Project Name: Lab 4 Deliverables
Course Name: SC2006 Software Engineering
Lab Group: SCSA
Group Number: 2

Name of Team Member	Matric Number
Ngo Zong Han	U2321758A
Yap Mei Yee	U2321703A
Athena Choo Ying Suan	U2321088E
Jothilingam Dheeraj	U2321317H
Agarwala Grisha	U2323294F

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Black Box Testing

I. Account Creation:
A. Register

Input Parameters: Name, Email, Password, Postal Code

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Valid)** Postal code: 288383	Successful Account Creation.	Successful Account Creation.	Yes
2	**(Valid)** Name: Athena **(Invalid)** Email: athena.gmail **(Valid)** Password: password **(Valid)** Postal code: 288383	Unsuccessful Account Creation. Invalid email.	"This email address is badly formatted."	Yes
3	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Invalid)** Postal Code: 12345	Unsuccessful Account Creation. Invalid Postal Code.	"Please enter a 6-digit postal code."	Yes
4	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Invalid)** Password: pass **(Valid)** Postal Code: 123456	Unable to register. Password must be 6 characters or longer.	Unable to register. Error Prompt. Password length must be 6 characters or longer regardless of capitalisation,	Yes

			special characters not required.	
5	**(Valid)** Name: Athena **(Invalid)** Email: [Empty] **(Invalid)** Password: [Empty] **(Invalid)** Postal Code: [Empty]	Unable to register. Error prompt, only 1 field filled.	Unable to register. Error prompt, only 1 field filled.	Yes
6	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Invalid)** Password: [Empty] **(Invalid)** Postal Code: [Empty]	Unable to register. Error prompt, only 2 fields filled.	Unable to register. Error prompt, only 2 fields filled.	Yes
7	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Invalid)** Postal Code: [Empty]	Unable to register. Error prompt, only 3 fields filled.	Unable to register. Error prompt, only 3 fields filled.	Yes
8	**(Invalid)** Name: [Empty] **(Invalid)** Email: [Empty] **(Invalid)** Password: [Empty] **(Invalid)** Postal Code: [Empty]	Unable to Register. Error Prompt, all fields empty.	Unable to Register. Error Prompt, all fields empty	Yes

B. Login

Input Parameters: Email and Password

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Email: athena@gmail.com **(Valid)** Password: password	Successful Login.	Successful Login.	Yes
2	**(Valid)** Email: athena@gmail.com **(Invalid)** Password: passsword	Login Failed. Password not found/incorrect.	Login Failed. Password not found/incorrect.	Yes
3	**(Invalid)** Email: admin1@gmail.com **(Invalid)** Password: password	Login Failed. Email not found/incorrect.	Login Failed. Email not found/incorrect.	Yes
4	**(Valid)** Email: athena@gmail.com **(Invalid)** Password: [Empty]	Error Prompt. Login Failed.	Error Prompt. Login Failed.	Yes
5	**(Invalid)** Email: [Empty] **(Invalid)** Password: [Empty]	Error Prompt. Login Failed.	Error Prompt. Login Failed.	Yes

II. Google Maps:
A. Favouriting of Recycling Bins

Input Parameters: NIL

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	Favourite the bin by clicking the heart icon on the selected bin's markerInfoCard	Bin shows up in the user's favourite list.	Bin shows up in the user's favourite list.	Yes
2	Unfavouriting the bin by clicking the heart icon again in the favourite list	Bin is removed from the user's favourite list.	Bin is removed from the user's favourite list.	Yes
3	Unfavouriting the bin by clicking the heart icon again on the selected bin's markerInfoCard	Bin is removed from the user's favourite list.	Bin is removed from the user's favourite list.	Yes

B. Transport Route to Recycling Bin

Input Parameters: Postal Code, Address, Material Type, Radius

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Material Type: Plastic **(Valid)** Radius: 500m **(Valid)** Postal Code: 288383	Returns a recycling bin within a given radius and accepted material type.	Returns a recycling bin within 500m and accepts plastic.	Yes
2	**(Valid)** Material Type: Plastic **(Valid)** Radius: 500m **(Valid)** Address: 24 Nanyang Avenue	Returns a recycling bin within a given radius and accepted material type.	Returns a recycling bin within 500m and accepts plastic.	Yes
3	**(Valid)** Material Type: Plastic	Invalid postal code, system returns	System displays 'no bin found'.	Yes

		nothing.		
	(Valid) Radius: 500m **(Invalid)** Postal Code: 123456			
4	**(Valid)** Material Type: Plastic **(Valid)** Radius: 500m **(Invalid)** Postal Code: 12345	Invalid postal code, Not enough digits.	System displays 'no bin found'.	Yes
5	**(Valid)** Material Type: Plastic **(Valid)** Radius: 500m **(Invalid)** Address: 400 Nanyang Avenue	Invalid full address.	System displays 'no bin found'.	Yes
6	**(Valid)** Material Type: Plastic **(Valid)** Radius: 500m **(Invalid)** Address: Nanyang Avenue	Invalid partial address.	System displays 'no bin found'.	Yes

III. Recycling Input:

A. ML Model Scanner

Input parameters: Quantity

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Plastic Scanned	Material Scanned: Plastic	Material Scanned: Plastic (76%)	Yes
2	**(Invalid)** No Material Scanned	Error; Redirected to Manual Input.		
3	**(Valid)** Quantity: 1 **(Valid)** Upload a Photo: Camera	Successfully Submitted.	Your upload was successful and your reward will be awarded in 3-5 working days.	Yes
4	**(Invalid)** Quantity: 0 **(Valid)** Upload a Photo: Camera	Error prompt, quantity must be larger than 0.	Error prompt, quantity must be larger than 0.	Yes

