



# MOBILE PLATFORM APPLICATIONS: TESTING DOCUMENT

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# NTU Click & Collect Smart Campus Testing Document

## Demo video

<https://youtu.be/AAYH3KrAQmQ>

## User Testing

User Testing is testing a key strategy that is used to test an application using a user's feedback. This testing allows the developer to get real feedback from potential users can critique the design, functionality and propose new ideas which can be implemented to the application. I have used a three-stage user testing strategy that reviews the application at an early stage of development, the middle stage of the development, and post-development.

User Testing - Session 1 - February	
<b>What is being tested?</b>  In the first iteration of the user testing the user will be testing the NTU Click and Collect app which aims to allow students and visitors on the Clifton campus to order food for collection.  In this iteration, the sign-up page, login page, and a basic design of the dashboard is tested along with the basic implementation of authentication with firebase.  Originally, I had decided to deter from the original design and go with a blue login page and sign up page with minimalistic. This design layout can be seen in Appendix 1.  The main dashboard had little to no design with just a couple of buttons that would link to other pages with no design.	<b>What worked?</b>  Before the app was sent for user testing the login and sign up page worked without the implementation of firebase. The password and username were just being held in strings. The app was able to navigate between the login page, sign up page, and the main dashboard.  <b>Aims of this user test:</b> <ul style="list-style-type: none"><li>• Receive feedback on design.</li><li>• Test login and sign up pages</li><li>• Navigation between different activities.</li><li>• Test if the app did not crash.</li></ul>
<b>Name: Matthew Rose</b>	
<b>User Feedback:</b> Due to the app being at its early stages the user was able to sign up and login however there is no database connection, therefore, it is not as functional as expected. The app has a blue background which not the best choice and should be darker so text can be seen more evidently. The login and sign-up pages work however when clicked upon the NTU crest image the app does crash. The dashboard has limited functionality and more development is required maybe add a bottom navigation bar.	
<b>Name: Saniya Singh</b>	
<b>User Feedback:</b>	

The app so far is satisfactory as the login page and registration up both works. However, when the app is closed down the user is required to register again before logging into the app. The dashboard requires more thought as it does not have a good design yet with just only a few buttons for navigating to different screens. The colour blue colour is of the background is fine however the text is harder to read and possibly the text should be white and bigger.

**Name: Smita Singh**

**User Feedback:**

The colour scheme is a good choice the text can be a bit bigger. There is use of different fonts on the design which should be the same. The registration page works but it could be helpful for a message to be displayed on successful and unsuccessful registration. There is no message when the user fails to login. Also, the user randomly tapped on the screen which causes the app to crash.

**Name: Kriti Shewaramani**

**User Feedback:**

The main page after login requires more development with side navigation recommended by the tester to hold the logout and the navigation pages. The user has recommended changing the colour scheme of dark blue to grey to capture the university colours better. This user also found the application crashing on the login page when randomly clicked on the screen.

**What needed improvement?**

The colour scheme of the app needs to be reviewed and the layout of the widgets are required to be improved. The fonts are required to be consistent in the application. There is limited navigation on the dashboard which requires more development. The Login and registration pages require improvement with a Firebase integrated authentication by email. The onclick characteristic should be checked on the login page as the app crashed multiple times in the user testing sessions.

**How this user testing helped?**

The user testing helped as I was able to identify that there was an onclick characteristic linked to the NTU crest image which was causing the application to crash when users clicked on the login page randomly. I was also able to identify that some fonts were different and it is important to keep the fonts consistent in the application due to the design guidelines. From this user testing, I have also realised that I would need to integrate firebase authentication and develop my dashboard with navigation on the side.

**What to expect in the next iteration?**

In the next iteration, the app is expected to have a navigation bar from the side a better dashboard, and some clickable icons for representing food and restaurants. Firebase authentication is also required for the next iteration with a change in the colour scheme and font size.

