

Sprint Assignment 3 Report

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Introduction

As it was concluded in Milestone 2, our team decided to continue with the idea of a mobile application for seniors that will remind and warn them to take their medicine on time using notifications

The application will be connected wirelessly to a set of sensors that will be located in a pill box, and will keep notifying the user until the sensors detect activity. The application will also notify a caregiver or a guardian if no activity is detected for a predefined period of time. The application will also educate the patients about the medication taken by providing valuable information to them about the medicines. Those information will contain an illustration of the medication, the recommended intake frequency, the ingredients, the side-effects, what diseases it treats, etc.

We believe that our project will increase the effectiveness of pharmaceutical treatments by resolving the recurring problem of patients that forget to intake medications and by educating them at the same time.

The next step in the development of our mobile application will be the third sprint in which we plan to improve the first version of our software, improve the hardware and establish a connection between both. The software will be the skeleton of our application and will contain basic options such as a login page, a settings page and a reminder scheduler. For the hardware, we plan to create the best possible pillbox that will include two hall-effect sensors. The hardware will be able to detect if the box is open and communicate it to the mobile app through bluetooth.

Product Backlog

| Story ID | Story Title | Card | Story Point | Sprint | Status | Conversation | Confirmation |
|----------|--------------------------------|--|-------------|----------|-----------|--|---|
| BK-1 | sensor and microcontroller | <i>As a senior person, I want the medication box to be able to detect when I open the pill box, so that I can be reminded to take the medication</i> | 8 | Sprint 1 | Completed | 1. The sensors used are hall sensors 2. There will be an Arduino Uno 3. There will be two sensors | 1. The sensors can detect a magnetic field 2. The microcontroller can take data from the sensors 3. The sensors are in sync |
| BK-2 | skeleton | <i>As a senior, I want to be able to log into the Medication Taking Reminder app, check the information about my medication, allow my nurse to set the medication intake schedule, and input guardian contact information, so that I may reduce any possibility of missing my medication intake.</i> | 13 | Sprint 1 | Completed | 1. It is a prototype of our application. 2. it should have several button for those functions. | 1. Does it have a login button? 2. Does it have a check schedule button? 3. Does it have a set medication schedule interface? 4. Does it have set guardian information button? 5. Does each button take the user to a different page? |
| BK-3 | open box detection | <i>As a senior person, I want the medication box to be able to detect when I open the pill box, so that I can get a notification when I miss the time to take my medicine.</i> | 8 | Sprint 2 | Completed | 1. Hall sensors are used in the detection 2. A magnet will be used for sensing 3. The box is a common pill box 4. The miss rate for detection needs to be less than 5% | 1. Does the sensor successfully detect the "open box" action? 2. Is the miss rate less than 5%? |
| BK-4 | bluetooth connection | <i>As a user of the application, I want the medication box to be connect to my smart device so that I can have real-time updates on my device</i> | 5 | Sprint 2 | Completed | 1. There will be a Bluetooth slave chip on the sensor module 2. The version is Bluetooth 4.0 3. Sensor data sent via Bluetooth | 1. The Bluetooth chip connects to the phone 2. The sensor data is successively transmitted to the phone |
| BK-5 | Login page | <i>As a user, I want the application to be secure, so that no other person using my phone will be able to change the information of this application by accident.</i> | 5 | Sprint 2 | Completed | This page require the user name and password. | Access the application by inputting the correct user name and password |
| BK-6 | schedule setting | <i>As a nurse, I want the application to allow me to set a reminder schedule on my patient's cellphone for medication intake, so that I don't need to remind them personally every time for pills.</i> | 8 | Sprint 2 | Completed | 1. There will be a schedule planner 2. The guardian will be in charge of schedule planning | 1. The schedule can be set within 5 minutes 2. Schedule setting is not ambiguous 2. The schedule can be reset 4. The schedule can be updated |
| BK-7 | message notification | <i>As a senior person, I want the application to send me an alert when I don't open the medication box on time, so that I will not miss the chance to take medicine in proper time.</i> | 8 | Sprint 3 | Sprint 3 | 1. The notification is a message 2. The notification is a sound 3. The notification can be set to have different sounds 4. The user can set the notification frequency and time | 1. The notification message needs to include the time to intake, the time of intake, the medication to take and the quantity 2. It is possible to change the notification frequency and times |
| BK-8 | taskbar notification | <i>As a senior person, I want the notification to also appear in the taskbar so that I can be sure not to miss it</i> | 8 | Sprint 3 | Sprint 3 | Having this feature will eliminate some of the risks that the notification will not be heard | 1. Is the users information only obtainable by specific individuals? (i.e Nurse, Doctor, Guardian, User) |
| BK-9 | Existing Reminder modification | <i>As a use, I want the application allows me to modify the existing Reminder, so that I can organize my schedule easier.</i> | 5 | Sprint 3 | Sprint 3 | This functionality will allow the user to edit and delete the existing Reminder | 1. The exist Reminder can be modified 2. The Reminders can be deleted |
| BK-10 | Sensor to Box Integration | <i>As a senior person, I want to be able to use the box with all the components integrate inside so that I can easily transport it and not be bothered with exposed wires and electronic components</i> | 8 | Sprint 3 | Sprint 3 | 1. The components will be mounted on protoboards 2. The controller used is going to be Arduino Nano 3. The magnet is going to be fixed on the top cover | 1. Check if the wires are too loose 2. Check if the components are well fixed 3. Check if the magnet can touch the flat part of the sensors when in closed position |