B. Manual Input

Input Parameters: Materials, Quantity

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Material: Plastics **(Valid)** Quantity: 1 **(Valid)** Upload a Photo: Camera	Successfully Submitted.	Your upload was successful and your reward will be awarded in 3-5 working days.	Yes
2	**(Invalid)** Material: [Empty] **(Valid)** Quantity: 1 **(Valid)** Upload a Photo: Camera	Error prompt, must select at least 1 material.	Error Prompt, must select at least 1 material.	Yes

3	**(Valid)** Material: Glass **(Invalid)** Quantity: 0 **(Valid)** Upload a Photo: Camera	Error prompt, quantity must be larger than 0.	Error prompt, quantity must be larger than 0.	Yes
4	**(Valid)** Material: Glass **(Valid)** Quantity: 1 **(Invalid)** Upload a Photo: [Empty]	Error prompt, photo must be taken/uploaded.	Error prompt, photo must be taken/uploaded.	Yes
5	**(Valid)** Material: Glass and Plastic **(Valid)** Quantity: 2 **(Valid)** Upload a Photo: Camera	Successfully Submitted.	Your upload was successful and your reward will be awarded in 3-5 working days.	Yes
6	**(Valid)** Material: Glass and Plastic **(Invalid)** Quantity: 1 **(Valid)** Upload a Photo: Camera	Error prompt, quantity must be more than number of selected materials.	Error prompt, quantity must be more than number of selected materials.	Yes

IV. Home Page:

A. Rewards

Input Parameters: Mobile Number and User Points

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Claiming 7-Eleven $20 e-Voucher (100 Points) with 300 Points remaining **(Valid)** Mobile Number: 97710482 **(Valid)** Email: athena@gmail.com	Rewards Given. Points deducted.	Rewards successfully claimed and can be found under 'My Rewards'.	Yes
2	**(Valid)** Claiming Paynow $20 Cash Transfer (200 Points) with 200 Points Remaining **(Invalid)** Mobile Number: 9771 **(Valid)** Email: athena@gmail.com	Error prompt. Invalid phone number. Points not deducted.	Error prompt. Invalid phone number. Points not deducted.	Yes
3	**(Invalid)** Claiming Paynow $20 Cash Transfer (200 points) with 100 points remaining **(Valid)** Mobile Number: 97711234 **(Valid)** Email: athena@gmail.com	Error prompt, not enough points, Reward not given, Points not deducted.	Error prompt, not enough points, Reward not given, Points not deducted.	Yes
4	**(Valid)** Claiming 7-Eleven $20 e-Voucher (100 Points) with 300	Error prompt. Reward already claimed.	Error prompt. Reward already claimed.	Yes

	Points remaining	Points not deducted.	Points not deducted.	
	(Valid) Mobile Number: 97710482			
	(Valid) Email: athena@gmail.com			

V. User Details:

A. Settings

Input Parameters: Toggle Button

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Toggle GPS Location Button off	GPS Location turned off.	GPS Location turned off.	Yes
2	**(Valid)** Toggle GPS Auto-Detect Button off	GPS Auto-Detect turned off.	GPS Auto-Detect turned off.	Yes
3	**(Valid)** Toggle Notifications Button off	Notifications from the app turned off.	Notifications from the app turned off.	Yes
4	**(Valid)** Maximum Walking Distance: 200m	Maximum walking distance shown during directions is 200m.	Maximum walking distance shown during directions is 200m.	Yes

B. User Profile

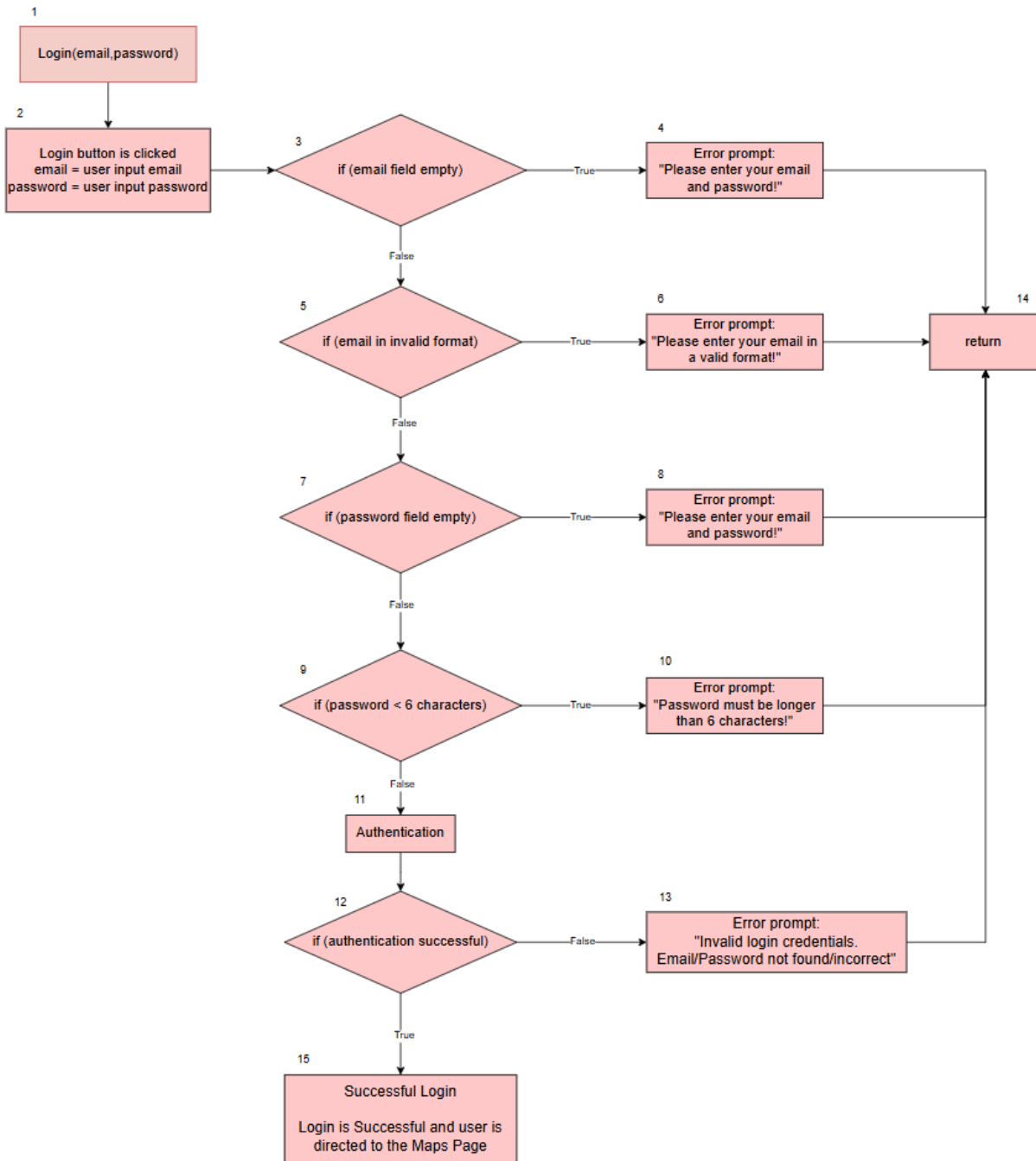Input Parameters: Name, Postal Code, Password