User Testing - Session 2 – Mid March	
<p><b>What is being tested?</b></p> <p>In the second user testing, session improvements have been made and the users will be testing a refined login and sign up design that is integrated with firebase authentication. The users will also be testing the new splash screen and the dashboard page which has been improved. Finally, in the session, the users will be testing a new activity which is the restaurants activity which has the three restaurants available on campus. The design of the app can be seen in appendix 2.</p>	<p><b>What worked?</b></p> <p>Before the app was given to users the login page and sign up page was fully functional and as identified in the previous iteration the login page does not crash anymore. Also, the login page uses firebase authentication instead of static strings. The dashboard now uses two recycler views one to hold different types of restaurants and the other hold different food options. A navigation slide is also present using an animation.</p> <p><b>Aims of this user test:</b></p> <ul style="list-style-type: none"> <li>• To test the splash screen and its length</li> <li>• To test the new login and registration pages</li> <li>• To test the dashboard and its recycler views.</li> <li>• To test the restaurant's activity.</li> </ul>
<p><b>Name: Matthew Rose</b></p>	
<p><b>User Feedback:</b></p> <p>The app has been developed and the colour change from the royal blue colour to a grey colour represents the university colours well which is seen on both the login page and the registration page. The dashboard is designed well and the navigation slide works however when clicked on the navigation items the app crashes. When the restaurant images are clicked on the dashboard the app crashes. The app is well designed this time with good use of colours, fonts, and layouts.</p>	
<p><b>Name: Saniya Singh</b></p>	
<p><b>User Feedback:</b></p> <p>The app looks much better from the design point of view however there are problems with the functionality of the app as the app crashes when an item is clicked on the navigation slider. The splash screen is a good addition to the app and the length of the splash screen is just right. The dashboard has a unique design and the colours used for the application represent the University well. However, the dashboard is still not as functional as it should be as the app crashes when clicked on random elements of the design.</p>	
<p><b>Name: Smita Singh</b></p>	
<p><b>User Feedback:</b></p> <p>The app should allow the user to select a restaurant or an item of food that they would like to order however when clicked on an item the app crashes on the dashboard. The slide navigation is a good addition but again there is nowhere to navigate to. The new</p>	

restaurant activity is a good addition and the ability to scroll is also very good however there is not much functionality in this activity. The splash screen is well designed and the login and registration page are well designed and fully functional.

**Name: Kriti Shewaramani**

**User Feedback:**

There is a big problem as the app crashes when the navigation items are clicked on also the navigation slide animation works however when clicked on the navigation sidebar icon on the main page the navigation drawer does not open up. The app crashes when a food item is clicked and needs attention. The design is much better and the colours, fonts, and layouts are consistent. The recycler view representing the restaurants is very creative and a good addition.

**What needed improvement?**

The app's functionality is the main point that has been addressed in the feedback from the users. More work is required on the dashboard and navigation of the app needs to be improved. More functionality needs to be implemented to allow the user to choose a specific food item and place it in their basket which shows all the food items chosen and can remove the food items if not wanted. Possibly a map feature can also be added to show where these restaurants are on Clifton campus.

**How this user testing helped?**

This user testing session was very helpful in identifying the failures in the dashboard as some items were able to navigate to different activities however the app crashed when some users clicked on items I did not expect them to. The navigation slider animation was the main testing feature I wanted users to test however I should have implemented the navigation of the drawer as well. This user testing session was very helpful in identifying areas of improvement and gave confidence in the work I was doing as I felt I was on track and producing a good app.

**What to expect in the next iteration?**

In the next iteration, the app is expected to be finished with the user able to choose the restaurant of their choice, food item of their choice, and add the item to the cart. The users should be able to get a message saying their order should be ready for collection in 30 minutes. Once the order is sent for collection the firebase database must be updated. Problems with the dashboard and navigation drawer must be sorted also the navigation icon on the dashboard is required to be functional.

**User Testing - Session 3 - End March**

**What is being tested?**

In the third session, the whole app has been completed and is ready for its final user testing. This user testing session only comprises two users testing the app. The app is tested for bugs and general feedback from the users on all the activities. The map feature and cart feature are two new aspects

**What worked?**

Before the app was given to users all features of the app we're working users were able to register and login creating accounts for them on firebase. Users can successfully login and choose the food outlet they want to pick items from the menu and add them to the cart. Users