| | | | | | | | |
|-------|---------------------------|--|----|--------|---------------|--|---|
| BK-11 | notification for guardian | <i>As a guardian, I want the application be able to inform me if my senior does not take their medicine a period time pass the schedule, so that I can contact them and get more detail of why they miss the right time to take pills.</i> | 13 | Future | Not in sprint | <ul style="list-style-type: none"> 1. What is the period be we send the notification to the guardian, if the senior does not take their medicine? 2. How can we store the information of guardian? 3. How can the application automatically send the notification to the guardian phone when the senior does not take the pill pass a period of time? | <ul style="list-style-type: none"> 1. Does the notification send when the sensor does not detect a action passing a certain of time? 2. Does the notification sucessfully send to a particular phone? |
| BK-12 | educative interface | <i>As a senior person, I want to be able to have access to information concerning the medication I take so that I know the benefits, dosage and secondary effects of the medication I'm intaking.</i> | 20 | Future | Not in sprint | Having this feature will allow the user to be better informed on the benefits, dosage and secondary effects of the medication, thus allowing him/her to make better choices and to encourage him/her to take the medication | <ul style="list-style-type: none"> 1. Can the user understand clearly the information provided? 2. Is the information up-to-date with current research and development? 3. Is the information stated in a way which invites the user to read and does not bore them? |
| BK-13 | privacy protection | <i>As a senior, I want to be able to have protected access to the application so that I can preserve my confidentiality</i> | 13 | Future | Not in sprint | <ul style="list-style-type: none"> 1. What technology are we using to complete this function? 2. Who can access the data? | <ul style="list-style-type: none"> 1. Is the users information only obtainable by specific individuals? (i.e Nurse, Doctor, Guardian, User) |
| BK-14 | multi-box interface | <i>As a senior, I want to be able to monitor my activity when I have more than one medication box so that I do no mix up and can be more organized</i> | 20 | Future | Not in sprint | <ul style="list-style-type: none"> 1. There will be a page to add, drop and modify box and box content 2. There will be buttons to access these pages on the main page | <ul style="list-style-type: none"> 1. Check if add/drop/modify takes less than 5 minutes to do 2. Check if the buttons get to the different section within 3 clicks |
| BK-15 | multi-sensor detection | <i>As a senior, I want to have a redundant system using multiple sensors to detect my medication activities so that I can be sure I took the medication</i> | 40 | Future | Not in sprint | <ul style="list-style-type: none"> 1. The suggested sensors are motion sensors, contact sensors, vibration sensors 2. The sensors will complement each other | <ul style="list-style-type: none"> 1. Check sensor data output 2. Check if the controller can handle all the data 3. Check how sensors can complement one another |
| BK-16 | user database | <i>As a guardian, I want to have access to the information concerning the senior from my own mobile device so that I can monitor their activity from any location</i> | 20 | Future | Not in sprint | <ul style="list-style-type: none"> 1. There will be a database that can be updated through servers 2. The database will hold using information 3. Authorized user can access assigned database | <ul style="list-style-type: none"> 1. Check if updating database is simple 2. Check if authorized users can access theirs but not others 3. Check if servers can process data quickly |
| BK-17 | battery life extension | <i>As a senior, I want to be able to use the sensor device for an extensive amount of time without having to change the battery so that I do not have to spend a lot of money on batteries</i> | 20 | Future | Not in sprint | <ul style="list-style-type: none"> 1. The overall power usage of the system is reduced 2. Research into lower power controllers and Bluetooth technology to be done 3. Optimization of the circuit | <ul style="list-style-type: none"> 1. Check if the battery can last for at least two months without replacement |
| BK-18 | battery replacement | <i>As a senior, I want to know when I need to replace the batteries in the device so that I can avoid not receiving signal because the battery needs to be replaced</i> | 13 | Future | Not in sprint | <ul style="list-style-type: none"> 1. There will be a warning notification when the battery goes below a certain voltage level 2. There will be a mechanism to check for battery voltage | <ul style="list-style-type: none"> 1. Check if the mechanism takes less than 0.1% of the total power usage 2. Check if the warning notification is clear |

Table 1: Product Backlog

Sprint 2 Backlog

| Sprint 2 Goal(s): | | | | | | |
|------------------------------|---------|------------------------------------|---|-------------|-------------|---|
| Story ID | Task ID | Task Title | Task Description | Ideal Hours | Status | Comments |
| BK-3 | 3,1 | Obtaining the box | Find or purchase a suitable box, ideally a commercially available pill box, as our prototype | 1 hour | Completed | The box was bought at Staples. |
| | 3,2 | Box opening action (definition) | Define what is considered as opened and what is considered as closed, this subtask is done by brainstorming | 2 hours | Completed | The box is considered as closed if the magnet touches the Hall sensor and opened if the magnet is not touching the hall sensor |
| | 3,3 | Data collection | Collect data from the sensors for opening and closing the box | 2 hours | Completed | Data has been collected from all the sensors. Since the sensors are digital, we are getting true/false value where a high voltage value represents opened and a low voltage value represents closed |
| | 3,4 | Missing rate | Determine the miss rate from the data collected | 2 hours | Completed | The miss rate was found to be 1 in 100 which is due to mispositioning of the magnet |
| | 3,5 | Reducing the missing rate | if the missing rate is greater than 5%, adjust the sensor to a better position, and calculate the missing rate | 5 hours | Completed | To reduce the miss rate we need to align the magnet and the flat part of the sensor perfectly, we are also using triple redundancy and majority voting to reduce the miss rate |
| BK-4 | 4,1 | Pill box and smartphone connection | | | | |
| | 4.1.1 | Bluetooth integration | Integrate a Bluetooth Chip with the microcontroller system | 3 hours | Completed | Successfully paired the phone with the bluetooth chip |
| | 4.1.2 | Wireless sensor system | Use a battery (9V) to power the sensor/microcontroller system to make the system independent of the computer's usb port | 3 hours | Completed | The system is can be fully independent from the computer since the code has been uploaded to the microcontroller and the battery is well connected to the board |
| | 4.1.3 | Bluetooth connection | Write the code that will enable the application to receive Bluetooth signals | 4 hours | In Progress | |
| | 4.1.4 | System testing | Test the connection at different distances and in different rooms to verify the connectivity and obtain data | 5 hours | Completed | Strength of connectivity has been measured by going into different rooms and using an app to measure the strength in dBm. The signal could work anywhere in a radius of at least 10 meters in different rooms |
| BK-5 | 4,2 | Sensor interfacing | Write the code that will enable the application to use the sensor data received from the sensor module | 5 hours | In Progress | |
| | 5,1 | Login layout | Implement a unique layout | 6 hours | Completed | Background, text field, round button, logo |
| | 5,2 | Input Type | Brainstorm and decide what input type the username and password would be | 2 hours | Completed | Username is made of alphabetical only and Password is numeric only (characters) |
| | 5,3 | Input Length | Code implementation to set the maximum length of characters which each input field could have | 3 hours | Completed | Username is 5 characters long and Password is 4 characters long |
| BK-6 | 5,4 | Security check | Test if the entered credentials are correct | 6 hours | Completed | Check when the each/both input field(s) is/are empty, check if the user entered the correct credentials then grants access, and display toast messages for those. |
| | 6,1 | Schedule time setting | allow the user to set up the alarm time | 5 hours | Completed | |
| | 6,2 | Schedule date setting | allow the user to set up the alarm date | 4 hours | Completed | |
| | 6,3 | Schedule repeat setting | | | | |
| | 6.3.1 | Switch | a switch that allows the user to set the event repeat or not | 3 hours | Completed | |
| | 6.3.2 | Repeat period setting | allow the user to set the period they need | 4 hours | Completed | |
| | 6.3.3 | Repeat period TextView | it will show the period which the user set up | 3 hours | Completed | |
| | | | | | | |
| Testing and fix defect | | | 10 hours | Completed | | |
| Potential customer feedback | | | 1 hour | Completed | | |
| Documentation (the pdf file) | | | 6 hours | Completed | | |
| Product backlog grooming | | | 5 hours | Completed | | |