Test Case	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Changing User Name	User Name should change after changes are saved.	User Name should change after changes are saved.	Yes
2	**(Valid)** Changing Postal Code	New Postal Code should reflect in the	New Postal Code should reflect in	Yes

		GPS Location feature.	the GPS Location feature.	
3	**(Valid)** Changing password: password	Password changed; in valid format of 6 characters or longer.	User is able to log in with their new password.	Yes
4	**(Invalid)** Changing password: word	New password not in valid format of 6 characters or longer, Password not changed.	User is only able to log in with their old password as their password was not changed.	Yes
5	**(Invalid)** Changing postal code: not equal to 6 digits	New postal code does not contain 6 digits. Postal Code not changed.	User's postal code is not updated and the old postal code remains.	Yes

White Box Testing

I. Login

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basic Path Testing

Basis Paths:

1. Baseline path: 1, 2, 3, 5, 7, 9, 11, 12, 15
2. Basis path 2: 1, 2, 3, 4, 14
3. Basis path 3: 1, 2, 3, 5, 6, 14
4. Basis path 4: 1, 2, 3, 5, 7, 8, 14
5. Basis path 5: 1, 2, 3, 5, 7, 9, 10, 14
6. Basis path 6: 1, 2, 3, 5, 7, 9, 12, 13 14

C. Test Cases and Results

Input parameters: Email and Password

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Email: athena@gmail.com **(Valid)** Password: password	Successful Login.	Successful Login.	Yes
2	**(Invalid)** Email: [Empty] **(Valid)** Password: password	Error Prompt. "Please enter your email and password!"	Error Prompt. "Please enter your email and password!"	Yes
3	**(Invalid)** Email: athena@gmail or athenagmail.com **(Valid)** Password: password	Error Prompt. "Please enter your email in a valid format!"	Error Prompt. "Please enter your email in a valid format!"	Yes
4	**(Valid)** Email: athena@gmail.com **(Invalid)** Password: [Empty]	Error Prompt. "Please enter your email and password!"	Error Prompt. "Please enter your email and password!"	Yes
5	**(Valid)** Email: athena@gmail.com **(Invalid)** Password: pass	Error Prompt. "Password must be longer than 6 characters!"	Error Prompt. "Password must be longer than 6 characters!"	Yes

6	**(Invalid)** Email: admin1@gmail.com **(Invalid)** Password: passwor	Login Failed. Error Prompt. "Invalid login credentials. Email/Password not found/incorrect	Login Failed. Error Prompt. "Invalid login credentials. Email/Password not found/incorrect	Yes

II. Register

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basic Path Testing

Basis Paths:

1. Baseline path: 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, 18, 21
2. Basis path 2: 1, 2, 3, 4, 20
3. Basis path 3: 1, 2, 3, 5, 6, 20
4. Basis path 4: 1, 2, 3, 5, 7, 8, 20
5. Basis path 5: 1, 2, 3, 5, 7, 9, 10, 20
6. Basis path 6: 1, 2, 3, 5, 7, 9, 11, 12, 20
7. Basis path 7: 1, 2, 3, 5, 7, 9, 11, 13, 14, 20
8. Basis path 8: 1, 2, 3, 5, 7, 9, 11, 13, 15, 16, 20
9. Basis path 9: 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, 18, 19, 20

