Restaurant Management System

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ASSIGNMENT DECLARATION FORM

Lecturer: Luke Raeside

Module Name: Major Group Project

Date of Submission: 28th of April 2017

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Acknowledgments

The group would like to thank our project supervisor Luke Raeside for his advice and guidance provided when completing this project. He helped point us in the right direction when we got lost.

Abstract

The purpose of this paper was to present the idea of an android application that manages processes that occur in a restaurant setting. The developed android application provides a way for management and employees to carry out restaurant operations from one central application. When creating the application, android studio was used and sublime was used writing the php scripts. The application uses the software and hardware of the android device to carry out its functions.

Current systems on the market were analysed and the disadvantages associated with each system were identified. There are several systems on the market that operate as management systems for restaurants but they typically only manage one area, such as point of sale or reservations. This application integrates different areas to provide a system that can handle all processes required at a reasonable price. There are many advantages associated with this application compared to other applications available on the market. The advantages will be discussed further within the report.

The result of this project is a fully functional android application that handles all the operations that occur inside a restaurant setting. It uses volley to handle client-server operations and incorporated NotificationManager to alert waiters about changes to their order statuses. The android application allows waiters to view their orders and create new orders. It allows all the users to create new notes, view old notes, edit old notes and delete notes that are now longer needed. Notes on the application can be viewed by other users and can be a means of communication between the different users. Waiter can view their upcoming shifts and previous shifts on the application. Management can add new shifts on the application and view the entire roster for a specified date. The chef can edit menu details and add/delete menu items. Chefs can mark individual food items and orders as complete which will notify the waiter to the change in status.

Introduction

In Ireland, there is a growing foodservice market in 2015 the Irish foodservice market was worth €6.3 billion. It was forecasted to grow to €6.9bn by 2018 but in Bord Bia's 2016 annual report the market has already reached that and is exceeding it to €7.5 billion, and is forecast to grow to over €9 billion by 2020. The forecasted total market growth rate between now and 2020 is 4.9%. In the 2016 report almost 35% of consumers spend their money on Quick Service Restaurants. Industry Trends found in the 2016 report are that consumers expect food on demand and new services are being developed to meet this need. Consumers want to be able to personalize their dining experience to their preferences. This is where we would like to target. Technology helps customize the experience and provides the consumer with a quick service. (Bord Bia, 2016)

The idea for this software was developed from visiting restaurants. When entering a restaurant customers are sometimes greeted by a bulky desktop computer with a reservation and table layout for the restaurant. This computer indicates whether a booking is made or the status of a table. The application proposed works to eliminate the need for a desktop or laptop computers to deal with bookings, instead reservations can be carried out through the application.

The restaurant may have a paper based menu that is difficult to alter. It can be costly to reprint menus when simple changes such as the alteration of names or prices are required. The application allows staff to constantly have access to an updated version of the menu they require. Management can make changes to the menu from one device and all the devices will be updated.

Many consumers have recently become conscious of their calorie intake and try to make conscious efforts when eating out. Customers need to know nutritional information to make choices best suited to their dietary restrictions. The application can display all the nutritional information regarding menu items. The application labels each menu item regarding allergies and calorie count.

Proposed System

The proposed system will be an android application that will handle restaurant operations such as order handling and roster management electronically. Network operations will be handled through volley. Volley allows for multiple concurrent network connections, so it's suitable for a restaurant

scenario where many waiters could be calling on the network at the same time. The system will allow waiters to immediately send the orders to the kitchen and get progress updates.

Scope of Project

By using the proposed application, the restaurant's management tools are in one place. The users can:

- Make a reservation.
- Edit information regarding a reservation.
- Cancel a reservation.
- Edit menu items.
- Add new menu items.
- Delete menu items.
- View menu item details such as allergy information, calories, spice levels etc.
- Take orders from customers as they remain at their table and have it immediately sent to the kitchen.
- Employees can clock-in and clock-out from the application.
- Section for employee notes.
- Roster section for employees to view their schedule.
- Management can update the rosters.

Major Tasks:

1. Plan the requirements for the application.
2. Build a prototype and demonstrate it to supervisor.
3. Build the finished product.

4. Demonstrate the finished product to supervisor.
5. Deploy the finished project to the market.

Limitations of our system

The limitations associated with the proposed system are that it is internet based, the user must have a connection to the internet to sign in and interact with the application. The server on which the application interacts with, must have a continuous uptime during open hours or there should be a backup server. This allows for the application to experience no problems during busy hours. Another limitation of the system is staff knowledge. Management should ensure that the staff is sufficiently trained to use the software at hand and are provided with continuous training.

Problem statements

The goal of this project is to highlight how technology can help to make restaurant operations run more smoothly.

Some of the questions we hope to have answered by the end of this project are:

1. How can restaurant management be improved with the use of software?
2. Do restaurants manage better with automated ordering systems?
3. What effects do calorie and nutritional information have?

The proposed system aims to eradicate the following problems that we have recognized:

1. Taking Orders

   In traditional restaurants, waiters write down the orders on paper. Some restaurants have computers that the order is placed in or the paper is sent directly to the kitchen. During busy times mistakes can be made when writing down orders.
2. Order Handling

   During busy hours, it can be difficult to keep track of paper orders.
3. Orders Analysis and Data mining

   It can be difficult to analyse large quantity of paper based orders for patterns of customer preferences.

Feasibility

Our proposed system is a feasible project. The technical requirements can be met within the time frame allocated. A sound understanding of java is required to develop an android application. The orders and the menu are kept in a phpMyAdmin for manipulation and querying. The scripts required to handle the data are written php. We have studied modules for java and php that provide a good basis for developing the proposed system.

Technology to be used:

Android Studio, Java, phpMyAdmin and php.

Research required

Research into android development and how our java experience can be molded to suit android. Research into existing systems.

Literature Review

Current Systems on the market

The market currently has many systems that provide the features this application will offer but they are usually packaged as separate services or as add-ons to the base software.

There are multiple systems already in place that use a combination of existing software and a POS system to take orders in restaurants and bars. A similar system to the proposed application is McDonald's self-serve kiosks, that allows customers to place an order, send their order to the kitchen and pay for their order.

Lightspeed Restaurant EPOS

The lightspeed restaurant epos is a point of sale systems for bars, restaurants and cafes. It provides table-side ordering and employees management such as reporting and accounting. For small businesses, the system costs £79 per month. The small business tier includes one register, up to two printers, personalized onboarding, 24/7 support, free updates, secure cloud backups and basic reporting.

OpenTable

Open Table is reservation management system for restaurants. It provides restaurants with an Electronic Reservation Book to replace paper reservation systems. The provided system can handle restaurant management, table management, guest recognition and email marketing (OpenTable, 2017.).

The Electronic Reservation Book is a touchscreen system that is stationed at the restaurant's hosts stand. It can help manage reservations, assign tables, recognise repeat customers and remember dinner preferences. The price for the system is $199 per month. The price includes software, unlimited upgrades, the touch-screen system, customer support and there's a one-time installation fee estimated between $600 - $700. The final installation price depends on the size of installation, that covers on-site fitting, training and custom configuration of the system (Potter, 2010).

Talech

Talech is a tablet based point of sales system, it can take card payments, organise table plans and

manage orders. It also manages multiple payment forms, split bills, manage employee timesheets, clock in, set access and permissions. It allows management to manage multiple locations across from one single system. The system can create customer profiles to view past sales and order histories. Manage multiple cash drawers, track no sales, pay-outs, drops and pay-ins. Talech costs €69.99 per month for the first device excluding VAT and €29.99 per month for each additional device (Anon, 2017).

Comparison of similar products

The following table shows feature comparisons between the proposed system and the systems currently available on the market.

	Our System	Lightspeed EPOS	OpenTable	Talech
Menu	Yes	No	No	No
View nutritional information	Yes	No	No	No
Reservation system	Yes	No	Yes	No
Place orders	Yes	Yes	No	No
Order management	Yes	No	No	Yes
View Order status	Yes	No	No	No
Roster management	Yes	No	No	Yes

Clock-In/Clock-out Capabilities	Yes	No	No	Yes

Table 1 Comparison of Systems

How can restaurant management be improved with the use of software?

The aim of the systems is to streamline restaurant operations. Having different stations such as bar tills, desktop POS can cause confusion and takes time inputting details into different systems. Restaurant employees must also be trained and familiarized with the different systems in place. Having one system in place allows for a cohesive experience. Employees will only have to be trained to use one system.

To improve business processes with the assistance of software a lot of the operations occurring within the restaurants must be kept in one place. In a typical restaurant, waiters will use paper for taking orders, a desktop to record reservations, rosters, editing menus and a POS for payment. Using an Android tablet and the proposed software, a restaurant could keep many of the operations in one place for easier and quicker access. This will increase convenience and the quality of information. It will also allow for consistency in terms of data collected.

Using software for placing orders, allows the orders to later be data mined for statistics. Statistics recovered from the software allows managers to better understand their menu and customers. Statistics helps businesses prepare better for their busiest nights and stock control.

Do restaurants manage better with automated ordering systems?

Having an automated system in place enables customers to experience greater convenience. Service convenience is related to a customer's desire to conserve time and effort. An increase in convenience can be associated with an increase in satisfaction (Leonard L. Berry, 2002). Restaurants can use technology to increase convenience by making it easier for waiters to take the orders at the customers table and immediately have it sent to the kitchen rather than going to an extra stage and inputting the order.

By using automated ordering systems, restaurants can save time transferring order details between

the different stations within a restaurant. By having an efficient system in place, waiters can save time serving guests. With the proposed system, the waiters are immediately notified when their dishes are prepared.

What effects do calorie and nutritional information have?

A study published in the Journal of Foodservice in 2008, found that customers were willing to pay $2.00 more for items that were low-fat when the information was present (Hwang and Lorenzen, 2008).

A study conducted in 2010, found that calorie information on restaurant menus reduced the total number of calories people ordered and consumed for a meal. This improved their ability to estimate calories consumed (Roberto et al., 2010).

The above studies provide support to the theory that consumers consider health when making food choices. The system will aim to generate an increase in profit by providing customers with more information.

By providing a calorie count for management when creating new menu items from within the proposed systems, the system should provide accurate calorie information. With accurate calorie information and relevant nutritional information customers can make a choice best suited for their circumstance.

The proposed system uses a MySQL database that contains calorie information from united states department of agriculture's database (u.s department of agriculture, 2017). The database can be updated with more items as required.

The aim to include a calorie count and nutritional information has many benefits for both the restaurant and customer. Customers are willing to pay more for items they believe are low-fat. It can be difficult to fit detailed information into a paper menu. Using the proposed system, restaurants can add detailed nutritional information for individual dishes.

Justification & Benefits

Management Benefits

There are many benefits to this application, the main people to benefit from this application are the

restaurant owners and managers. Having a menu that is easily editable means a manager can quickly add or take an item from the menu to avoid customers requesting a food item that may be out of stock. A manager can create and post rosters from inside the application and create notes for employees. A stock system will also be in place so managers can avoid running out of a certain product by having the number of items left displayed within the application.

1. Wireless Printing

   One of the reasons behind building this as an android application is it provides the advantage of having wireless printing built into the device system, that may be further developed and used in the future.

2. Cost saving

   The system has cost saving benefits when it comes to menu changes. Instead of manually changing menus, the system will update all menus from one device. The system also combines all restaurant process into one system, so that management don't have to buy additional add-ons.

3. Competitive edge

   Management can analyse the orders history to tailor the menu to suit their customer base.

Consumer Benefits

Consumers will also benefit from the use of this application, they will be able to order their food and drinks and pay for them simultaneously from the tablet. The customer will also benefit by constantly having an updated version of the menu.

1. Service speed

   In general, if service speed is accelerated more customers can be served. Depending on the stage of the meal, customer satisfaction can be enhanced by increased service velocity. This affect revenue positively specially during hours of high demand (Kimes, 2008).

2. Order Queue

   Foods can be served according to their time of order to avoid mixing up customers' orders queue.

3. Time Saved

   Technology could potentially reduce the time taken during the ordering and delivering food stage. Since waiters would immediately be notified when an item is ready for a customer.

Analysis and Design

Analysis is the process of breaking down a complex system into smaller parts to understand it better. We analyzed the individual parts and designed their components. After designing the proposed system, we developed the components into individual standalone applications and once complete were integrated into one.

Design emphasizes a conceptual solution in software and hardware, that fulfills the requirements, rather than its implementation. For example, a description of a database schema and software objects. Design ideas often exclude low-level or "obvious" details, obvious to the intended consumers. Ultimately, designs can be implemented and the implementation such as code expresses the true and complete realized design (Larman, 2004).

Waterfall Model

The proposed system was developed using the waterfall model throughout the development process. The waterfall model is a sequential model, progression to the next stage cannot be completed until the primary stage is complete. It has six stages -> Requirements -> Analysis and Design -> Implementation -> Testing -> System Deployment -> Maintenance. The model is helpful in breaking down the developmental process into steps that need to be completed.

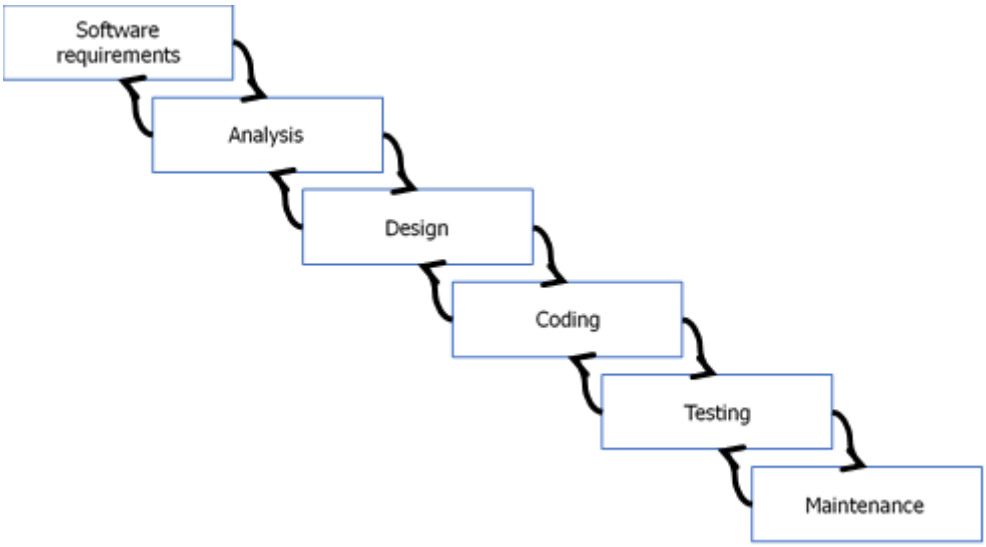

Figure 1 Waterfall Model

It was concluded that the benefits outweighed the disadvantages in accordance to this project.

- The requirements were known to us.
- The definition model of the project was fixed, the outcome was known.
- The technology was comprehended well, as the group had worked with java for the past three years. This helped in terms of navigating the android development.

Specifications

The following are features that have been implemented in the application, they are the key requirements of the restaurant.

Functional Requirements

- Login for floor staff and management
- Management dashboard
- Waiters dashboard
- Reservations
- Staff Rosters
- Menu
- Order handling
- Clock-in
- Notes

Non-functional Requirements

- Calorie count when adding new items to the menu.

Hardware Specifications

- Android Phone/Tablet with android KitKat 4.4 or higher

Architecture of our software

The system consists of the following parts:

1. Database
2. Android Application

3. PHP Scripts

The application is designed to interact with PHP scripts to retrieve data from the MySQL database. By calling on different scripts we can query the database for whatever information that may be required.

