CPT the Second

Test Plan / Test Results

Customer Product Transparency by SAP Research

Functional Test Plan

In order for the application to be considered stable enough to undergo user testing, its behaviour must follow the following key principles:

1. Output must be consistent and predictable - if a user scans a 600mL bottle of Coca-Cola, they should expect to always retrieve the same information on the 600mL bottle under all circumstances.

2. Program operation must be reliable - an information request to the server must always receive a response. Users must be notified of scheduled downtime on the web service.

3. Program operation must be stable - the application must not crash or hang for an unreasonable length of time. Error messages must be in plain English and understandable by end users.

The results of all the following Functional or Unit Tests will be conveyed in the unit test transcript provided during the in-class demonstration.

Unit Testing - Barcode Scanning & Processing

Unit Test 1: Accuracy of Barcode Interpretation

An assertion test is performed to check that the physical numeric barcode scanned by the camera is equivalent to the ProductID interpreted by the barcode framework. This test demonstrates the application satisfying Principle 1 regarding the predictability of the application output. However at present, the nUnit testing framework cannot execute native application code because of a difference in the versions on the .NET platform used by the nUnit and Windows Phone 7 framework.

Unit Test 2: Durability of Barcode Interpretation

An exception handling test is performed to check that the barcode scanner can handle garbage input such as incorrectly formatted barcodes or when there is no barcode in the captured image. The application is expected to throw an exception and output a human readable error message to the user. However at present, the nUnit testing framework cannot execute native application code because of a difference in the versions on the .NET platform used by the nUnit and Windows Phone 7 framework. At present both Unit Test 1 and 2 can only be checked manually but not as a unit test.

Unit Testing - Product Information Request

Unit Test 3: Client Application retrieves correct Product Record

An assertion test is performed where a ProductID is submitted to the web service with the intent of pulling a record down containing the product information. The test checks whether the client's ProductID is equivalent to the ProductID contained in the record returned by the web service.

Unit Test 4: Client Application correctly handles 'no record found' Web Service Response

nUnit assertion test is performed where the web service has no record corresponding to the ProductID submitted by the client. This test would show that the client has the capacity to handle negative responses from the web service (Principle 3 – Application Stability); by checking that if a barcode is not present in the database the client will correctly receive a null response.

Unit Test 5: Web Service correctly handles Bad Client Requests.

This test demonstrates that the web service can handle bad requests and the web service is stable in the event of garbage input. The nUnit test sets up a connection with the web service and then sends it a badly formatted or garbage request. The correct web service response is to ask the client to resend the request, this is checked by asserting that the correct exception is thrown by the web service.

Unit Test 6: Client correctly handles bad web service responses.

This test demonstrates that the client can handle badly formatted responses and that the client is stable in the event garbage is received. Similar in concept to Unit Test 5, the test emulates a garbage response from the web service, and checks that an exception is thrown and a plain English error message output to the user. Due to the nature of the WCF framework, garbage request from invalid clients are ignored, therefore the request has to be correctly formatted before a receiving a response. Thus this behaviour cannot be effectively tested for, but is included in the test plan.

Unit Testing - Communication Failure

Unit Test 7: Client correctly handles no Internet Access

If the client has no 3G internet access its correct behaviour is to display an error message to the user. To simulate the loss of internet access, a nUnit test is written passing an invalid server endpoint to the application and asserting that a communication exception is thrown.

Unit Test 8: Client correctly handles premature Web Service Disconnection

This test demonstrates that the client is capable of handling premature web service disconnection or non-response. The correct behaviour of the client is to catch a server unreachable exception or timeout, and throw a plain English error message back to the user. This situation will most commonly occur when the user's mobile phone loses 3G data connection or when the web service server goes down. Unfortunately, this unit test is untestable without actually scheduling a server outage or having to write a complex set of codes.

Web service correctly handles premature Client Disconnection - No Test Required

The web service is based on a connectionless model where once an information request is fulfilled the connection to the client is immediately terminated. Hence premature client disconnection is not an issue we need to handle.

Unit Testing - Web Service and Client API Tests

A series of individual unit tests were also conducted on each API web function. These tests verify that valid input will result in a positive output, and that invalid input result in a negative response for

each and all of the API functions. Individual tests were written for each side of the API for both client and server execution.

User Test Plan

CPT the Second believes that the application will be tailored towards a broad audience. Users are expected to have a large range of experience with mobile phone applications. However, it is more likely to be used by people who are familiar with the technology. Research shows that the average age of shoppers at a supermarket is approximately 47 years. It is therefore predicted that the most dominant age group using the application will be users between the ages of 20-50.

