CA326 Testing Documentation - EfficiClean

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Table of Contents

1. Use Case Testing

Reference number	***Scenario***	***Result***	***Developers comments/ Proposed solution***
001	Guest login to the application	Guest logged in successfully	As intended
002	Guest mark room “Please Service my Room”	Room successfully marked and information page displayed	As intended
003	Guest mark room “Do not disturb”	Room successfully marked and information page displayed	As intended
004	Guest mark room “Checking out”	Room successfully marked but information page has message cut off	Information page needs text boxes resized
005	Guest change room status	Room successfully marked but incorrect time displayed on estimated room service time. Current time: 12:28 Estimated time given: 11:43	Make changes to “Guest Please Service” activity to resolve this issue.
006	Guest log out	Correctly presented with pop up and logged out successfully	As intended
007	Staff Login	Staff logged in successfully	As intended
008	Staff check queue	Queue presented correctly	As intended
009	Staff check today’s teams	Button works correctly and table presented correctly	As intended

010	Staff view map	Button works correctly and map view presented correctly	As intended
011	Staff Request Break	-> Page displayed correctly but enter on input field goes to new line. Usability issue. -> App crashes if ":" left out between hours and minute values -> No matter what break selected it says you have that breaks amount of minutes remaining -> Bug if break has already been assigned	-> Input type of field needs to be changed to only allow one line of input. -> We will remove the ":" from the input as it causes accessibility issues -> Further work is need in Break allocator to resolve this issues
012	Staff Add room to queue	-> If user types in incorrect room number app crashes -> If users clicks room and enter and doesn't mark status the app crashes	Changes must be made to current job class to rectify this issue
013	Staff mark room as "Clean"	Room successfully marked as cleaned	As intended
014	Staff mark room as "Severe Mess"	Hint for description is "etDescription"	Must be changed to "Description" in xml
015	Staff mark room as "Hazardous"	Room successfully marked and description sent	As intended
016	Supervisor Login	Supervisor successfully logged in	As intended
017	Supervisor view team's progress	Team progress list correctly updated	As intended
018	Supervisor	Staff member successfully	

018	report absence	removed from queue	As intended
019	Supervisor view map	Button works correctly and map view presented correctly	As intended
020	Supervisor breaks approval	Break approved	As intended
021	Supervisor “Service” approval	Room approved and team progress increased. Room disapproved and sent back to team	As intended
022	Supervisor “Severe Mess” approval	Severe mess approved and sent back to team. Team get increased priority.	As intended
023	Supervisor “Hazard” approval	Hazard approved. Room disapproved and sent back to team	As intended
024	Reception Login	Reception Logged in successfully	As intended
025	Reception View Map	Map displayed correctly	As intended
026	Reception Check Out Room	Room checked out. Map updated successfully.	As intended

2. Gitlab Continuous Integration Pipeline

We are using the gitlab continuous integration pipeline to run our unit tests every time we push to git. This allows us to test our application numerous times a day to ensure that it was still functioning as expected. To set up the pipeline, we have a gitlab-ci.yml file which sets up the Android environment we are using.

Our git pipeline uses both JUnit and Espresso to run these unit tests. JUnit is a framework for writing java unit tests. We use this to unit test our functions to ensure that they were operating as intended. Espresso runs instrumented tests on an emulator. This means it checks elements such as login, buttons functionality, keyboard and page link up. We found this very useful for keeping our testing going as we implemented new features before we completed other rigorous tests on them.

Whenever the git pipeline fails, we are notified of what exact error was causing this failure. We can easily then fix the issue and push the commit without the error.

3. Unit Testing

GuestLoginTest.java

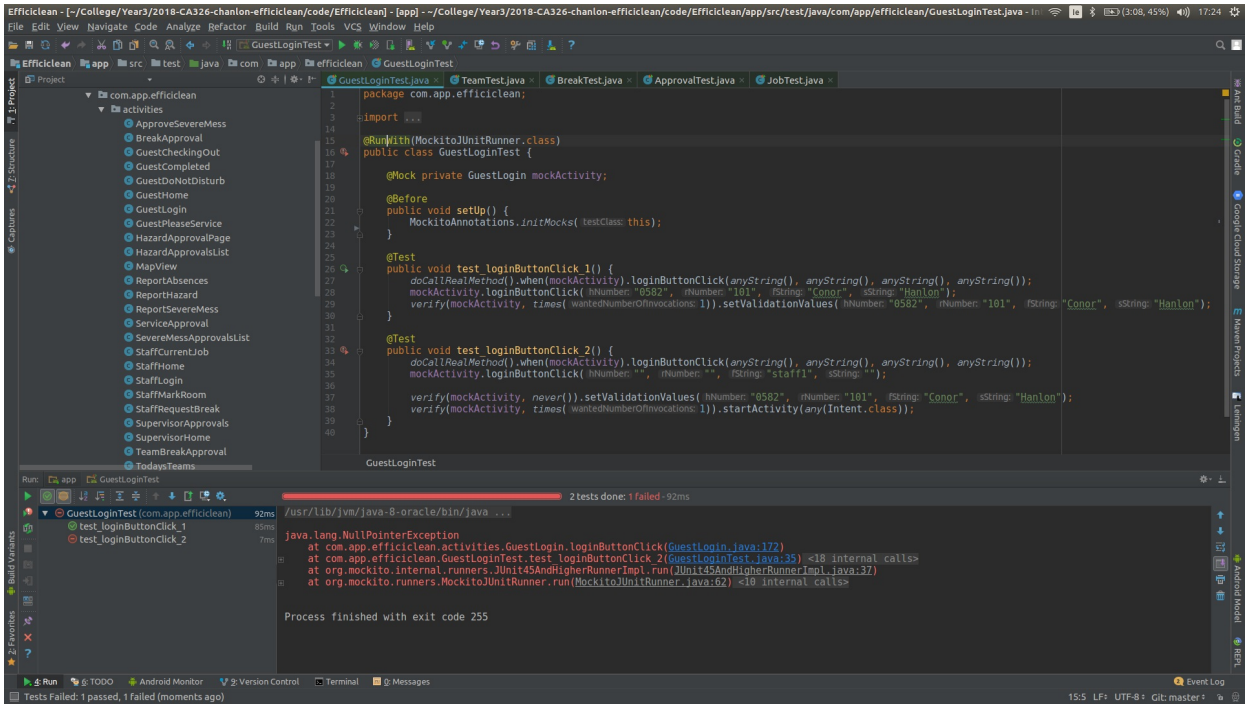
```
@RunWith(MockitoJUnitRunner.class)
public class GuestLoginTest {

    @Mock private GuestLogin mockActivity;

    @Before
    public void setUp() {
        MockitoAnnotations.initMocks(this);
        ProgressBar spinner = mock(ProgressBar.class);
        mockActivity.spinner = spinner;
    }

    @Test
    public void test_loginButtonClick_1() {
        doCallRealMethod().when(mockActivity).loginButtonClick(anyString(), anyStri
        mockActivity.loginButtonClick("0582", "101", "Conor", "Hanlon");
        verify(mockActivity, times(1)).setValidationValues("0582", "101", "Conor", '
    }

    @Test
    public void test_loginButtonClick_2() {
        doCallRealMethod().when(mockActivity).loginButtonClick(anyString(), anyStri
        mockActivity.loginButtonClick("", "", "staff1", "");

        verify(mockActivity, never()).setValidationValues("0582", "101", "Conor", "H
        verify(mockActivity, times(1)).startActivity(any(Intent.class));
    }
}
```

- This test class unit tests the login functionality of inital *GuestLogin* activity. It uses Mockito to mock the class, allowing us to track the operations performed as a result of our input.

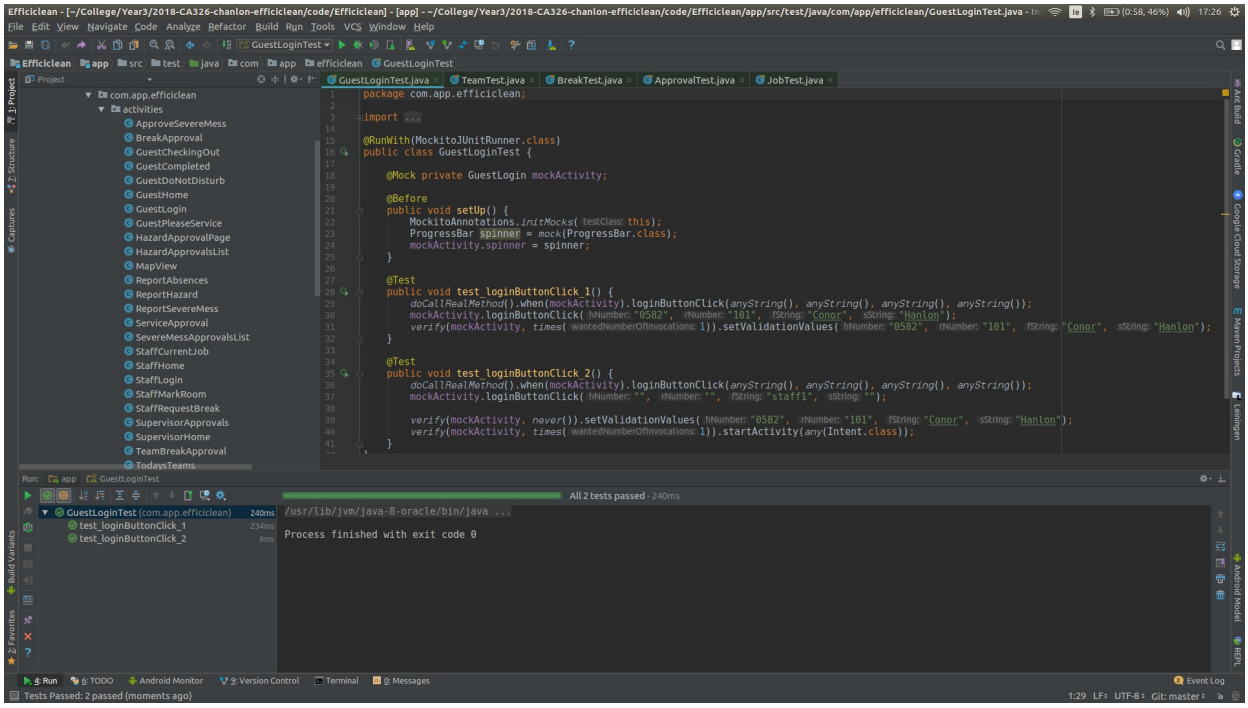
- The first test runs the *loginButtonClick* method with valid input in all fields. We use the static Mockito method *verify* to check that our code acts as we intended it to.

- Next, we invoke the same method with the input that brings the user to the *StaffLogin* activity. We verify that an intent is invoked as a result of this method call.

- Below is a screenshot of our tests failing on an early version of the test class:



- We get a *NullPointerException* because our mock did not initialise our *ProgressBar* for the activity. Once we fixed this in the *setUp* method, our tests passed as intended.



TeamTest.java

```
public class TeamTest {

    @Test
    public void test() {
        Job job1 = new Job();
        job1.setPriority(0);
        job1.setRoomNumber("101");
        job1.setDescription("Clean room");
        job1.setCreatedBy("Conor");

        Job job2 = new Job();
        job2.setPriority(1);
        job2.setRoomNumber("205");
        job2.setDescription("Clean room");
        job2.setCreatedBy("Luke");

        Team team = new Team();
        team.setCleanCounter(0);
        team.setPriorityCounter(0);
        team.setStatus("Waiting");
        team.setCurrentJob(job1);
        team.setReturnedJob(job2);

        assertNotNull(team.getBreakRemaining());
        assertNotNull(team.getCleanCounter());
        assertNotNull(team.getCurrentJob());
        assertNotNull(team.getMembers());
        assertNotNull(team.getPriorityCounter());
        assertNotNull(team.getStatus());
```

```
        assertNotNull(team.getReturnedJob());

        assertEquals(team.getBreakRemaining(), 60);
        assertEquals(team.getMembers().size(), 0);

        team.addMember("James");
        team.addMember("Derek");
        team.addMember("Holly");
        team.addMember("Anne");

        assertEquals(team.getMembers().size(), 4);
        assertEquals(team.removeMember(1), "Derek");
        assertEquals(team.getMembers().size(), 3);
        assertNotSame(team.getCurrentJob(), team.getReturnedJob());
    }
}
```

- *TeamTest* aims to test the functionality of the *Team* class. It creates an instance and calls the setter methods to allocate values to the object variables.