Table 2: Sprint 2 Backlog

Design Document

Android Application Wireframe

The wireframe shown in figure 1 is the skeleton of the application. It best interests the needs of seniors since they will occupy the majority of the user base. The user interface will have many big buttons and easy to read text. The creation interfaces only hold 3-4 types of data, that way the user is not overwhelmed with unnecessary options. Also, the user will be able to navigate to any page within two button presses (after the user select screen), this way the user will be able to navigate back to the splash screen with ease. Expect the final application to have similar features to those shown in figure 1.

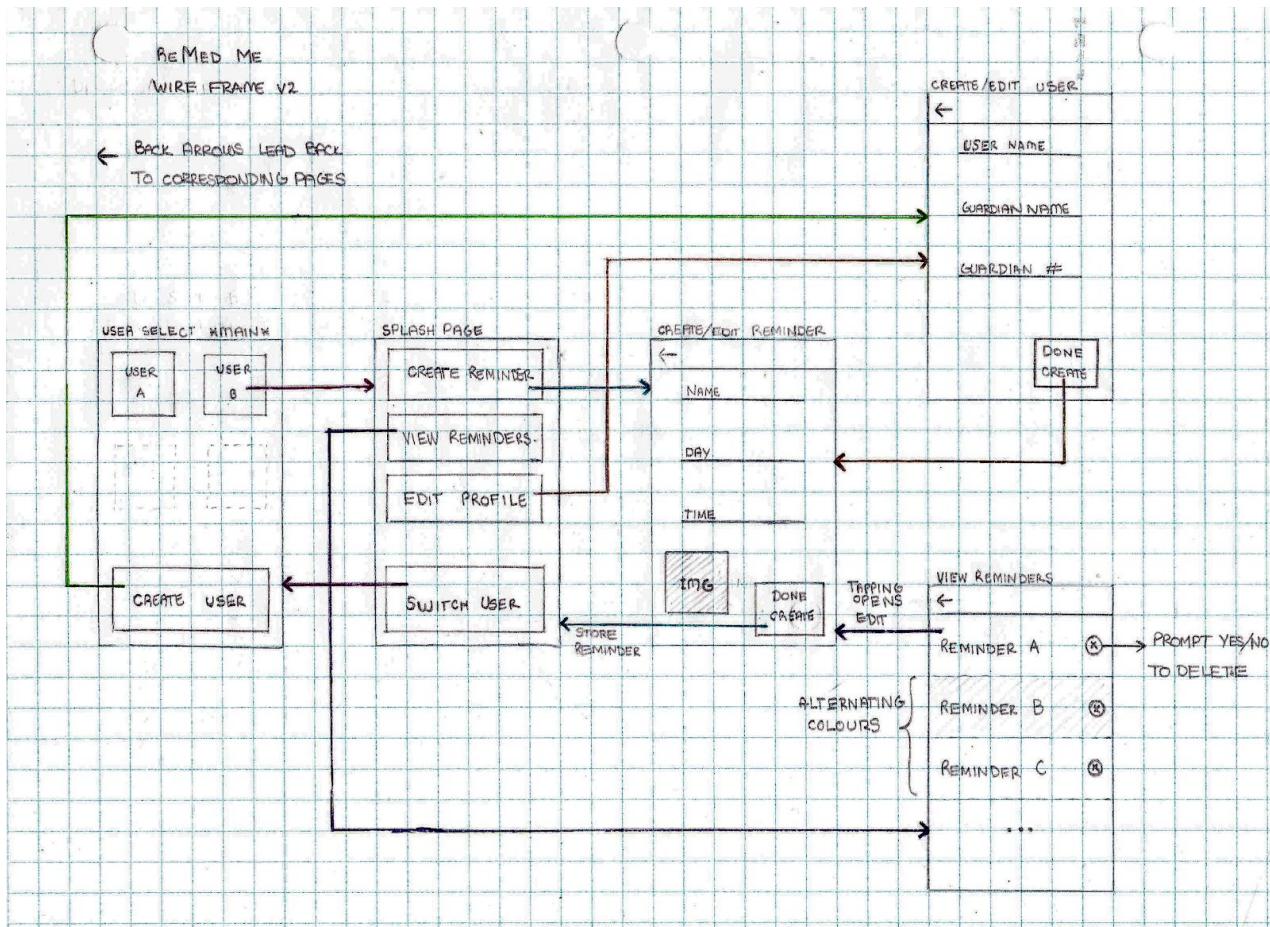


Figure 1: Application Wireframe v2

System Architecture

This system architecture will be as shown in figure 2. The hall effect sensors will receive an input from the user and send a signal to the microcontroller which will then send a signal via bluetooth to the device. Once the signal is received, the device will process the signal and shut off the alarm if the correct signal is received. Optionally, the device can send a text message to a guardian if the notification has yet to be disabled for X amount of time. User profiles will be stored in an SQLite table, as well as the reminders which will be held in their own SQLite table per user.