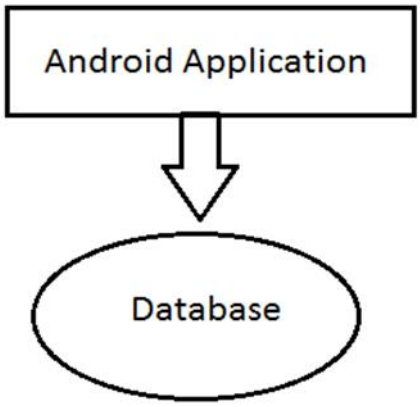

Figure 2 System architecture

There is one database for this application called User Database.

User Database Contained:

1. Ingredients table, that holds nutritional and calories information regarding commonly used food.

2. Menu table, that maintains a custom menu for the restaurant that customers would be able to access and order from.

3. Notes table, this holds information regarding notes section. Note id, note title, note content, date written and by who (employee id).

4. Order Items table, this holds all the items ever ordered from the menu and the order quantity associated with each item. Using this table, management could derive statistics from a single product.

5. Orders table, this holds information regarding an order, for example order id, total, table number and waiter information etc.

6. Reservations table, this maintains information regarding reservations such as the date, time and number of customers.

7. Staff table, this holds all the information related to staff such as usernames, passwords, date of births and phone numbers.

8. Roster table holds all the information related to the staff working hours such as the date they are working on, start and end time and employee ID(name).

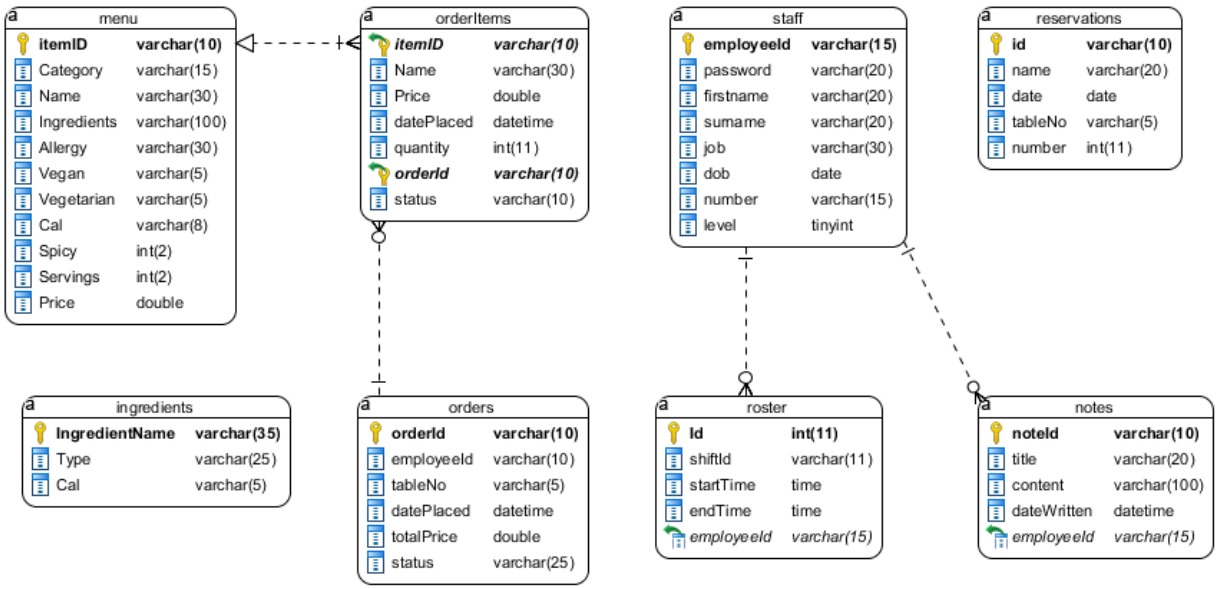

Figure 3 Database

Use Case Diagrams

Use case for restaurant manager

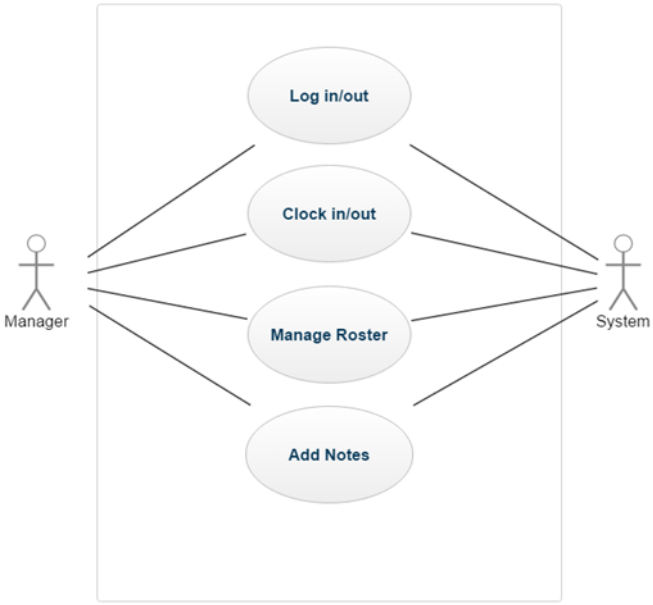

Figure 4 Use case for restaurant manager

Figure 5 shows the different events a manager can trigger. They can manage the roster, clock-in/clock-out and add notes.

Use case for host/hostess

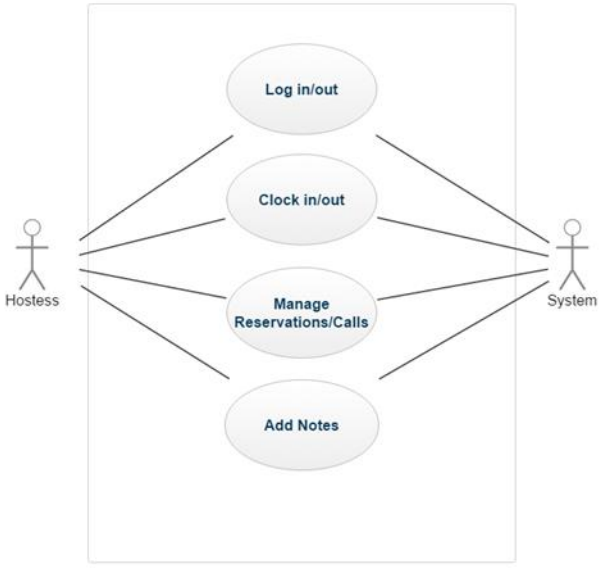

Figure 5 Use case for host/hostess

Figure 6 shows the host/hostess can clock-in/clock-out, manage reservation and add notes to the system.

Use case for waiter

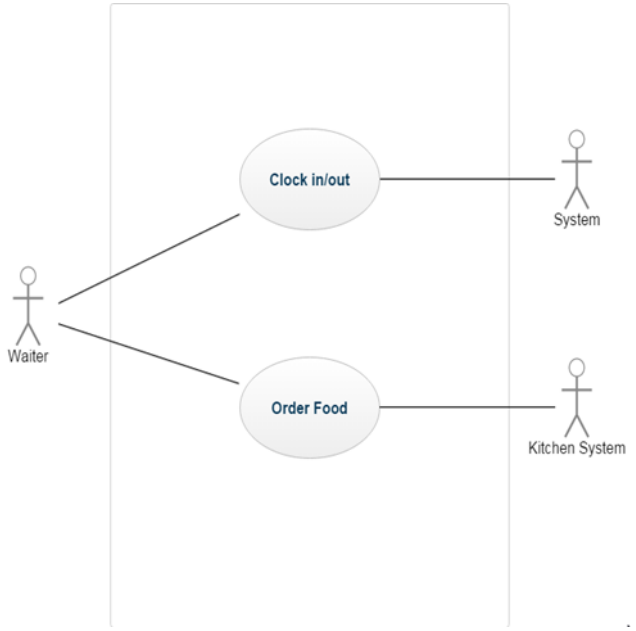

Figure 6 Use case for waiter

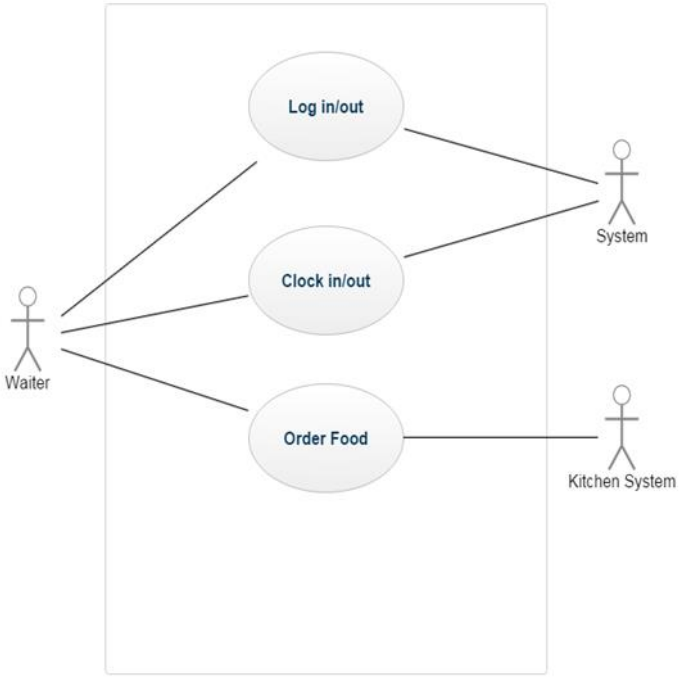

Figure 7 Use case for waiter

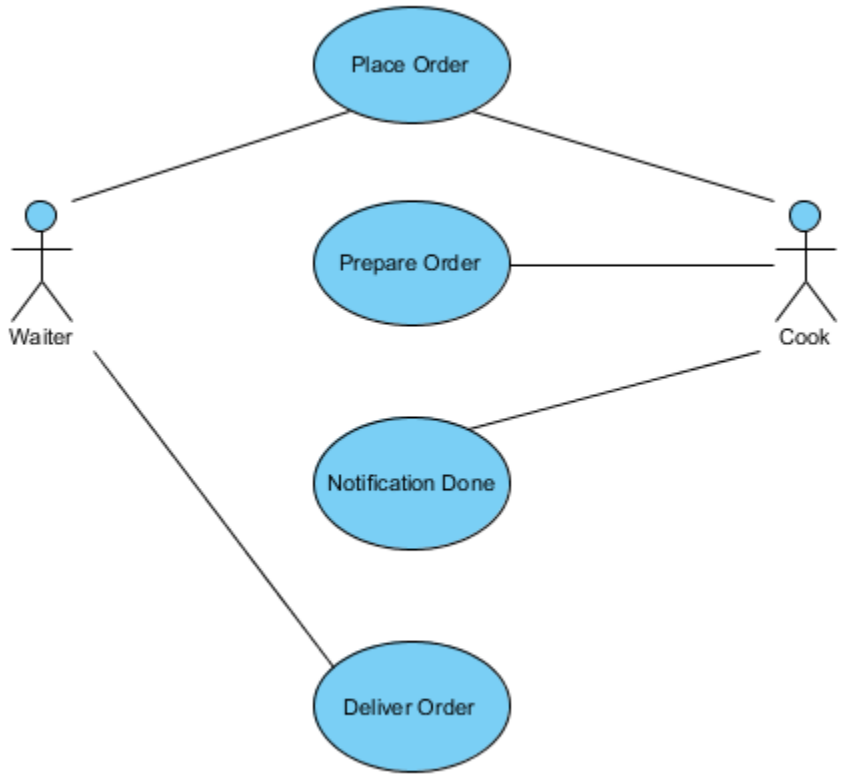

Figure 8 Use case for waiter

Figure 9 shows what happens when an order is being processed. Firstly the waiter inputs the customer's order and it is being processed into the kitchen. The kitchen prepares the order and once its completed they click on the order to notify the waiter that their order has been complete. The waiter now is notified by a notification that says order has been completed and can serve to the customer.

Name: Order

Actors: Staff (Initiator) & Cook

Type: Primary

Description: The use case begins when the waiter inputs an order to be processed and completed. It arrives on the kitchen order dashboard. Once the order is ready by the kitchen staff the order is put to “complete” which notifies the waiter by notification that their order has been complete

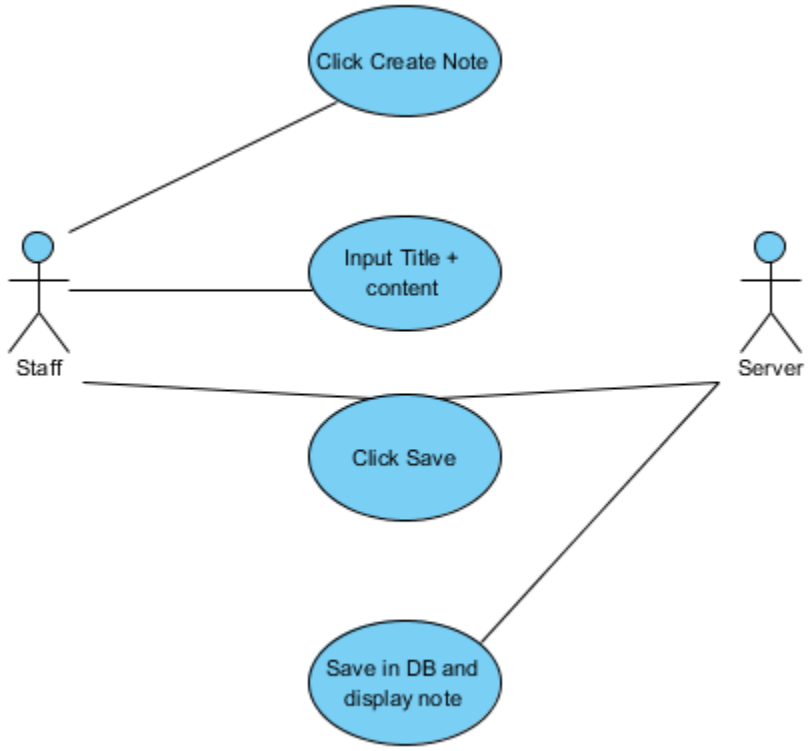

Figure 9 Use case for waiter

Figure 10 shows what happens when the staff tries to create a note. The staff has to input the title and content of the note and click save. It then saves itself to the database and displays it correctly.

Roster management use case:

Name: Manage Roster

Actors: Manager (Initiator)

Type: Primary

Description: The use case begins when the manager clicks on roster and clicks on the “plus” button

on the top right. The manager selects a date on the calendar and clicks “New Entry” which prompts up a form for the manager to input the employee name, start time and end time of their shift. Once done the manager clicks “add” which will add the information into the database.