- After the variables have been initialised, we use assertions to ensure that the object has no unexpected null classes. We also use *assertEquals* to check that the constructor performed the correct operations.

- The *Team* class uses an *ArrayList* to store the identification keys of housekeepers assigned to that team. We lastly call methods of our custom class that are used to access this list, and test the operation results using assertions.

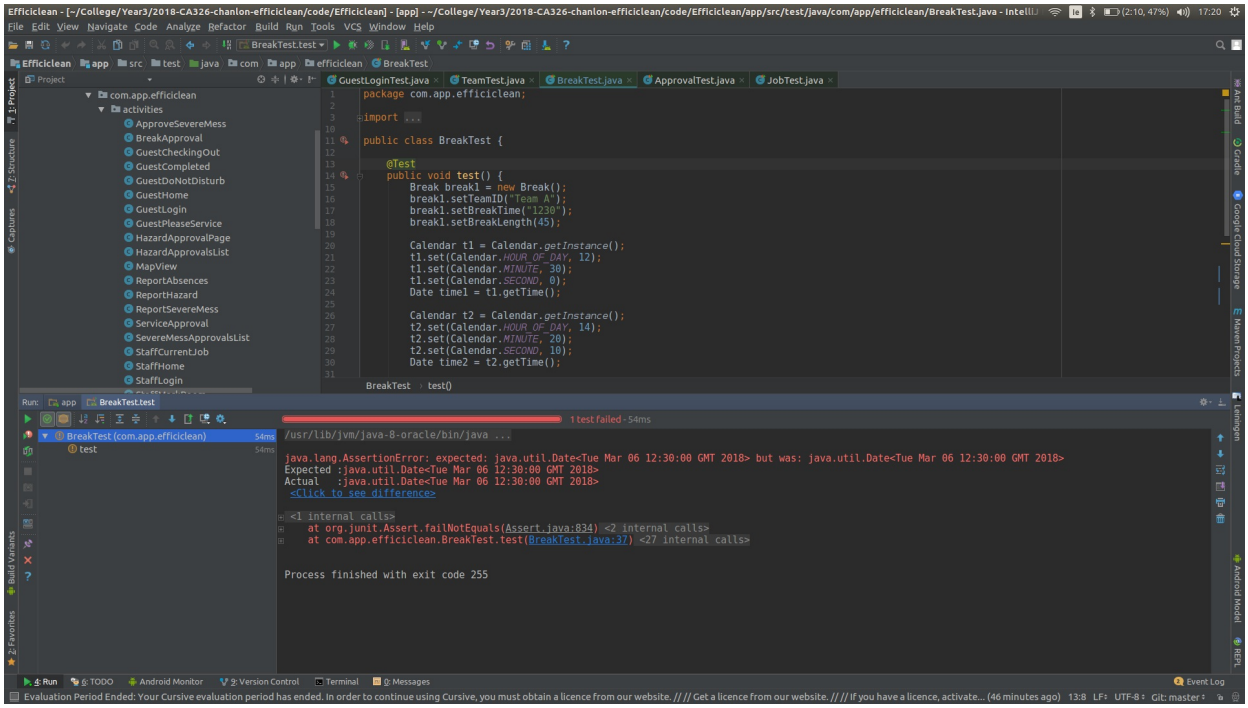
BreakTest.java

```
public class BreakTest {

    @Test
    public void test() {
        Break break1 = new Break();
        break1.setTeamID("Team A");
        break1.setBreakTime("1230");
        break1.setBreakLength(45);

        Calendar t1 = Calendar.getInstance();
        t1.set(Calendar.HOUR_OF_DAY, 12);
        t1.set(Calendar.MINUTE, 30);
        t1.set(Calendar.SECOND, 0);
        Date time1 = t1.getTime();

        Calendar t2 = Calendar.getInstance();
        t2.set(Calendar.HOUR_OF_DAY, 14);
        t2.set(Calendar.MINUTE, 20);
        t2.set(Calendar.SECOND, 10);
```

```
        Date time2 = t2.getTime();

        assertFalse(break1.isAccepted());
        assertNotNull(break1.getBreakLength());
        assertNotNull(break1.getBreakTime());
        assertNotNull(break1.getTeamID());

        assertEquals(time1.getHours(), break1.getBreakTime().getHours());
        assertEquals(time1.getMinutes(), break1.getBreakTime().getMinutes());
        assertEquals(time1.getSeconds(), break1.getBreakTime().getSeconds());

        assertNotEquals(time2.getHours(), break1.getBreakTime().getHours());
        assertNotEquals(time2.getMinutes(), break1.getBreakTime().getMinutes());
        assertNotEquals(time2.getSeconds(), break1.getBreakTime().getSeconds());

        break1.setAccepted(true);

        assertTrue(break1.isAccepted());
        assertTrue(break1.getBreakLength() >= 0);
    }
}
```

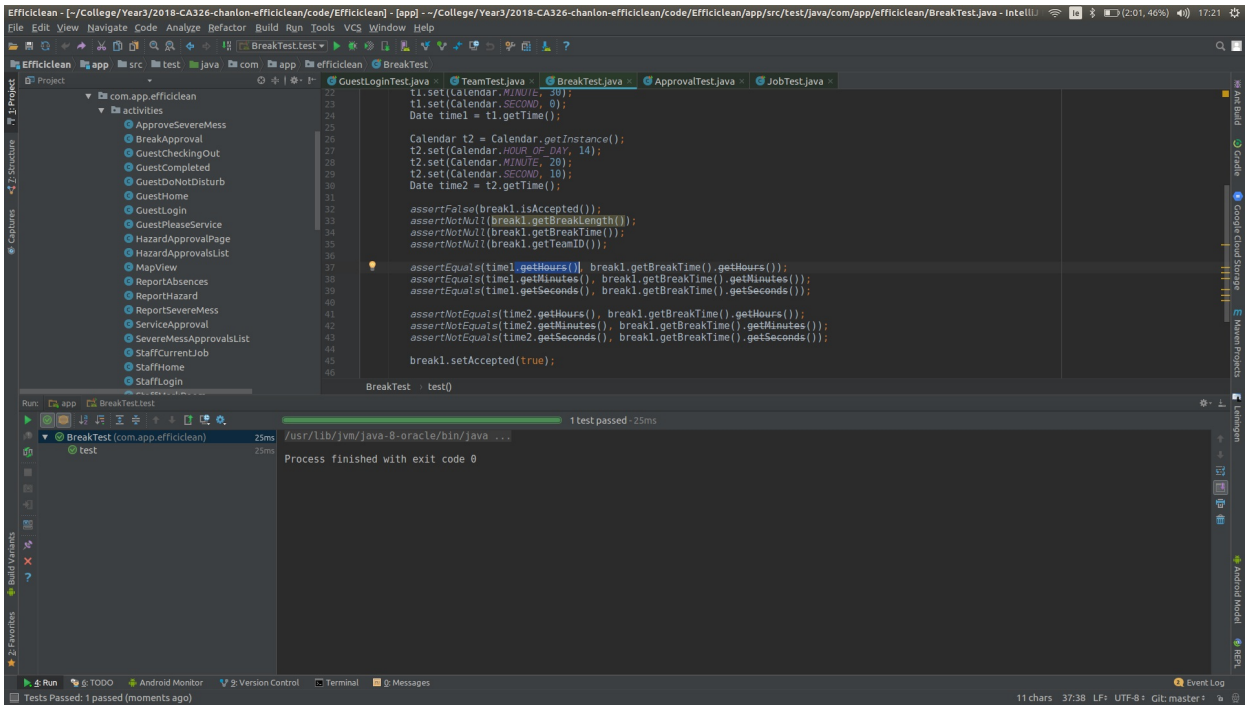
- *BreakTest* tests our custom *Break* class. It firstly creates an instance of *Break* followed by two seperate *Date* objects. *Break* creates its own instance using a formatted time string passed into the *setBreakTime* method. We test our *breakTime* variable against our test objects.

- At first, our assertions which should have found that the *Date* instances were true failed.



- After debugging our code, we realised that the reason our assertion was failing was because both *Date* objects had different Unix timestamps, which are precise to the millisecond. To fix

our test, we compared the individual hour, minute and second values of the variables instead. Our test class ran successfully after making this change.



ApprovalTest.java

```
public class ApprovalTest {

    @Test
    public void test() {
        Job job1 = new Job();
        job1.setPriority(0);
        job1.setRoomNumber("101");
        job1.setDescription("Clean room");
        job1.setCreatedBy("Conor");

        Job job2 = new Job();
        job2.setPriority(1);
        job2.setRoomNumber("205");
        job2.setDescription("Clean room");
        job2.setCreatedBy("Luke");

        Job job3 = new Job();
        job3.setPriority(0);
        job3.setRoomNumber("310");
        job3.setDescription("Clean room");
        job3.setCreatedBy("Shauna");

        Approval service = new Approval();
        service.setCreatedBy("Dave");
        service.setJob(job1);
```

```
        HazardApproval hazard = new HazardApproval();
        hazard.setCreatedBy("Shane");
        hazard.setDescription("Corrosive chemicals in bath.");
        hazard.setJob(job2);

        SevereMessApproval severeMess = new SevereMessApproval();
        severeMess.setCreatedBy("Brian");
        severeMess.setDescription("Bathroom floor flooded.");
        severeMess.setJob(job3);

        assertFalse(service.getApproved());
        assertFalse(hazard.getApproved());
        assertFalse(severeMess.getApproved());

        assertNotNull(service.getCreatedBy());
        assertNotNull(service.getJob());
        assertNotNull(service.getPriorityCounter());

        assertNotNull(hazard.getDescription());
        assertNotNull(hazard.getCreatedBy());
        assertNotNull(hazard.getJob());
        assertNotNull(hazard.getPriorityCounter());

        assertNotNull(severeMess.getDescription());
        assertNotNull(severeMess.getCreatedBy());
        assertNotNull(severeMess.getJob());
        assertNotNull(severeMess.getPriorityCounter());

        assertTrue(hazard.getPriorityCounter() > severeMess.getPriorityCounter());
        assertTrue(hazard.getPriorityCounter() > service.getPriorityCounter());
        assertTrue(severeMess.getPriorityCounter() > service.getPriorityCounter());

        service.incrementPriorityCounter();

        assertTrue(hazard.getPriorityCounter() > service.getPriorityCounter());
        assertEquals(severeMess.getPriorityCounter(), service.getPriorityCounter())

        service.setApproved(true);

        assertTrue(service.getApproved());
        assertFalse(service.getJob().getStatus());

        service.getJob().markCompleted();

        assertTrue(service.getJob().getStatus());
    }
}
```

- Multiple different custom classes are tested by *ApprovalTest*. *HazardApproval* and *SevereMessApproval* both inherit from the parent *Approval* class. The difference between the classes is their priority based on the importance of each different approval type.

- Firstly, we create different *Job* objects before our different approvals are initialised. We then call setter methods to assign values to class variables and use assertions to ensure our operations were successful. This is followed by testing that our *priorityCounter* values were set correctly by the constructors through comparing our different objects. We then increment the *Approval* priority, and define new assertions for what we expect our values to be.