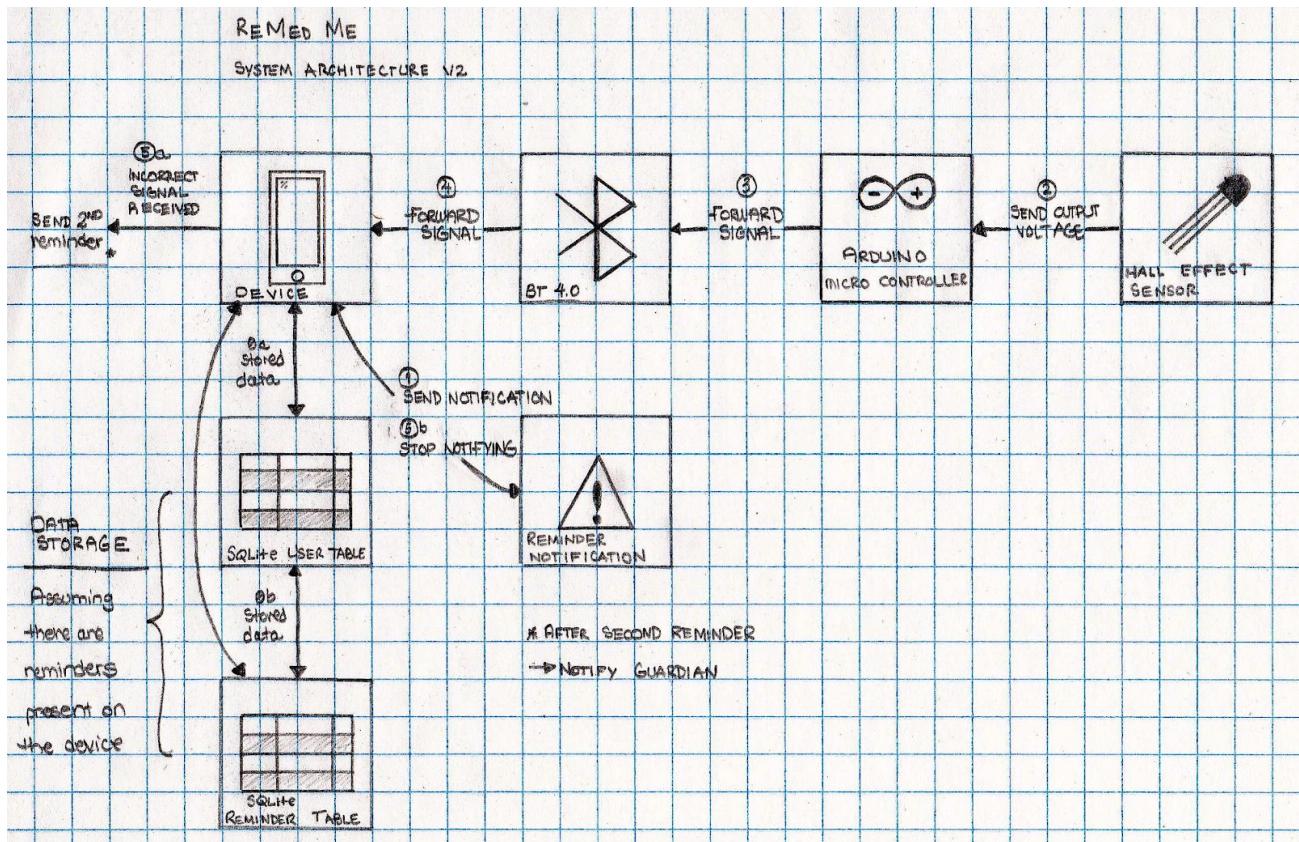


Figure 2: System Architecture v2

Hardware Architecture

The system will be using two hall effect sensors within the box on the edges of the dividers. There will magnet tape on the underside of the lid. The sensors and magnets will line up when the box is closed. Hall effect sensors are used for proximity switching. When the box is closed, the sensor will be

next to the magnet, the sensor will respond to the magnetic field and output a certain voltage. Opening the move the sensors away from the magnets, thus changing the output voltage. The two different output voltages will be classified as the box being either opened or closed. When a reminder initiates on the device, it will search for an open signal from the microcontroller, when the lid is opened and the signal is received, the application will cease to notify the user of the reminder.

Software Architecture

The software contains 7 activities. The main activity is the user login, this will be the screen the user sees when they initially launch the app. From the user select screen, the user may proceed into the main functionality of the application by logging in with the correct credentials, there will be default credentials for first time logins. The create user activity currently has five credentials to fill out, username, date of birth, address, emergency contact name, and emergency contact phone number. When the create/done button is pressed, the credentials will be stored in the user SQLite table, as well as create a new SQLite table for the reminders. When a user is selected, the splash page will appear with 3 options, create reminders, view reminders and edit profile. The create reminder activity currently has four credentials, medication name, day of the week, time and repeating switch that will allow an input for the reminder to repeat every X days (with future support for an image of the medication). Pressing the create/done button stores the reminder in the current users reminder table and goes back to the splash page. The view reminders activity will show all existing reminders of the current user in a ListView. Pressing an existing reminder will redirect to the edit reminder activity that will function very similarly to the create reminder activity but will instead update the credentials over creating a new row. There will also be an option to delete a reminder from the ListView in the future, which will remove the reminders row from the table. The edit user activity functions very similarly to the create user activity but will instead update the credentials over creating a new row.

Use Cases and Sequence Diagrams

Use Case 1: Creating/Editing & Viewing Reminders (figure 3)

Starting from the main activity, the user select activity, tapping on user_btn (User 1, 2, 3...) sends the user to the splash page activity. Tapping on createReminderBtn (Create Reminder) sends the user to the create reminder activity. In this activity there are three credentials to input, a String for the medication name, a String for the day of the week, and an int for the time. There will be future support for a BufferedImage for an image of the medication. When addReminderBtn (Create) is tapped, the information is stored in the SQLite table with INSERT INTO reminder_table. Alternatively, from the splash page activity, tapping viewReminderBtn (View Reminders) sends the user to the view reminders activity. In this activity, the contents of reminder_table are displayed in ListView format. Tapping a one of the TextViews will prompt the user to edit or delete the reminder. Deleting the reminder calls DELETE FROM reminder_table and removes the specified row from the database. Editing the reminder sends the user to the same page as it would for creating the reminder but instead of inserting into the table, the table is updated with UPDATE reminder_table.

