and data protected?

8. Bibliography

- Growing plant with JANE (JANE) application
- Gardroid application
- Planter application
- Planting plan application