JobTest.java

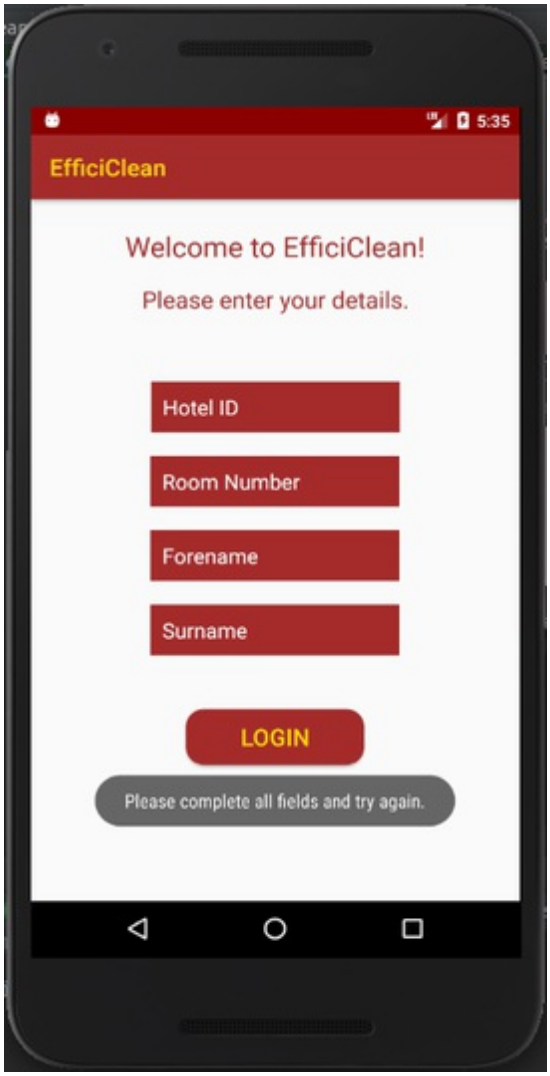
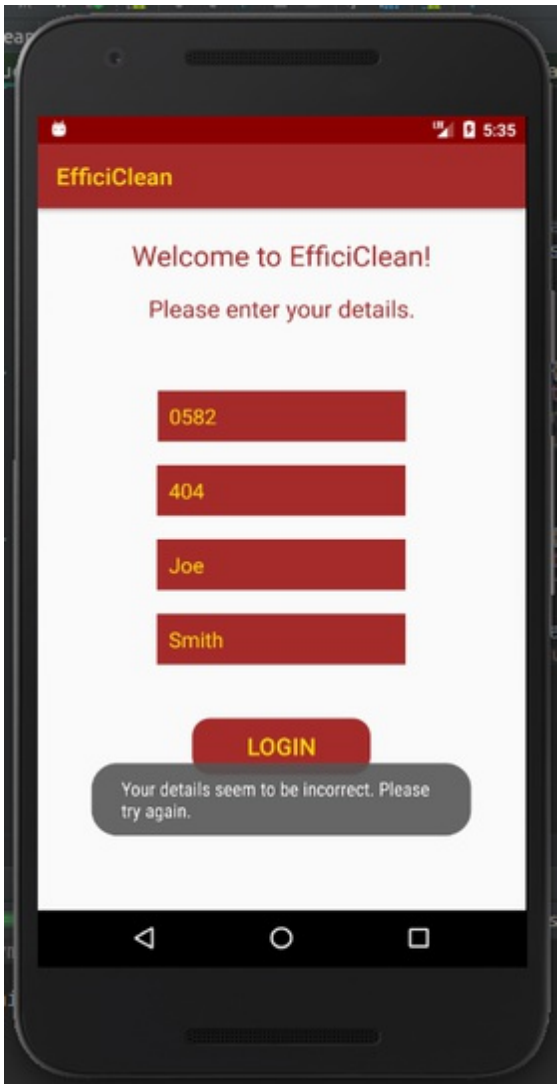
```
public class JobTest {

    @Test
    public void test() {
        Job job1 = new Job();
        job1.setPriority(0);
        job1.setRoomNumber("101");
        job1.setDescription("Clean room");
        job1.setCreatedBy("Manager");

        assertFalse(job1.getStatus());
        assertTrue(job1.getTimestamp() > 0);
        assertNotNull(job1.getCreatedBy());
        assertNotNull(job1.getDescription());
        assertNotNull(job1.getPriority());
        assertNotNull(job1.getRoomNumber());

        Job job2 = new Job();
        job2.setPriority(0);
        job2.setRoomNumber("304");
        job2.setDescription("Wash sink");
        job2.setCreatedBy("Manager");

        assertEquals(job1.getPriority(), job2.getPriority());
        assertTrue(job1.getTimestamp() <= job2.getTimestamp());
        assertEquals(job1.getCreatedBy(), job2.getCreatedBy());
        assertNotEquals(job1.getDescription(), job2.getDescription());

        job1.markCompleted();
        assertTrue(job1.getStatus());
    }
}
```

- Lastly, we have a simple test class to check the functionality of our *Job* class. We declare two objects and use assertions to check that the methods perform the correct operations.

4. Instrumented Testing

We also ran instrumented Android tests as part of our testing process. These are designed to test activities and run the application on an emulator device. This allows us to ensure tasks such as entering text into input boxes and clicking buttons are working correctly.

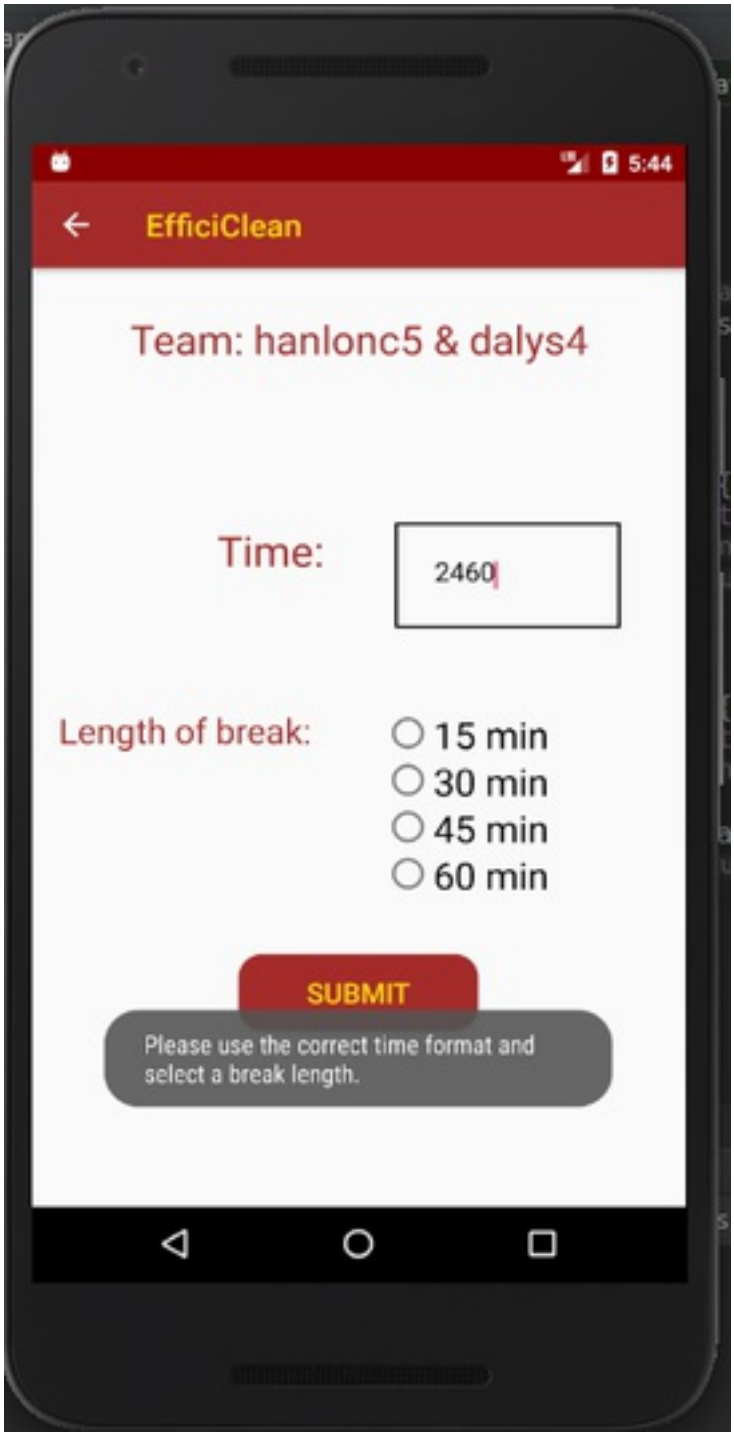
Instrumented testing plays a big role in the validation of the application. We ran tests using different possible inputs to prompt a response from the application. The example below shows the different *Toast* popups displayed on the *GuestLogin* activity.

Guest doesn't fill in all fields	***Guest inputs incorrect details***
	

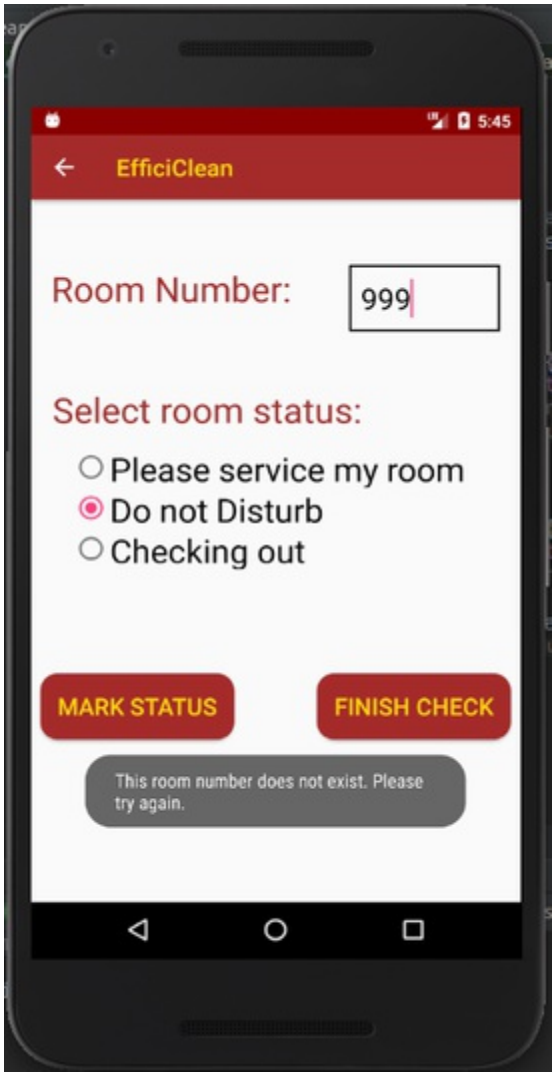
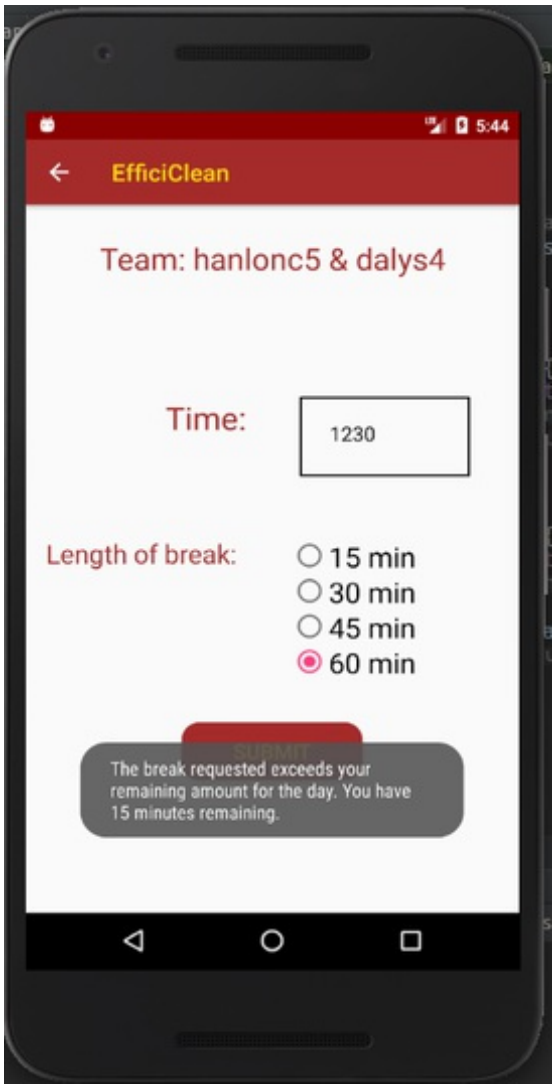
This demonstrates error handling by blocking the user to perform actions without the valid input. It is also informative and gives them accurate feedback on why their operation has been unsuccessful, helping them correct their mistake.

