**HCI Assignment Part 2**

**Final Design of a SmartGarden App**

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**Executive Summary / Abstract**

The purpose of this report is to highlight the concepts and functionality of the design of the garden application created and to explain to the graphical designers how to create the application with user interaction of the application in mind.

This report provides an analysis of user needs and tasks, which the design of the application takes into account and shows the specific user interactions with the application to meet the needs of the users and their specified tasks. This report will allow the graphical designers to understand how to develop the application based on the specific requirements, sensor inputs, REMIT 10 patented smart protocols and how users interact with the application to display the actions of the application based on these interactions.

**Introduction**

With an emerging market for integrated control and monitoring of ‘smart-gardens’, REMIT 10 Inc, an international gardening-supplies company, is exploring the option to provide an application which interacts with smart-gardens including small hydroponic centres. Through the use of smart protocols patented by REMIT 10, the application is intended to make use of a wide range of garden sensors and actuators installed in a user’s garden that detect factors such as temperature, rainfall and humidity. By using the information provided from these sensors, the application will allow users to interact, control, monitor and maintain their gardens in a smarter and more innovative way providing REMIT 10 with a significant competitive advantage.

The purpose of this report is to provide a comprehensive explanation of both the concepts and the functionality of the finalised design by Better Solutions™ for the REMIT 10 Inc. SmartGarden Application. The report provides a summarised description of the user needs and tasks based on an intensified analysis of the key users; categorised into hobbyists, busy homeowners and small-scale horticulturalists. This was further developed from the analysis used to produce the sketch-based design solutions in the project’s initial design process phase. The key characteristics of these three user categories have been evaluated and from these multiple examples of user scenarios were developed in order to pinpoint the fundamental tasks that the application users would want to carry out. Based on these user tasks, a set of necessary functions specific to the user interface were developed. These functions were categorised and further analysed by determining their frequency and importance, which was then used to determine the layout of the final user interface design in order to guarantee ease of use for the application users. Through the use of figures and accompanying annotations and text descriptions, the report provides an unambiguous description of the final design to show exactly how the user will interact with the application including the multiple states and how they can be reached.

This finalised design by Better Solutions™ satisfies both the needs and wants of the potential varied application users, as well as the requirements of REMIT 10 Inc. The design puts user requirements first, while maintaining a simple and functional application.

**User Categories - Key Characteristics:**

We have identified the following three types of users for the SmartGarden App.

***Hobbyist***

* Loves being in the garden, all day over the weekend and every evening
* Has different garden regions based on different plant needs
* Has knowledge about gardening
* Willing to make investments on equipments to get the best garden (more sensors)

***Busy homeowners***

* Working all day so can’t maintain garden
* Wants minimal work involved to maintain a garden
* Needs reminders to weed/harvest
* Has limited knowledge about gardening
* May only have lawn to look after so only interested in watering and mowing

***Small scale horticulturalist***

* Has greenhouse so wants different regions
* Looking to minimise usage and bills - wants to view where resources are being used
* Wants to set multiple timers at once
* Owns a larger garden area so has more to look after

**User examples**

***Hobbyist gardener 1: Greg the Greeny***

I grow my own veges at home and I am cautious about how much water I use when watering my garden. I have researched that early morning and in the evening are the best times to water the garden in order to save as much water as possible, so I want my garden to automatically water at those set times. But since different veges need different amounts of water, I want to be able to separate my garden into regions and water them independently. For example, I want to water my lettuces twice a day at 6:00am and 6:00pm and my potatoes only once overnight between 10:30pm and 11:00pm.

***Hobbyist gardener 2: Mary the Retiree***

I love gardening but I am getting too old to be out in the garden all the time, especially in extreme weather conditions. I recently spent a fair bit of money on some decent sensors to measure the moisture content of the soil and want to make use of them. I want to be able to water my garden with my sprinklers from the comfort of my living room if the soil is too dry. For example if it has been extremely hot that day and the soil is dry then the plants will need to receive more water than usual to keep them hydrated at all times. I also have pretty flowers and need to know exactly when I planted or last pruned them so that I can prune them again at the right time so I don’t risk damaging them.