of the application which are to be tested by the user. In the last iteration problems with the navigation drawer and dashboard had been identified which have now been fixed and require testing. The design of the app can be seen in Appendix 3.	<p>are also able to remove these items from the cart and order them for collection. The navigation and usability of the app works well.</p> <p><b>Aims of this user test:</b></p> <ul style="list-style-type: none"> <li>• Test the functionality of the login and registration page with destructive techniques.</li> <li>• Test dashboard and its recycler views.</li> <li>• Test the ability to add items to the cart and navigation in the app.</li> </ul>
<p><b>Name: Saniya Singh</b></p> <p><b>User Feedback:</b> The app is fully functional and the design is good. Very well laid out however the search bar does not function. The user is successfully able to add items to the basket and order for collection. However, the cart does not delete all the items once the order has been processed. The map is a good feature to have to find where the restaurant outlets are. Overall the application is good and achieves the functionality it was set out to.</p>	
<p><b>Name: Kriti Shewaramani</b></p> <p><b>User Feedback:</b> The app allows the user to create an account add items to order and send the order for collection. The cart allows users to remove items from the cart which is good and is fully functional. The navigation has improved and the app is simple to use as the layout is well designed. A payment system could be integrated so the user can pay from the app instead of paying at collection.</p>	
<p><b>What needed improvement?</b></p> <p>The app has come to a completion and all of its features which were meant set out to be achieved have been however small errors have been highlighted and can be done in the future. The search bar on the main page is not functional hence that requires improvement. Also, one of the users would like a payment system integrated into the app making it easier for users to pay.</p>	<p><b>How this user testing helped?</b></p> <p>This iteration of user testing helped test the functionality of the fully implemented app. This iteration has helped highlight any improvements which can be made in the future such as a payment system and implementing the search functionality.</p>
<p><b>Future work</b> In the future, I would like to improve the app by implementing the search functionality which is on the dashboard along with integrating a payment system for users so they can pay within the app. For this project, I had also been working on a chatbot using Dialogflow which would give users information about the restaurants on campus and the food items on the menus. However due I was not able to fully implement this with the existing</p>	

application hence it has not been included in the final product. In the future, I would like to carry on with this and implement it further so users can make orders using a chatbot.

## Unit Testing

Unit testing has been used in this project to double-check the correct functionality of the code written. I have been able to write unit test functions to check the creation of activities the ability for users to add items to the cart. The implemented unit tests below are also able to add and subtract the total cost of the order. Examples of this can be seen in the extracts of code below which have helped identify any errors and check that incorrect values in the system do not harm it.

The unit tests below check the price conversion of the string variable into a double. In the implemented function data is retrieved from the Firestore database in a string format which is then converted into a double so the total value of the cart can be identified. Further unit tests can be found in the testing file of the project.

```
package com.example.foodcollectionntu.User;

import com.example.foodcollectionntu.helperClass.dashboardAdapter.ItemData;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

import java.util.List;

import static org.junit.Assert.*;

public class CartActivityTest {

    private CartActivity activity;

    @Before
    public void setUp() throws Exception {

        activity = new CartActivity();

    }

    @After
    public void tearDown() throws Exception {
        activity = null;
    }

    @Test
    public void calculateAmount() {
        String val = "£0.99";
        Double price = Double.parseDouble(val);
        List<ItemData> itemDataList;
        itemDataList.getPrice();

        assertEquals(2.99 , activity.calculateAmount());

        assertEquals(0.99, calculateAmount(val));
        assertEquals(5.88, calculateAmount(val));
        assertEquals(0.34, calculateAmount(val));
        assertEquals(3.49, calculateAmount(val));
    }
}
```



```

    }

    @Test
    public void calculateAmount() {
        String val = "6.99";
        Double price = Double.parseDouble(val);

        assertEquals(1.00, calculateAmount(val));
        assertEquals(2.443244, calculateAmount(val));
        assertEquals(2, calculateAmount(val));
        assertEquals("234rtt", calculateAmount(val));
    }

    @Test
    public void calculateAmount() {
        String val = "6.99";
        Double price = Double.parseDouble(val);

        assertEquals("3.233233232", calculateAmount(val));
        assertEquals("44444444", calculateAmount(val));
        assertEquals(2333.3, calculateAmount(val));
        assertEquals("234rtt", calculateAmount(val));
    }

    @Test
    public void calculateAmount() {
        String val = "6.99";
        Double price = Double.parseDouble(val);

        assertEquals(1.00112122, calculateAmount(val));
        assertEquals("HIHEFEFE", calculateAmount(val));
        assertEquals(22222222, calculateAmount(val));
        assertEquals("234rtt", calculateAmount(val));
    }
}