This error handling is also present in the staff interface. Due to the interactive nature of the application, it is crucial that there are constraints in place that will block any invalid operations which may be harmful to the system. One simple example is when housekeepers are requesting breaks. Instrumented testing allows us to try different edge cases and ensure that our application will react positively when stress tested. Below is the prompt displayed in the case that staff members input an invalid time format for their break.

Invalid time inputted



Finally, our Android tests check that our communication between the application and the Firebase database are accurate. Queries are made regarding different information which impacts whether or not a user can perform an operation. Below are two examples:

Invalid room inputted	*Requested break exceeds allowance*
	

In the first image, a housekeeping team has been assigned the task of adding rooms in the hotel still using the old system of hanging signs on the door to the queue. Our test performs this operation with a room that does not exist, which would essentially create a fake job. Our code queries our database to verify that the inputted number exists. This instrumented test validates that our system handles human error and stops the app from crashing, while also performing informative feedback to the user.

The next screenshot displays the *Toast* popup shown when a staff member requests a break of longer length than they have remaining for the day. This case reiterates what was mentioned above with the query to Firebase to retrieve the minutes of break time remaining for that team. The user's request is rejected and they are informed of how long of a break they have left to take.

5. User Testing

5.1 User Testing Plan

To complete user testing we will hold two separate user testing sessions. We will have two sessions so that we can take feedback onboard from the first session and see what other issues users may find in the second session.

We will ask users to complete a survey and following on from this complete a short interview. Both of these methods will be utilised to ensure that we gather both qualitative and quantitative data to ensure that we are provided with as much information about our application as possible. Below is an example of our survey and questionnaire questions.

Efficiclean Questionnaire

Please tick the appropriate box for the below questions

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The application is easy to use					
The application is pleasing to look at					
I would use this application					
I would recommend this application to a friend					
I found this application frustrating to use					
This application could be improved					
I was happy with the pace I learned to use the application					

Which feature of the app did you find most useful and why?

Please highlight any feature that you feel is missing from the application.

How would you describe the product in one or more words?

If you were to review Efficiclean what score would you give it out of 10?

What do you like best about the application?

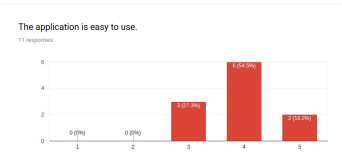
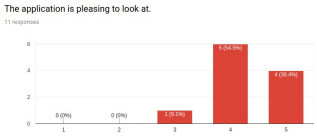
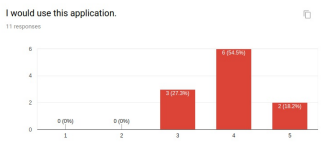
Efficiclean Interview Questions

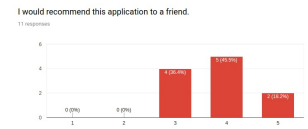
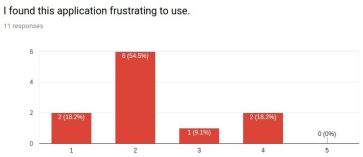
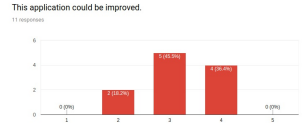
- How did you find using the Efficiclean application?
- What did you find enjoyable about using the application?
- Is there any aspect of using the application which you did not enjoy?
- Is there anything you would like to see changed in the application?
- Is there anything you found unclear while using the application?
- Did you have any difficulties using the application?
- Do you have any further feedback?

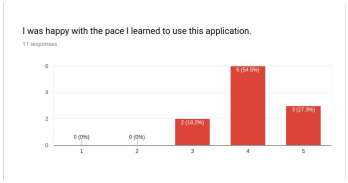
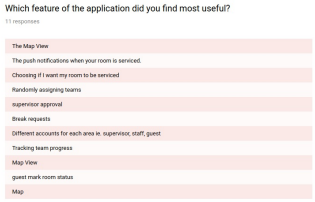
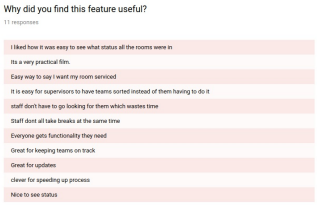
Once we have gathered this information we will take all feedback onboard to make corrections and changes that users would like to see present in Efficiclean.

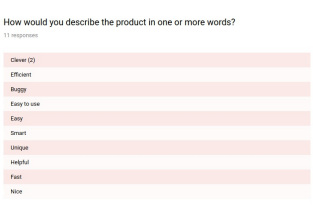
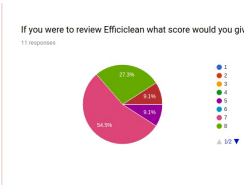
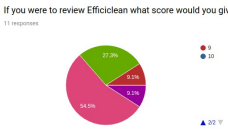
5.2 User Testing Phase One

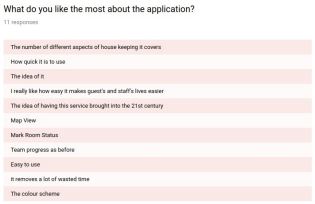
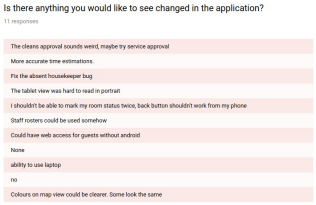
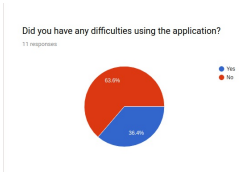
As mentioned in the user testing plan, we decided to implement our user testing in two phases. We would implement a week between these two user testing stages to allow us to make changes and improve our application before asking users what their opinions are now to ensure we implement all changes correctly.

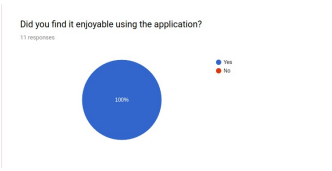
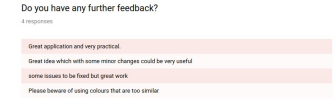
Question 1	***Question 2***	***Question 3***
		
The majority of those tested found the application easy to use.	Most found is pleasing to look at.	Those tested would use the appication

Question 4	***Question 5***	***Question 6***
		
Most would recommend this application to a friend.	The results of this question were very widespread. We do not want any users to find the application frustrating to use so have to work on bug fixes and making the application less frustrating to use.	Users felt the application could be improved so we will work on this before the next round of user testing

Question 7	Question 8	Question 9
		
Users were happy with how they learned to use the application.	Testers found a wide range of elements useful. Those most commonly mentioned included Map View and guests marking their rooms status.	Users key reasons pointed that they liked things to be easy, fast and kept track of.

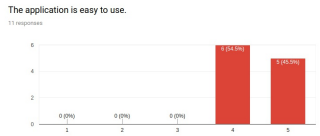
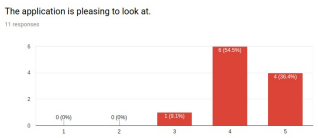
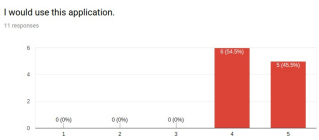
Question 10	Question 11 a	Question 11 b
		
Users found Efficiclean easy to use, clever and fast. Unfortunately, one user mentioned the application was buggy. We will have to make sure to resolve this issue.	Users scored the application between 5 and 10. We would like to improve this score.	Here was can see the remainer of the legend

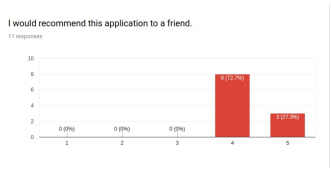
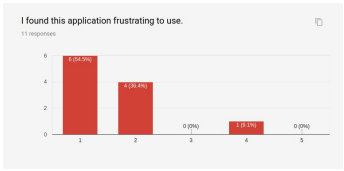
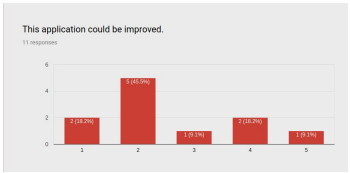
Question 12	*Question 13*	*Question 14*
		
Again, Map View and Marking room status were popular among users.	Users gave us some great advice on changes they would like to see implemented. We will investigate each of these options.	Although most users did not face difficulties with the application, over a third did. We would like to eradicate these issues.

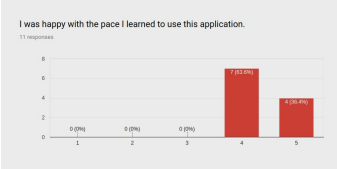
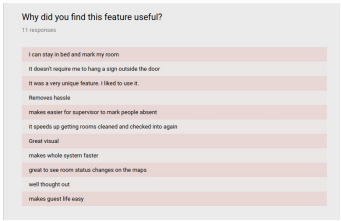
Question 15	*Question 16*	*Question 17*
		
The issues users faced were predominately down to bugs which we will fix. Some issues were with colour contrasts and font sizes which will be adjusted.	All users found the application enjoyable to use which we were delighted to see.	Overall, users enjoyed using our application but felt it needed some work.

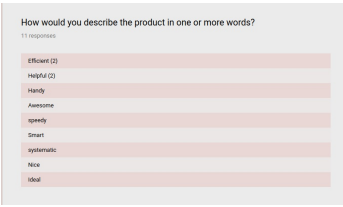
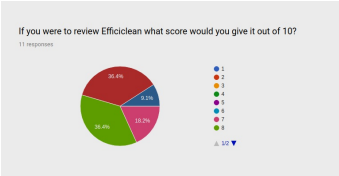
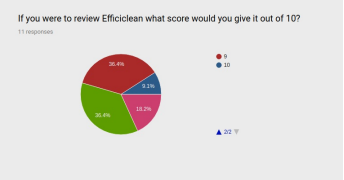
5.2 User Testing Phase two

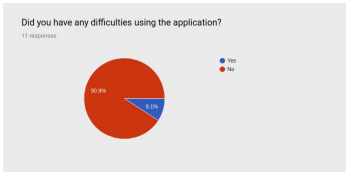
Our first stage of user testing taught us a vast amount about our application and what users would like to see in the application. We took all of the feedback from the first round of user testing onboard and applied it to our application. Thankfully, this paid off as we received improved feedback from our users. This can be seen throughout our survey results.

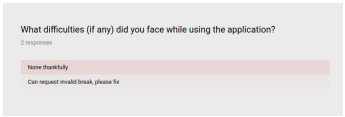
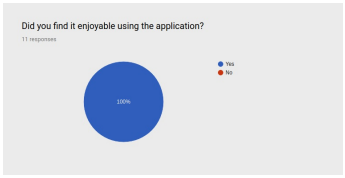
Question 1	***Question 2***	***Question 3***
		
This score increased from our first phase of user testing. All respondents found the application easy to use.	This score also increased, the vast majority of users found the application pleasing to look at.	This also increased. Thankfully users would use the application.

Question 4	***Question 5***	***Question 6***
		
Most would recommend this application to a friend.	Thankfully most users found the application not to be frustrating but unfortunately one user did.	The results of this question were widespread. Some users felt the application could be improved and later gave feedback on this.

Question 7	Question 8	Question 9
		
Yet again all users were happy with how they learned to use the application.	Again Map View and Marking Room Status were the aspects of the application that users found most useful. Again there was a wide range of responses to this question.	Users liked that the named features were fast, easy to use and simple.

Question 10	Question 11 a	Question 11 b
		
There was no negative remarks in this section as before. Users were very happy with the application and found it helpful, fast and clever.	Users scored the application between 7 and 10. This score has increased for 5-10 last time. We are delighted with this increase.	This diagram shows the later end of the legend.

Question 12	***Question 13***	***Question 14***
		
Again, Map View and Marking room status were popular among users.	Advice given by users was very helpful and will be taken onboard.	A very small percentage of users faced difficulties with the application. We hope to resolve this issue.