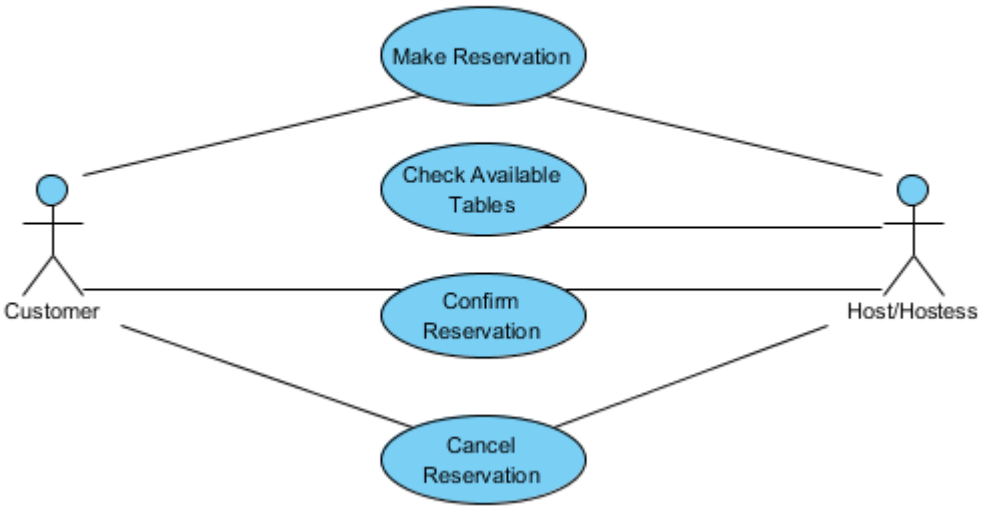

Figure 10 Use case for reservation

Reservation use case:

Name: Reservation

Actors: Customer (Initiator) & Host/Hostess

Type: Primary

Description: The use case begins when the customer calls into the restaurant and asks to make a reservation. The host/hostess will ask the customer what time and will check are any tables free during that time period. The host/hostess can ask the customer if they wish a window table or anywhere. Once a table has been set the host/hostess will mark that table as reserved during that time period. Customer will come at their reserved time period and enjoy a lovely meal.

Sequence Diagrams

Login Sequence Diagram

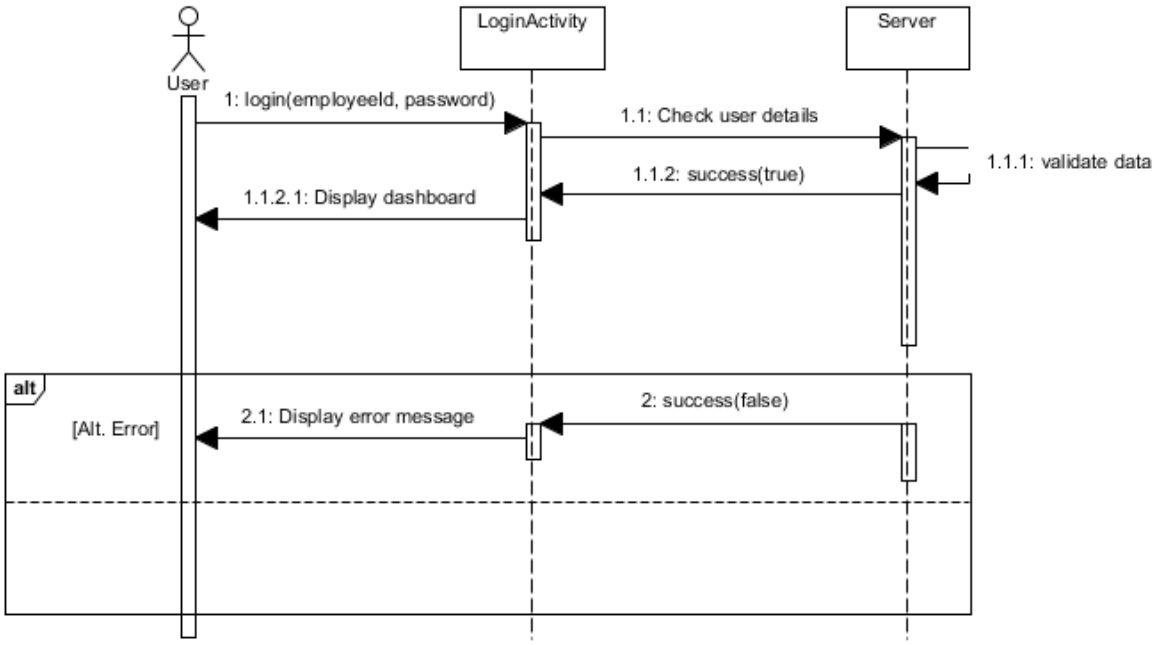

Figure 11 Login Sequence Diagram

Figure shows the sequence of activities when a user attempts login. If the user is success full they are show their dashboard, but if the password or employee Id is incorrect they are shown an error message.

Order Sequence Diagram

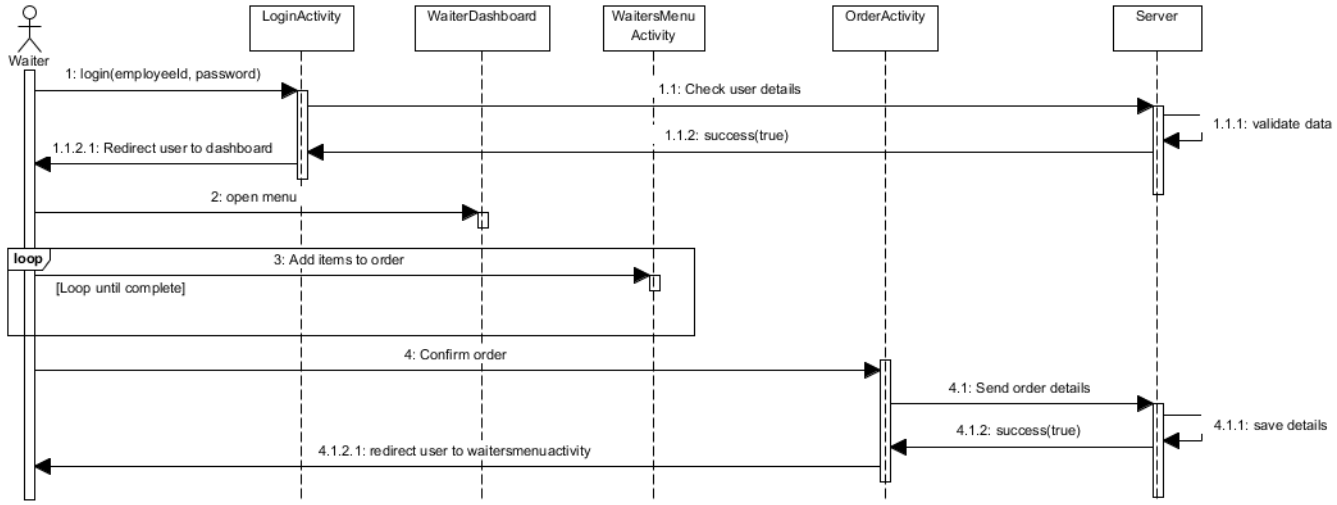

Figure 12 Order Sequence Diagram

Figure shows the sequence of activities when a user places an order with the system. The user first logs in and then is redirected to the dashboard if their credentials are valid. From there they can select menu and start building an order for a customer. Once the order is confirmed it is then sent to the server and placed in the orders list.

Order Complete Sequence Diagram

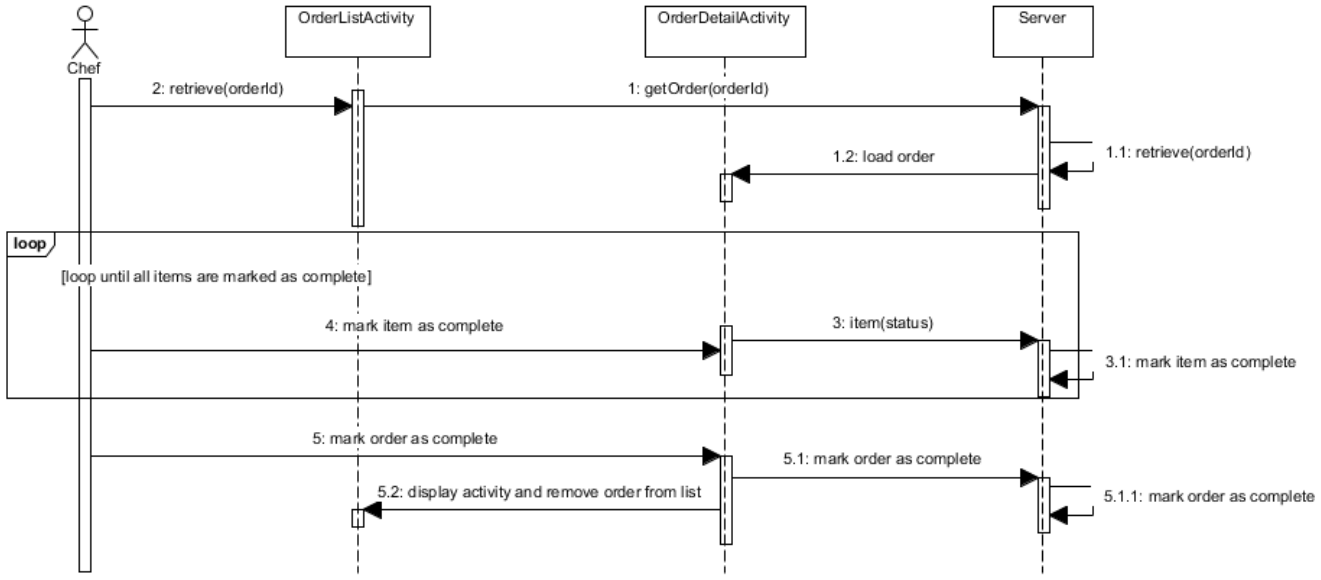

Figure 13 Order Complete Sequence Diagram

Figure shows the sequence of events the system goes through when a chef completes an order.

New Note Sequence Diagram

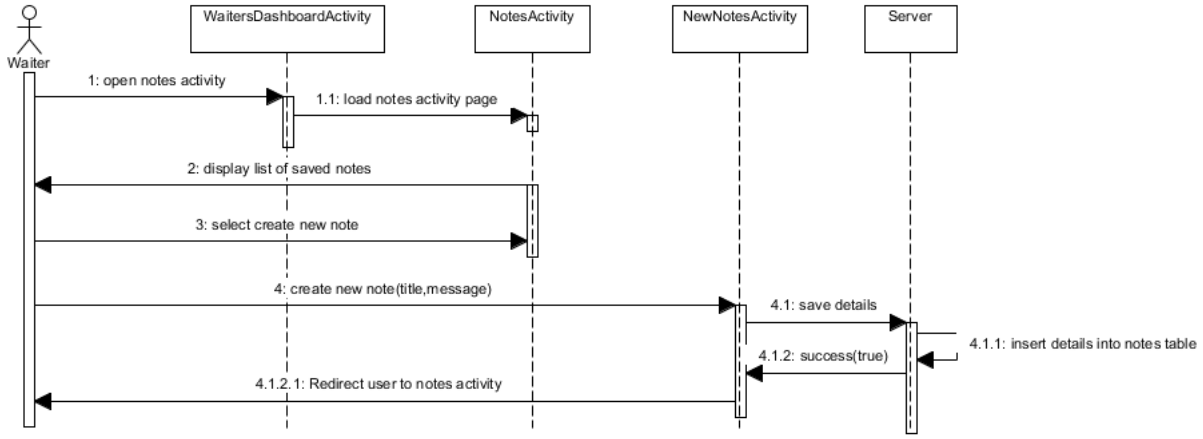

Figure 14 New Note Sequence Diagram

Figure displays the sequence of events when a user decides to create a new note. The waiter must fill the new note form and then submit it. The system saves the note in the database.

Memory management

RecycleView is an efficient version of ListView, which is a container for rendering larger data that frequently changes so that they can be recycled and scrolled. RecycleView is similar to ListView, but with more flexibility to customize. (android, 2017)

The application uses RecycleView (ListView + ArrayAdapter) to save memory space when displaying menu items and order list items. Before implementing the RecycleView the allocated memory was 7.68mb and it jumped to 10.79 when the menu fully loaded now it goes from 8.44 to 8.63mb.

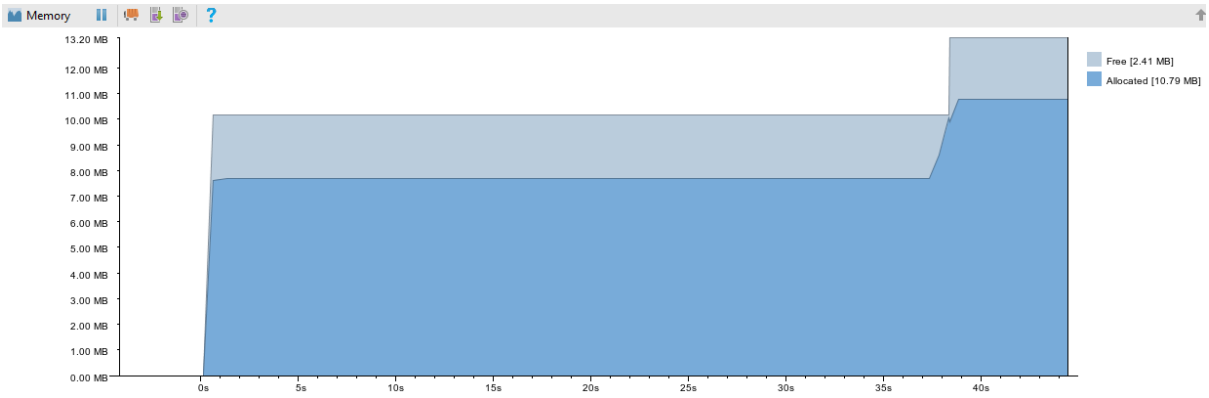

Figure 15 Memory Consumption: Before RecycleView

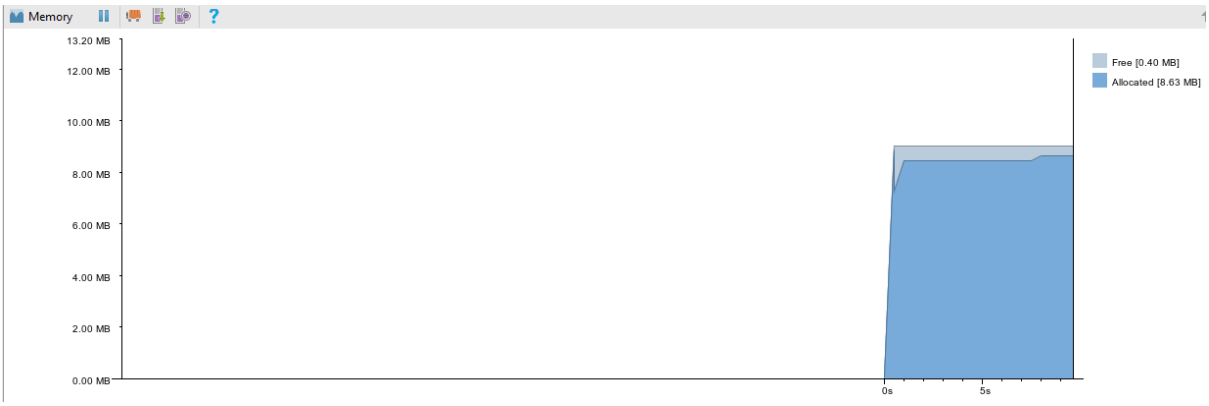

Figure 16 Memory Consumption: After RecycleView

Interface Design

The interface design is an important aspect of the program. To reduce user errors a clean user interface is a necessary aspect. The user interface is a vital part of all software. *A poorly designed user interface* may result in increased errors and higher training costs. It can also cost businesses money and time wasted trying to use an unorganized system. Mandel (1994) lists 10 most common problems in user interfaces that were acknowledged and avoided when creating this system.

Common Usability Problems

1. Ambiguous menus and icons.

2. Languages that permit only single-direction movements through a system.
3. Input and direct manipulation limits.
4. Highlighting and selection limitations.
5. Unclear step sequences.
6. More steps to manage the interface than to perform tasks.
7. Complex linkage between and within applications.
8. Inadequate feedback and confirmation.
9. Lack of system anticipation and intelligence.
10. Inadequate error messages, help, tutorials and documentation (Galitz, W.O. p.65, (2007)).