```

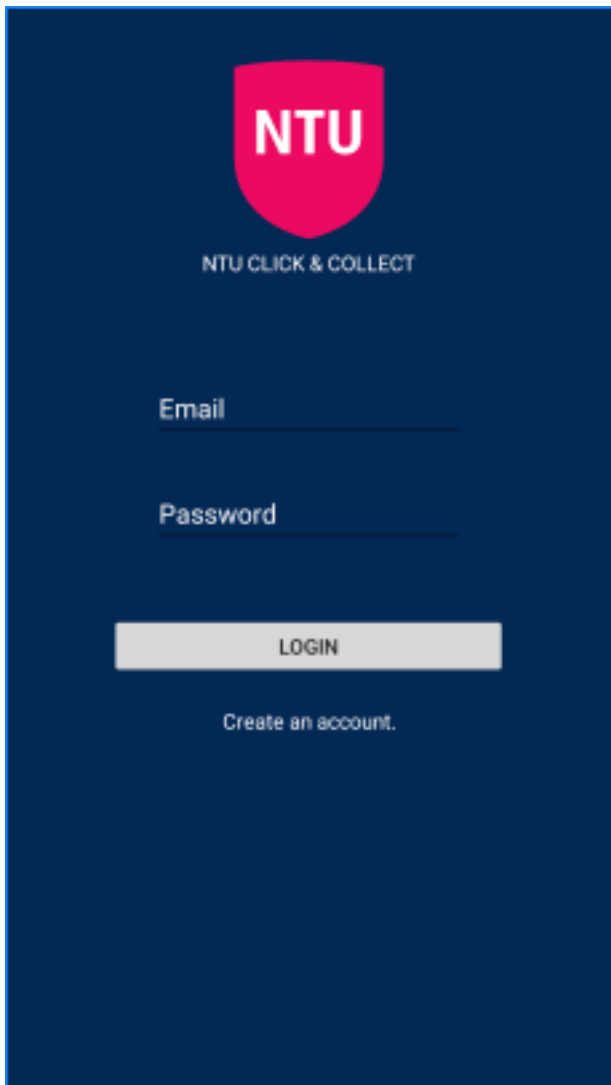
## Unit testing Discussion

The unit tests I have performed have been difficult to implement as I have written these after implementing my solution. It would have been much easier to write the unit tests out first and then implement my solution using a test-driven development strategy. However, the unit tests I have implemented above and in the testing files. These tests have helped me double-check the implementation and functionality of the code by running tests that would pass and by running tests that would fail.

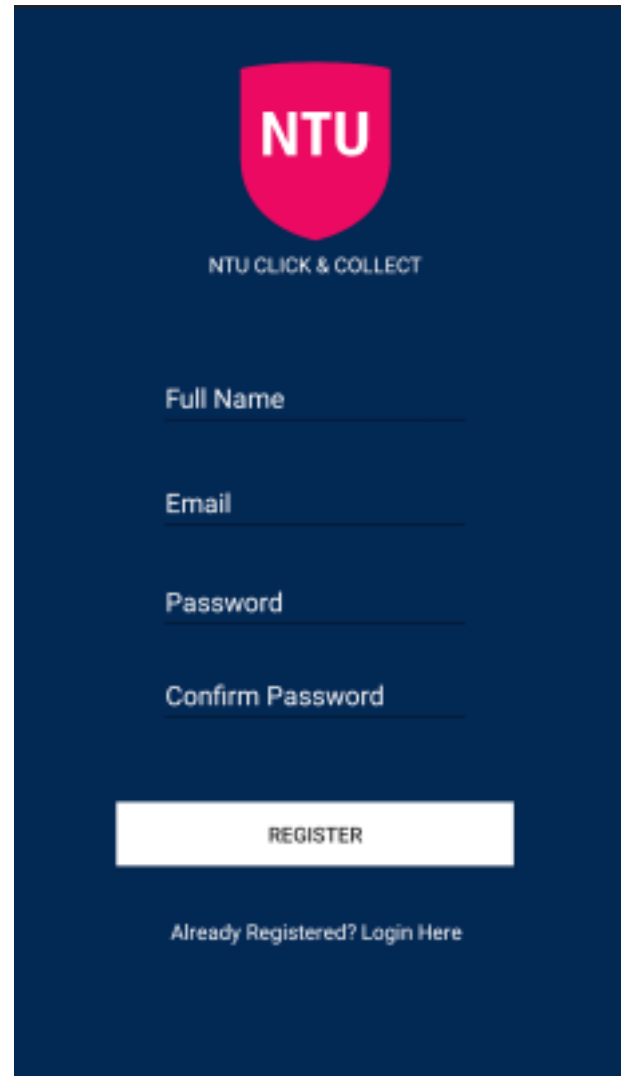
The user testing has allowed me to check the total amount function by entering values that I expect to pass and values that I know will not pass. An error I had found was that when I had originally entered the string into the function I had entered the pound sign from the database. This was crashing my application and was identified from my unit tests. I then altered the function to get rid of the pound sign convert the string to a double and then concatenate the pound sign back on to the value of the double.