***Busy homeowner 1: Susan the Mother of Three***

I am a busy mother of three and since I’m a stay at home mum I thought I would have lots of time to garden but since my third was just born, I’ve just been too busy looking after the youngest two while the oldest is at school. I don’t know much about best harvesting times but I’ve planted carrots and potatoes, so it would be handy to have a log to keep track of when I planted things and when they might be ready, I would like a reminder to harvest them. I also want to set the day that I get reminded so that it works around my busy schedule.

***Busy homeowner 2: Jimmy the Working Class Man***

Since I’m at work all day and with the kids all evening, I don’t have time to maintain my garden myself. But I want to keep my lawn looking luscious and since my kids enjoy playing outside with the pretty flowers, I’d like to keep them looking nice as well. So I want to make sure my garden is watered automatically during the week when it needs it, without having to remember to do it myself since as I said I am a very busy man and don’t have much time to look after my garden so it would be great if it could be watered automatically at certain times and remind me when I actually do have to get out there and do stuff like weeding and harvesting. I’d also like to get the kids more involved in the gardening side of things to get them outside, so some information about the different types of plants and how to plant them would be great so they can learn about it properly.

***Small scale horticulturalist 1: Jessica the Flower Extraordinaire***

I grow exotic tropical flowers to sell at markets and they have very a very specific climate that is not found in New Zealand. For example I have exotic flowers from Spain in my greenhouse and they need to be kept in a humid atmosphere at all times and can only survive at a temperature of 25°C and over, so in the winter I need my heaters to be activated. Along with my greenhouse, I have a personal vegetable garden out the back of my house so I’d like to be able to control the sprinklers and other components in that garden and the greenhouse separately.

***Small scale horticulturalist 2: Megan the Entrepreneur***

I have been growing my plants in a hydroponic fashion for some time now since it is a healthier way to grow food, and I’m wondering if my garden is using too much water. It’s a pretty expensive process at the moment and I want to reduce my lighting and heating bill, water consumption and plant feed. I have a big shed with different plants in specific areas that need different amounts of water and different nutrients. I want my plants to get the exact right amount of water that they need so the water consumption is at a minimum, and I would like to be able to see a summary of the energy and water use for each day.

**General user tasks**

***Hobbyist Gardeners***

* Want to ensure that the different zones in the garden are watered individually with the varying amounts that the plants require and at certain times.
* Want sprinklers to turn on by themselves if the soil is dry.
* Want to track garden activities and create to-do lists with reminders of when to weed/prune flowers etc.
* Want to be able to set what time sprinklers will turn on and off.

***Busy Home Owners***

* Want to make sure the garden is watered automatically when it needs it.
* Want reminders to harvest plants when they might be ready but want to set specific day to get reminder.
* Wants notifications/tips for when to start growing plants throughout the year/season.

***Small-scale Horticulturalists***

* Want to make sure the humidity and temperature inside the greenhouse stays at a good level.
* Want to turn on sprinklers at certain times for multiple zones individually and all at once.
* Looking to be efficient with watering/plant feeding/lighting and heating, to minimise production costs.

**Categorising necessary UI functions based on user tasks**

***Water - useful for all three user types:***

1. Set/view timer for sprinklers to turn on at a specific time and to turn off at another specific time and also automatically turn itself off for set conditions (ie. turn off sprinkler when moisture above 60%).
2. Control the level of nutrient feeds in water system.
3. Set timer for feeders to turn on at specific time and turn off once certain nutrient amount has been distributed into the water.

***Air - useful for small-scale horticulturalists:***

1. Turn all heaters on and off so the area stays in a certain range of temperature .
2. Adjust the heating level.

***Light - useful for small-scale horticulturalists:***

1. Set/view timer for lights to turn on at a specific time and turn off at another specific time.
2. Control intensity of the lights set based on conditions.

***Documentation and Advice - useful for busy homeowners:***

1. Gardening tips - guides e.g. what time of year to plant specific plants, what time of the year to prune plants.
2. Log of specific plants - recognise certain words in reminder titles and link to information from Gardening Tips section about that plant.
3. Get reminders of specific tasks entered by the user displayed on the homepage. View a summary of temperature, humidity and rainfall for each day, also for each additional sensor.

***Zones - useful for hobbyists and small-scale horticulturalists:***

1. Able to control timers for sprinklers, lights, windows, feeders and heaters separately for different regions in garden.
2. Set sprinklers/lights/etc to turn on/off for all zones at once or individually.