Question 15	***Question 16***	***Question 17***
		
The user gave feedback on the issue they were facing. We will resolve this issue.	Again, all users found the application enjoyable to use which we were delighted to see.	Overall, users were happy with our application.

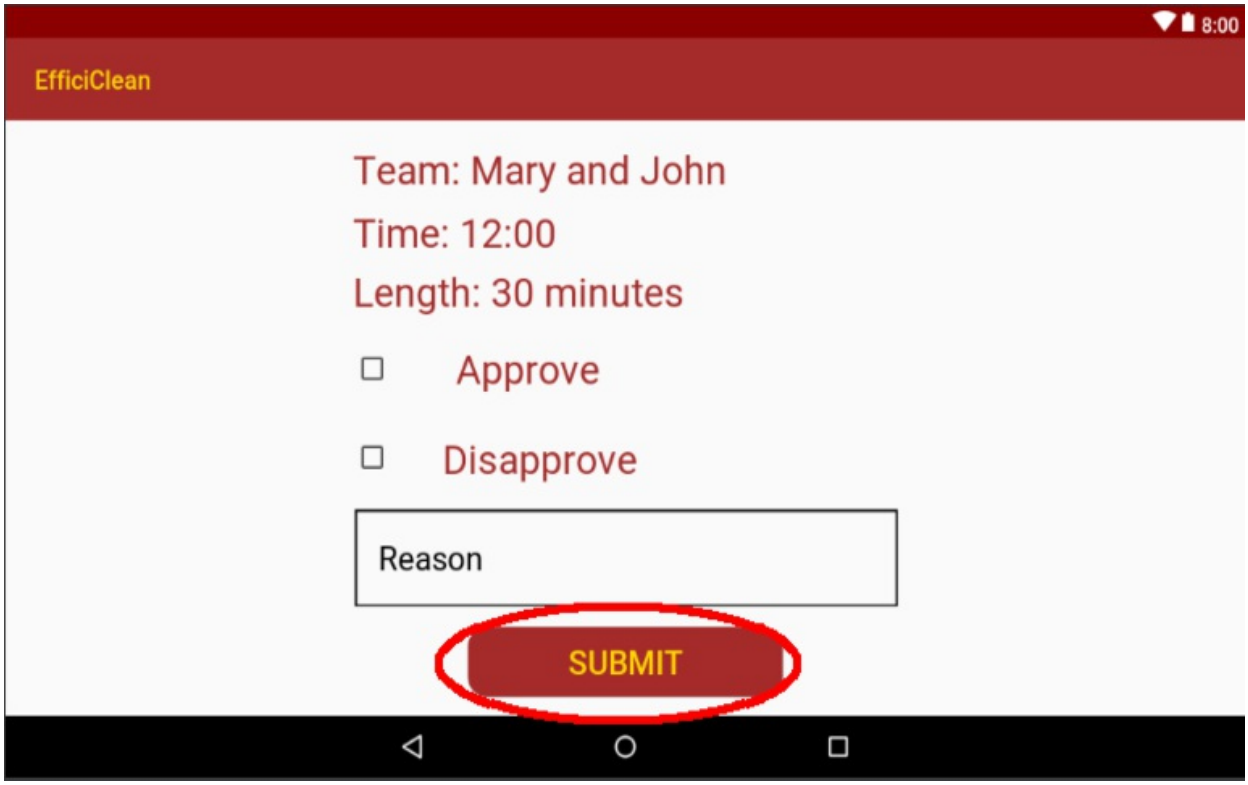
User testing was very helpful in helping us discover issues that we would not have discovered without this testing. Different points of view meant exploring aspects of the application which we had not considered and brought about many issues which will be fixed. As the results show, users opinions of the application greatly increased between both phases of testing which assured us that we were heading the correct way with our changes. We gave users a voice to help us tailor Efficiclean to the user and it greatly impacted the application.

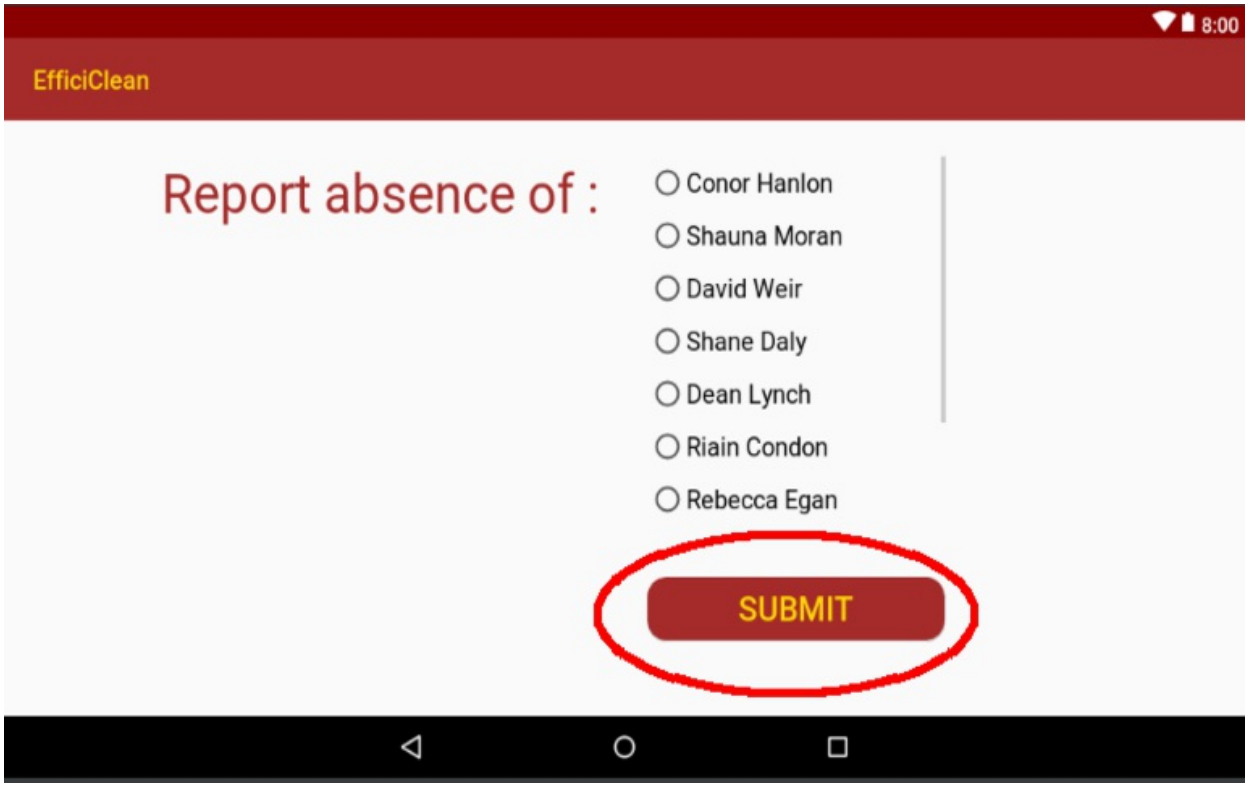
6. Heuristic Testing

Shneiderman's Eight Golden Rules

Strive for consistency.

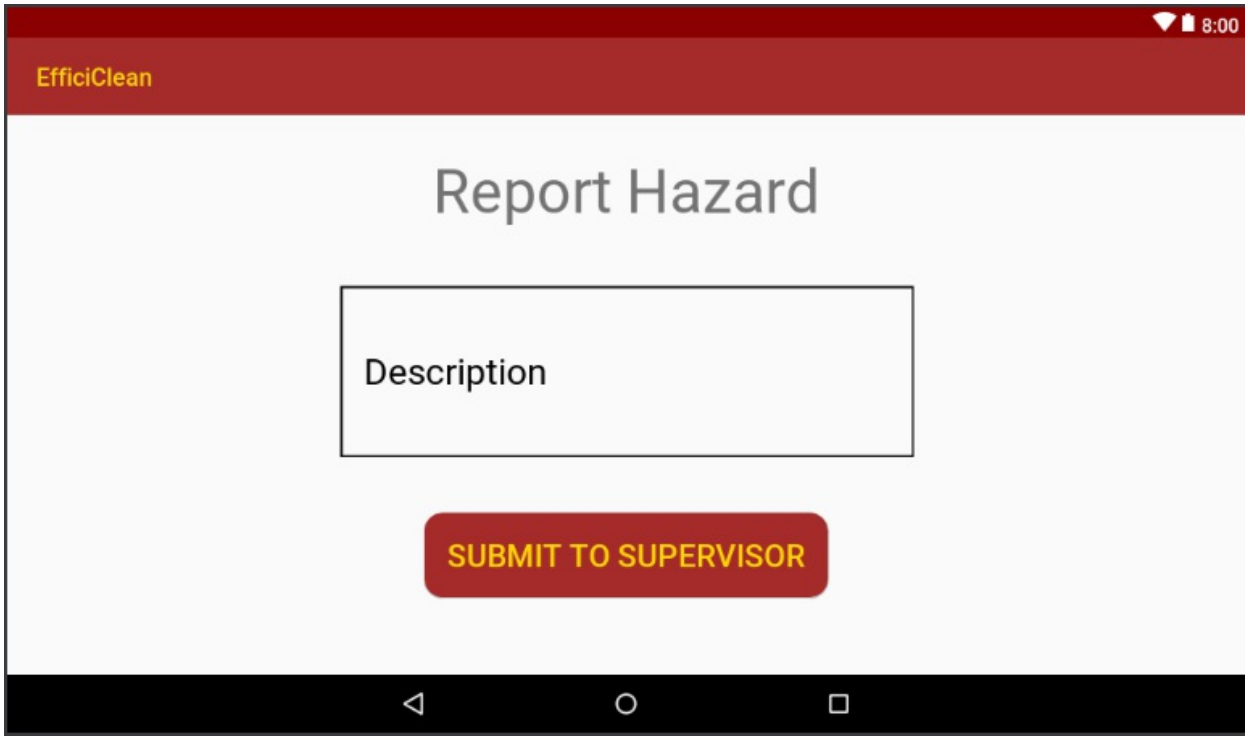
Throughout our application we ensured that similar terminology was used to avoid confusion. As you can see below, elements such as the submit button are recognisable on each page.