The proposed system has been designed to have minimum clicks required to perform a task. It is a user-friendly interface.

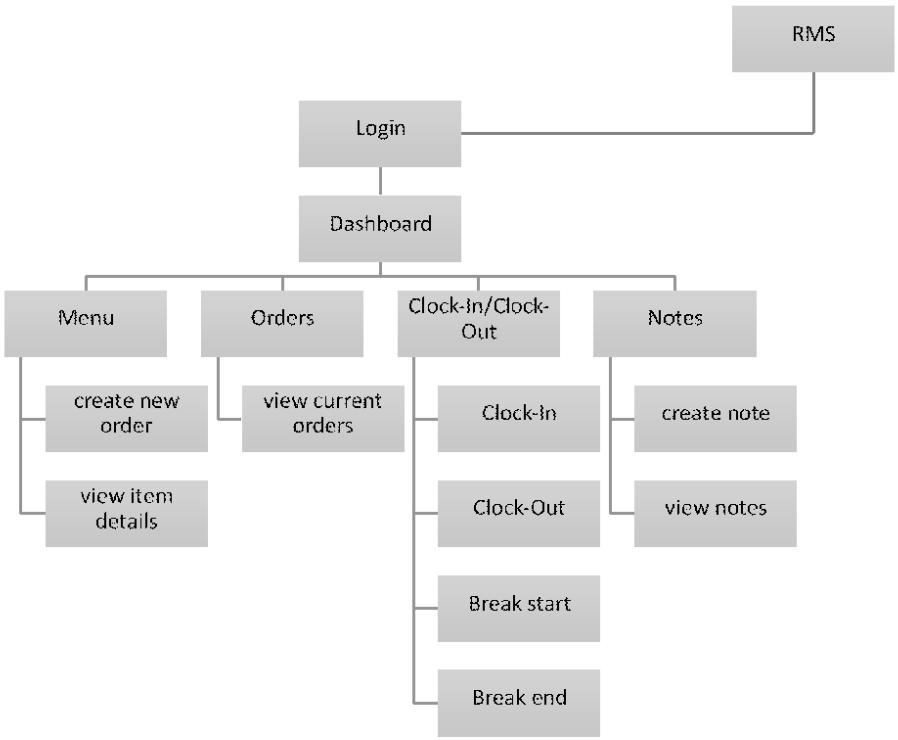

Figure 17 Waiters GUI Structure

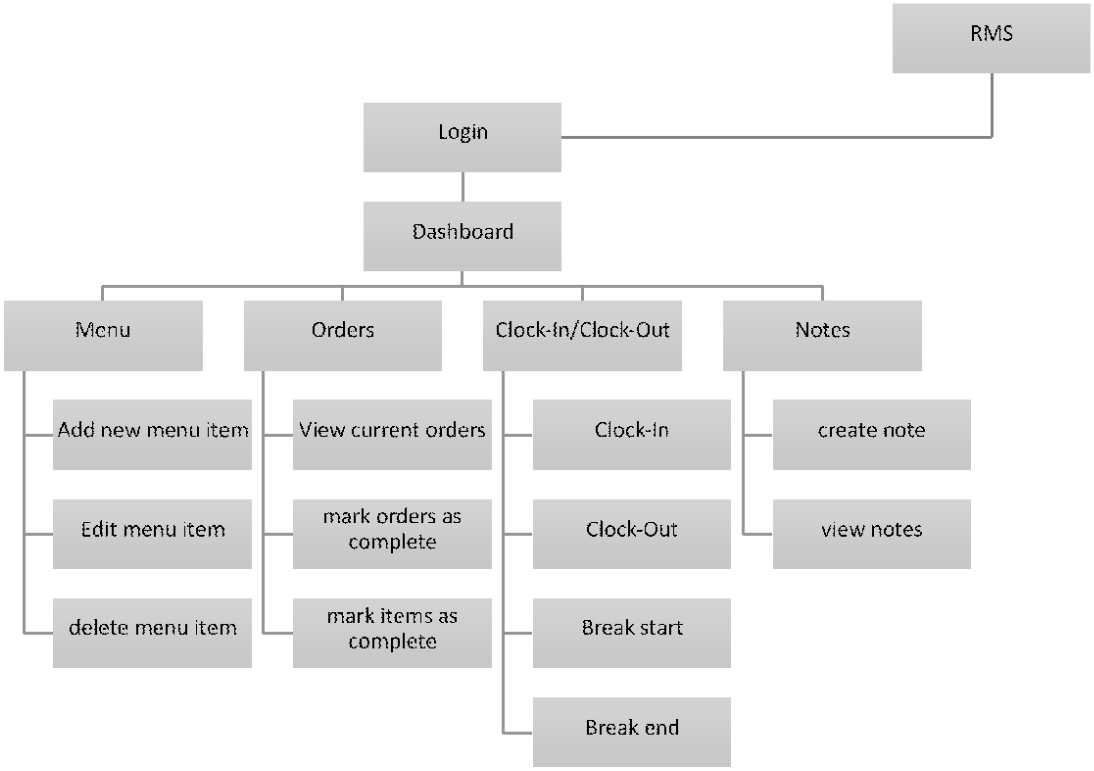

Figure 18 Chefs GUI Structure

Wireframes

Before beginning any programming, it is best to have a wireframe or a rough template of the system to follow when coding. Wireframes were prioritized to allow clients to have an input in the systems appearance. We understood from previous projects it is important to have template to work from, so that the development team understands the end goal and there are is no confusion in communication.