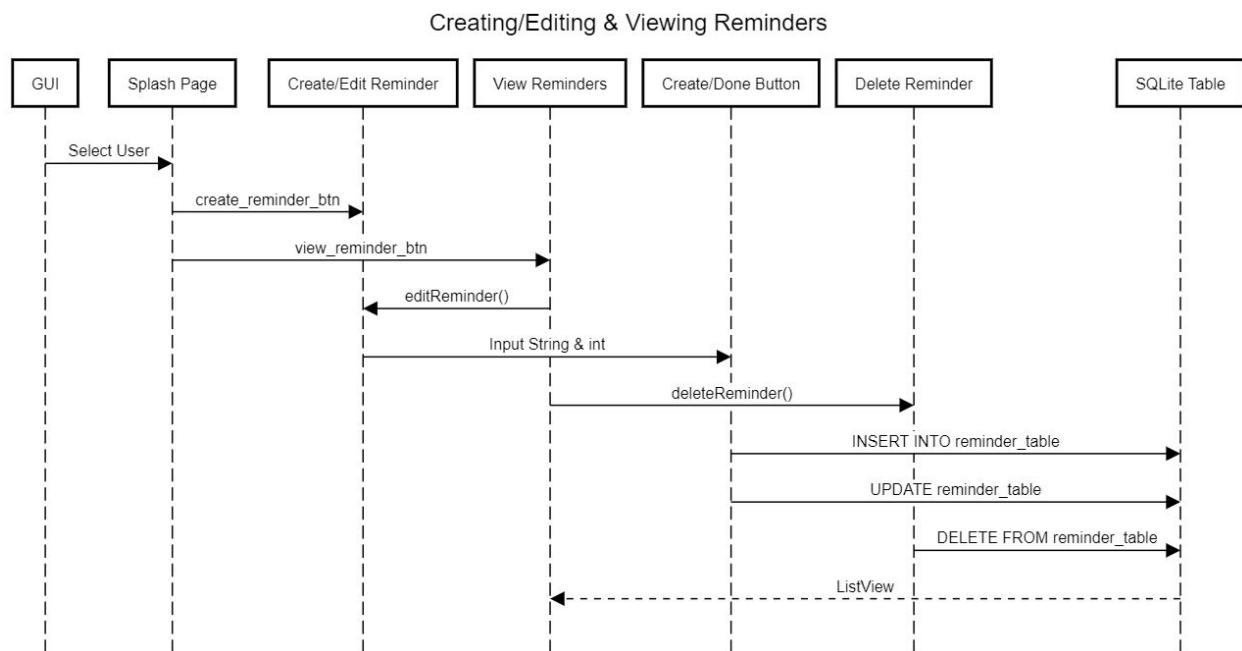


Figure 3: Reminders Sequence Diagram

Use Case 2: Creating/Editing User Profile (figure 4)

Starting from the main activity, the user select activity, tapping on `create_user_btn` (Create New User) sends the user to the create user activity. In this activity there are three credentials to input, a String for the users name, a String for the guardian name, and a String for the guardian phone number. When `add_user_btn` (Create) is tapped, the information is stored in the SQLite table with `INSERT INTO user_table`. Alternatively, from the user select activity, the user can select a profile to move the the splash page activity. When `edit_user_btn` is tapped, the user is sent to the edit user activity which is the same as the create user activity but instead of inserting into the table, the table is updated with `UPDATE user_table`.

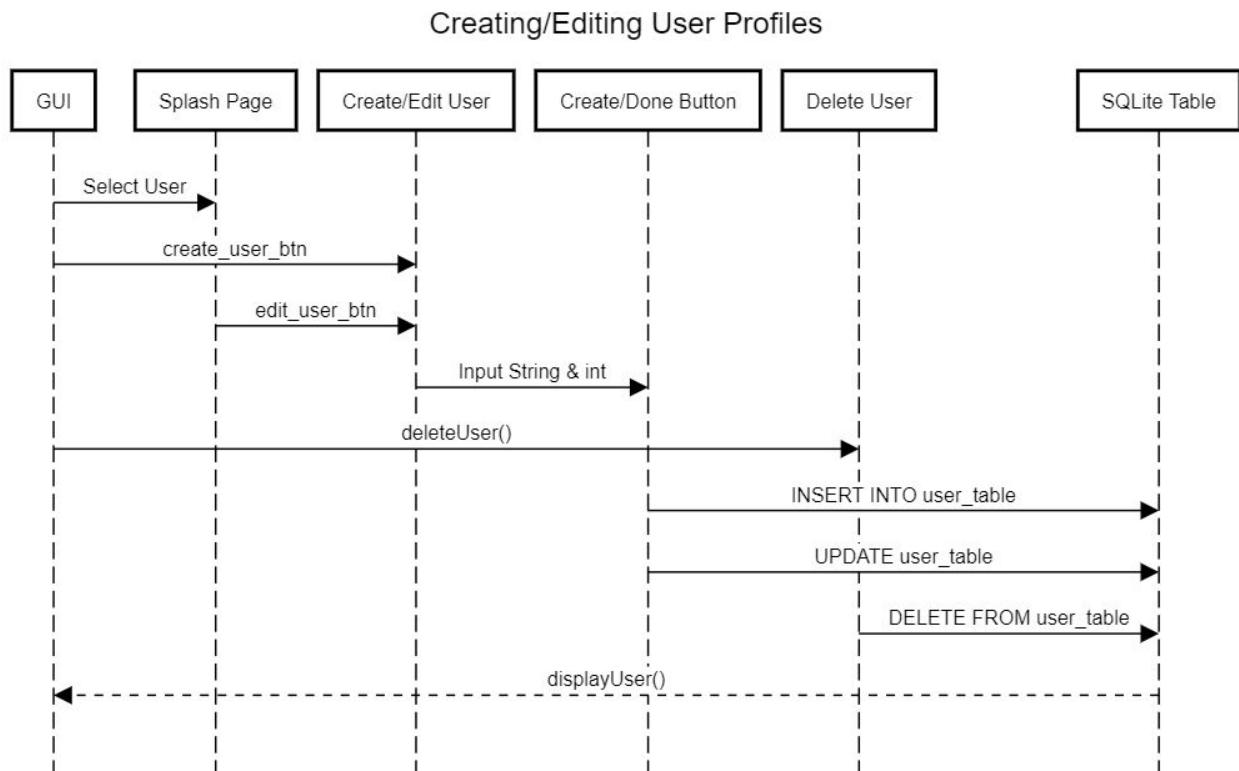


Figure 4: User Profile Sequence Diagram

Changelog (Sprint 2)

The user interface of the application was overhauled with a much nicer design. There is a new login page with support for only one user currently, currently there is a username and password authentication (defaulted to admin & 1234 respectively). If no user profile exists, the user is redirected to the edit profile page instead of the splash page. The user profile now has a date of birth and an address parameter. The reminder creation now has a date selection via calendar and time selection via clock, as well as an option to set the reminder to repeat every X day(s). The splash page now displays the users name, date of birth, and address.