**UI Task Frequency Analysis**

The following table shows each UI task identified previously, ranked on how frequently they will be carried out and how important they are to users:

|  |  |  |
| --- | --- | --- |
| **~Tasks~** | **Less important** | **More important** |
| **Infrequent** | W2. | A2, L2, D1, D2. |
| **Frequent** | W3, A1. | W1, L1, D3, H4, Z1, Z2. |

**Final Design Explanation**

By analysing the user categories, and both the user and UI tasks, the best design concepts have been selected and combined to produce the design. The design explanation below indicates which user category it has been implemented for, and similarly the UI tasks have been referenced for specific design ideas.

**HOME (H1)**

The Home screen will show a list of reminders, information and suggestions. The reminder items (H02) are reminders that the user has logged into the application through the Log section. When clicked on, takes the user to the corresponding L3 page in the Log section, and the reminder item itself can be swiped away horizontally by the user. These are removed from the Home screen one week after the reminder date if the user has not removed them themselves. There is also an ‘add reminder’ button which takes the user to the Log section to add a new reminder (H06).

The information items (H04) show an occasional extreme weather happening, eg if rainfall was over 50mm yesterday show the user a small item of info about that. These again cannot be clicked on, only swiped away horizontally on the information item itself by the user. The suggestions (H05) (eg “Now would be a good time to plant potatoes") are able to be clicked on for more information about that specific plant via the Tips section. These less significant items are removed from the Home screen after a day or can be removed by the user by swiping horizontally on the suggestion itself.

This has been implemented primarily for the busy homeowners and hobbyist gardeners so that they can have a look at what needs to be done quickly.

**MENU (H01)**

There will be a sidebar menu present on every screen in the application (H01), which displays a picture of each section and the corresponding name that can be clicked on. The order of the sections in the sidebar menu have been determined through the task frequency analysis, making the most frequently used sections closer to the top and therefore easier to access.

The Home section takes users to the H1 page when the user clicks on the section.

The Timers section takes the users to the T1 page when the user clicks on the section.

The Logs section takes the user to the L1 page when the user clicks on the section.

The Tips page takes the user to the G1 page when the user clicks on the section.

The current section is highlighted to show what page the user is on. This has been implemented so that the user knows which section of the application that they are currently using.

**TIMERS**

*This section satisfies UI tasks W1, W2, W3, A1, A2, L1, L2, Z1 and Z2, and is helpful for all three types of users.*

**Timers (T1)**

The timer overview page shows headings of the types of timers and how many of each component type (T101) is created by the user. This can be expanded/retracted (T102) to show all the timers created of this type. When opened each timer shows the zones and times activated (T103). Each of the timers also has a feature which highlights the timers that are activated during this time (T104).

**Timer details (T2)**

Each of the timer in this section (T103) can be clicked on by the user, taking the user to T2 page to show more details about the timer. This page also has options to edit (T204) and delete (T205) the selected timer. This can be closed by the user clicking the close icon on the top right corner, which takes the user back to T1. At the bottom of the screen there is a button which takes the user to the relevant T3-T6 page. If the page is longer than the screen, this button (T105) will stay at the bottom of the user’s screen and a fade effect (T106) will be seen on the screen.  
  
**New Timer** **(T3-T6)**

On the New Timer page T(3/4/5/6), All the fields are required, except those fields under conditions (these can be blank leaving ‘--’ on the fields). For the field Type (T301) when clicked a combo box drop down indicating the user to select from sprinkler, lighting, heater and feeder. For the fields Zone (T302) and Days (T304) a multiple selection combo box will appear on the page as well as a done button to indicate the user finishing the selection. For the Turn on and Turn off fields (T303) the user will click on each box for a pop-up and scroll vertically to select the time they want, once finished they can click done to indicate the user finishing the selection. The repeat weekly checkbox (T305) will activate this timer to be a weekly timer when the user clicks on the checkbox instead of a one off timer. The Save button (T308) will only activate once all the required fields (Type, Zone, Turn on/off, Days) are filled out by the user. When the user clicks on the Cancel button (T309) or one of the menu items (H01) a pop-up will appear to make sure the user wants to leave page (F09), as when the user leaves the page all the data in the fields will be lost. If the user clicks ‘Stay’, the user will stay on the New Timer page (T1-T6). If the user clicks ‘Leave’, the application will redirect the user to the selected menu item’s screen, or the page T1 if the ‘Cancel’ button is clicked. There are different fields and certain conditions for the 4 different types of timers, which are shown in pages T3-T6.