C. Test Cases and Results
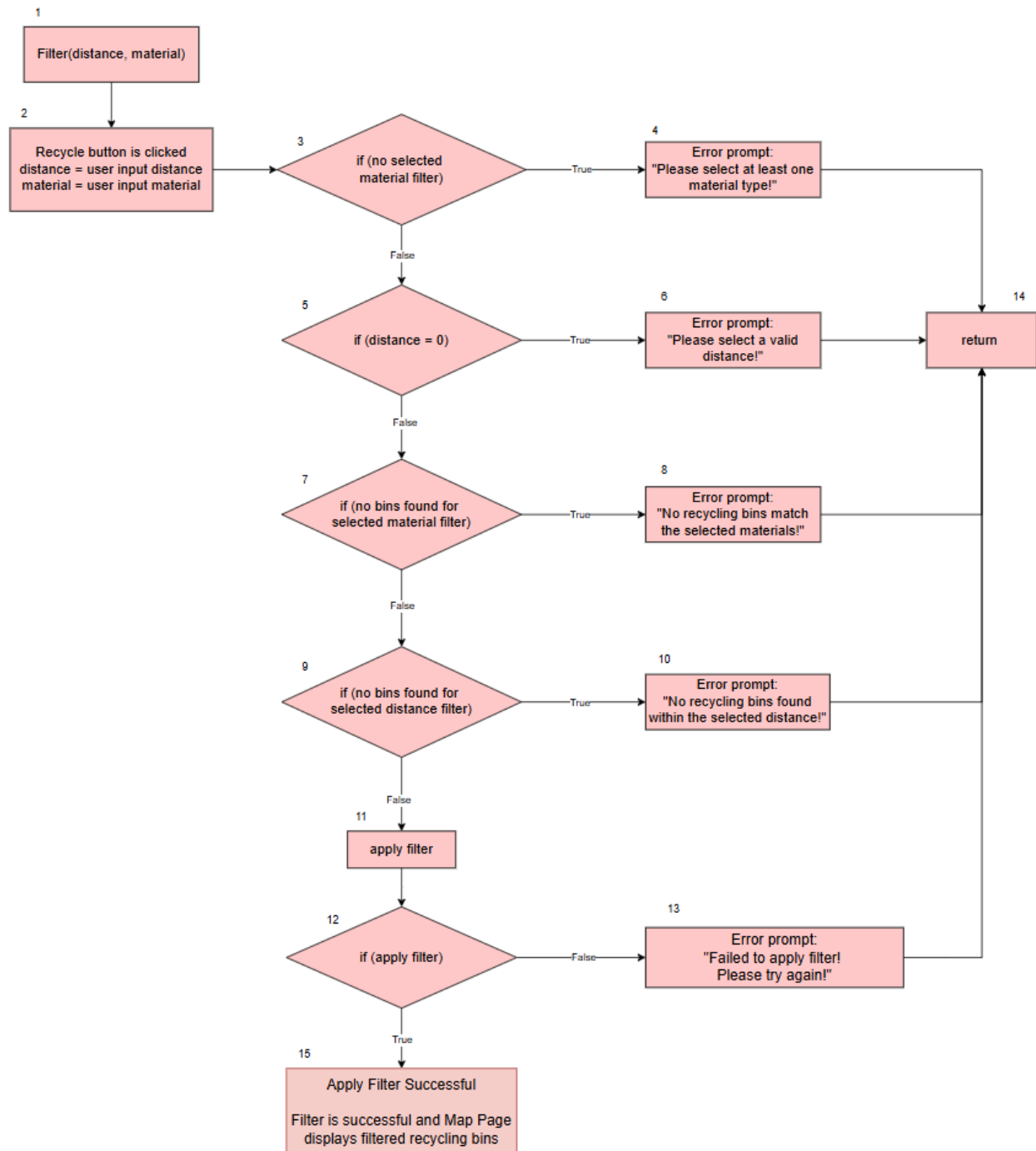
Input parameters: Name, Email, Password and Postal Code

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Valid)** Postal code: 288383	Successful Account Creation.	Successful Account Creation.	Yes
2	**(Valid)** Name: Athena **(Invalid)** Email: [Empty] **(Valid)** Password: password **(Valid)** Postal code: 288383	Error Prompt. "All fields are required!"	Error Prompt. "All fields are required!"	Yes
3	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail or	Error Prompt. "This email address is badly formatted!"	Error Prompt. "This email address is badly formatted!"	Yes

	athenagmail.com **(Valid)** Password: password **(Invalid)** Postal Code: 12345			
4	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Invalid)** Password: [Empty] **(Valid)** Postal code: 288383	Error Prompt. "All fields are required!"	Error Prompt. "All fields are required!"	Yes
5	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Invalid)** Password: pass **(Valid)** Postal code: 288383	Error Prompt. "Password must be longer than 6 characters!"	Error Prompt. "Password must be longer than 6 characters!"	Yes
6	**(Invalid)** Name: [Empty] **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Valid)** Postal code: 288383	Error Prompt. "All fields are required!"	Error Prompt. "All fields are required!"	Yes
7	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com	Error Prompt. "All fields are required!"	Error Prompt. "All fields are required!"	Yes

	(Valid) Password: password **(Invalid)** Postal code: [Empty]			
8	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Invalid)** Postal code: 2883	Error Prompt. "Please enter a valid 6-digit postal code!"	Error Prompt. "Please enter a valid 6-digit postal code!"	Yes
9	**(Valid)** Name: Athena **(Valid)** Email: athena@gmail.com **(Valid)** Password: password **(Valid)** Postal code: 288383	Error Prompt. "An error occurred during registration, please try again!"	Error Prompt. "An error occurred during registration, please try again!"	Yes