The design of the box has changed slightly. The sensors will now reside inside the box, with the magnets on the bottom side of the lid. The microcontroller and circuit will be stored inside one of the compartments of the smaller compartments of the box.

Test Document

Test Plan 1: Crash Test

Summary: BK-2, BK-5

We are trying to see whether the app will crash while switching activities in quick succession for a moderate period of time. If we are constantly switching activities, the application could potentially crash from too many actions happening in a short period of time.

We are trying to see whether the app will crash if we keep adding items to the reminder table. If we add too many reminders to the database, the application may not be able to hold all of them and throw an error or crash.

| Test Case 1.1: Stress Test | | |
|--|---|----------------------------------|
| Pre-Condition: BK-2: We need a working skeleton to be able to switch between activities | | |
| Steps | Expected Results | Actual Result |
| 1. Switch to a different activity | Proper switch through activities | Proper switch through activities |
| 2. Speed up rate of switching to attempt to crash the application | Application crashes due to too many actions | Application did not crash |
| Pass/Fail: | | |
| 👍 | | |

| Test Case 1.2: Overflow Test | | |
|---|--|-----------------------------------|
| Pre-Condition: BK-2, BK-5: We need a working skeleton and working reminder creation to store reminders | | |
| Steps | Expected Results | Actual Result |
| 1. Navigate to create reminder activity | Proper switch to correct activity | Proper switch to correct activity |
| 2. Add a reminder to database | Reminder is added to database | N/A |
| 3. Continue adding many reminders to the database to crash or generate an error | Error is generated or crash due to too many insertions to the database | N/A |

| |
|--|
| Result: Not enough data is available to generate a result at the moment |
|--|

Test plan 2: Skeleton Reliability

Summary: BK-2

We are going to test the performance of the skeleton. Firstly, we are going to test the login page. The login page should have multiple buttons and they will lead us to different user's profile or user creating Activity. Secondly, we are going to test the user information creation Activity. This Activity has three EditText and one button, and it allows us to input information and create a profile. Thirdly, test the user's profile Activity. This Activity contains four button which are "Create Reminder", "View Existing Reminder", "Edit Profile", and "Switch Profile". Also, each button link to an Activity. Fourthly, Reminder Creation Activity allows use to input the information and set the time for taking medication. Fifthly, Schedule check Activity allows us to check the schedule. Finally, the Edit Profile Activity should allow us to reset the user information.

| Test Case 2.1: Login page | | |
|--|---------------------------------|---------------------------------|
| Pre-Condition: Have the application running on a device | | |
| Steps | Expected Results | Actual Result |
| 1. Click the "Create User" button | Go to User information Activity | Go to User information Activity |
| 2. Click backward icon | Back to login page | Back to login page |
| 3. Click "User 1" button | Go to user' profile Activity | Go to user' profile Activity |
| Pass/Fail: | | |
| thumb up | | |

| Test Case 2.2: User's Information creation Activity | | |
|---|---|---|
| Pre-Condition: Select the "Create User" button on the login page | | |
| Steps | Expected Results | Actual Result |
| 1. Type in the name | Keyboard show up, and allows input characters | Keyboard show up, and allows input characters |
| 2. Type in the phone number | Number keyboard show up and allows input # | Number keyboard show up and allows input # |
| 3. Click "Create" button | A message shows and return to the login page | A message shows and return to the login page |

| |
|---|
| Pass/Fail: |
|  |

Test Case 2.3: User's Profile Activity

Pre-Condition: Select the “User #” button on the login page

| Steps | Expected Results | Actual Result |
|---|--|--|
| 1. Click “Create Reminder” button | Bring us to Reminder Creation Activity | Bring us to Reminder Creation Activity |
| 2. Click backward icon on the action bar | Back to User’s Profile Activity | Back to User’s Profile Activity |
| 3. Click “View Existing Reminders” button | Go to Schedule Check Activity | Go to Schedule Check Activity |
| 4. Click backward icon on the action bar | Back to User’s Profile Activity | Back to User’s Profile Activity |
| 5. Click “Edit Profile” button | Go to User’s Information creation Activity | Go to User’s Information creation Activity |
| 6. Click backward icon on the action bar | Back to User’s Profile Activity | Back to User’s Profile Activity |
| 7. Click “Switch Profile” button | Return to login page | Return to login page |

| |
|---|
| Pass/Fail: |
|  |

Test Case 2.4: Reminder Creation Activity

Pre-Condition: Select the “Create User” button on the login page, then click “Create Reminder”

| Steps | Expected Results | Actual Result |
|--------------------------------|--|--|
| 1. Type in the medication name | Keyboard show up, and allows input characters | Keyboard show up, and allows input characters |
| 2. Select the day from menu | A menu which we can choose between Monday and Sunday | A menu which we can choose between Monday and Sunday |
| 3. Type in the time | Number keyboard show up and | Number keyboard show up and |

| | | |
|--------------------------|---|---|
| | allows input # | allows input # |
| 4. Click “Create button” | A message shows and return to User’s Profile Activity | A message shows and return to User’s Profile Activity |
| Pass/Fail: | | |
| 👍 | | |

| Test Case 2.5: Schedule Check Activity | | |
|---|------------------------------------|---------------------------------|
| Pre-Condition: Select the “Create User” button on the login page, then click “View Existing Reminders” | | |
| Steps | Expected Results | Actual Result |
| 1. Observe this Activity | An empty schedule should be exist. | Empty schedule exists |
| 2. Click backward icon on the action bar | Back to User’s Profile Activity | Back to User’s Profile Activity |
| Pass/Fail: | | |
| 👍 | | |

Test plan 3: Adding/Editing/Removing Reminders

Summary: BK-6

We are going to test the output of adding a reminder to the database. Firstly, we are going to set a reminder for 1 minute from the current time. Upon pressing the name, we should be able to edit the name of the medication, we should also be able to set a date and a time. Flicking the switch should enable an editText for number of days repeating. Pressing the create reminder should set an alarm.