**LOG**

*This section satisfies UI tasks D2 and D3, and is helpful mainly for hobbyist gardeners.*

**Calendar (L1)**

The Calendar page will show the current month (L101) on the top of the screen, and the user can view previous or upcoming months by clicking on the left or right icons (L102) on either side of the month. The current date is highlighted by being circled with a black outline (L105). The users can judge how many events and reminders are happening / have happened on different days by the level that the days are shaded (L104), using 10 different shades from white being no events/reminders occurring on that day, to black indicating 10+ events/reminders occurring on that day. If the user clicks on a specific date on the calendar, it will take them to the page for that day (L2). The ‘Add New’ button (L106) will take the user to the to the ‘New Event’ page (L4) instead of ‘New Reminder’ as a default.

**Day (L2)**

The Day page will show the date (L201) the user selected from the Calendar page (L1), and the user can view previous or upcoming days by clicking the left and right icons (L202). When the user clicks the Log menu item it will take the user back to the Calendar page (L1), for the other menu items it will take the user to each of their respective main screens (H1, T1, G1). The Day page shows statistics for the selected day (L204), which is only available for previous days and the current date. Statistics of Temperature, Humidity and Rainfall (L204) are shown always, and a ‘more’ option (L203) is available for users with extra sensors (ie, moisture sensor) to show data from those sensors, the icon will toggle between more and less for those users. When less is clicked it will go back to showing only the default three statistics. The page will also include the events and reminders logged for that particular day in the order of what the user first logged (L205, L206). When the user clicks on a particular logged item, a window will pop-up on screen (L3) showing all the details (L304, L305) of the selected logged item (L303). The user can also edit (L307) the item which takes the user to page L4 with the title ‘Edit Event/Reminder’ instead of ‘New Event/Reminder’, or delete (L308) the item which displays a pop-up asking the user if they’re sure they wish to delete. They can close this page using the (x) icon (L302) which will take them back to the day page (L2).

**New Event / New Reminder (L4)**

On the New Event and New Reminder page all the fields are required, except the details fields (L404) which the user can leave blank. Until filling these required fields, the save button (L408) is deactivated. When the required fields are filled out but the user decides to create a new reminder along with the event (L412), the save button (L408) deactivates itself again until the required fields are filled out. A delete icon (L405) will show on the right side of the new reminder in case the user accidentally added the reminder. The ‘Add Another Reminder’ button (L412) will be displayed below the reminders that have already been added.

The fields for Type, Title and Details are entered using a keyboard that will pop-up on screen once these fields are clicked on. When the user is done entering these fields they can vertically swipe down on the screen which will remove keyboard from the screen. When the Date field is clicked on a calendar will pop-up on the screen for the user to enter the date they want the event or reminder to be held on, the default is the current date.

When the Title is entered in the reminder section, an information icon (L407) may pop-up depending on the title. The application itself will search its gardening tips database for text it recognises like plant names. Users can click on this text which will lead the user to the its corresponding gardening tips information page (G4). When the user exits out of this page using the x icon, the user will still be in the new event/new reminder page with their entered data intact. When the user clicks on the ‘Cancel’ button (L409) or one of the menu items (H01), a pop-up will appear to make sure the user wants to leave page, as when the user leaves the page all the data in the fields will be lost. If the user clicks ‘Stay’, the user will stay on the New Events or the New Reminder page. If the user clicks ‘Leave’, the application will redirect the user to the selected menu item screen (H1, T1, L1, G1) or the Log Calendar page (L1) if ‘Cancel’ was clicked.

**GARDENING TIPS**

*This section satisfies UI task D1 and is helpful mainly for busy homeowners.*

The user can use the search bar to get the information they want faster, by clicking on this a keyboard will pop-up for the user to input their search item, they can remove the keyboard off the screen by swiping down on the screen. The application will then use its database to find the string patterns that matches in the title based what the user is searching, the application will do this automatically as the user is typing as updates the search results automatically on the screen. The user vertically scrolls on the page until they find the information they want or reach the bottom of the page. When they find the information they want the user can click on this title/between its partition to enter details about the title selected, which can lead them to another page, narrowing down the information they want or lead them to a pop-up about the title that they selected which gives them more information about the topic, when the x icon is clicked the user will go back to the previous page before the topic was selected. When the user clicks the Tips menu item it will take the user back to the main gardening tips page (G1), for the other menu items it will take the user to each of their respective main screens (H1, T1, L1).