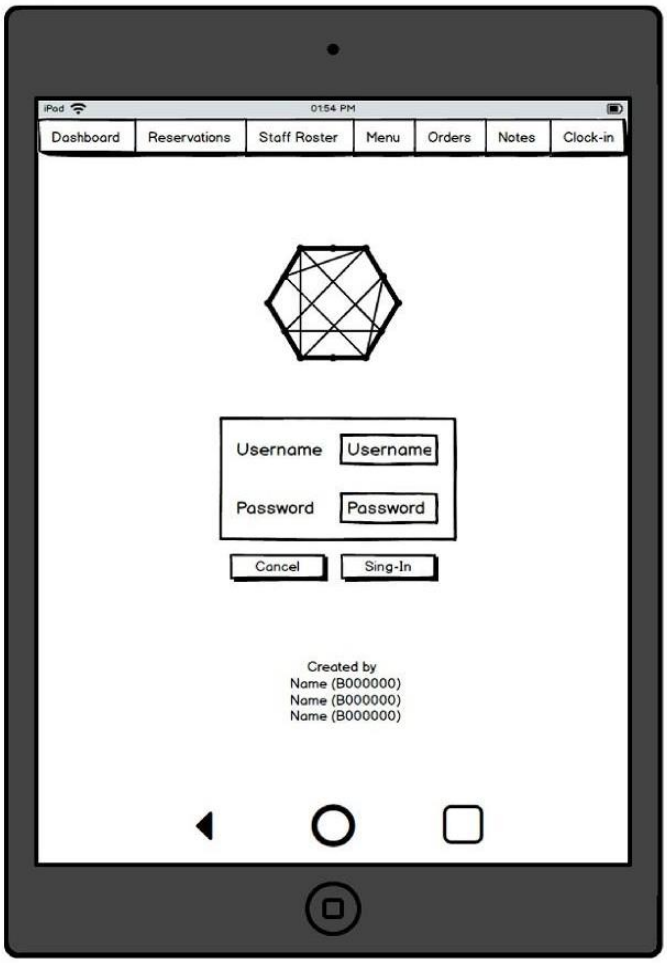

Figure 19 Login Wireframe

Figure 20 Dashboard Wireframe

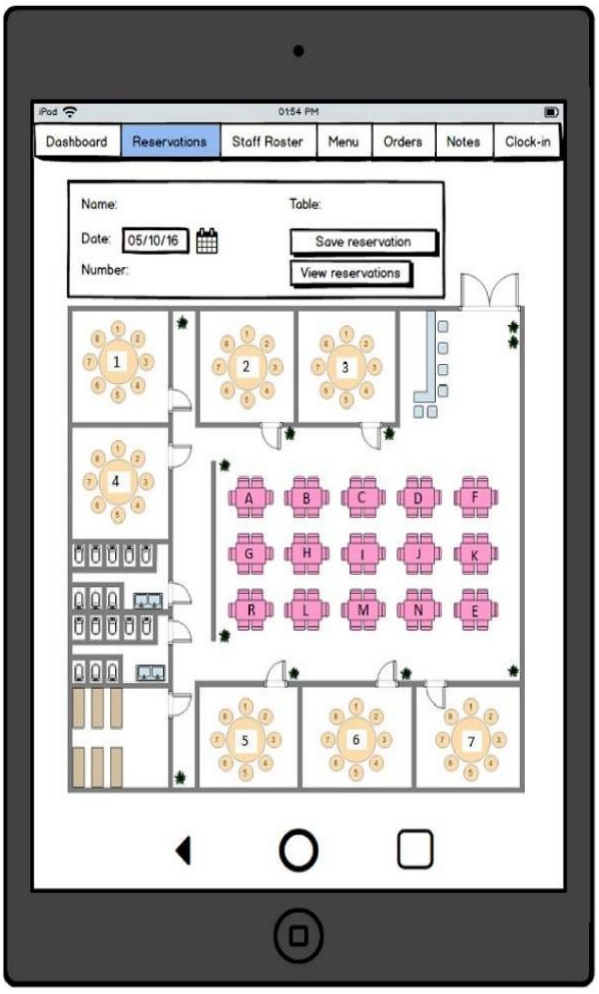

Figure 21 Reservations overview

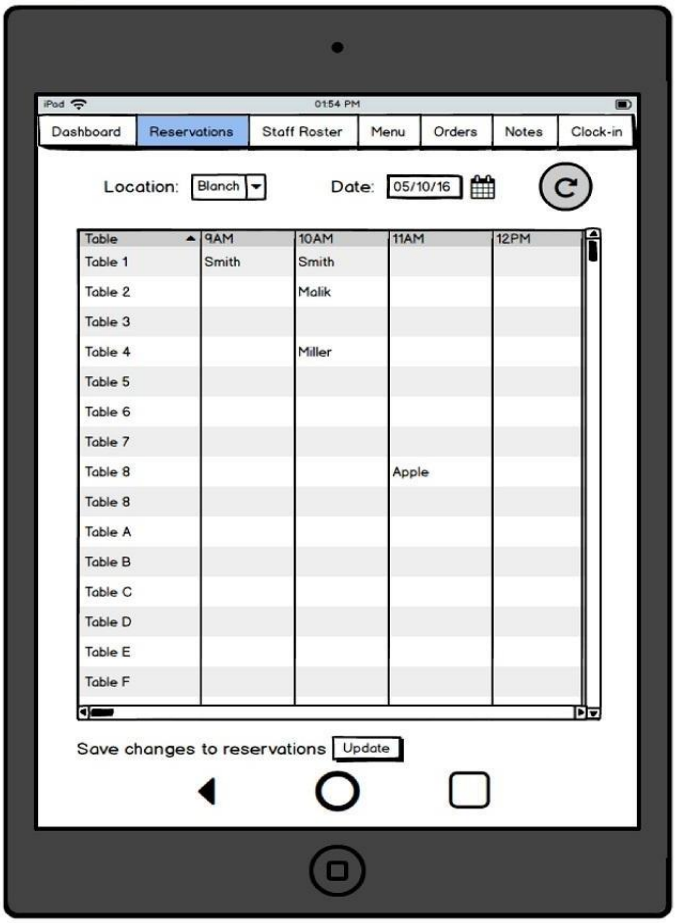

Figure 22 Reservations pt.2

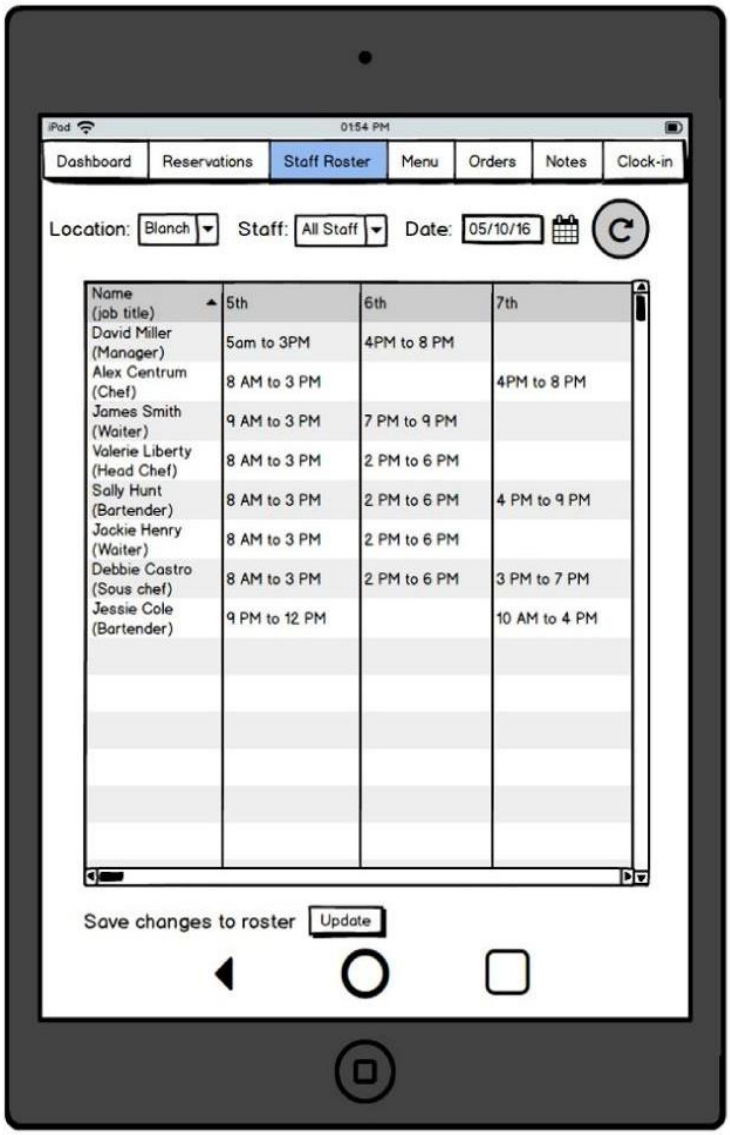

Figure 23 Staff Roster

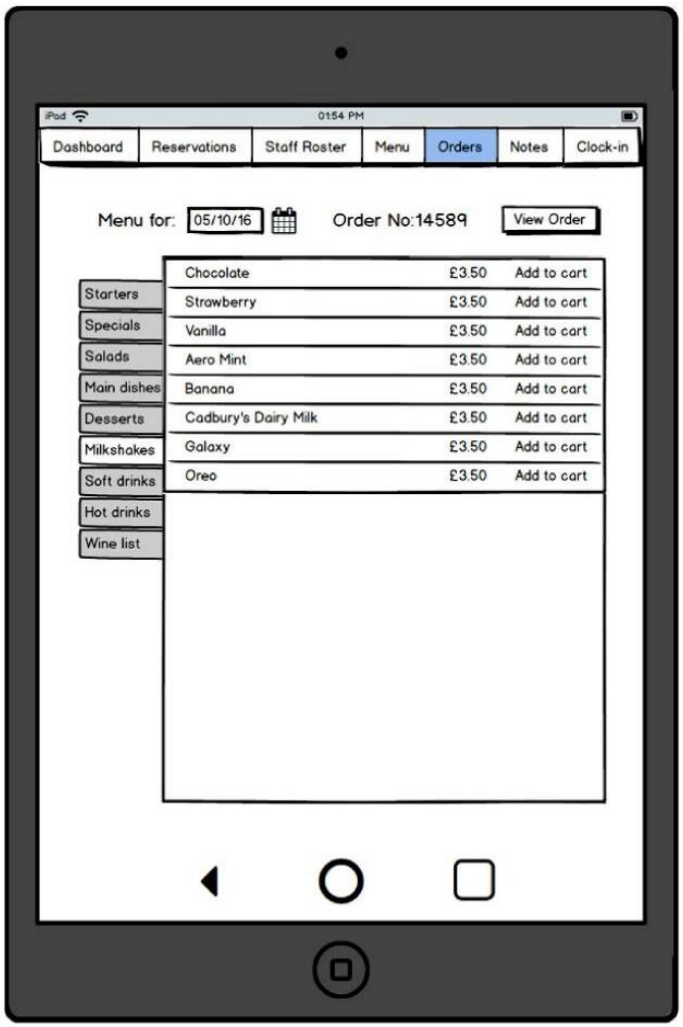

Figure 24 Menu

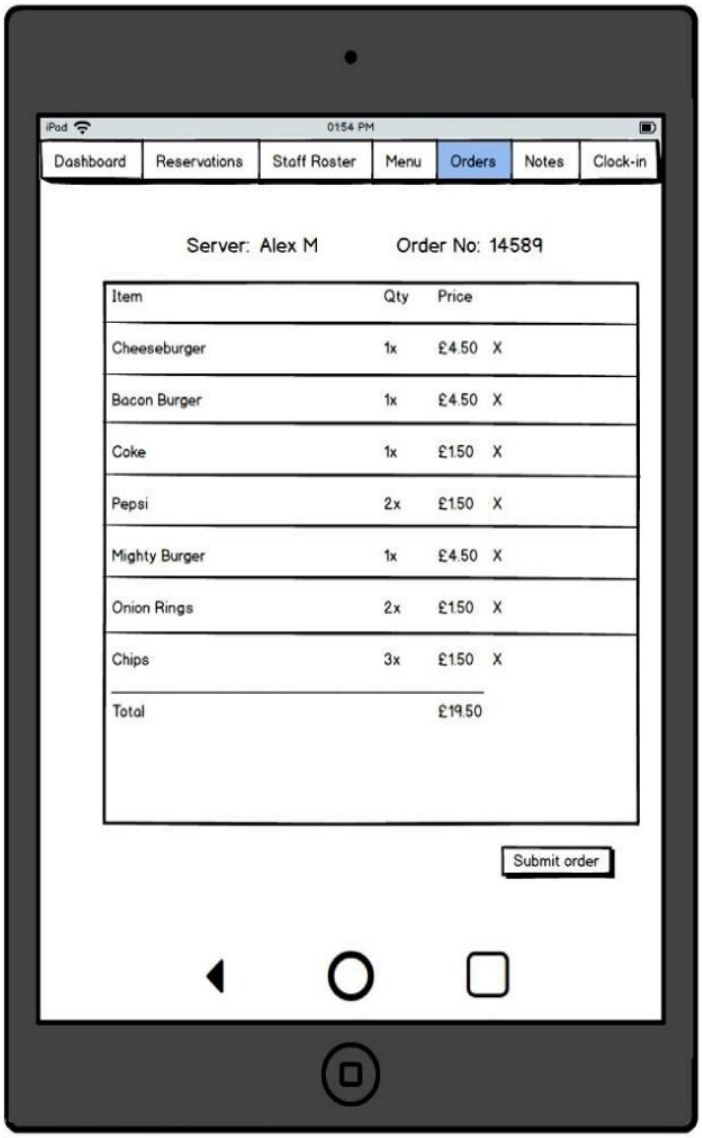

Figure 25 Order

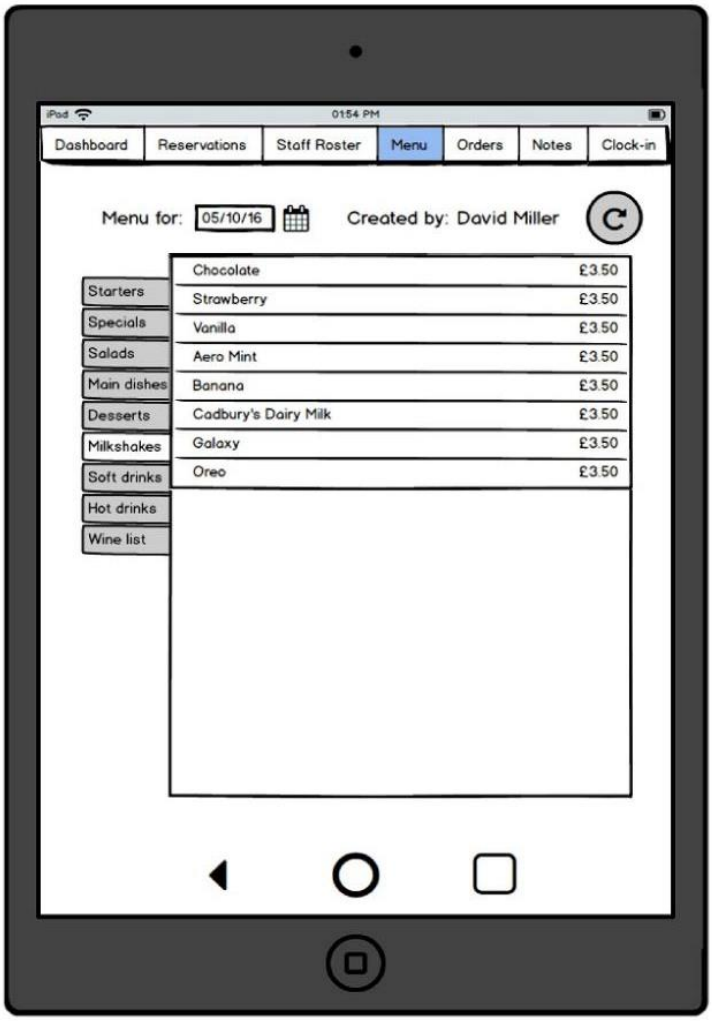

Figure 26 Order details

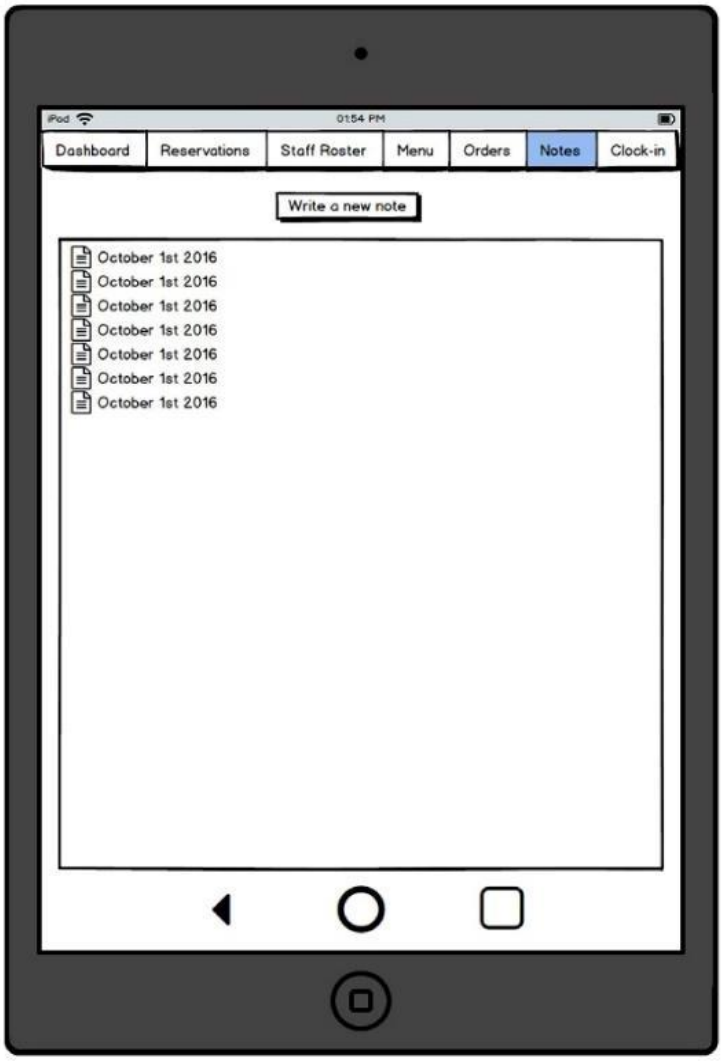

Figure 27 Notes List

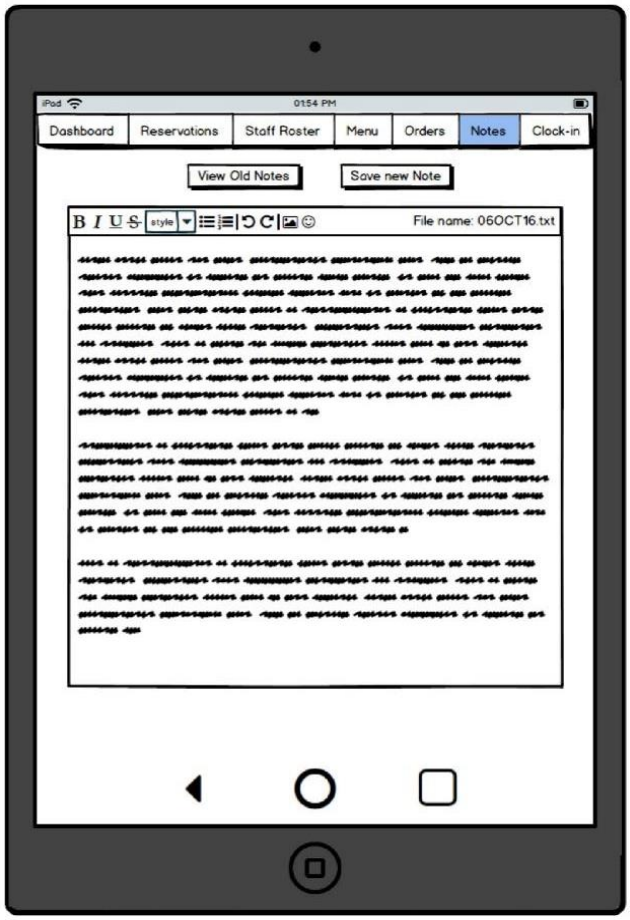

Figure 28 Create new note

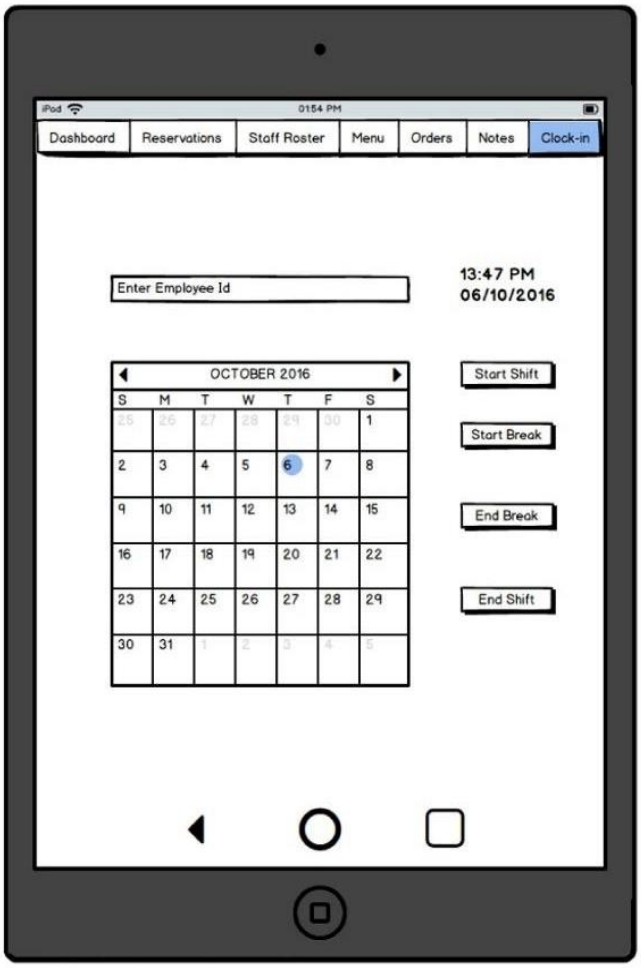

Figure 29 Clock-in and Clock-out section

Final Interface design

The android application consists of several activities depending on whether the waiter or management signed in a different dashboard is displayed. From the dashboard, they are only given options that fit their user level for example the chef can see all orders where as a waiter can only see their own.

Waiter's Dashboard Activity

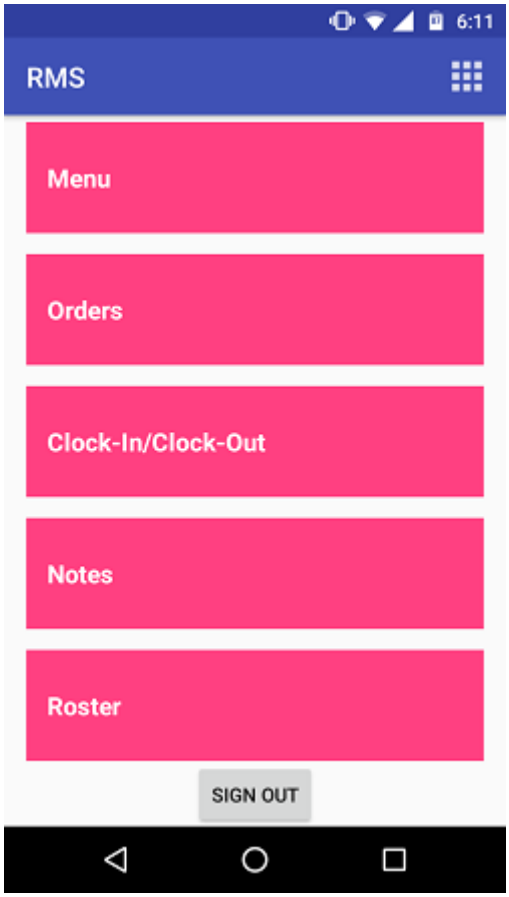

Figure 30 Waiter's Dashboard Activity

This is the main dashboard of the waiters. The waiters can access everything except for the managing permissions.

Waiter’s Menu Activity

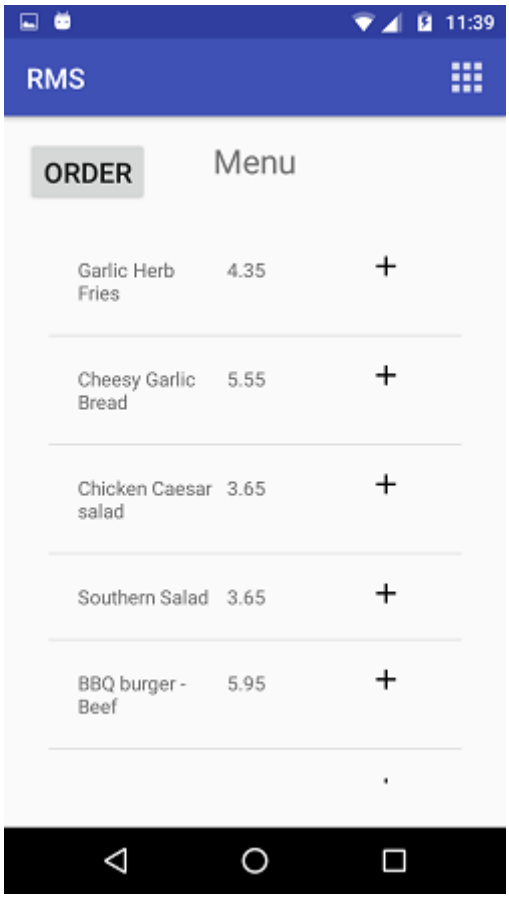

Figure 31 Waiters Menu Activity

This is the waiter’s menu in which they will place orders which will be sent to the kitchen.