| Test Case 3.1: Setting Parameters | | |
|---|---|---|
| Pre-Condition: Select the Create Reminder button to move to Create Reminder Activity | | |
| Steps | Expected Results | Actual Result |
| 1. Tap the medication name | Keyboard appears to edit the medication name | Keyboard appears to edit the medication name |
| 2. Tap the set date text | Calendar appears and text is updated depending on date selected | Calendar appears and text is updated depending on date selected |

| | | |
|--------------------------|--|--|
| 3. Tap the set time text | Clock appears and text is updated depending on time selected | Clock appears and text is updated depending on time selected |
| 4. Tap repeat switch | Days to repeat editText appears | Days to repeat editText appears |
| 5. Tap create button | Alarm is set for selected time | BUG Alarm is set for current time |
| Pass/Fail: | | |
| 👉 | | |

| Test Case 3.2: Viewing Existing Reminders | | |
|---|------------------------------------|----------------------------------|
| Pre-Condition: Reminders already exist in DB and select view reminder button | | |
| Steps | Expected Results | Actual Result |
| 1. Move to view reminder activity | List of existing reminders appears | Empty List. (However, DB exists) |
| Pass/Fail: | | |
| 👉 | | |

| Test Case 3.3: Edit existing reminder | | |
|---|--|----------------------------|
| Pre-Condition: Reminders already exist in DB and select view reminder button | | |
| Steps | Expected Results | Actual Result |
| 1. Tap on an existing reminder | Option to delete or edit reminder appears | <i>Not yet implemented</i> |
| 2. Tap on edit reminder button | Move to edit reminder activity (should look like create reminder activity) | |
| 3. Tap on done button | Alarm values are updated | |
| Pass/Fail: | | |
| 👎 | | |

| Test Case 3.4: Delete existing reminder | | |
|--|---|----------------------------|
| Pre-Condition: Reminders already exist in DB and select view reminder button | | |
| Steps | Expected Results | Actual Result |
| 1. Tap on an existing reminder | Option to delete or edit reminder appears | <i>Not yet implemented</i> |
| 2. Tap on delete reminder button | Alarm is removed | |
| 3. <i>Additional Check:</i> Wait for previously designated time to see if alarm fires | Alarm does not fire | |
| Pass/Fail: | | |
| 👎 | | |

Test plan 4: Notifications Validity

Summary: BK-7

We are going to ensure that notifications are received in the notification trigger activity. Once received, the notification will trigger when the corresponding alarm fires.

| Test Case 4.1: Notification Trigger is successful | | |
|---|---|--|
| Pre-Condition: Alarm must already exist in the system | | |
| Steps | Expected Results | Actual Result |
| 1. Wait for time/date of alarm | Alarm fires | Alarm fires +/- 30 seconds of set time |
| 2. Check if notification appears | Notification appears when alarm is fired | Notification appears when alarm is fired |
| 3. <i>Additional Check:</i> Does the notification contain the medication name? | Notification description contains medication name | <i>Planned for future</i> |
| Pass/Fail: | | |
| 👍 | | |

Definition of Done

Definition of Done criteria

After discussing the important criterias that are related to our project, here is the checklist that we decided to use for the validation of each PBI :

- ✓ *Produced artifact (code/document) for the PBI*
- ✓ *Requirements mentioned in PBI are satisfied*
- ✓ *Acceptance criteria(s) for PBI are satisfied*
- ✓ *Unit tests performed and passed*
- ✓ *Integration tests performed and passed*
- ✓ *Project builds without errors*
- ✓ *Design Document updated*
- ✓ *Test Document updated*

Definition of Done validation

| Story ID: BK-1 | |
|---|----------------------------|
| User Story: Sensor and Microcontroller <i>As a senior person, I want the medication box to be able to detect when I open the pill box, so that I can be reminded to take the medication</i> | |
| DoD checklist for this PBI: | |
| <ul style="list-style-type: none">✓ <i>Produced artifact (code/document) for the PBI</i>✓ <i>Requirements mentioned in PBI are satisfied</i>✓ <i>Acceptance criteria(s) for PBI are satisfied</i>✓ <i>Unit tests performed and passed</i>✓ <i>Integration tests performed and passed</i>✓ <i>Project builds without errors</i>✓ <i>Design Document updated</i>✓ <i>Test Document updated</i> | Status Completed |
| | <i>Done</i> |

Story ID: BK-2**User Story: Skeleton**

As a senior, I want to be able to log into the Medication Taking Reminder app, check the information about my medication, allow my nurse to set the medication intake schedule, and input guardian contact information, so that I may reduce any possibility of missing my medication intake.

| DoD checklist for this PBI: | Status |
|--|-----------|
| ✓ <i>Produced artifact (code/document) for the PBI</i> | Completed |
| ✓ <i>Requirements mentioned in PBI are satisfied</i> | Done |
| ✓ <i>Acceptance criteria(s) for PBI are satisfied</i> | Done |
| ✓ <i>Unit tests performed and passed</i> | Done |
| ✓ <i>Integration tests performed and passed</i> | Done |
| ✓ <i>Project builds without errors</i> | Done |
| ✓ <i>Design Document updated</i> | Done |
| ✓ <i>Test Document updated</i> | Done |

Story ID: BK-3**User Story: Open Box Detection**

As a senior person, I want the medication box to be able to detect when I open the pill box, so that I can get a notification when I miss the time to take my medicine.

| DoD checklist for this PBI: | Status |
|--|-----------|
| ✓ <i>Produced artifact (code/document) for the PBI</i> | Completed |
| ✓ <i>Requirements mentioned in PBI are satisfied</i> | Done |
| ✓ <i>Acceptance criteria(s) for PBI are satisfied</i> | Done |
| ✓ <i>Unit tests performed and passed</i> | Done |
| ✓ <i>Integration tests performed and passed</i> | Done |
| ✓ <i>Project builds without errors</i> | Done |
| ✓ <i>Design Document updated</i> | Done |
| ✓ <i>Test Document updated</i> | Done |

Story ID: BK-4**User Story: Bluetooth Connection**

As a user of the application, I want the medication box to be connect to my smart device so that I can have real-time updates on my device

| DoD checklist for this PBI: | Status |
|--|-----------|
| ✓ <i>Produced artifact (code/document) for the PBI</i> | Completed |
| ✓ <i>Requirements mentioned in PBI are satisfied</i> | Done |
| ✓ <i>Acceptance criteria(s) for PBI are satisfied</i> | Done |
| ✓ <i>Unit tests performed and passed</i> | Done |
| ✓ <i>Integration tests performed and passed</i> | Done |
| ✓ <i>Project builds without errors</i> | Done |
| ✓ <i>Design Document updated</i> | Done |
| ✓ <i>Test Document updated</i> | Done |