**Annotated Final Design**

After analysis of the users and user tasks, we have integrated all the necessary UI functions into the final design of our SmartGarden app.

**HOME**

|  |  |
| --- | --- |
| **H1** |  |

**Annotations for H:**

**Home (H1)**

1. Side menu - accessible on every screen of the app, section is shaded when user is using that section of the app. Click on different icons to access the four sections of the app.
2. Reminders can be clicked on, takes the user to the corresponding L3 page in the Log section (when exited goes back to home screen).
3. The items that have an information circle on their right hand side are able to be clicked on by the user to access more relevant information.
4. Random pieces of information to do with statistics, can be swiped away horizontally.
5. Suggestions, can be clicked on, takes the user to corresponding G4 page in the Gardening Tips section (when exited goes back to home screen).
6. “Add Reminder” button (F02) takes user to New Reminder page L5 in the Log section.
7. When lots of items on home page, user can scroll through. The items fade when they slide behind the button (F03).

**TIMERS**

|  |  |
| --- | --- |
| **T1** |  |
| **T2** |  |
| **T3** |  |
| **T4** |  |
| **T5** |  |
| **T6** |  |

**Annotations for T1 - T6:**

**Timers (T1)**

1. Component name, also has number of timers that have been created already for that component beside it.
2. Expand/retract buttons to so the user can view different timers sorted by the component type. Minimises clutter. Default=retracted.
3. Each timer for that component is displayed when the respective component section is expanded. These individual timers can be clicked on to take the user to new timer page (T2).
4. Indicator of whether that timer is on at the current time (filled diamond) or off (empty diamond).
5. ‘Create New Timer’ button (F02), takes user to new timer page (T2).
6. When there is too much info to display on one screen, the user can scroll through it all. The content fades when it slides behind the “Create New Timer” button (F03).

**Timer Details (T2)**

1. Exit button, takes user back to page T1.
2. Component name and zone name displayed with relevant information (time, day(s), repeat weekly, and conditions (T203)).
3. Conditions are displayed if they were set when the timer was created - only relevant for certain components, and different components have different conditions.
4. Edit button (F02) takes user to similar screen to T3-T6, with header ‘Edit Timer’ in place of ‘New Timer’.
5. Delete button (F02) shows a pop-up (F09 style) saying ‘Are you sure you wish to delete?’ with yes/cancel buttons. ‘Cancel’ takes user back to editing the timer (T2), ‘Yes’ deletes timer and takes user back to T1.
6. Darker background fades out previous screen to focus the user on the current selected timer.

**New Sprinkler Timer (T3)**

1. Type of component is selected via single selection drop down menu (F05) and determines following features of creating a new timer for specific components - default=‘Sprinkler’
2. Zone is selected with a multi selection pop-up menu (F06) since the timer can be applied to multiple zones at once. Default=‘--’
3. Time selected to turn on and off via pop-up number scroller (F07). Default is ‘--’ in each section.
4. Days for the timer to operate selected via multi selection pop-up menu (F06). Default is blank.
5. Check boxes to activate repeat mode and certain conditions (F04) - default is unchecked.
6. Percentage selected via number scroller (F07) - min=0, max=100, default=‘--’
7. Conditions are different for each component and appear once the type of component has been selected. Default type is sprinkler so default conditions available correspond to the sprinkler type.
8. Save button (F02) saves timer, button is only available to be clicked by user when all fields filled out (F08 shows inactive vs active button).
9. Cancel button (F02) shows user a pop-up warning the user that they have not saved their timer if data was entered (F09).
10. ‘New Timer’ header stays in place at all times. Information below fades at the top if user able to scroll (ie more info than can fit on one screen).

**New Feeder Timer (T4)**

1. Nutrient level is set via the keyboard (F01), turning the feeder off when it has released this specified amount of nutrients.
2. No conditions available for feeder component so that section is not displayed.