Waiter’s Order Activity

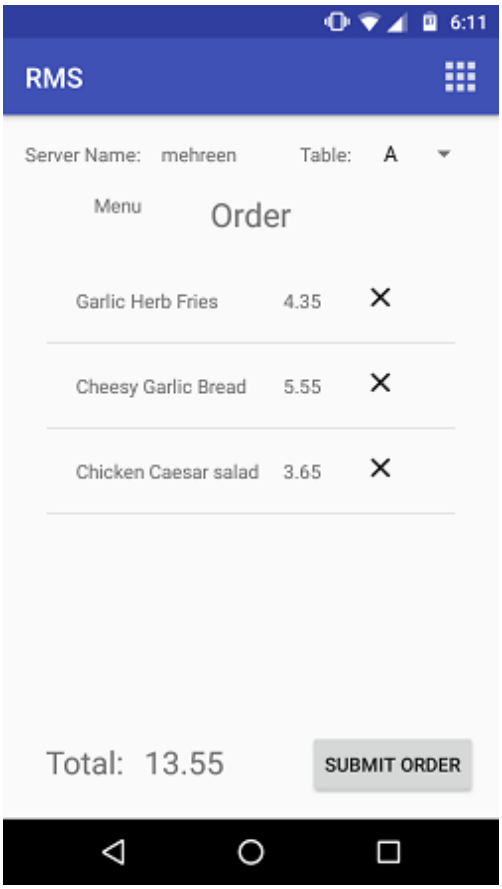

Figure 32 Waiter's Order Activity

After the order has been finished by the waiter, the waiter can read back the order if they wish before submitting it to the kitchen for preparation.

Waiter's Order List Activity

Figure 33 Orders List Activity

When the waiter submits their order, they can view to see how their current orders are doing. If the customer is asking how long, the waiter can give them an estimated time frame and tell them if its done or still in preparation.

Notes Activity

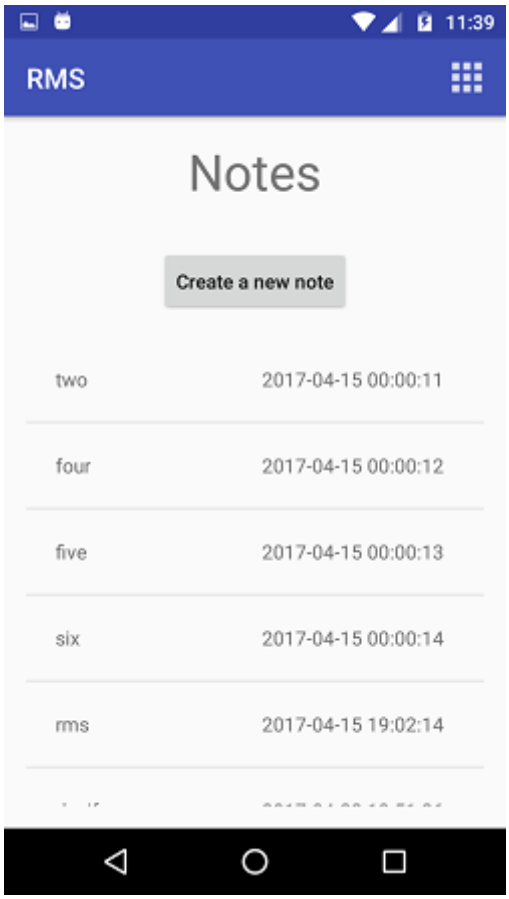

Figure 34 Notes Activity

This is the notes section where the whole staff can create notes and edit notes. The notes are regularly created every day to keep any information if needed for everyone to see.

New Note Activity

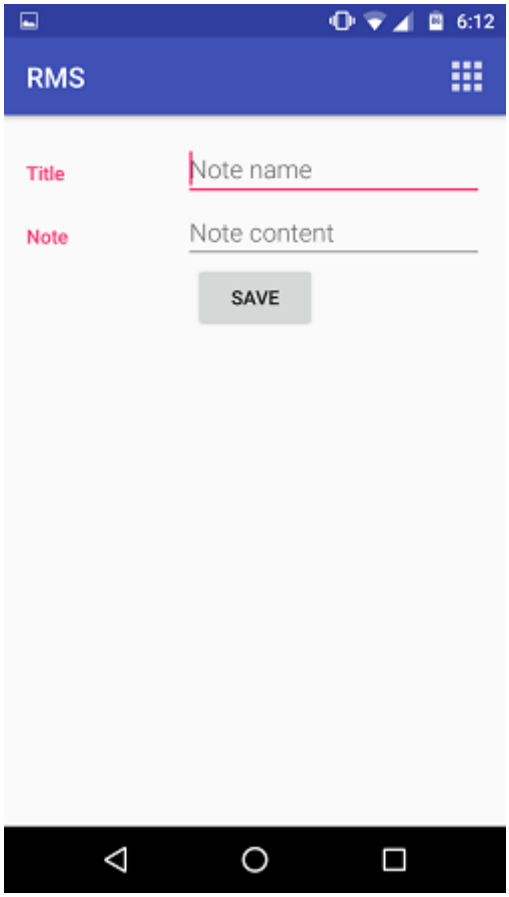

Figure 35 New Note Activity

When the employee clicks create a note. This will prompt up for the employee to input the title and the content of the note.

Roster Activity

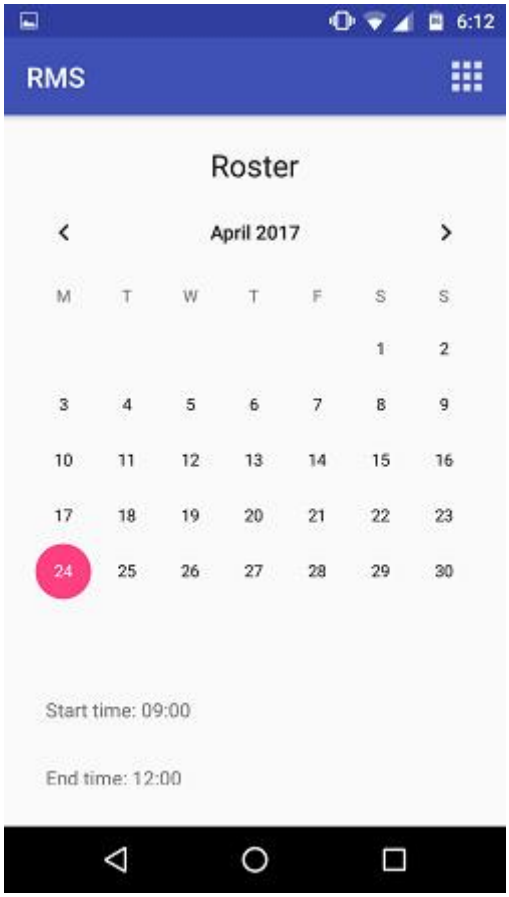

Figure 36 Roster Activity

This is the roster for all employees. When an employee clicks on roster, they are prompted with a calendar where they can press on any date and underneath their working hours will appear if they are working that day.

Management Dashboard Activity

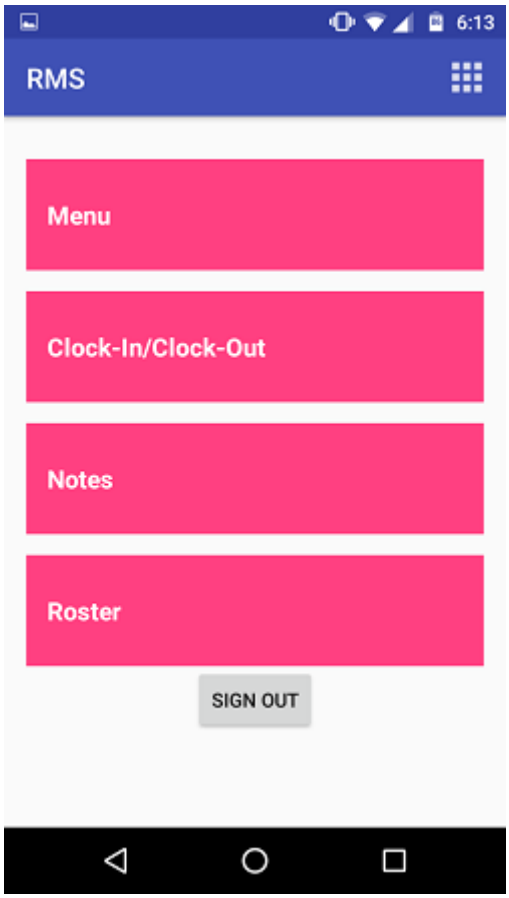

Figure 37 Management Dashboard Activity

This dashboard is designed only for the management, where they can do management duties.

Management Menu Activity

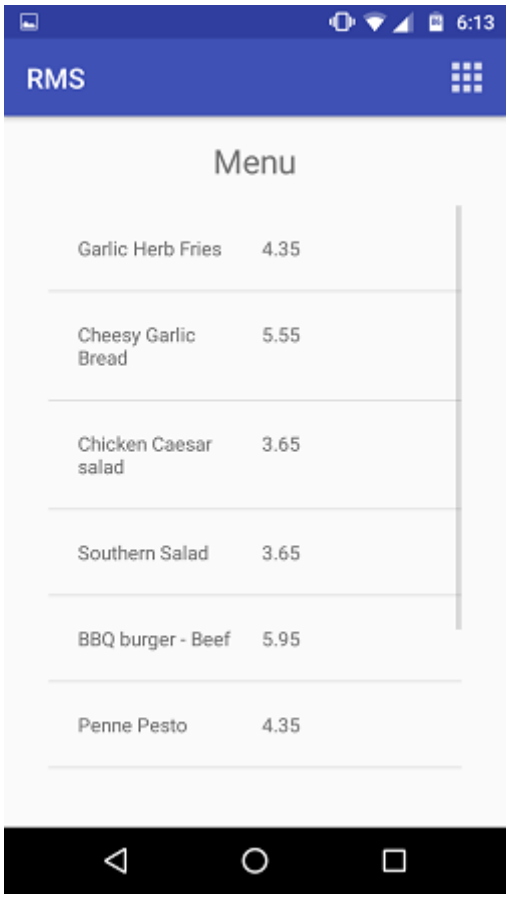

Figure 38 Management Menu Activity

This is the menu management view where they can see all the items on the menu, and if anything needs changing, have a talk with the kitchen staff.

Management Roster Activity

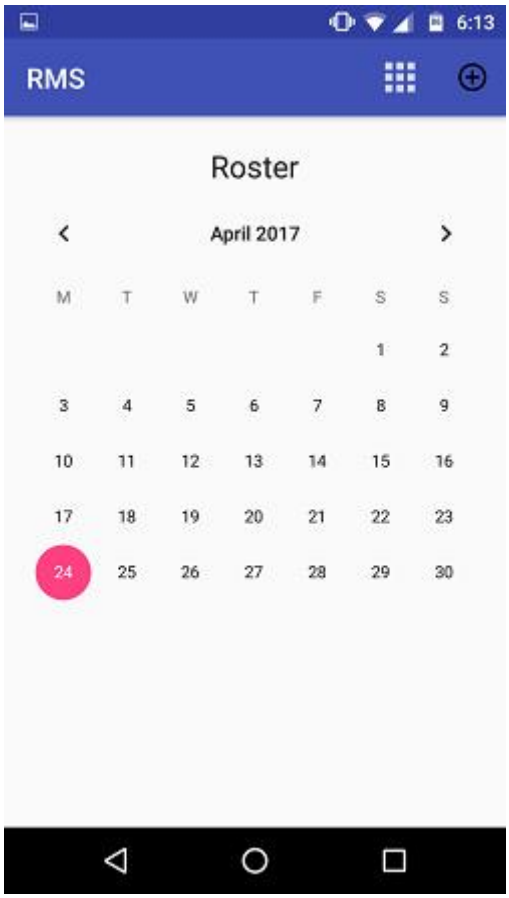

Figure 39 Management Roster

The management can view the roster same as everyone else except they can click the plus button on the top right to add people to work a specific day and what hours.

Management Edit Roster Activity

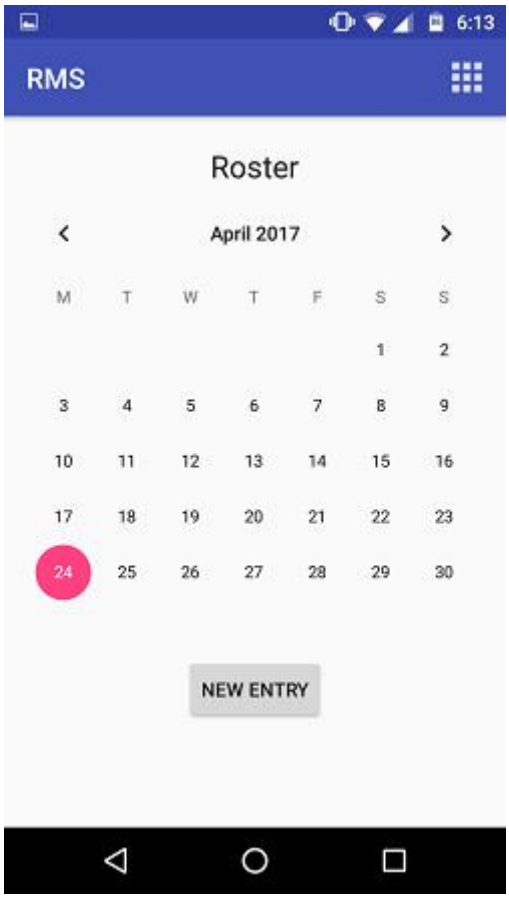

Figure 40 Management Edit Roster

The Management clicks on any day they wish to add someone to work on and click “New Entry”.

Management New Shift Activity

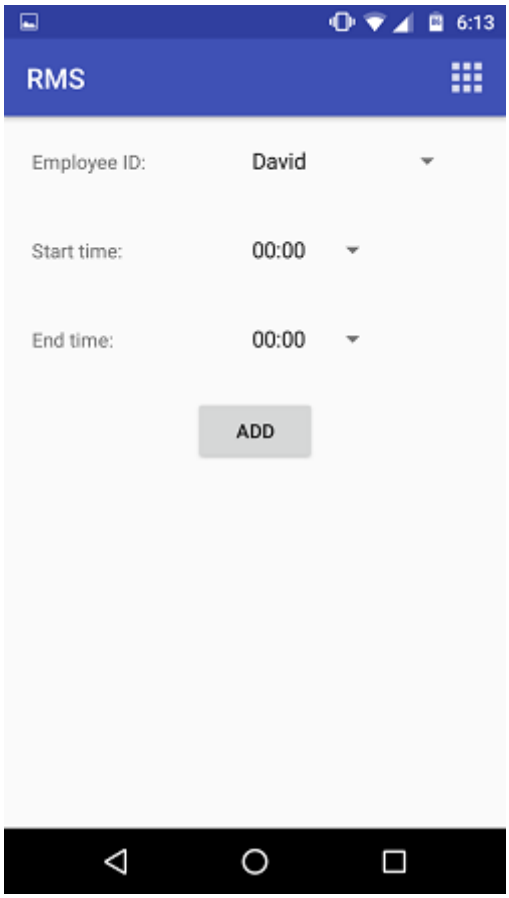

Figure 41 Management New Shift

Once the manager clicks “New Entry” this form will popup allowing them to input what employee and what their hours are to work that day.