Story ID: BK-5**User Story: Login Page**

As a user, I want the application has a login page, so that I or other person use my phone will not change the information of this application by accident.

| DoD checklist for this PBI: | Status |
|--|------------------|
| ✓ <i>Produced artifact (code/document) for the PBI</i> | <i>Completed</i> |
| ✓ <i>Requirements mentioned in PBI are satisfied</i> | <i>Done</i> |
| ✓ <i>Acceptance criteria(s) for PBI are satisfied</i> | <i>Done</i> |
| ✓ <i>Unit tests performed and passed</i> | <i>Done</i> |
| ✓ <i>Integration tests performed and passed</i> | <i>Done</i> |
| ✓ <i>Project builds without errors</i> | <i>Done</i> |
| ✓ <i>Design Document updated</i> | <i>Done</i> |
| ✓ <i>Test Document updated</i> | <i>Done</i> |

Story ID: BK-6**User Story: Schedule Setting**

As a nurse, I want the application to allow me to set a reminder schedule on my patient's cellphone for medication intake, so that I don't need to remind them personally every time for pills.

| DoD checklist for this PBI: | Status |
|--|------------------|
| ✓ <i>Produced artifact (code/document) for the PBI</i> | <i>Completed</i> |
| ✓ <i>Requirements mentioned in PBI are satisfied</i> | <i>Done</i> |
| ✓ <i>Acceptance criteria(s) for PBI are satisfied</i> | <i>Done</i> |
| ✓ <i>Unit tests performed and passed</i> | <i>Done</i> |
| ✓ <i>Integration tests performed and passed</i> | <i>Done</i> |
| ✓ <i>Project builds without errors</i> | <i>Done</i> |
| ✓ <i>Design Document updated</i> | <i>Done</i> |
| ✓ <i>Test Document updated</i> | <i>Done</i> |

Sprint 3 Backlog

| Sprint 3 Goal(s): | | 1. Create message and taskbar notifications 2. Create existing reminder modifier 3. Add ability to edit/remove existing reminders | | | | |
|-------------------|---------|---|---|-------------|---------|----------|
| Story ID | Task ID | Task Title | Task Description | Ideal Hours | Status | Comments |
| BK-7 | 7,1 | Message notification | Create a notification message that contains time of intake, time to intake, medicine to take and quantity | 5 hours | Planned | |
| | 7,2 | set notification sending | | | | |
| | 7.2.2 | get setting time | A function which will set the alarm time | 5 hours | Planned | |
| | 7.2.3 | compare function 1 | A function for comparing the real time and the setting time | 3 hours | Planned | |
| | 7.2.4 | check "open" action | A boolean function to check the pill is opened or not | 5 hours | Planned | |
| | 7.2.5 | date check | it will compare the date of the system and the date we set | 5 hours | Planned | |
| | 7.2.6 | repeat alarm | it will allow the user to set the period they want to repeat the notification | 3 hours | Planned | |
| BK-8 | 8,1 | Taskbar notification | when the alarm is on, the will be a notification show up on the taskbar | 4 hours | Planned | |
| | 8,2 | Taskbar notification clickable | when click the notification on the taskbar, it will lead to new activity | 5 hours | Planned | |
| | 8,3 | Alarm off Activity | This activity will allows use to turn off the alarm | 5 hours | Planned | |
| | 8,4 | notification send | If the pill box does not open, the notification will send. Otherwise, the notification will not send. | 3 hours | Planned | |
| | 8,5 | notification resend | if the pill box does not open 15 mins after the first notification was sent, send the notification again | 5 hours | Planned | |
| | 8,6 | notification repeat | it will base on the repeat period which set by the user, and repeat the notification | 5 hours | Planned | |
| | | | | | | |
| BK-9 | 9,1 | Existing Reminder modify | Allow user the change the information of the existing Reminder | 5 hours | Planned | |
| | 9,2 | Existing Reminder Delete | | | | |
| | 9.2.1 | Reminder remove from SQLite table | The existing Reminder will be delete from the SQLite table | 4 hours | Planned | |
| | 9.3.2 | Reminder remove from application | The existing Reminder will be delete from the application | 4 hours | Planned | |

| | | | | | | |
|-------------------------------------|--------|-----------------------------------|---|----------|-------------|------------------------|
| BK-10 | 10,1 | Components Position | Decide on the position of the magnet, the sensors, the controller and the bluetooth module inside the box | 3 hours | Planned | |
| | 10,2 | Wiring Position | Decide on the position of the wires inside the box | 1 hour | Planned | |
| | 10,3 | Uno to Nano | Switching from Arduino Uno to Nano since Nano takes less space and can be soldered to a protoboard | 3 hours | Planned | |
| | 10,4 | Soldering to Protoboard | | | | |
| | 10.4.1 | Determining Protoboard Dimensions | Determine the different dimensions for the protoboards for the sensors, the controller and the bluetooth module | 2 hours | Planned | |
| | 10.4.2 | Cutting Protoboard | Cut the protoboards to the dimensions determined previously | 1 hour | Planned | |
| | 10.4.3 | Placing Components | Place the components on their respective protoboards | 1 hour | Planned | |
| | 10.4.4 | Soldering | Solder the necessary connections between the different components | 4 hours | Planned | |
| | 10.4.5 | Iterative Testing | Test the components for every few connections made to find defects and misconnections early on | 3 hours | Planned | |
| | 10,5 | Integration to Box | Install the different components within the box | | | |
| | 10.5.1 | Component Integration | Install the sensors', controller's and bluetooth module's boards inside the box | 3 hours | Planned | |
| | 10.5.2 | Wire Integration | Fix the wires to the box inside frame | 1 hour | Planned | |
| | 10,6 | System Testing | Test the system for any defects or misconnections | 2 hours | Planned | |
| <hr/> | | | | | | |
| Testing and fix defect | | | | 10 hours | Planned | |
| Potential customer feedback | | | | 1 hour | Planned | |
| Documentation (the pdf file) | | | | 4 hours | Planned | |
| Product backlog grooming | | | | 5 hours | In Progress | |
| | | | | | | Total hours: 110 hours |