III. Filter (Map)

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basis Path Testing

<u>Basis Paths:</u>
1. Baseline path: 1, 2, 3, 5, 7, 9, 11, 12, 15
2. Basis path 2: 1, 2, 3, 4, 14
3. Basis path 3: 1, 2, 3, 5, 6, 14
4. Basis path 4: 1, 2, 3, 5, 7, 8, 14
5. Basis path 5: 1, 2, 3, 5, 7, 9, 10, 14
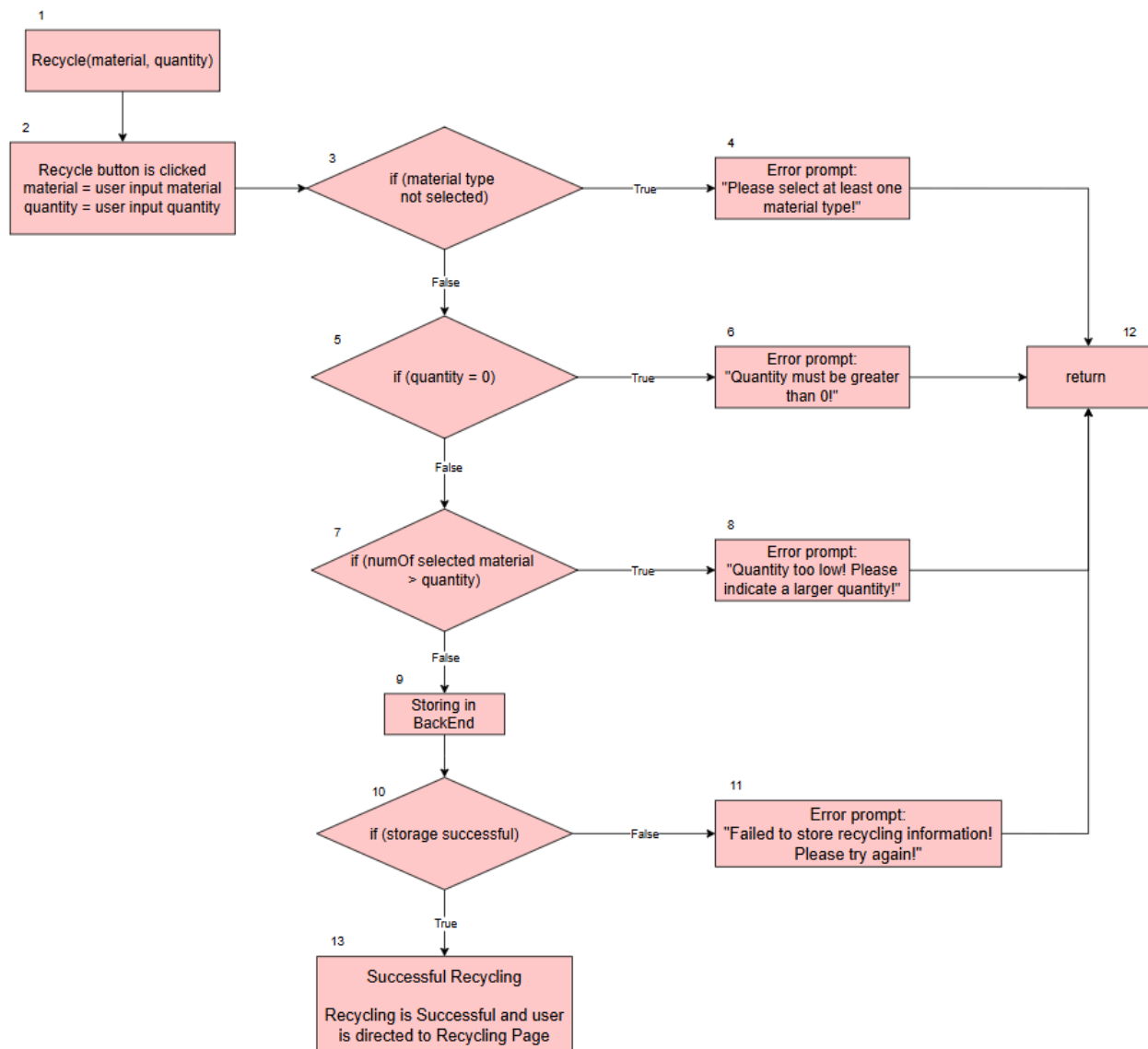6. Basis path 6: 1, 2, 3, 5, 7, 9, 11, 12, 13, 14

C. Test Cases and Results

Input parameters: Distance and Material Type

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Material Type: Plastic **(Valid)** Radius: 1000m	Returns a recycling bin within a given radius and accepted material type.	Returns a recycling bin within a 1000m radius from the user's location and accepts plastic.	Yes
2	**(Invalid)** Material Type: [Empty] **(Valid)** Radius: 1000m	Error Prompt. "Please select at least one material type!"	Error Prompt. "Please select at least one material type!"	Yes
3	**(Valid)** Material Type: Plastic **(Invalid)** Radius: 0m	Error Prompt. "Please select a valid distance!"	Error Prompt. "Please select a valid distance!"	Yes
4	**(Valid)** Material Type: Metal **(Valid)** Radius: 1000m	Error Prompt. "No recycling bins match the selected material types!"	Error Prompt. "No recycling bins match the selected material types!"	Yes
5	**(Valid)** Material Type: Plastic **(Valid)** Radius: 200m	Error Prompt. "No recycling bins found within the selected distance!"	Error Prompt. "No recycling bins found within the selected distance!"	Yes
6	**(Valid)** Material Type: Plastic	Error Prompt. "Failed to apply filters!	Error Prompt. "Failed to apply filters!	Yes

		Please try again!"	Please try again!"	
	(Valid) Radius: 1000m			

IV.   Recycling (Manually Input)

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basis Path Testing

Basis Paths:

1. Baseline path: 1, 2, 3, 5, 7, 9, 10, 13
2. Basis path 2: 1, 2, 3, 4, 12
3. Basis path 2: 1, 2, 3, 5, 6, 12
4. Basis path 2: 1, 2, 3, 5, 7, 8, 12
5. Basis path 2: 1, 2, 3, 5, 7, 9, 10, 11, 12