Appendices:

Appendix 1 – User Testing implementation images



The image shows a login form for NTU Click & Collect. At the top is the NTU logo, a red shield with 'NTU' in white. Below it is the text 'NTU CLICK & COLLECT'. The form has two input fields: 'Email' and 'Password'. Below these fields is a grey button labeled 'LOGIN'. At the bottom, there is a link that says 'Create an account.'



The image shows a registration form for NTU Click & Collect. At the top is the NTU logo, a red shield with 'NTU' in white. Below it is the text 'NTU CLICK & COLLECT'. The form has four input fields: 'Full Name', 'Email', 'Password', and 'Confirm Password'. Below these fields is a white button labeled 'REGISTER'. At the bottom, there is a link that says 'Already Registered? Login Here'.

Click and collect

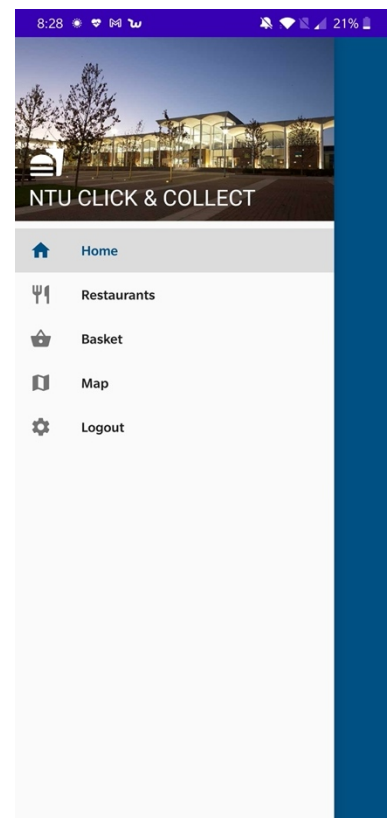
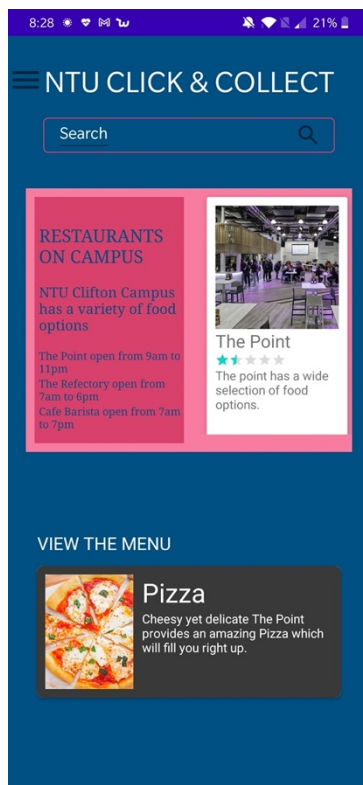
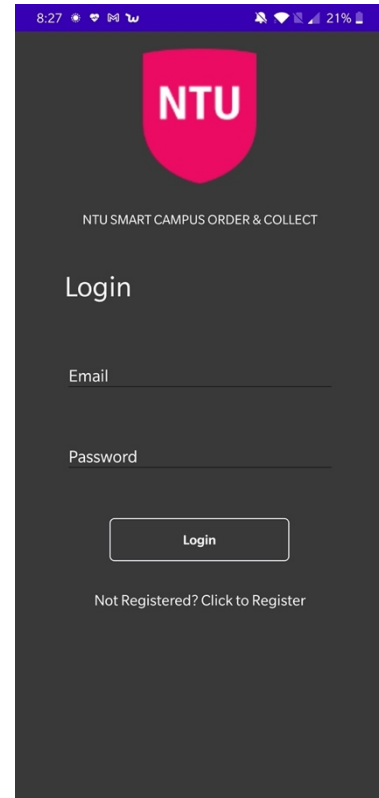
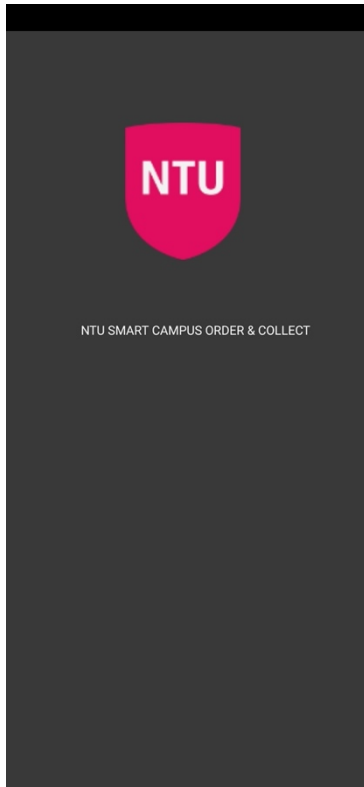
HOME