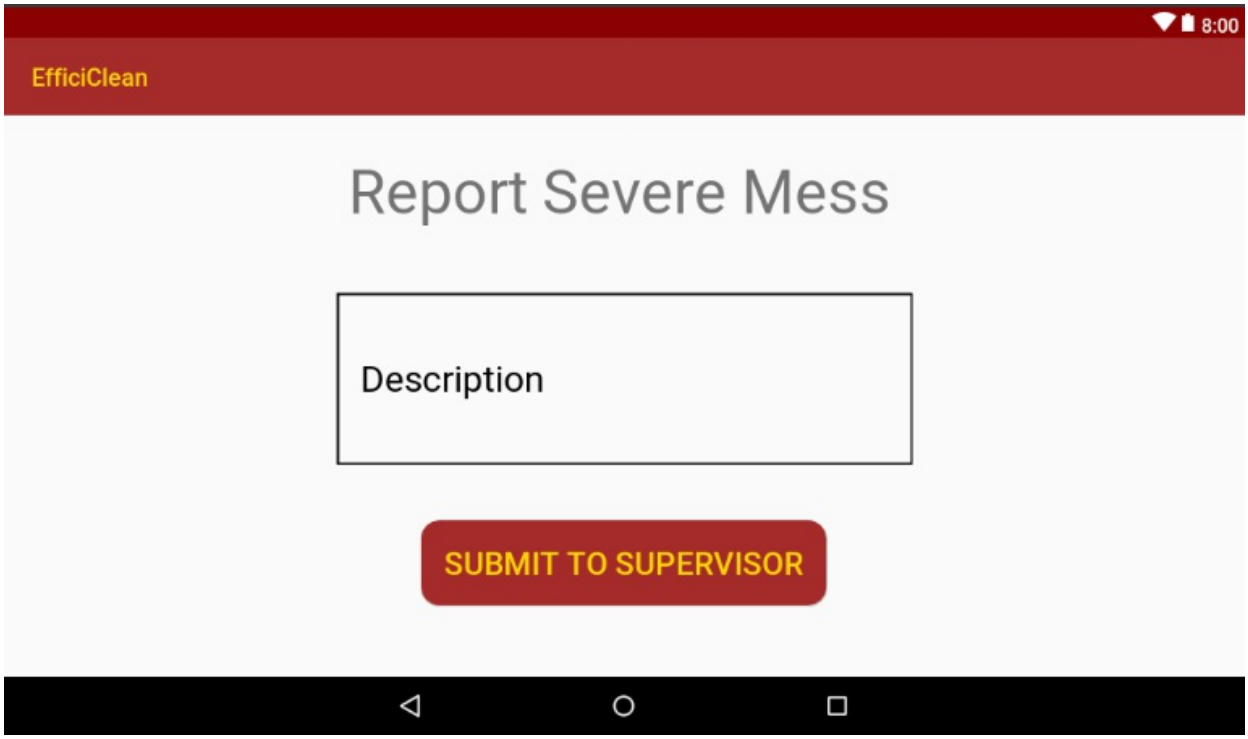




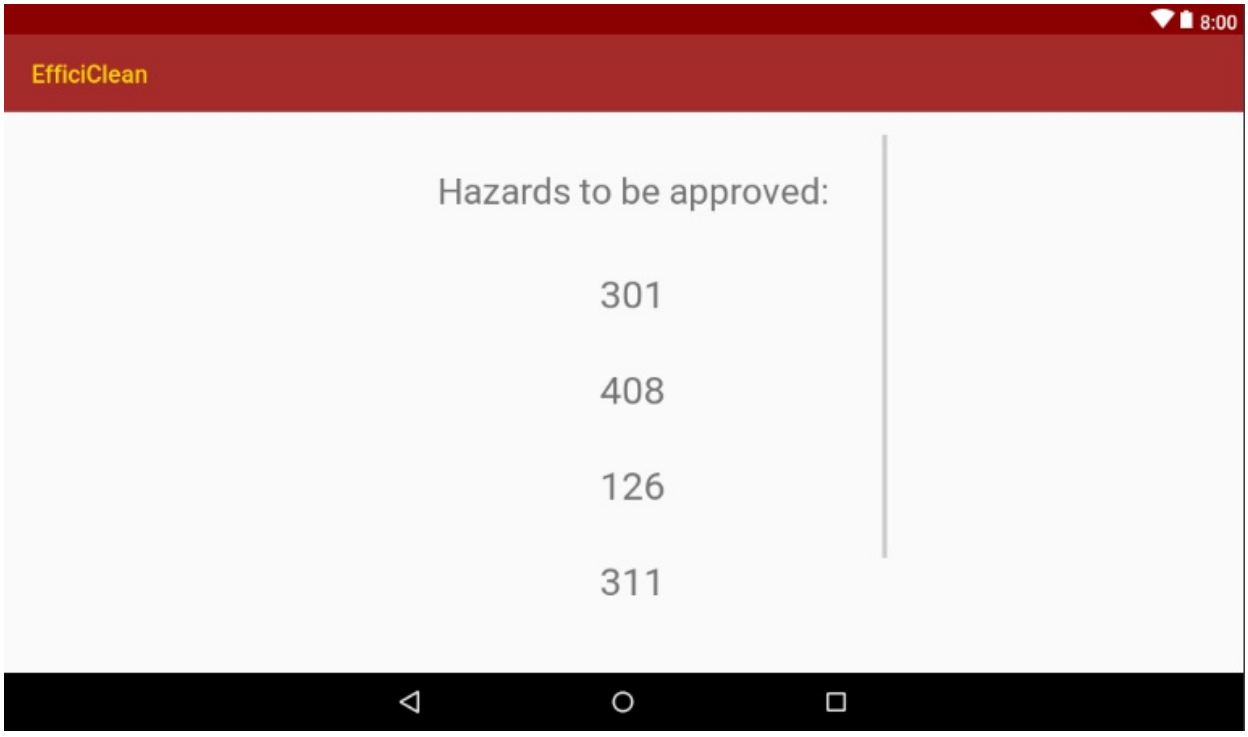
Resembling actions are carried out in the same manner. The consistency of each of these elements ensures that Efficiclean is easy to use.

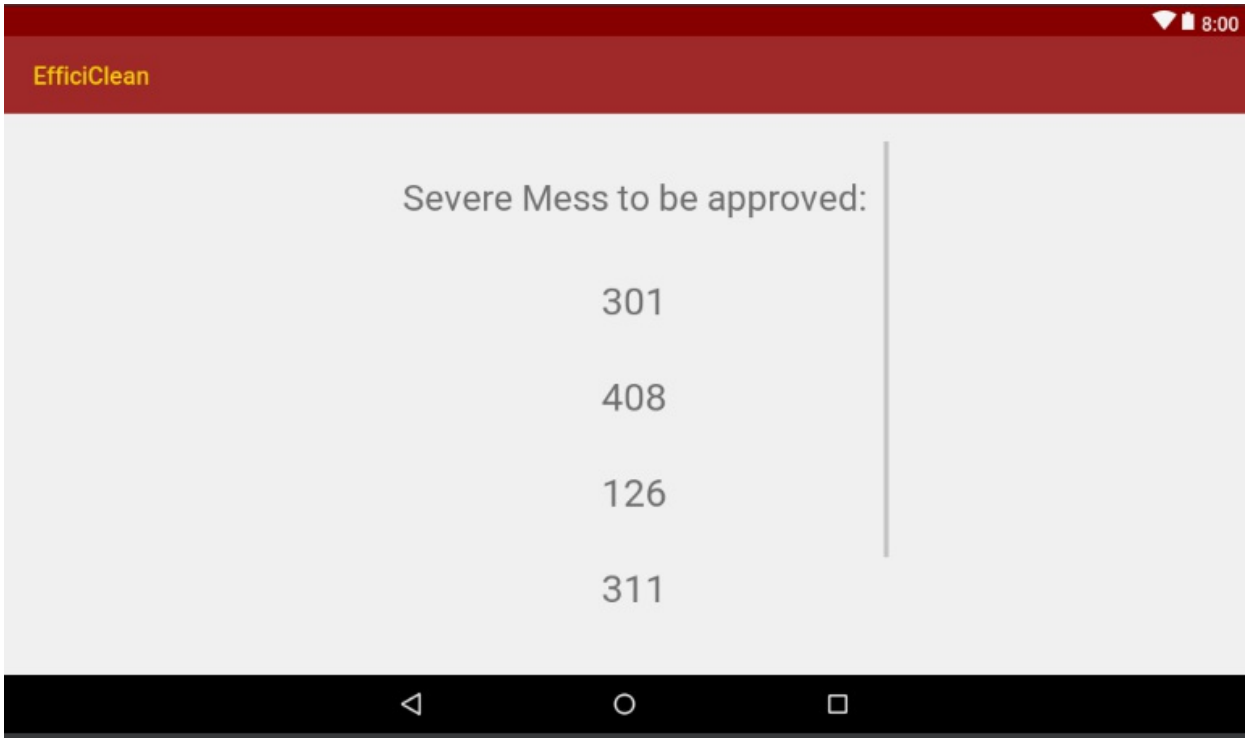
Report Hazard and Severe Mess pages:





List Hazard and Severe Mess pages:





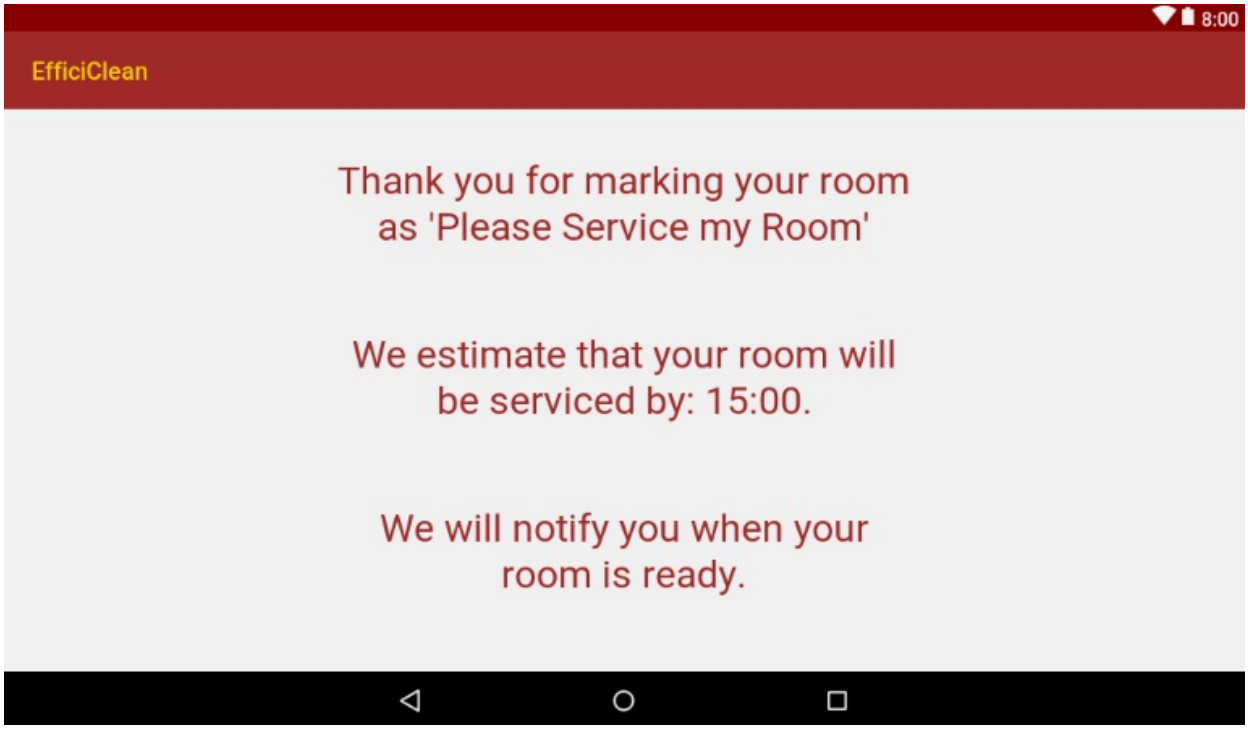
As we can see from each of the above pages, the background and font colours throughout Efficiclean are the same. We utilised red and gold as they symbolised royalty and high quality.

Enable frequent users to use shortcuts.

At this current time there are no shortcuts built into Efficiclean as all actions must be carried out methodolocially. However, as future work, we would like to keep guests logged in until they leave the hotel when they will be automatically logged out.