C. Test Cases and Results
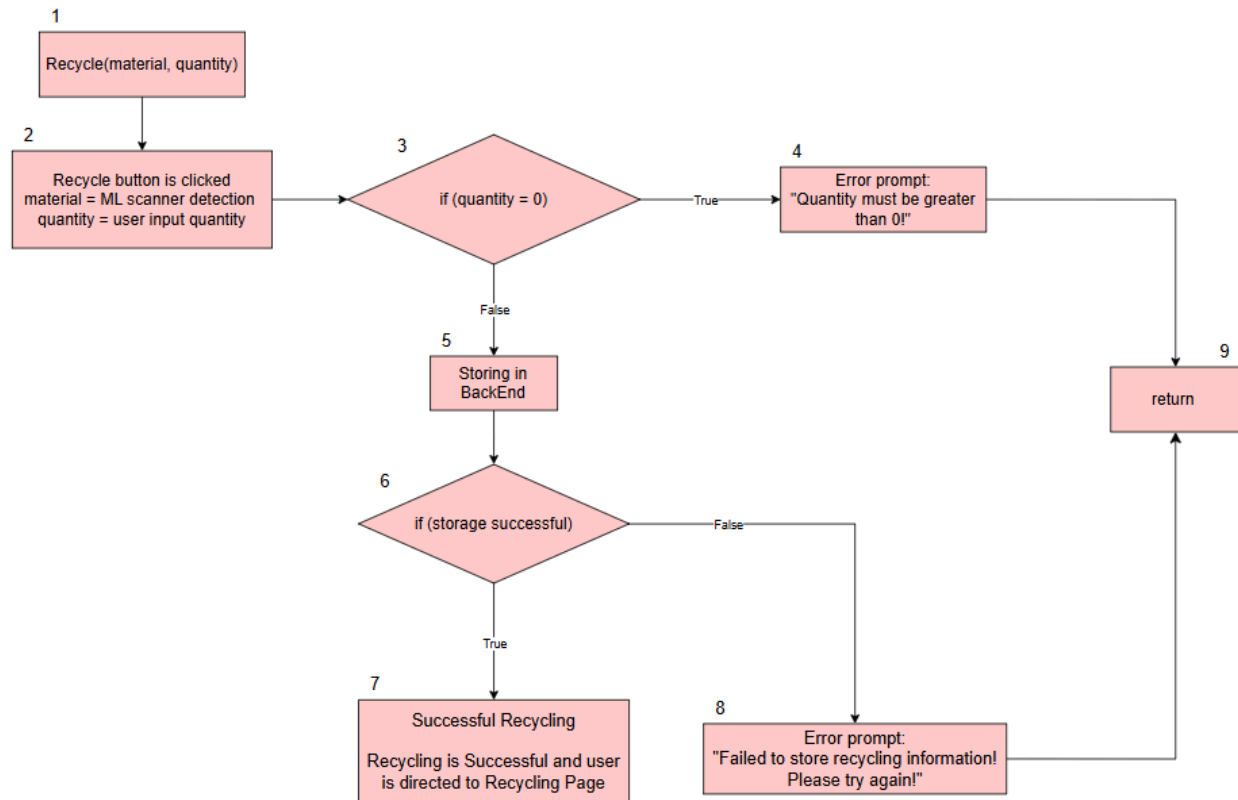
Input parameters: Material Type and Quantity

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Material: Plastics **(Valid)** Quantity: 1	Successfully Submitted.	Your upload was successful and your reward will be awarded in 3-5 working days.	Yes
2	**(Invalid)** Material: [Empty] **(Valid)** Quantity: 1	Error Prompt. "Please select at least 1 material type!"	Error Prompt. "Please select at least 1 material type!"	Yes
3	**(Valid)** Material: Plastics **(Invalid)** Quantity: 0	Error Prompt. "Quantity must be greater than 0!"	Error Prompt. "Quantity must be greater than 0!"	Yes
4	**(Valid)** Material: Plastics, Metal **(Valid)** Quantity: 1	Error Prompt. "Quantity too low! Please indicate a larger quantity!"	Error Prompt. "Quantity too low! Please indicate a larger quantity!"	Yes
5	**(Valid)** Material: Plastics **(Valid)** Quantity: 1	Error Prompt. "Failed to store recycling information! Please try again!"	Error Prompt. "Failed to store recycling information! Please try again!"	Yes