There is research to prove that females spend more time than males when shopping at the supermarket. Additionally, more than 60% of shoppers at supermarkets are female. Both these facts indicate that it is likely for the majority of users to be female.

Due to such a large age bracket, users' level of experience of mobile applications may range significantly. It is essential that the application is easy to navigate and simple to use in order to accommodate all potential users. The application must have a competitive edge to encourage users to continue using CPT rather than other similar applications.

Based on the information provided above, it is reasonable for the purpose of CPT's user testing to expect that an average user of the application would be a female between the ages of 30-50, with a basic knowledge of mobile phone applications.

Testing the User Experience Design

CPT the Second have considered multiple perspectives with regards to the user experience (UX) design of the application. Firstly, in order to convey the main function of the application to the users, the icons have to be well designed. The colours chosen for the icons and graphics send a strong message to the users. Secondly, it is essential for the application design to be consistent throughout. Colours and basic shapes are repeated on different screens within the application. The black background, green border decoration and the barcode graphic is used consistently throughout the application. Finally, the button design for the system has to be considered as well. In order for the application to be used smoothly, the buttons should be consistent with what users are used to seeing in other applications. For instance, a star generally means favourites or bookmarks, a camera means scan, a house indicates a link back to the home page. Users are familiar with these object associations and therefore, navigating around the application requires less effort. In general, the goal is to design an application that is user friendly and draws on user's existing knowledge of mobile applications to enhance their experience with the CPT application.

User Test 1: Logic of the Design
Design logic test is one of the interface usability tests that demonstrate whether the connection and relation of each screen make sense. The aim of the test is to find any screens that may confuse the user when they use the application. This test ensures the application can be used smoothly. This test is usually performed using a sketched flow chart to ask users to walk through the

application, or in this case, stepping through the actual application screens.

User Test 2: Button Comprehension
The button comprehension test is aimed to test the user's reaction for each button used in the application. More specifically, the test will indicate whether the button design makes sense to the users. This test is carried out using sketches of buttons. Detailed button designs based off the sketches, will be created on the computer for additional phases of testing.

To perform User Interface testing, a series of concrete tests were required to ensure users were able to perform all primary functions of the application. Five tasks were devised to cover all of the major user interactions with the application.

1. Login to Facebook via the CPT application
2. Scan a product barcode and view the information returned by the application
3. Read existing reviews and write a new review
4. View product manufacturer details
5. Retrieve a user's recent search history and add one product to favourites.

Detailed scenarios were then devised to place these tasks into real world situations using personas that form part of the application's target audience.

Scenario 1 - Login to Facebook via the CPT Application
Mark, 28 years old, purchased a can of tuna for lunch at the supermarket and has decided to use the CPT mobile application to check out the reviews from other customers. Before he can access this information he needs to login to Facebook through the application.

Scenario 2 - Scan barcode and retrieve product information
Sarah, 42 years old, mother of two children. Has recently discovered that one of her sons is allergic to nuts and has to ensure that no food she purchases contains any traces of nuts. Sarah is trying to find a new cereal to buy and decides to use the CPT mobile application to scan a selection of cereals in order to retrieve certain allergen information.

Scenario 3 - Read existing reviews and write a new review
Heather, 44 years old, has purchased a box of a dozen free range eggs. She previously checked the sustainability information of the eggs whilst she was in the shop, however she is still sceptical on the accuracy of the information provided. Once she arrives home she researches the supplier to ensure the facts she read using the CPT application were trustworthy and genuine. After discovering that her own findings matched the information she received from the application, she decides to write a review commenting on the accuracy of the information and the quality of the product.

Scenario 4 - View product manufacturer details
Samantha, 29 years old, has decided to purchase some canned tuna for lunch. Being conscious of the environment, she wants to ensure the manufacturer of the tuna promotes sustainable fishing methods and is an Australian company. Samantha scans the barcode of the product and needs to determine the specific manufacturer details using the CPT application.

Scenario 5 - Retrieve recent search history and add favourite

Margaret, 38 years old, is a regular customer at her local supermarket store. She has recently been introduced to the CPT application and has found it particularly useful to search for new products. Last time she was at the shop, she found a bottle of dishwashing detergent that was both environmentally friendly and produced in Australia but she can't remember the name or brand of the product. Margaret decides to login to the application and retrieve her search history to find out the name of the dishwashing detergent and then add it as a favourite so her problem does not occur again.