Kitchen Dashboard Activity

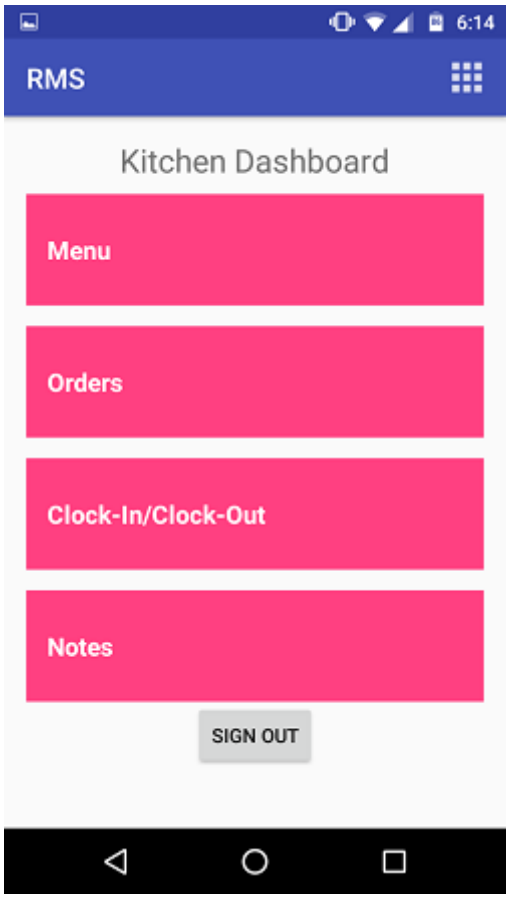

Figure 42 Kitchen Dashboard Activity

This is the kitchen dashboard designed specifically for the kitchen staff.

Kitchen Menu Activity

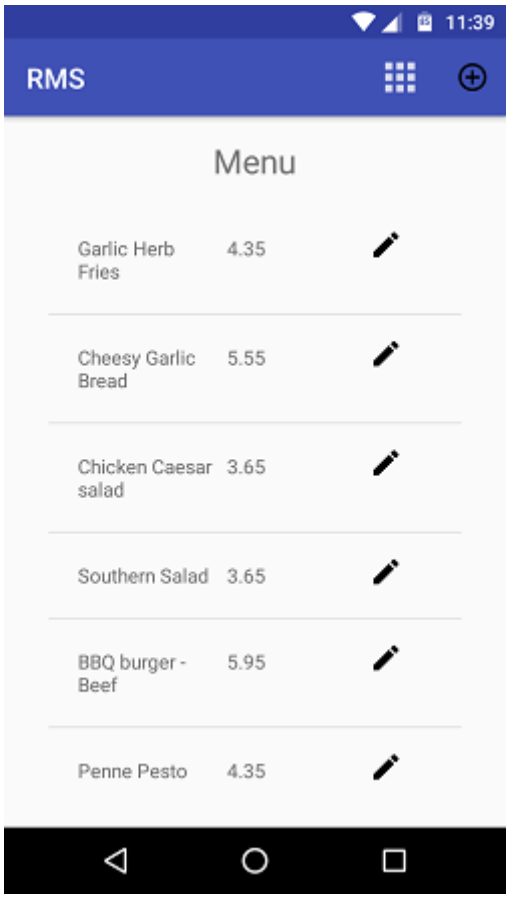

Figure 43 Kitchen Menu Activity

The kitchen staff can edit the menu items if need to change the price or edit the menu item.

Edit Menu Item Activity

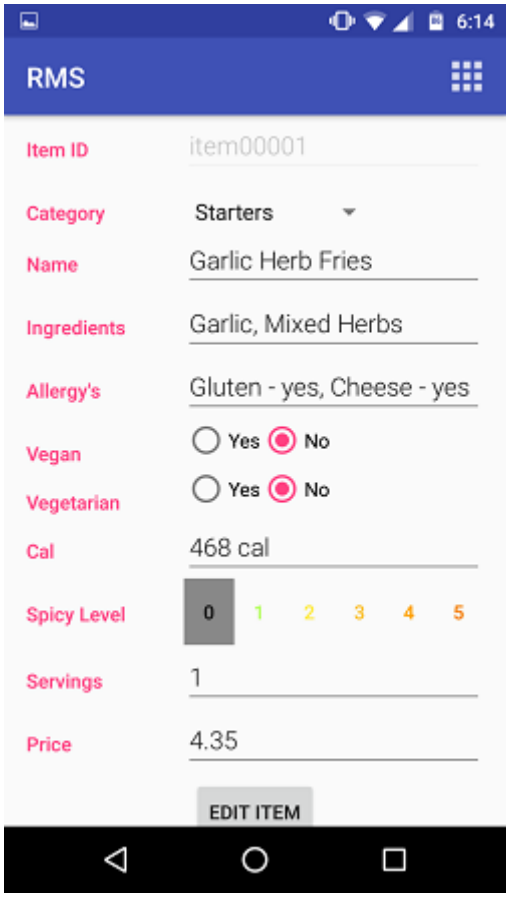

Figure 44 Edit Menu Item Activity

Once the kitchen staff clicks to edit a certain menu item, they are prompted with this form to fill in or change what they wish to change.

New Menu Item Activity

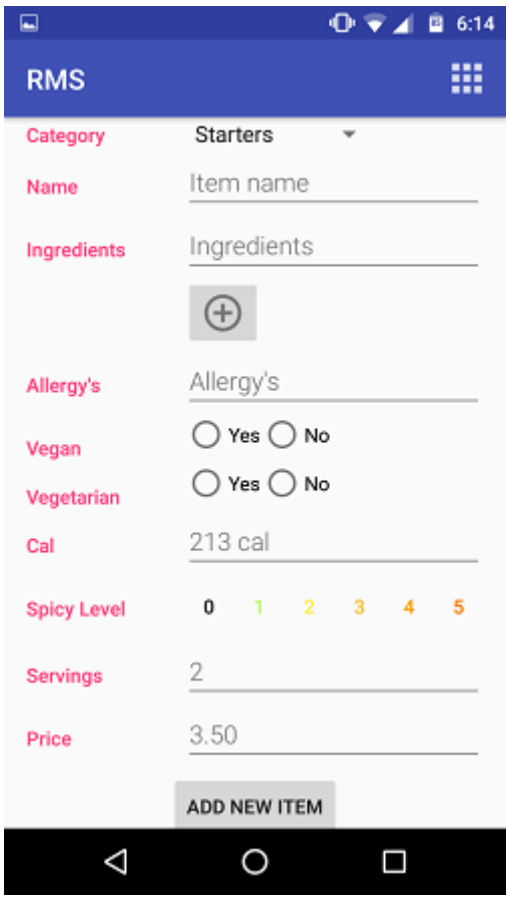

Figure 45 New Menu Item Activity

Only the kitchen staff can add additional items to the menu. Once they click to add a new menu item they will be prompted with this form to fill out for the new menu item to be added.

Ingredients Activity

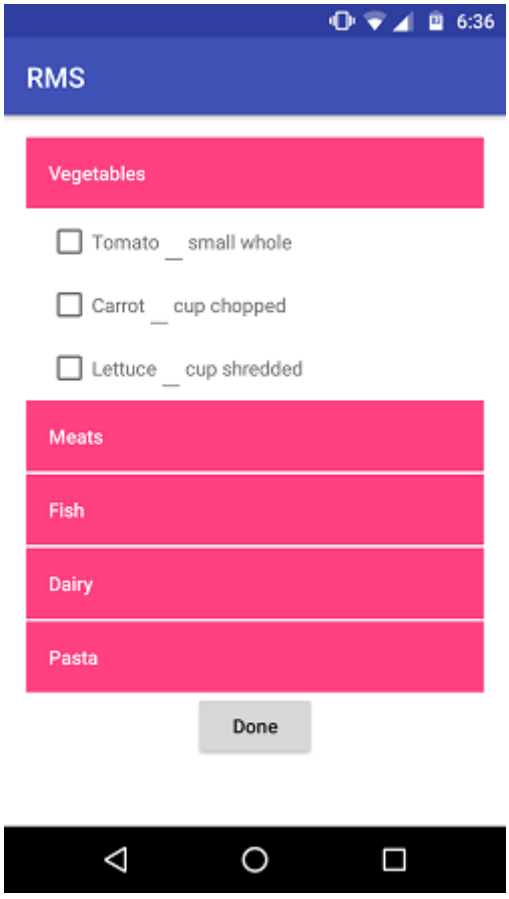

Figure 46 Ingredients Activity

The ingredients activity will allow the kitchen to tick off which activities have been completed.

Kitchen Order Details Activity

Figure 47 Kitchen Order Details Activity

This is the orders the kitchen staff will see. They can click on a specific order to view the details of the order and start preparing it.

Kitchen Order Details Activity

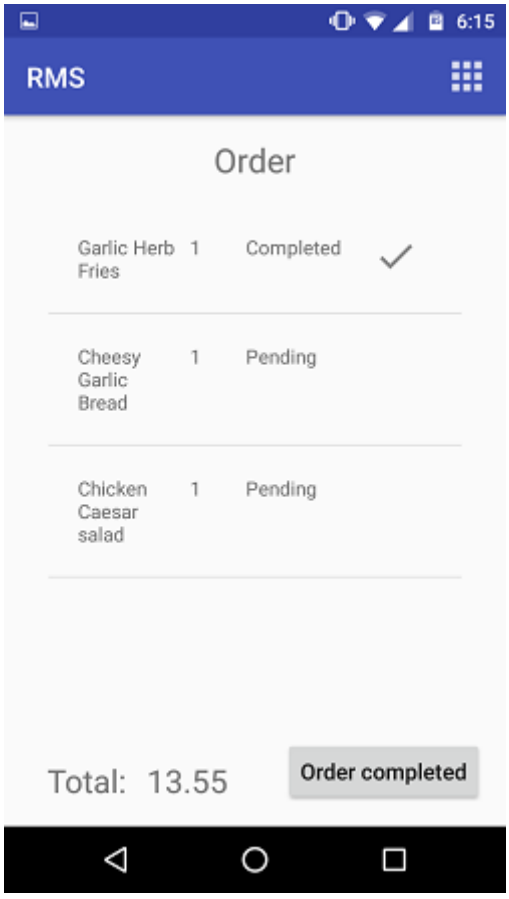

Figure 48 Kitchen Order Details Activity

Once an order has been clicked on, it will open the order and display as such. The kitchen staff can

click on items which have been completed and once the whole order is complete, they will press the “order completed” button on the bottom right and this will notify the waiter that their order has been completed.

Clock-in/Clock-out Activity

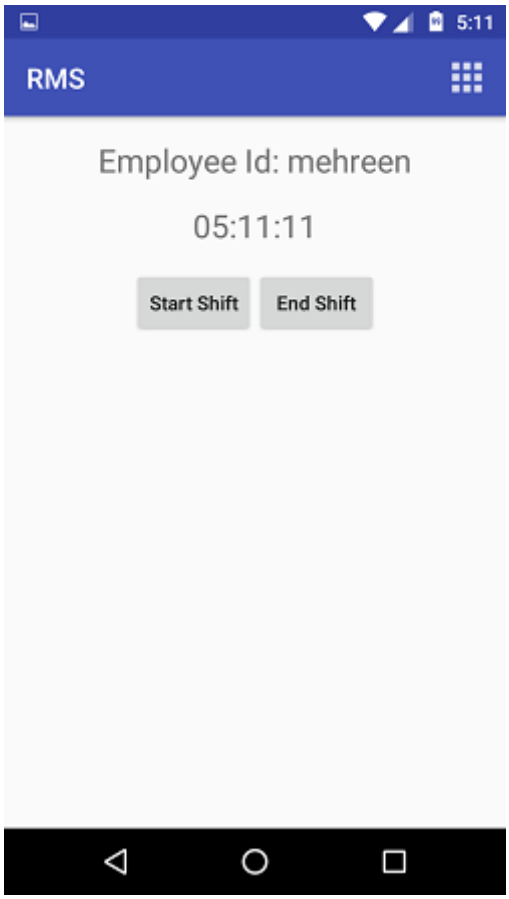

Figure 49 Clock-in/Clock-out Activity

Figure whatever shows the user's Clock-in/Clock-out Activity. Here they can submit their start time and end time for their shift.

Reservations overview

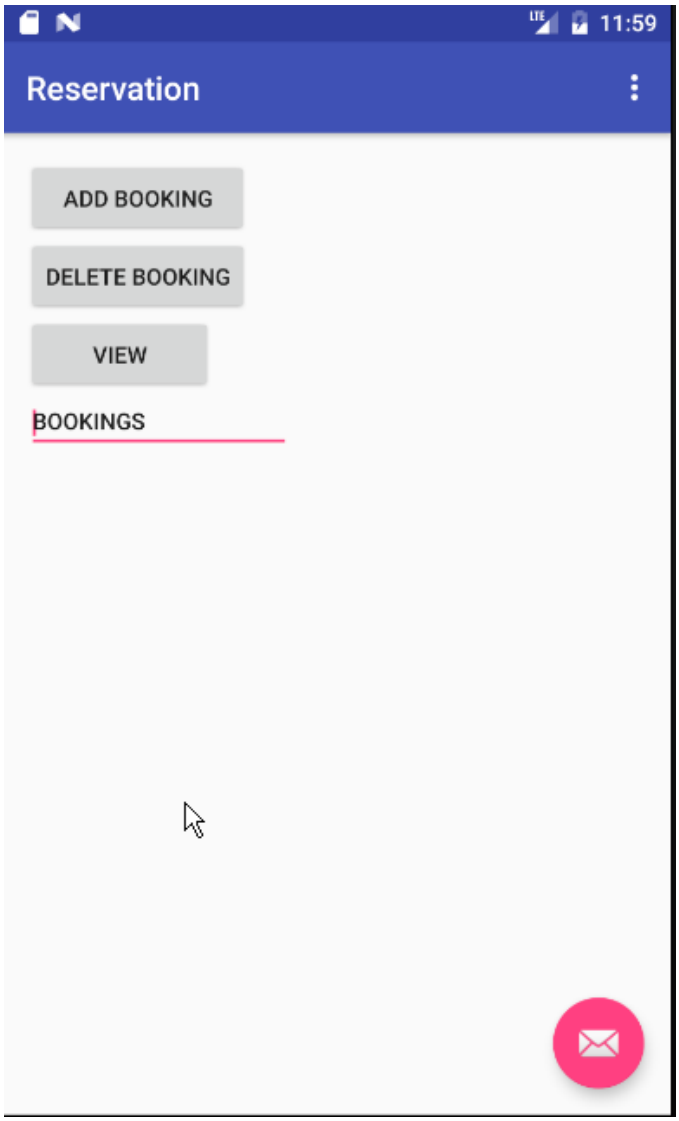

Figure 50 Reservations overview

In figure 50 the user can click on ‘add booking’ to make a reservation and ‘view’ to view all current reservations stored in the system. Delete was later removed and added to view.