V. Recycling (Scan Materials)

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basis Path Testing

Basis Paths:
1. Baseline path: 1, 2, 3, 5, 6, 7
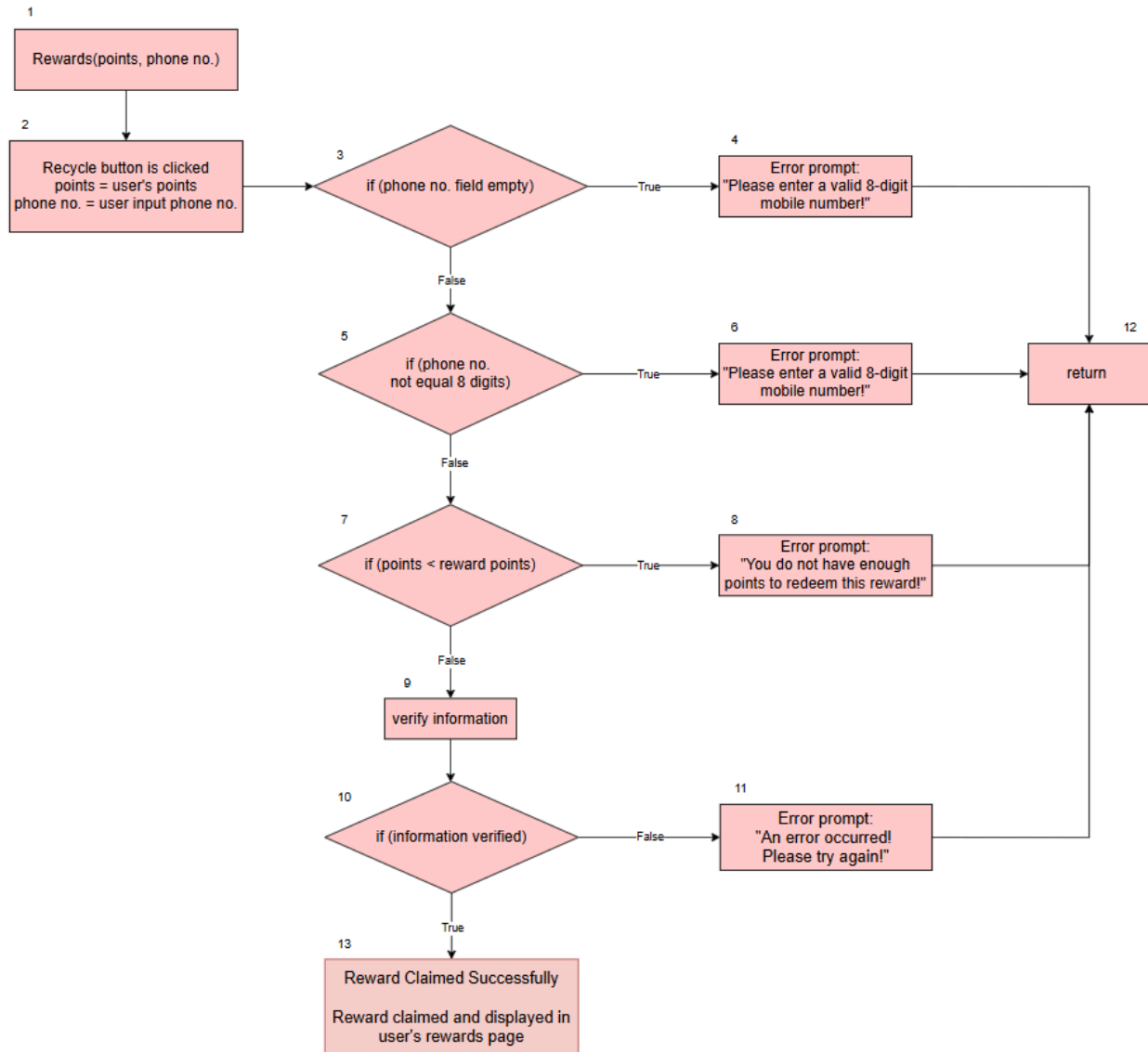2. Basis path 2: 1, 2, 3, 4, 9
3. Basis path 3: 1, 2, 3, 5, 6, 8, 9

C. Test Cases and Results

Input parameters: Material Scanned and Quantity

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Plastic Scanned **(Valid)** Quantity: 1	Material Scanned: Plastic Successfully Submitted.	Material Scanned: Plastic (76%) Your upload was successful	Yes
2	**(Valid)** Plastic Scanned **(Valid)** Quantity: 0	Error prompt. "Quantity must be larger than 0!"	Error prompt. "Quantity must be larger than 0!"	Yes
3	**(Valid)** Plastic Scanned **(Valid)** Quantity: 1	Material Scanned: Plastic Error prompt. "Failed to store recycling information! Please try again!"	Material Scanned: Plastic (76%) Error prompt. "Failed to store recycling information! Please try again!"	Yes

VI. Reward

A. Control Flow Graph

Please refer to the raw image file that is uploaded together with this document for a clearer image.

B. Basis Path Testing

<u>Basis Paths:</u>
1. Baseline path: 1, 2, 3, 5, 7, 9, 10, 13
2. Basis path 2: 1, 2, 3, 4, 12
3. Basis path 3: 1, 2, 3, 5, 6, 12
4. Basis path 4: 1, 2, 3, 5, 7, 8, 12
5. Basis path 5: 1, 2, 3, 5, 7, 9, 10, 11, 12

C. Test Cases and Results

No.	Test Input	Expected Output	Actual Output	Pass?
1	**(Valid)** Claiming reward (100 Points) with 300 Points remaining **(Valid)** Mobile Number: 97710482	Rewards claimed. User's points deducted.	Rewards successfully claimed and can be found under 'My Rewards'.	Yes
2	**(Valid)** Claiming reward (100 Points) with 300 Points remaining **(Invalid)** Mobile Number: [Empty]	Error prompt. "Please enter a valid 8-digit mobile number!"	Error prompt. "Please enter a valid 8-digit mobile number!"	Yes
3	**(Valid)** Claiming reward (100 Points) with 300 Points remaining **(Invalid)** Mobile Number: 9771	Error prompt. "Please enter a valid 8-digit mobile number!"	Error prompt. "Please enter a valid 8-digit mobile number!"	Yes
4	**(Invalid)** Claiming reward (200 Points) with 100 Points remaining **(Valid)** Mobile Number: 97710482	Error prompt. "You do not have enough points to redeem this reward!"	Error prompt. "You do not have enough points to redeem this reward!"	Yes
5	**(Valid)** Claiming reward (100 Points) with 300 Points remaining	Error prompt. "An error occurred! Please try again!"	Error prompt. "An error occurred! Please try again!"	Yes

	(Valid) Mobile Number: 97710482			

Demo Script:

Register & Login:

Login Sequence:

1. On the cover page, click login, start off with the login page.
2. Transition to register page through bottom text, "New to TRA$H? Sign Up".
3. After registration, switch back to the login page.
4. Test Cases:
   - All fields empty, user unable to login, error prompt.
   - 1 field filled, 1 empty, user unable to login, error prompt.
   - Both fields are filled, check whether parameters are formatted correctly and found in the database through Firebase Authentication.
   - Email not found/incorrect, user unable to login, error prompt.
   - Password not found/incorrect, user unable to login, error prompt.
5. Login successful, redirect user to home page, store user uid in user_session.dart file for easy access when trying to access firebase.