**New Lighting Timer (T5)**

1. Intensity level of lights as a percentage is set via pop-up number scroller (F07) - min=0, max=100, default=‘--’.
2. Intensity level for condition of lights as a percentage is also set via pop-up number scroller (F07) - min=0, max=100, default=‘--’.
3. Number of minutes before end time to activate the adjustment of light intensity set via keyboard (F01). Default=‘--’

**New Heater Timer (T6)**

1. Temperature of heater set via keyboard (F01).
2. Maximum temperature of air for when to turn off the heater in condition set via keyboard (F01) default=‘--’.

**LOG**

|  |  |
| --- | --- |
| **L1** |  |
| **L2** |  |
| **L3** |  |
| **L4** |  |
| **L4** |  |
| **L4** |  |

**Annotations for L1 - L4:**

**Calendar (L1)**

1. Header of the main page of the Log section shows current selected month, default=current month.
2. Left and right arrow buttons allows the user to scroll through the log month by month.
3. Days of the week indicated by letters - starting on Monday ending with Sunday.
4. Days are shaded in by a circle with the shade dependent on how many events / reminders correspond to that day (light=not many events, dark=many events (with date number changing to white when shade gets too dark), shading scale F11).
5. Current date has a circle around it to indicate to the user that it is today’s date.
6. “Add New” button (F02) takes the user to L4 (default ‘Type’=Event).

**Day (L2)**

1. Day and date that the user has clicked on from the calendar view in L1. This stays at the top on the screen when scrolling.
2. Left and right arrow buttons allows the user to scroll through the log day by day.
3. The ‘more’ button is available to those users that have configured more sensors than the default 3 of temperature, humidity and rainfall. When clicked, expands Statistics section to show the average daily statistics about moisture and energy use as well. The ‘more’ changes to ‘less’ when clicked, and retracts when user clicks less.
4. Shows average daily statistics for days in the past in relation to current day. Statistics section not included for days in the future.
5. Events that the user has logged for the selected day are available and can be clicked on to take the user to the corresponding L3 page.
6. Reminders that the user has logged for the selected day are available and can be clicked on to take the user to the corresponding L3 page.

**Event/Reminder Details (L3)**

1. Darker background fades out previous screen to focus the user on the current selected event / reminder.
2. Exit button, takes user back to page L2.
3. Event / reminder title that the user has set is displayed at the top of the window.
4. Headings are underlined so they can be distinguished from the data that the user has previously put in.
5. Data that the user has previously put in.
6. User can scroll up or down through more information. Items fade when they slide behind the edit / delete buttons (F03).
7. Edit button (F02) edits the current event / reminder - takes the user to a page similar to L4 with heading ‘Edit Event’ / ‘Edit Reminder’.
8. Delete button (F02) shows a pop-up to the user (F09) asking if they’re sure they want to delete with yes/cancel buttons. ‘Cancel’ goes back to L3 and ‘Yes’ deletes the event / reminder and takes the user back to page L2.

**New Event / New Reminder (L4)**

1. Select ‘Event’ or ‘Reminder’ with a menu single selection (F05). The content the user may input changes depending on which type is selected. Default=‘Event’.
2. Title of the event / reminder entered by keyboard (F01).
3. Date of the Event / reminder selected via date pop-up (F10) default=today’s date
4. Details of the event entered by user on keyboard (F01) can be left blank.
5. Delete button appears once the user has selected to add a reminder, changes to this from L412.
6. A reminder can be made at the same time an event is created, the reminder section appears once ‘Add new reminder’ (L412) is clicked by the user.
7. When the reminder title is filled, an information icon will show up relating to what the user has written. When clicked, it will take the user to the corresponding gardening tips information pop-up similar to G4. Exiting this pop-up will return the user to the previous new event / reminder page.
8. Save button (F02) saves timer, button is only available to be clicked by user when all fields filled out (F08 shows inactive vs active button).
9. Cancel button (F02) shows user a pop-up (F09) warning the user that they have not saved their event / reminder if data was entered. If they choose to leave the page the data that the user has entered is lost.
10. User can scroll up or down. Items fade when they slide behind the save and cancel buttons (F03).
11. ‘New Event’ header remains at the top of the screen when scrolling.
12. When the user clicks ‘Add Another Reminder’ it will show a new reminder field similar to L406. ‘Add New Reminder’ will appear as the last item on the screen.
13. User can scroll up or down. Items fade when they slide behind the header (F03).