Add Booking

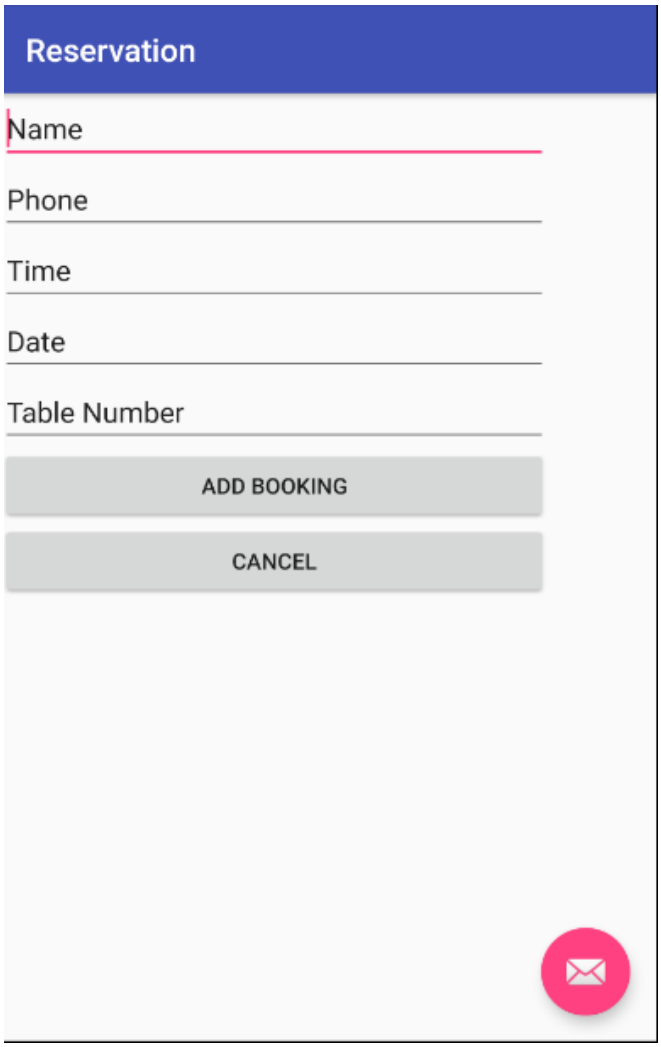

Figure 51 Add booking

When the user clicks on ‘add booking’ from figure 50 they are taken to a screen shown in figure 51. After inputting all of the information, the user can click ‘add booking’ and the information is then stored in the database to later be retrieved. Also stored is a unique booking ID not show in figure 51.

View bookings

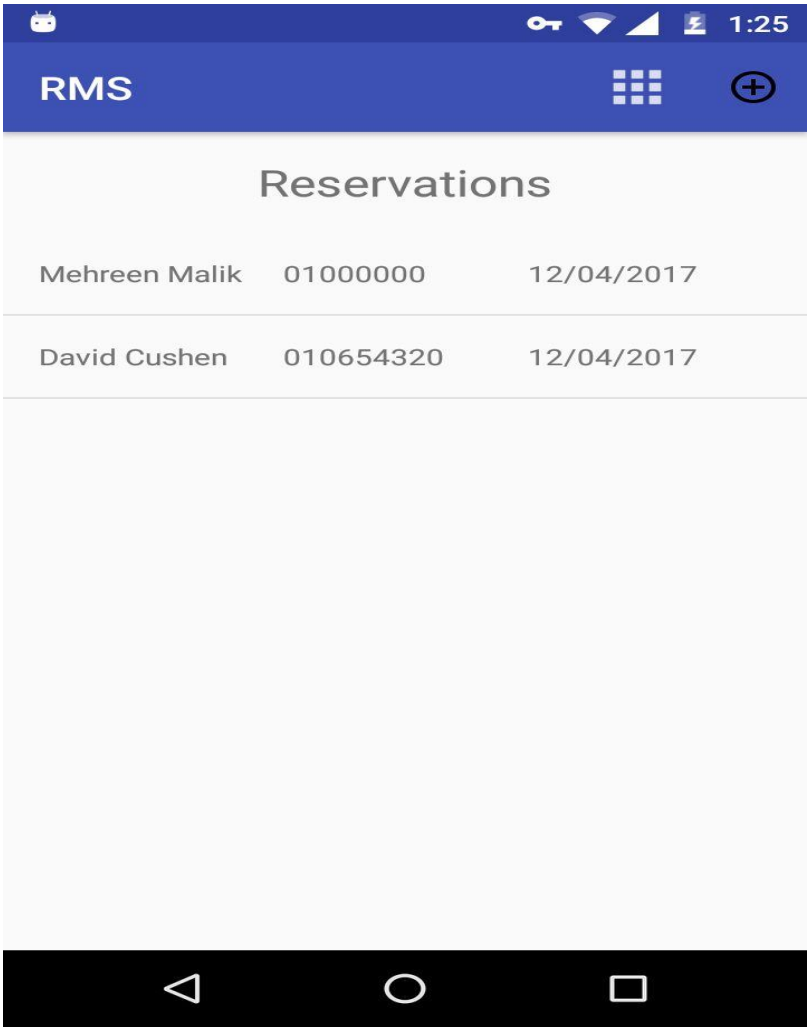

Figure 52 View reservations

When ‘view’ is clicked from figure 50 the user is displayed the screen in figure 52. This displays the name, phone number and unique booking ID. Other information such as table number, time and date can also be displayed. By pressing and holding on one of the list items the user will be prompted and asked if they would like to delete this list item. If the user clicks yes, it is removed from the database and the screen in figure 52.

System Testing and Evaluation

Testing the system is crucial to the development phase to catch any bugs before release.Testing is the second last phase in the waterfall model before releasing and maintaining the software.

Types of Tests

White box testing

White box testing is testing the internal components of the system such as unit and function testing.

Black box testing

Black Box Testing also referred to as Behavioral Testing, is a software testing method in which the internal structure, design and implementation of the item being tested is not known to the person testing it. These tests can be functional or non-functional, although they are usually functional (Black box testing, 2017.

Unit testing

Unit testing is a software test, in which the programmer tests specific pieces of code to compare expected results with actual results.

Function testing

Functional testing is a test to ensure that the required functionality is working properly.

Test cases:

- Add new menu item
- Edit menu item
- Delete menu item

- Create note
- Delete note
- View roster
- Manage roster
- Clock in and out

Tests performed on the system

Test Name	Event	Expected Result	Actual Result	Status
Login tests	Enter a correct username and password.	User should be successfully logged in.	Login Successful.	Pass
	Enter a correct username and the wrong password.	Login should be denied.	Login denied.	Pass
Login test for chef/management	Enter a correct username and password.	User should be successfully logged in and displayed the management dashboard.	Login Successful.	Pass
Login test for waiter	Enter a correct username and password.	User should be successfully logged in and displayed the waiter dashboard.	Login Successful.	Pass

Create a new menu item.	Leave the data fields empty.	Empty data fields should have an error sign beside them.	Errors signs were displayed.	Pass.
	Fill some of the data fields and leave some empty.	Empty data fields should have an error sign beside them.	Errors signs were displayed.	Pass.
	Enter valid data in all the data fields.	User should be redirected to the menu with the new item added and the user should see a toast message confirming the entry.	The user was redirected and a toast message confirmed the entry.	Pass.
Edit a menu item.	Empty the data fields.	Empty data fields should have an error sign beside them.	Errors signs were displayed.	Pass.
	Enter valid data in all the data fields.	User should be redirected to the menu with the updated item in	The user was redirected and a toast message	Pass.

		it and the user should see a toast message confirming the entry.	confirmed the entry.	
Delete a menu item.	Chef/Management should long click on an item.	User is shown a popup message asking them to confirm if they would like the item selected to be deleted. If yes is selected the item should be removed from the menu and the database.	The item was removed from the database and menu.	Pass.
	Chef/Management should long click on an item.	User is shown a popup message asking them to confirm if they would like the item selected to be deleted. If no is selected nothing should happen to the item.	Nothing happened to the item.	Pass.
Chef update	Click on item in	Item status	Item status is	Pass

individual items	order details.	should change from Pending to Completed and a tick should appear beside it.	changed and a tick appears.	
Chef update orders as completed.	Chef clicks on order and then marks it as complete.	order should be marked as complete in the database table and removed from orders list.	Order is marked as completed and removed from order list.	Pass
Waiter notifications.	Waiter can be on any activity when message can appear.	Message should appear showing order has been completed with order id.	Message pops up saying “orderId has been completed.”	Pass
Create New Note	Employee clicks “create a new note” and inputs note title and note content.	Message should appear showing that the note has been saved.	Message pops up saying “Note Saved”.	Pass
Delete Note	Employee long clicks on a note and click yes button once message pops up.	If employee selects “yes” message pops up “note has been deleted” and the notes are refreshed.	Message pops up “note has been deleted” the note is deleted and the notes are refreshed up to date.	Pass
View Note	Employee clicks on a note they wish to view.	Note title + content is shown to the employee.	Note is opened and the title + content is shown.	Pass
View Roster	Employee click on specific day to check working hours.	Employees can check their working hours by clicking on a specific day on the calendar.	Their working hours popup when they click specific day to check.	Pass
Management Roster View	Management clicks to view roster.	Management should be able	Management gets popup of	Pass

		to check all employees working on a specific day.	all employees working that specific day with their hours.	
Management Roster Add.	Management clicks to add employees to work a specific day.	Management should be able to add employees to work on a specific day in the roster.	Management gets a new page opened to fill out employee name + start/end time.	Pass

Table 2 Tests Performed

Acceptance Testing

Acceptance testing is testing performed on the finished system to determine whether the requirements were met or not.

Original requirements versus achieved product.

Original requirements	Achieved product
Make a reservation.	User can make a reservation with name, date, time, table number and phone number for the customer.
View reservations made	User can view reservations put into the database.
Cancel a reservation.	Reservations can be deleted by a long press on the list item and then deleting it from the database.
Edit menu items.	Menu items can be edited by the chef and management by selecting a pencil icon next to a menu item.
Add new menu items.	Chefs can add additional items by going into

	the menu and selecting a plus sign from the top bar.
Delete a menu item.	Chefs and management can delete an item by long pressing on it and selecting yes when asked.
View menu item details such as allergy information, calories, spice level etc.	Waiters can view a menu item's details by clicking on it.
Take orders from customers and have it immediately sent to the kitchen.	The orders are immediately sent to the kitchen orders tab. The kitchen is alerted to the new order by a toast message.
Employees can clock-in and clock-out from the application.	
Notes sections for employees.	Employees can create/delete/view notes.
Roster section for employees to view their schedule.	Roster section complete with calendar to choose what day you wish to check.
Management can update the rosters.	Management can view all employees working on a certain day. Add employees, working hours for a specific day.
Start and end shift	Users may now start and end shifts, time is stored when button is clicked. Sanitary checks still need to be implemented in future to avoid breaking the labour laws.

Table 3 Original requirements vs achieved product

Conclusion

The developed system has met the proposed specifications and passed the testing it was through. The system was developed in the time frame specified with recommendations from outside sources.

The restaurant industry is forecasted to grow to over €9 billion by 2020. By investing in technology restaurants will be ready to meet changes in the environment and able to scale their software to meet their new needs. Restaurants can use software to cater to customers need for immediate satisfaction.

In the next version of the system, an analysis section should be added for management. This would allow management to recognize their most popular dishes and cater to their customer. Before the developed system is released onto the market, further research should be made in concern to security. Research should be carried out in relation to handling customer information and storing it.

Personal Reflections

Mehreen Malik

While designing and developing this application I have learned a great deal about android development and working in a team. I've picked up many new skills and believe these skills will help me in future with other projects. I had to learn how to mold my java knowledge in a way that was compatible with android. Creating this application gave me a chance to work with new languages such as XML. By the end of this project I've come to understand that I truly love working with java and android.

I would like to thank Luke Raeside for helping us in creating this application and writing this documentation. I learned a great deal in his programming classes and they helped immensely during this project. I believe without his help or classes we would have struggled with this project.

Overall I am very satisfied with how the project was completed and I believe we did it to the best of our abilities. I look forward to working with these guys again in the future hopefully on another android application.

Mirza Rizvanovic

This project has been my introduction to android development. I have learned what an android application is composed of and how it works. Luckily this is very similar to the java I have been learning for the past two years which gives me a boost. Working on android development I have broadened my knowledge about programming and it's always good to know how to code on a different platform. While creating the application I have learnt XML design layouts. The more I learnt about android development the more fun it got.

During this group project, I have learnt how a good solid team can be very positive and helpful in times of need. As we all have our weaknesses and strengths, I would like to thank Mehreen Malik and David Cushen for having me as a group member for this project. They have both been supportive team members. I would like to also thank Luke Raeside for caring for us during this group project and pointing us in the right direction when we got stuck.

David Cushen

This project was my first introduction to app development and specifically Android Studios and the language used to create Android apps. Some prior knowledge of Java helped me with the coding of this app. I also had the opportunity to work SQL databases, XML and PHP. This project helped me gain a better understanding of how these languages work individually and in synchronous with each other. Through this project, I have learned more about the technologies we used and how to implement them, however I would like to get better at working with databases as it interests me.

Overall, I am happy with the quality of this project. With two strong members in Mehreen and Mirza and a strong team leader in Mehreen, I believe we hit most of our targets and given more time this application could be deployed for real world use. I would also like to thank Luke Raeside for his supervision and guidance when we had any questions.

Bibliography

Kimes, S. E. (2008). The role of technology in restaurant revenue management. *Cornell Hospitality Quarterly*, 297.

Leonard L. Berry, K. S. (2002). Understanding service convenience. *Journal of Marketing, 66*(3), 1-17.

OpenTable. (2017). Retrieved 2 2, 2017, from Wikipedia: The Free Encyclopedia: http://en.wikipedia.org/wiki/OpenTable

Potter, C. (2010, November 19). *How OpenTable Works for Restaurants*. Retrieved from OpenTable: https://blog.opentable.com/2010/how-opentable-works-for-restaurants/

Black box testing. (2017). Retrieved from Software Testing Fundamentals: http://softwaretestingfundamentals.com/black-box-testing/

Larman, C. (2004). *Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, 3rd Edition.* Prentice Hall.

Hwang, J. and Lorenzen, C. L. (2008), Effective nutrition labeling of restaurant menu and pricing of healthy menu. Journal of Foodservice, 19: 270–276. doi:10.1111/j.1748-0159.2008.00108.x

Roberto, C, Larsen, P, Agnew, H, Baik, J, & Brownell, K 2010, 'Evaluating the Impact of Menu Labeling on Food Choices and Intake', American Journal Of Public Health, 100, 2, pp. 312-318, SPORTDiscus with Full Text, EBSCOhost, viewed 11 March 2017.

Yang Xiang, Wanlei Zhou, (2007) "Pervasive computing at tableside: a wireless web-based ordering system", International Journal of Pervasive Computing and Communications, Vol. 3 Iss: 1, pp.82 - 101

Bord Bia (2016). *Irish Foodservice Channel Insights*. [online] Bord Bia, pp.16,20. Available at: http://www.bordbia.ie/industry/events/SpeakerPresentations/2016/IrishFoodserviceSeminar2016Report/2016%20Irish%20Foodservice%20Channel%20Insights.pdf [Accessed 23 Apr. 2017].

Ndb.nal.usda.gov. (2017). *Food Composition Databases Show Foods List*. [online] Available at: https://ndb.nal.usda.gov/ndb/search/list [Accessed 24 Apr. 2017].

View, R. (2017). *Recycler View | Android Developers*. [online] Developer.android.com. Available at: https://developer.android.com/guide/topics/ui/layout/recyclerview.html [Accessed 24 Apr. 2017].