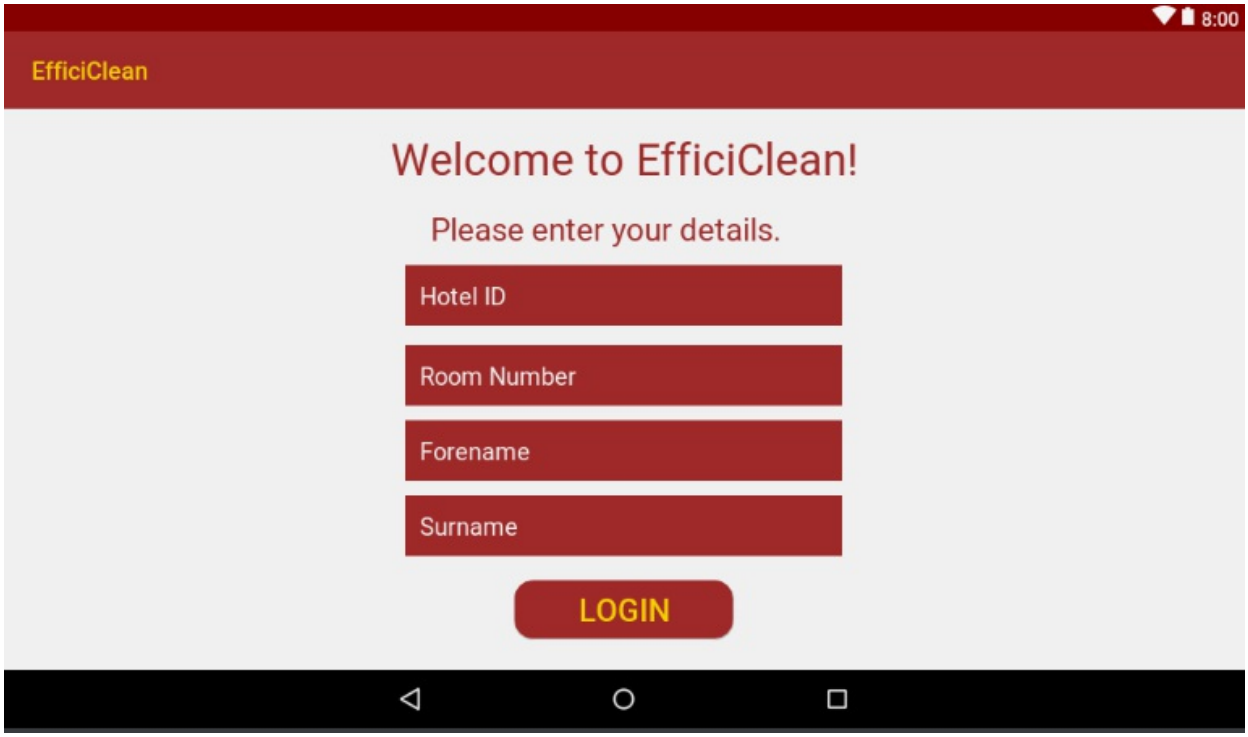
Offer informative feedback

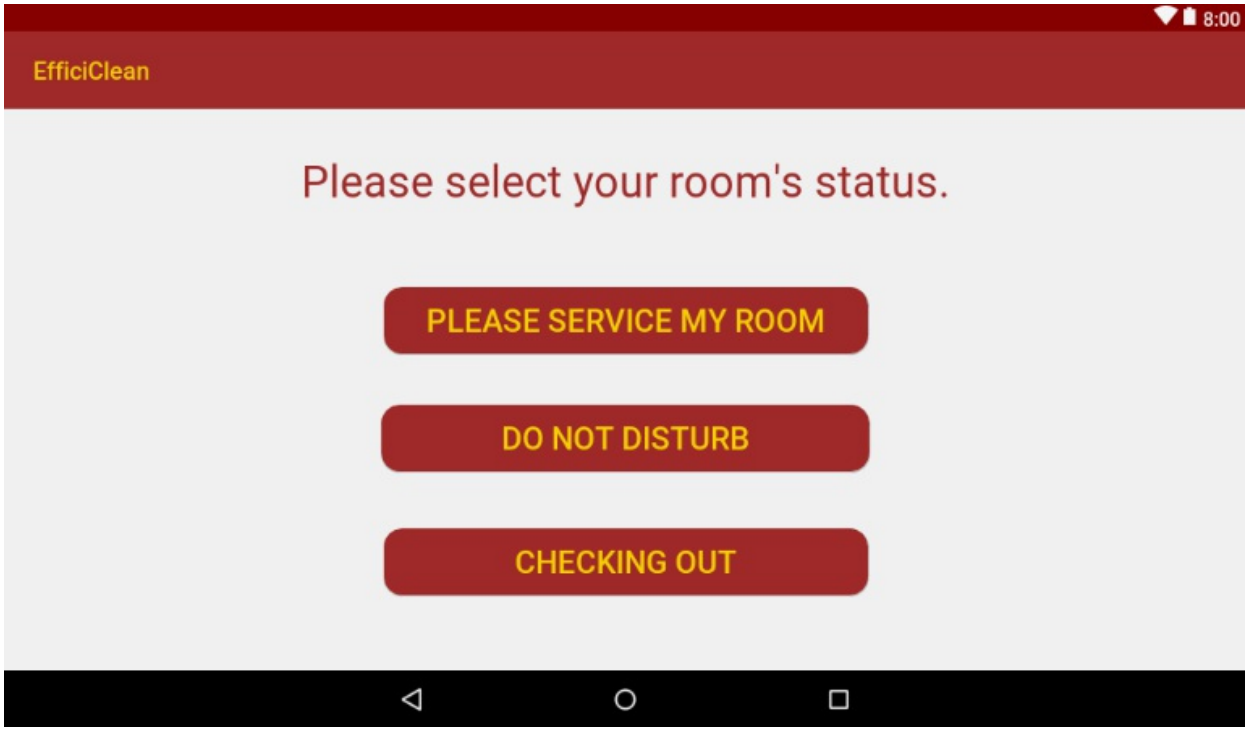
Once a guest marks the status of their room they are informed which option they have selected and provided with information on this option. Similarly, once a staff member sends a room to supervisor approval they will receive a pop up to let them know the room has been sent for approval. This feedback allows users to know that the action they have completed has been successful.

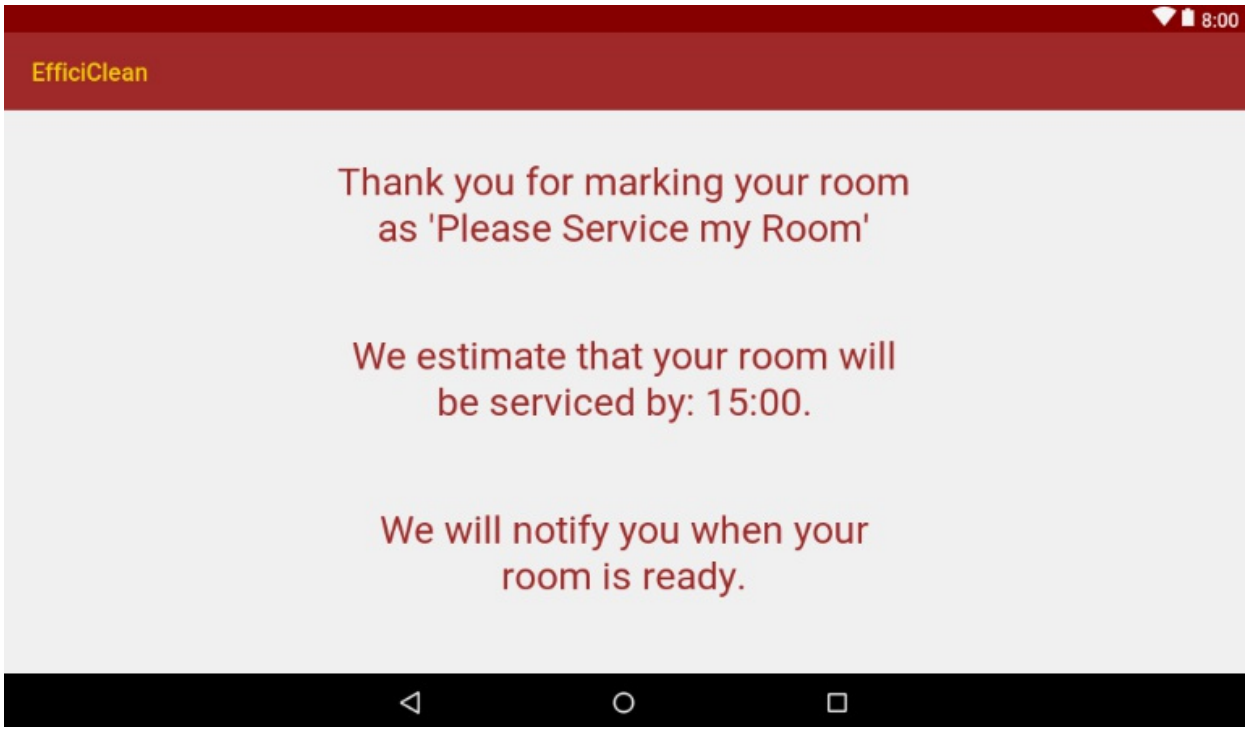


Design dialog to yield closure

Actions such as guests marking the status of their rooms has a clear sequence of actions. Guests first login to Efficiclean using their hotel ID, room number, first name and surname. They then progress onto the home screen and have three options “Please service my room”, “Do not disturb” and “Checking out”. Once the guest selects an option they are presented with a page to inform them what status there room is currently marked as.