**GARDENING TIPS**

|  |  |
| --- | --- |
| **G1** |  |
| **G2** |  |
| **G3** | **garden.png** |
| **G4** |  |

**Annotations for G1 - G4:**

**Advice Categories (G1)**

1. Search bar. Clicking the search bar goes to keyboard (F01). Swiping down on screen will remove the keyboard.
2. User can scroll up or down. Items fade when they slide behind the header (F03).
3. The list of categories. Clicking on a category takes user to a similar screen to G3.
4. User can scroll but since there is no button at the bottom there is no need to fade out the bottom.
5. Header remains at the top of the screen when scrolling

**Searching (G2)**

1. Search bar. Clicking the search bar goes to keyboard (F01). Swiping down on screen will remove the keyboard.
2. Highlighted parts of the word the user is searching for in real time - a message saying ‘no results found’ is displayed if the key phrase that the user types has no matches.

**Information Sections (G3)**

1. User can scroll up and down, faded out the top as the list of guides scrolls behind the search bar.
2. Different information sections under a specific category chosen in G1. When clicked it takes the user to the corresponding G4 page.

**Specific Section (G4)**

1. Exit button, takes user back to the previous page G3.
2. Title of the guide chosen by the user in G3.
3. Darker background fades out previous screen to focus the user on the current selected guide.
4. User can scroll for more information, the top and bottom is faded out when more information follows (F03).

**Manual Features:**

|  |  |
| --- | --- |
| **F01** | Keyboard placement: Keyboard will be overlayed across the bottom of the screen. |
| **F02** | Buttons: Left unclicked, right clicked. |
| **F03** | Scrolling behind buttons: Items near the top or bottom of the screen will fade when more information follows. |
| **F04** | Checkboxes:  checkbox.png when unchecked, checkbox.png when checked |
| **F05** | Menu single selection: Pop-up, selecting one of the options closes the pop-up. |
| **F06** | Menu multi selection: Pop-up, able to select multiple items with select all selecting all items, which can later be deselected individually. Exit the pop-up by clicking the ‘done’ button. |
| **F07** | Number scroller: Pop-up, flicking up or down on the values will scroll through the values in the respective direction. |
| **F08** | Save buttons: Left inactive (unable to click), right active (able to click) |
| **F09** | Confirmation pop-ups: The background is greyed out. Must click leave or stay to exit pop-up |
| **F10** | Date selection: Clicking the date field results in a pop-up of the calendar, with the background grayed out. Selecting a date closes the pop-up. User can scroll through the months using the arrows.  calendar.png |
| **F11** | Shades of number of events on specific days (for log) |

**Conclusion**

The finalised design by the Better Solutions™ team for the REMIT 10 Inc. SmartGarden Application has been presented in this report. The design makes use of the smart protocols patented by REMIT 10 and has been designed around the three types of users identified - hobbyists, busy homeowners, and small-scale horticulturalists - and the importance and frequency of their required tasks.

Although the application has been designed with these three common user categories in mind, the design allows any potential customers of Remit 10 Inc to use the application to aid in maintaining the garden that they desire. The simple learnability of the application and the intuitive nature of the interface makes the application easy to use for both novice and expert users.

Included in the final design is a timers section for all users to set timers for the different components in their garden. This can be separated into zones which is useful for hobbyist gardeners and small-scale horticulturalists who have different plants in separated regions that need specific water or nutrient levels. The home screen is primarily for busy homeowners. They can view the home screen to see the reminders that they have set and what needs to be done for that day. A log section for the busy homeowners and hobbyist gardeners is included so that they can view their own reminders quickly from the home screen, and also edit them from the log section. Events can also be made in the log section so that the hobbyist gardeners can keep track of what they have planted in their garden. A summary of daily statistics received by the sensors has been included in the log section for small-scale horticulturalists so that they can view daily water usage and other sensor summaries. A gardening tips section has also been included for the busy homeowners who generally have limited knowledge about gardening. They can look up information about specific plants and techniques in the gardening tips section to improve their knowledge.

Through the use of annotated diagrams and corresponding text descriptions, the graphical designers who are developing the application will know exactly how the user interface will operate. Clear examples of users and their specifications show that we have incorporated specific user tasks demonstrating how the application will be used by real people once it has been produced.

Overall, Better Solutions™ has produced a design that puts users requirements first, while maintaining a simple and functional application. Through incorporating REMIT 10 Inc’s patented smart protocols, this application will provide the company with a competitive advantage in the emerging smart-garden market.