



# A digital menu application for accessibility in restaurants

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<b>Link to Software Repository:</b>	<a href="https://github.com/C15402002/FYP">https://github.com/C15402002/FYP</a>	

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## 1. Project Statement

This project is for the creation of a restaurant ordering application for mobile devices. The method of communication will be in two parts one for the user which will be built using android system and the management part which will be controlled by the restaurant manager which will be built by web application. The customer user interface which will be designed to assist users, will contain the functions to create an account to capture customer details, add, edit and delete order, ability to change font size according to the user and assist users with any vision impairment. The second part will be the user interface used by the restaurant manager will contain the ability to perform the CRUD functions for menu items, analysis of sales, management of restaurant staff and overall management of the restaurant. The two interfaces will then be connected to a back-end server. In this report a detailed background research, project approach, design, prototyping, testing, issues and risks, and the future plan are elucidated.

## 2. Research[1][2]

### 2.1 Background Research

Quick Response codes also known as QR codes are becoming extremely popular in the technology industry. QR codes is defined by the oxford dictionary as a machine-readable code consisting of an array of black and white squares, typically used to store URLs or other information for reading by the camera of a smartphone.

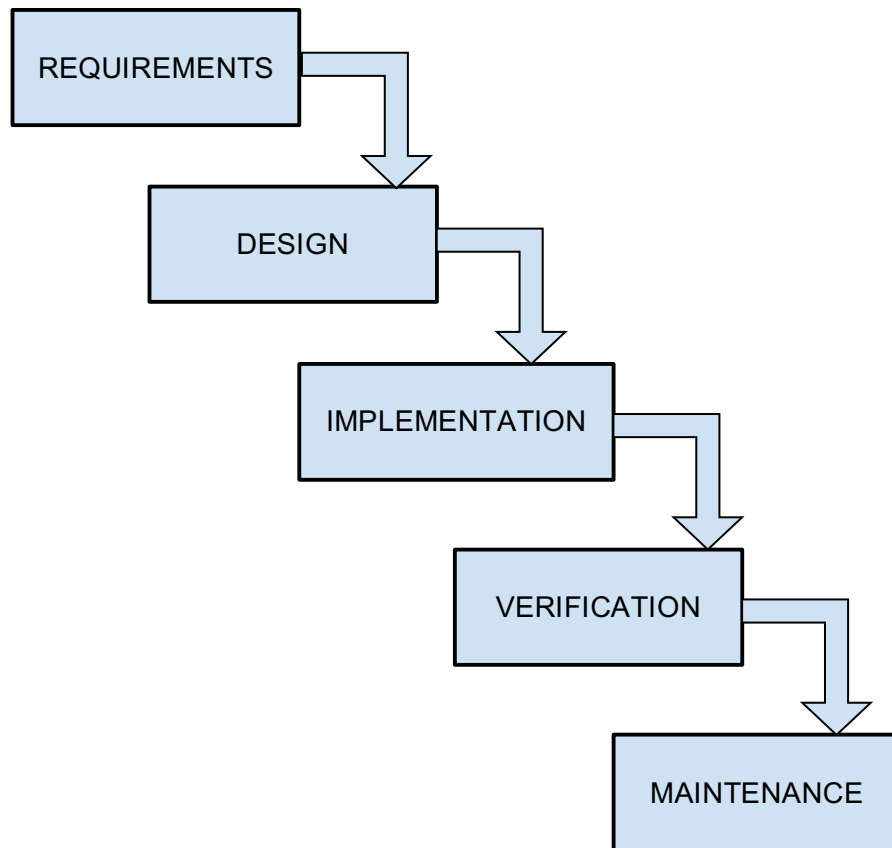
Quick Response codes were first introduced by Denso Wave during 1994. It was used to enhance decoding speed and the ability to hold large amount of information. These codes are growing rapidly in the marketing and ecommerce community. According to an article by [OpenJaw](#) (1) the rise of QR code usage is targeted in Asian countries especially China. Unlike any other country China has

900 million active consumers a month using a popular worldwide application called **WeChat**. This application contains many functions one in particular is its use of QR codes for payment transactions, marketing and user identification. A downside to this application would be its functionality outside of China. This app will only operate at its full potential if the user has a Chinese credit card and a Chinese phone number otherwise it is just another social media application.