RESTAURANTS

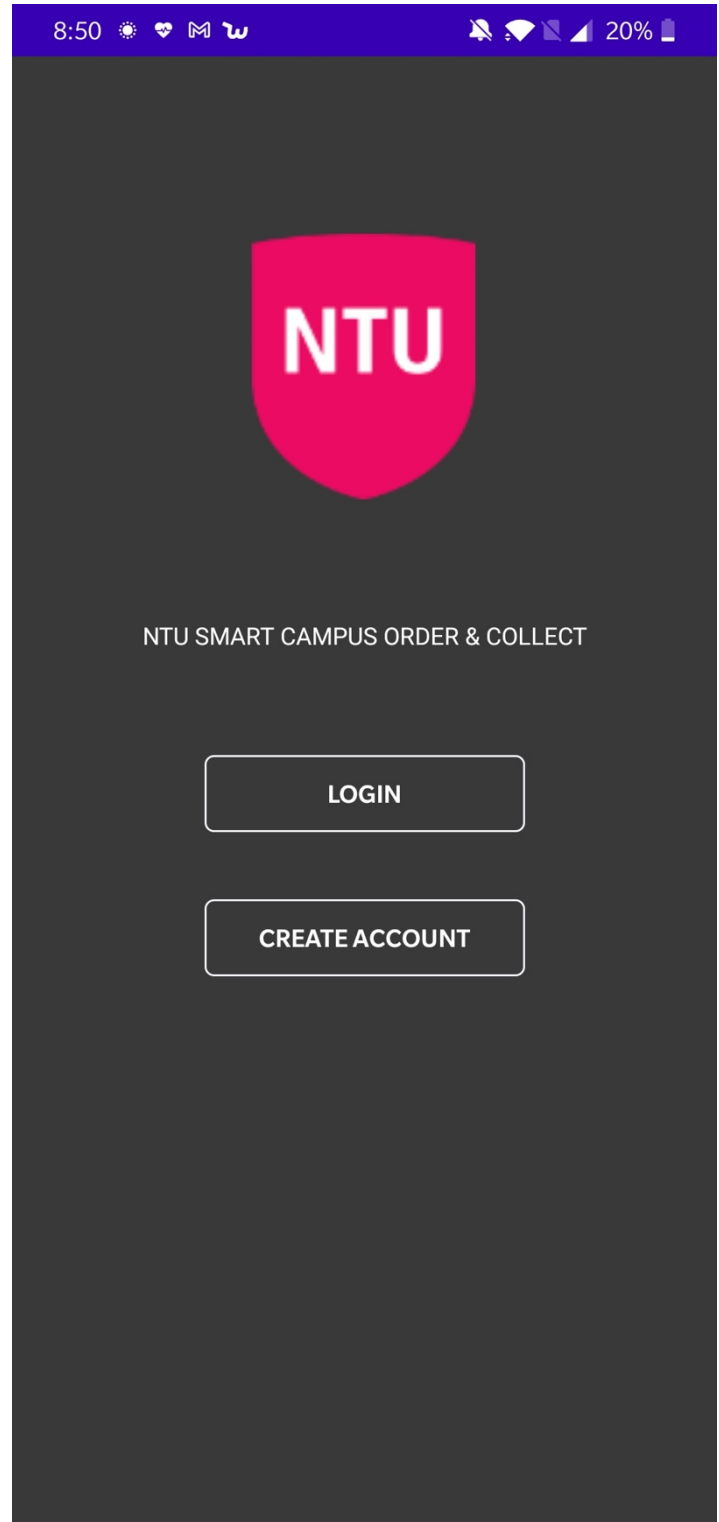