Test Results

To carry out the two UX tests and five scenarios described above, six potential users deemed to fit the application's target audience were selected as participants in a series of user tests. Participants were selected on a convenience basis, provided they could be placed in the target audience and had active Facebook accounts. Participants comprised primarily of the family and friends of CPT the Second. Each participant carried out each of the five scenarios under the observation of the application developers who recorded performance metrics and user feedback.

Performance Metrics:
- Ability for participant to complete the given task (Boolean)
- Time taken for participant to complete given task (Numerical Value)
- Number of times user requested help (Numerical Value)

Open Ended Feedback:
Participants were asked to provide general feedback on their experience using the application, the logical flow of the application, comment on button/graphic association, and to recommend possible improvements if they had any.

Scenario 1 - Facebook Login
Performance Metrics (Averaged across 6 participants)

	Task Completion	Completion Time	Help Requests
Average Score	1	72 seconds	0.166
Interpretation	All participants were able to complete task.	Generally task completion time was relatively low, the reported average is slightly elevated due to one help request.	5 out of 6 participants required no assistance. One participant required assistance using the Windows Phone 7 interface. This is not considered a direct issue with the CPT application.

Open Ended Feedback
All participants gave generally positive responses, the only feedback regarding the Facebook login task was that a success notification on the application interface would have been beneficial. As all participants had active Facebook accounts the task was not unfamiliar. Another user commented on

the size of the Facebook button as being too small, which will be considered in the next iteration of the development.

Scenario 2 - Scan Product Barcode and View Information
Performance Metrics (Averaged across 6 participants)

	Task Completion	Completion Time	Help Requests
Average Score	1	23 seconds	0
Interpretation	All participants were able to complete task.	In the majority of cases the camera was able to take a clear picture of the product barcode and time taken was around 15 seconds. However when the camera was not able to pick up a barcode (occurred twice) time taken was significantly increased.	All participants were able to complete the task unassisted. When users had difficulty scanning the barcodes they were easily able to retry without assistance.

Open Ended Feedback
Participants were very impressed with the speed of information returned when successful - when the image processing was not successful some participants suggested that a faster negative response would be beneficial. This tends to be a technical limitation of the device's processing power, however the suggestion has been taken on board for investigation.

Scenario 3 - Read existing reviews and write a new review
Performance Metrics (Averaged across 6 participants)

	Task Completion	Completion Time	Help Requests
Average Score	1	92 seconds	0.332
Interpretation	All participants were able to complete task.	When user encountered no navigation issues the time taken was closer to 50-60 seconds. However minor navigation issues tacked on extra time as users attempted to find out where the reviews were located.	Two participants required assistance regarding navigating to the reviews. All participants, once there, found it easy to complete the review.

Open Ended Feedback
Participants familiar with the WP7 interface generally had no criticism to give and were impressed at the simplicity of the reviewing process. One user suggested placing the reviews underneath the product information, the other suggested having a clickable link or button to the reviews on the

product information page.

Scenario 4 - View manufacturer information

Performance Metrics (Averaged across 6 participants)

	Task Completion	Completion Time	Help Requests
Average Score	1	28 seconds	0
Interpretation	All participants were able to complete task.	Low time taken to complete task with low standard deviation. Participants seem to have familiarised themselves with the workings of the interface by this stage of testing.	As users had noticed the manufacturer information and location page, it is not surprising that there were no help requests.

Open Ended Feedback

All participants gave positive responses, with no detailed feedback or criticism given regarding viewing manufacturer information.

Scenario 5 - Retrieve a user's recent search history and add a favourite

Performance Metrics (Averaged across 6 participants)

	Task Completion	Completion Time	Help Requests
Average Score	1	28 seconds	0.332
Interpretation	All participants were able to complete task (with assistance).	Low task completion time was assisted by the fact that search history is displayed on the homepage of the application. Some of the users hesitated when attempting to find out where to add a favourite which pushed the average up.	4 out of 6 participants required no assistance. Two participants required assistance in adding a favourite, as they were unfamiliar with the press-and-hold nature of the WP7 interface.

Open Ended Feedback

Users who were more familiar with Android and iOS attempted to press the keys to locate the add a favourite button, and hence suggested we add a similar feature for Windows Phone 7. This is an OS limitation with WP7 and cannot be circumvented. All other users found the task relatively easy.