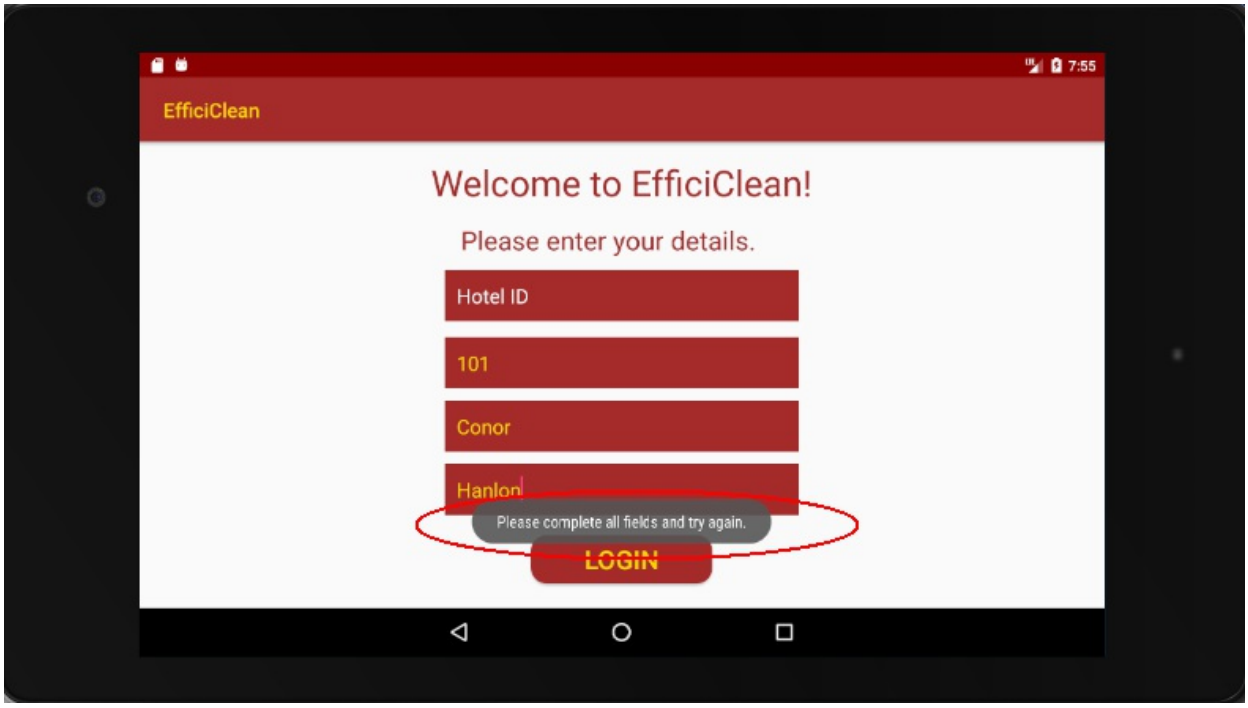






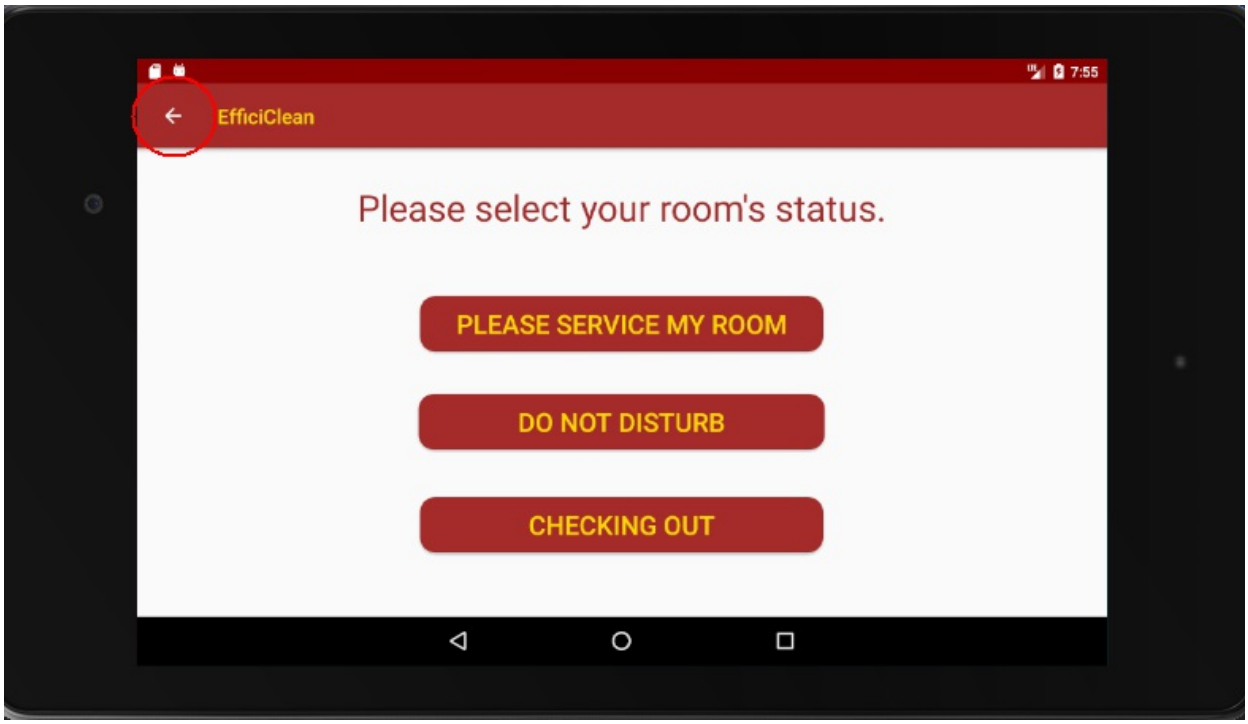
Offer simple error handling.

Users will not be able to make errors in Efficiclean as they will receive a pop up to inform them of their error. An example of this is if a user does not fill in a field when logging into the application. They will be informed that this needs to be changed for them to log into the application.



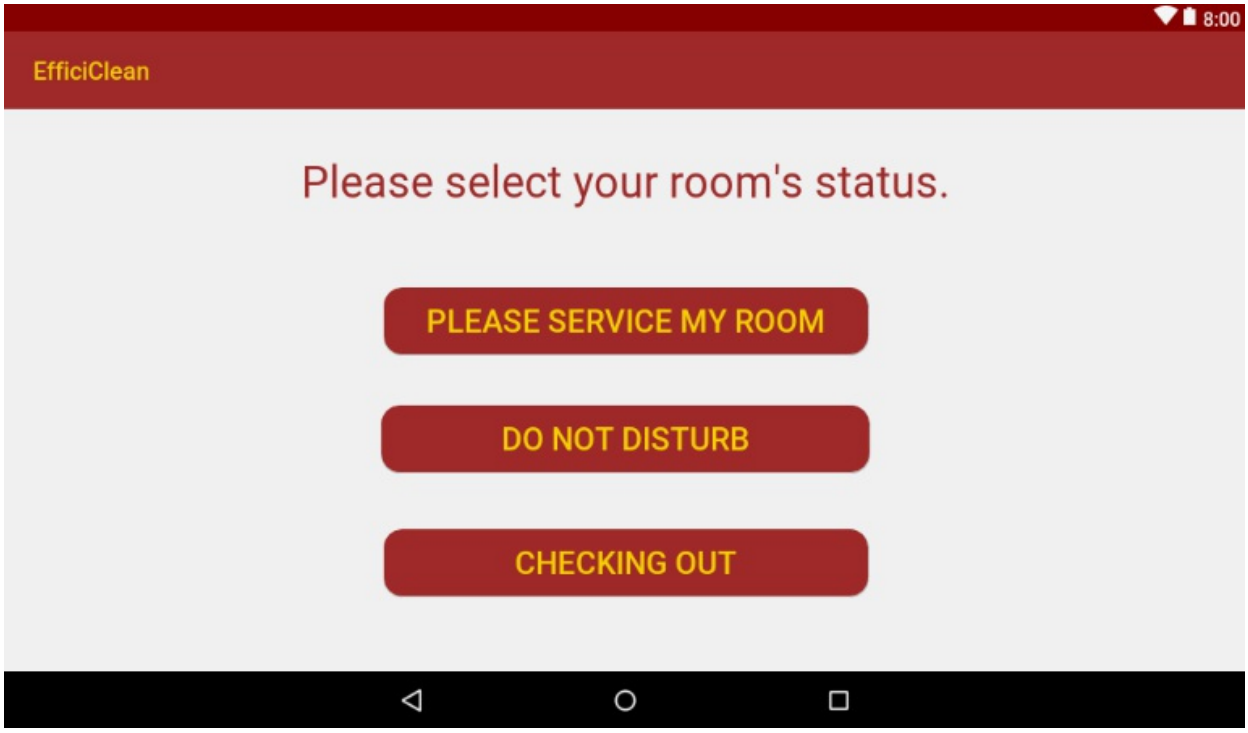
Permit easy reversal of actions.

Throughout Efficiclean there is a back button in the toolbar to allow users to return to the previous page if they have made a mistake. Similarly, if a user marks their room as do not disturb, they have the option to change this until a certain time.



Support internal locus of control

Users have full control of the application. The guests get to choose to the status of the rooms, the staff and supervisor get to select what actions they perform in the application. Users initiate all actions within the application.



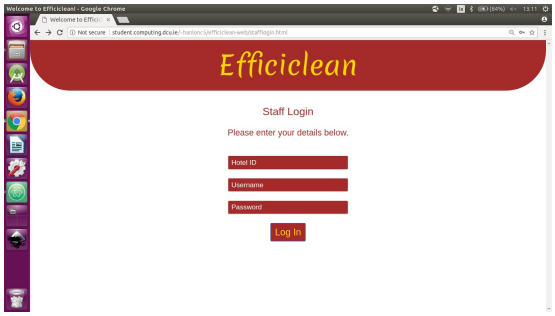
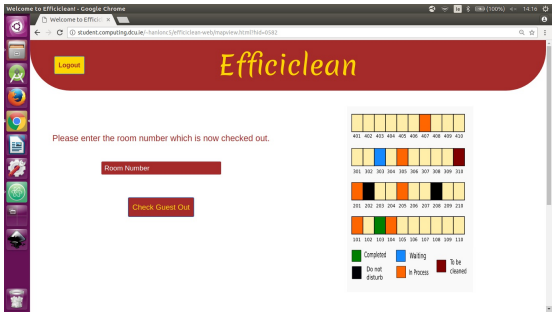
Reduce short-term memory load.

As our short term memory supports only 5 to 9 items at one time, we kept our user interface as simple as possible. This means that users are not overloaded with information and can enjoy using the application.

7. Accessibility Testing

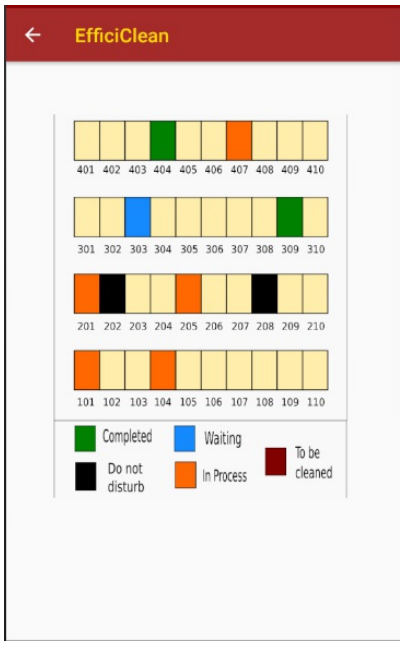
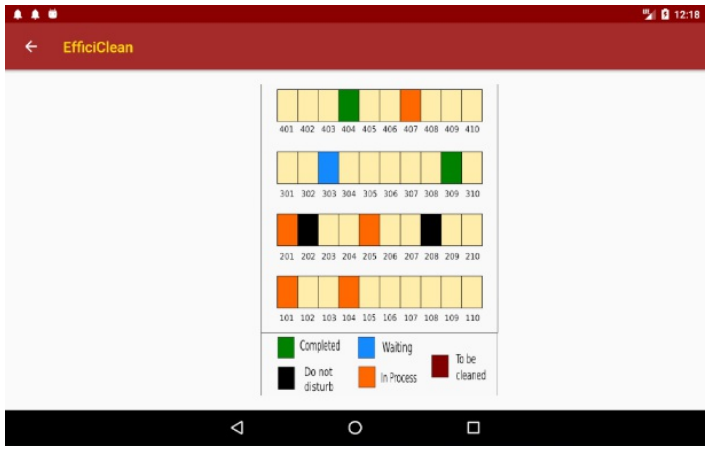
Sight Difficulties

For users with sight difficulties, the Efficiclean mobile application, although as usable as possible, may not be very easy to use. For this reason, we developed a web interface which was been vigorously accessibility tested. Guests who suffer from sight difficulties can use this interface to mark there room status and receive a notification to inform them when their room has been cleaned. The web interface can be controlled through the use of a keyboard and does not require a mouse.

Web Login	*Web Homepage*
	

Colour Blindness

To ensure Efficiclean was usable for users who suffer from colour blindness, we were careful to make sure that contrasting colours were not used together. Similarly, we had to ensure colours on the Map View did not contrast.

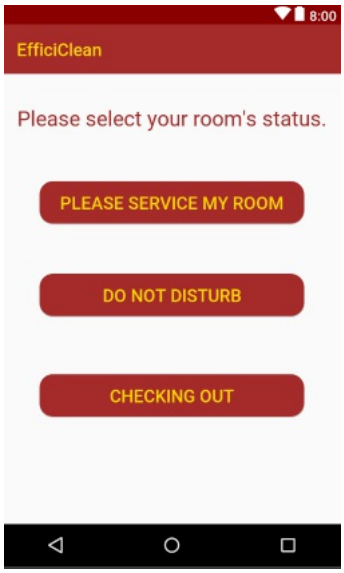
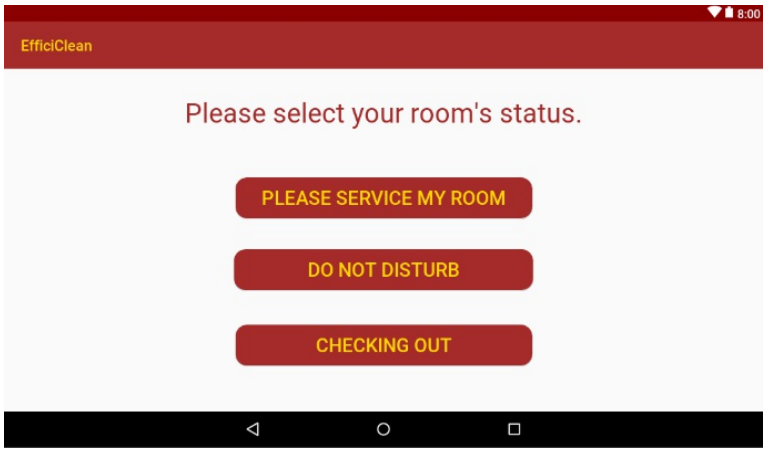
Mobile Interface	*Tablet interface*
	

Hearing Difficulties

As Efficiclean has no audio within the application their will be no difficulties present for users with hearing difficulties. The only aspect of Efficiclean which involves audio are the push notifications. One example of these push notifications are the alerts which let users know that their room has been cleaned.

Motor Skills

Users who suffer from poor motor skills benefit from elements which will be used in sequence placed close together. This structure is evident throughout Efficiclean. Buttons should also be large to ensure they are easier to tap. Similarly to users experiencing sight issues, guests with motor issues may benefit from using the web interface as they can avail of the use of the keyboard.

Mobile Interface	***Tablet interface***
	
Large buttons to make it easier to use to users with poor motor skills.	Tablet interface also has large buttons for accessibility purposes.