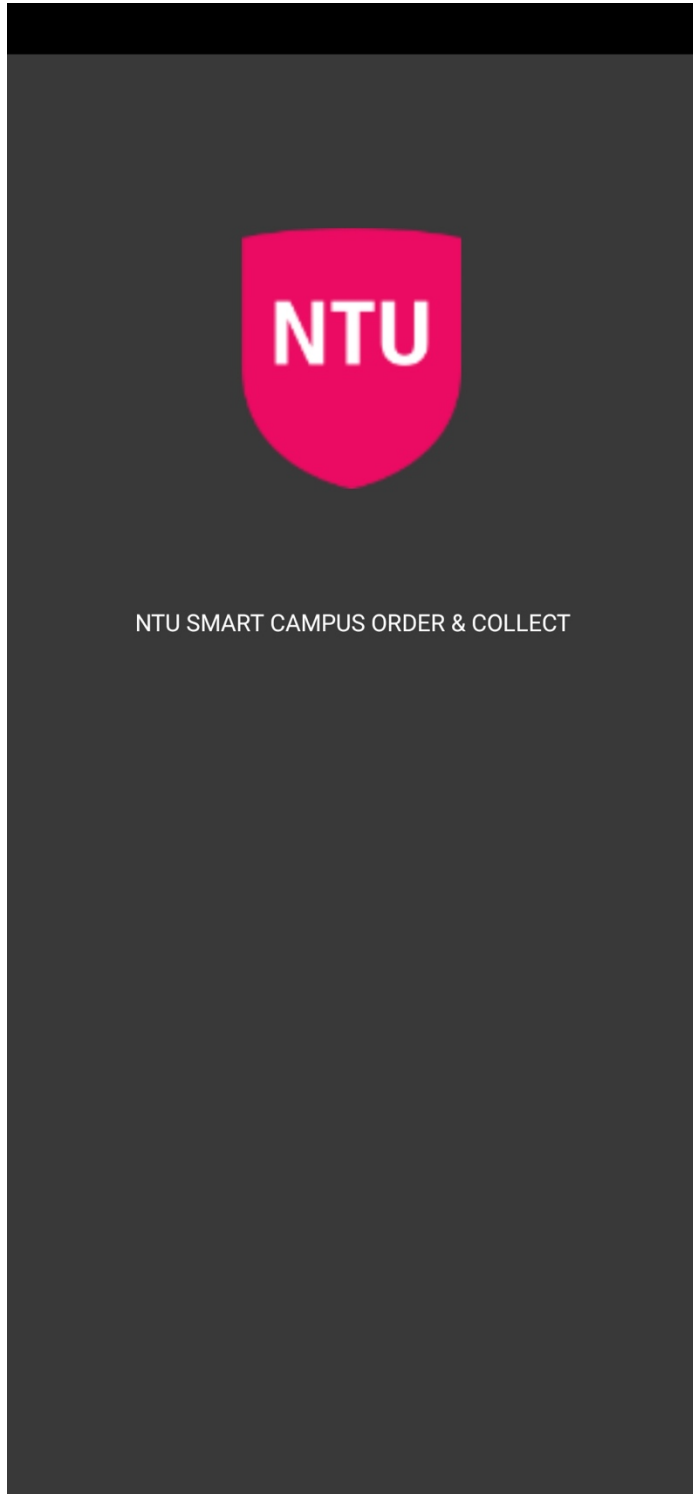
MENU