Register Sequence:

1. From the login page, show the register sequence.
2. Test Cases:
   - All fields are empty, user unable to register, error prompt.
   - 1 field filled, rest empty, user unable to register, error prompt.
   - 2 fields filled, rest empty, user unable to register, error prompt.
   - 3 fields filled, rest empty, user unable to register, error prompt.
   - All fields are filled, the user is only able to register when email and password are correctly formatted.
   - Email must be formatted with xx@xxx.com otherwise user unable to register, error prompt.
   - Password length must be 6 characters or longer regardless of capitalisation, special characters not required.
3. After successful registration, the user will be redirected to the login page automatically.
4. Otherwise, go to the login page by clicking the bottom text that says "Already have an account? Sign in".

Map & Recycling:

Map Sequence:

1. When the user navigates to the map page, the system will generate a map view of all recycling bins and their icons.
2. Interactive features such as zoom in/out and movement of map, centering user location through the button are available.
3. Clicking on the icon of recycling bins (green for normal waste and purple for e-waste) will display a marker info card that is unique to each recycling bin.
4. There's a favourite/unfavourite function which uses the heart icon found on the marker info card as well as in the favourite list.
   - Favouriting a bin is only allowed through the heart icon found on the selected bin's marker info card on the map view.
   - Unfavouriting can be done either in the user's favourite list or selected bin's marker info card.
5. The user is also able to filter recycling bins by distance/material type .
   - Toggling of the parameters to filter the bins by.
   - Select the radius (metre) up to 1000m.
   - Select the material type accepted by recycling bins.
   - Ensure 'Apply' and 'Reset' buttons are working as intended.
6. The user can also search for recycling bins using the search bar, through full/semi postal code and full/semi recycling bin address.
   - Postal Code:
     - searching a valid postal code (full 6 digits) returns a recycling bin.
     - searching an invalid postal code (full 6 digits) returns nothing, the system displays 'no bin found'.
     - searching a valid postal code (1-5 digits) returns a recycling bin.
     - searching an invalid postal code (1-5 6 digits) returns nothing, the system displays 'no bin found'.
   - Recycling Bin Address
     - searching a valid address (full address) returns a recycling bin.
     - searching an invalid address (full address) returns nothing, the system displays 'no bin found'.
     - searching a valid address (partial address) returns a recycling bin.
     - searching an invalid address (partial address) returns nothing, the system displays 'no bin found'.
7. On the marker info card of each bin, clicking 'click here for directions' will allow the user to select their desired transport from the 3 transport options given.
8. After clicking any of the 3 transport options, a step by step direction guide and polyline will show on the map.

Recycling Sequence:

1. On the recycling screen, click the "manual input" card, start with this sequence.
2. Test Cases:
   - Material not selected, user unable to proceed, error prompt.
   - 0 quantity selected, user unable to proceed, error prompt.
   - Number of material selected > quantity selected, user unable to proceed, error prompt.
3. After selecting the material and quantity, the user can either upload an image from their gallery or take a picture using their camera for verification.
4. After finishing this sequence, the user will be returned to the recycling screen, click the "scan material" card, starting a new recycling sequence.
5. User's camera will be used by the app to detect the material in the view of the camera.
6. User will select the quantity and the quantity must be more than 0, otherwise there will be an error prompt and the user is unable to proceed.
7. the user can either upload an image from their gallery or take a picture using their camera for verification.
8. After finishing this sequence, the user will be returned to the recycling screen.

Home & Reward & History:

Home & History Sequence:

1. Home Page consists of a top bar displaying user's points and claimed rewards, clicking on it will redirect the user to the rewards page.
2. There is a graph called "My Progress" that displays a mock up of the user's recycling statistics, clicking on it will display the user's recycling history.
3. Quick links are also found that redirect the user to the recycling page using the 'Manually Input' and 'Scan Material' buttons.
4. The user's favourited bins can also be found in home page, clicking on the 'click here for directions' button will redirect the user to the selected bin on map page.
5. The user's recycling history will be updated through submitting a new recycling entry through 'Manually Input' or 'Scan Material' recycling sequence.

Reward Sequence:

1. Displays all possible rewards the user can claim.
2. Once a user claims a reward through the dialog box, the reward will be greyed out and added to the user's reward, user's points will also be deducted.
3. The home page will also reflect this change and display the number of rewards and user's points are also updated.
4. Test Cases:
   - The user has insufficient points and tries to claim a reward, user unable to claim reward, error prompt.
   - The user tries to claim a reward they have already claimed, user unable to claim reward, error prompt.
   - The user tries to claim a reward but enters an invalid phone number (not 8 digits), user unable to claim reward, error prompt.

Setting & Profile & Logout:

Setting Sequence:

1. User settings will be shown (stored and retrieved from firestore), user is able to toggle their settings.
2. Users can click into the small box above to edit their personal details, redirecting to the profile page.
3. After updating the user's profile, the 'name' attribute in settings page should also be updated to reflect the change.
4. Logout and log back in to show all newly added data has been stored in the cloud and is able to be retrieved from the cloud.

Profile Sequence:

1. The user is able to change their name, postal code and password, email is not allowed because it is the unique identifier in firebase Auth.
2. Test Cases:
   - Name attribute has no restrictions and can be changed according to the user's preference.
   - Postal code must be 6-digits, same as registration, otherwise the postal code won't be updated.
   - Password must be in a valid format, same as registration, 6 characters or longer regardless of capitalisation, special characters not required, otherwise password won't be updated.

3. After all changes are made, the parameters changed should be updated and reflected in the profile page.

Logout Sequence:

1. Click the logout button to log the user out of the current session.
2. Login back into the app using the same account details (or new password if password got changed)
3. Check the favourite list to verify that favourite bins are retrieved correctly.
4. Check the history list to verify that the user's history has been retrieved correctly.
5. Check the user's settings to verify that the user's settings have been retrieved correctly.
6. Check the user's profile to verify that the user's profile has been retrieved correctly .