For a business, it is important to understand its market and acknowledge the connection with its consumers. Flexibly is the key to a successful business, by implementing technology into the food and drink industry we are able to establish this connection. An application that captures user detail and functions subjected to flexibility like dairy free, gluten free, vegetarian or vegan. We can build a trusted foundation between the producer and consumer. Point of Sale (**POS**) systems contains tools that are essential to businesses that handles sales reporting, customer management, Inventory management and employee management.

## 2.2 Similar Applications

### 3. Approach and Methodology[3][4]



*Fig. 1 Waterfall Model*

The waterfall model

## 4. Design

### a. Technical Architecture Diagram

*Fig. 2 MVC*

The model view controller architecture (MVC) helped me to design an interactive system that can be flexible to change. MVC consists of three parts, the first would be the model. The model, contains the data of the application any changes to the model the view changes alongside to show the user of a new update. The second part is the view, this is the graphical user interface (GUI) displayed to the user. The last part is the controller, this controls the user input and according to the inputs the view and/or model might change.

From this architecture, I am able to design my system which will consist of the customer (view), the manager (view), firebase database(model). The controller will update any data that has been changed by both views to model, once the update is done the views will automatically update.

### b. Use Case diagram and iterations

For my use case I designed three iterations. I think that this is a simple way to understand each actor's roles and what the system entails.

The First Iteration:

*Fig. 3 First Iteration*

Description: From the first iteration, we can see that the Customer is able to scan QR, create account, create order, view menu and view order status. The staff actor is consisting of waiters and chefs.

Pre-condition: we know nothing about the user.

Post-conditions: we know information about the user, we know their allergies and we know if they have a vision impairment.

Exception Errors: The user may only use card transaction when using this application.

Alternative variations: Users are validated by unique email and a corresponding password.

The Second Iteration:

*Fig. 4 Second Iteration*

Description: The second iteration shows the staff and administrator. The staff can see the order placed by customers and transaction progress. Administrators maintains the system and keeps the system updated.

Pre-condition: Each staff are given roles by manager, we know information about each staff. We know information about the administrator. Staff doesn't know customer orders.

Post-condition: Waiters are able to see order after customer has placed one.

Exception Error: The chef can only see the order if the transaction process is completed.

Alternative Variables: Waiter and chef must log into the staff account, role and position is saved.

The Third Iteration:

*Fig. 5 Third Iteration*

Description: The third iteration will contain the details of roles the restaurant manager. The manager can create, view, update and delete menu items.

Managers are also responsible for staff management and stock management. By



capturing customer details in the first iteration managers can view weekly, monthly and annually analytics of target sales.

Pre-condition: Managers knows information about menu, staff and products.

Post-condition: Managers can view targets and what products needs to be ordered.

Exceptional Errors: Manager is the only one who can view the analytics

Alternative Variables: Manager logs into staff page, the role and position must be clearly stated

## Sequence Diagram

*Fig. 6 Sequence Diagram for customer*

This sequence diagram shows the sequence of actions performed by the customer when using this system. The user upon using the application must log into an already existing account or create a new account. The user inputs will be validated based on firebase authentication on email and password. Once the user is able to access their account they are able to use the QR code scanner. They must first allow the application access to their mobile device camera to perform the camera function. After scanning the QR code, the activity page will show the restaurant menu from here the user can add items on the menu into their basket to add to the order. Once the user is finished with their order they must pay the total amount that is owed before the order goes to the kitchen. The application will ask the user permission to enter card details. Subsequently, the transaction is successful order will be sent to the kitchen staff and waiter. The user from here will be able to see the estimated time of arrival to their table.

*Fig. 7 Sequence Diagram for Restaurant Manager*

## Entity Relationship Diagram

*Fig. 8 Entity Relationship Diagram*

## 5. Prototyping and Development[5]

## 6. Testing[6]

## 7. Issues and Risks[7]

## 8. Plan and Future Work[8][9]