LOGOUT

## Appendix 2 – Second user testing



## Appendix 3 – Third User Testing



8:50

20%

NTU SMART CAMPUS ORDER & COLLECT

Register

Name

Surname

Email

Password

Register

Already have an account?

8:51

20%

NTU SMART CAMPUS ORDER & COLLECT

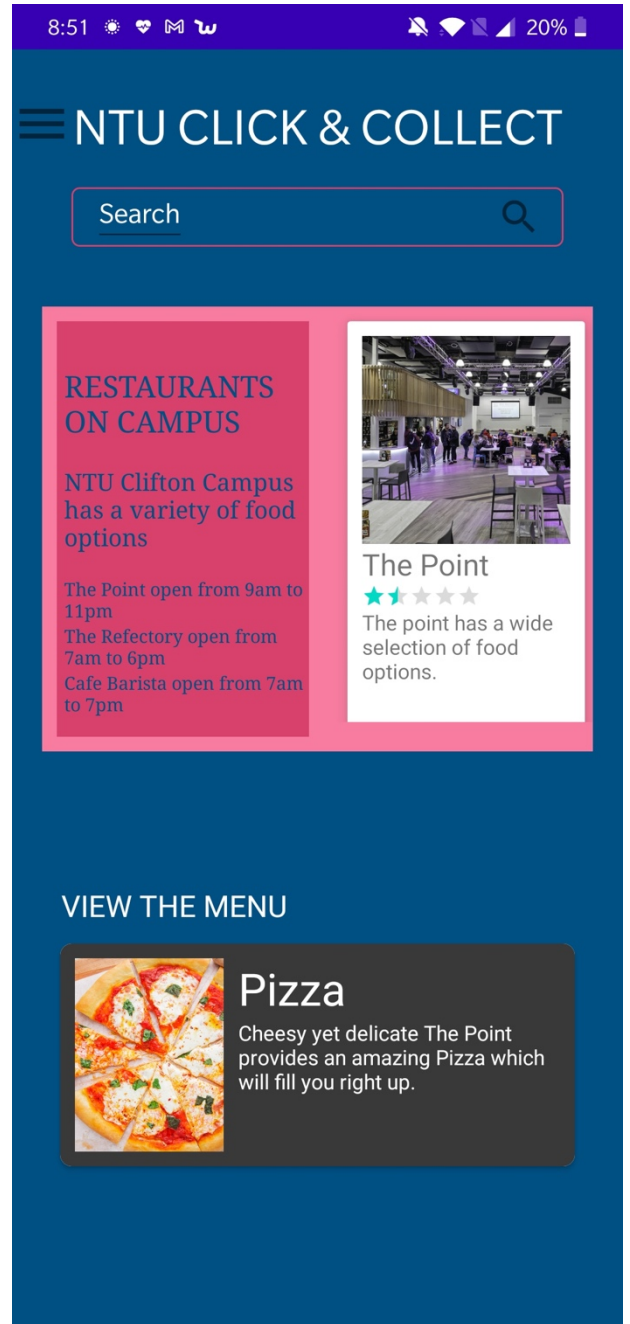
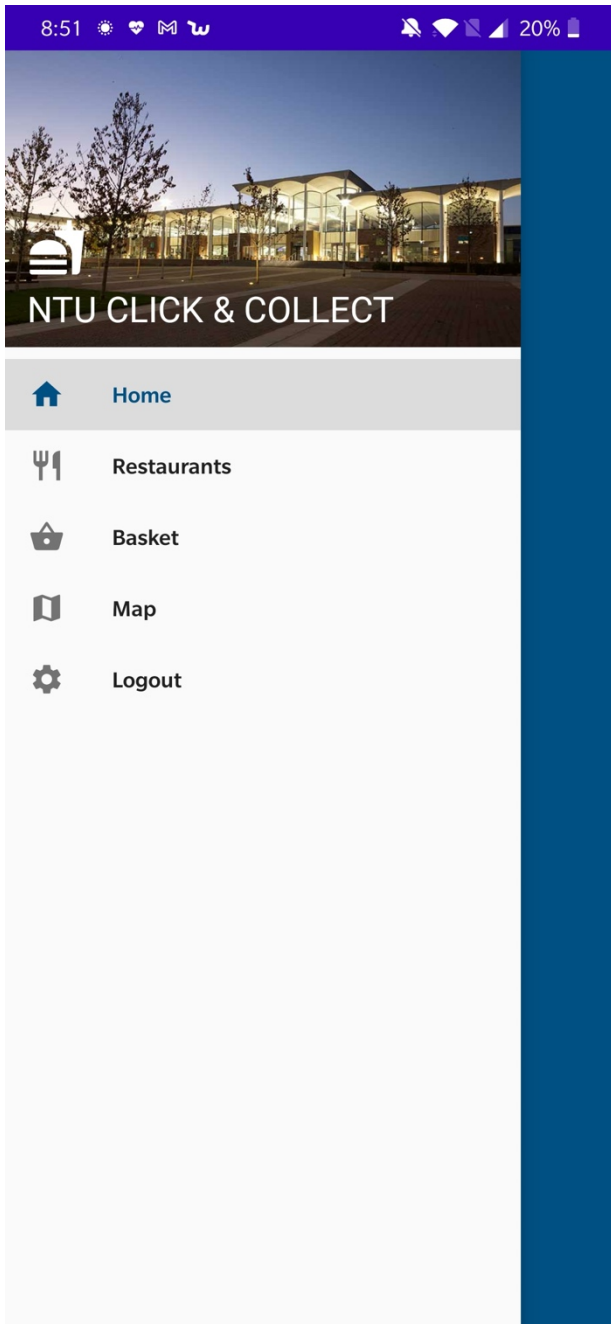
Login

Email

Password

Login

Not Registered? Click to Register



8:51

20%



# MENU

## Limited Menu



### Cheese Tomato Pizza

The Point  
£5.99



### Pepperoni Pizza

The Point  
£5.99



### Chicken Wings

The Point  
£2.99



### Red Sauce Pasta

The Refectory  
£4.50



### Chicken Butterfly

The Point

8:51

20%



# RESTAURANTS

## On Campus



### The Point



This space transforms itself from a pub and diner by daytime into an amazing club space by night.



### The Refectory



The Refectory provides a wide range of food which can help regenerate your energy for a busy day of studies.





