# IET Canteen

## CANTEEN AUTOMATION SYSTEM

A

Project Report
in the partial fulfillment of the requirements for the award of the degree of

**Bachelor of Technology**
in
**Information Technology**

By

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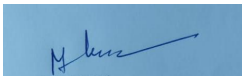
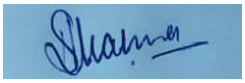
Under the guidance of
**Prof. M.H. Khan**
**Dr. Aditi Sharma**





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May 2022

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# Declaration

We hereby declare that this submission is our own work and that, to the best of our belief and knowledge, it contains no material previously published or written by another person or material which to a substantial error has been accepted for the award of any degree or diploma of university or other institute of higher learning, except where the acknowledgement has been made in the text. The project has not been submitted by us at any other institute for the requirement of any other degree. Submitted by: -

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# Certificate

This is to certify that the project report entitled “IET Canteen” presented by Pankaj Kumar, Arvind Kumar Singh and Pradeep Verma in the partial fulfillment for the award of Bachelor of Technology in Computer Science and Engineering, is a record of work carried out by them under our supervision and guidance at the Department of Computer Science and Engineering at Institute of Engineering and Technology, Lucknow.

It is also certified that this project has not been submitted at any other Institute for the award of any other degrees to the best of my knowledge.

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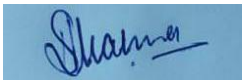

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# Acknowledgement

We would like to express my greatest appreciation to all individuals who have helped and supported me throughout the project. We are thankful to our Project Supervisor, Prof. M.H. Khan and co-supervisor Dr. Aditi Sharma , Head Of Department Prof. D.S. Yadav , for their ongoing support during the project, from initial advice, and encouragement, which led to the final report of this project.

A special acknowledgement goes to our classmates who helped us in completing the project by exchanging interesting ideas and sharing their experience.

We wish to thank our parents as well for their undivided support and interest who inspired us and encouraged us to go our own way, without whom we would be unable to complete our project.

In the end, We want to thank our friends who displayed appreciation for our work and motivated us to continue our work.

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# Abstract

The area of Canteen Automation System has been broadly researched in the last decades, but remains an open research problem. The objective of the Canteen Automation System is to Remove the pressure on Canteen Owners and provide good service to the customer. The main concern of this project is to automate the functioning of the College canteens directly via the application to reduce the rush on Canteen and provide an online portal for Canteen owners to take orders.

In the last 5-10 years multiple advancements have been proposed in the current literature, most notably the application of Android methods to learn feature representations from the Canteen Automation System. In this report, we present how the problem has been handled in the past few decades, analyze the recent advancements in the field, and the potential directions for future research.

The Android based virtual canteen enables an interactive model for food ordering where food details are shown using interactive views (Card views , Recycler views and Image views).



Keywords: Canteen Automation , material design , android , food ordering.

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# Chapter 1 - Introduction

A virtual Canteen environment ensures to reduce rush on canteens and also simplifies the ordering process for both the customer and the canteen.
In virtual canteen customers can pick their favorite food similar to how they would in a regular canteen and can also compare the rating of different varieties of foods available.

As the title suggests that our project is about reducing the rush on college cafeteria and easing the functioning of our college cafeteria. We want to work for the fast, reliable and user-friendly services for the students and faculty respectively. It provides our users a user friendly environment that helps them to have their food without standing in long queues with a single click of work to order their meal directly via their smartphones without going anywhere and our app is fast and secure to use and it doesn't contain any jamming barriers/arrears in using and managing it .

Moreover our app will provide features that will promote healthy eating and keep track that every user has hassle free experience. The burden on the canteen's end is prominently relieved by virtual canteens , as computerized methods are enabled for food ordering. After an order is placed using a virtual canteen from a mobile phone , it is entered into the database and then retrieved, by an android application on the canteen's end in pretty much real-time. Inside this application, all order items are displayed, using their equivalent options and supply details, in a pretty , summarizing and easy to read manner. Then canteen staff can speedily go through the orders placed and can scan theQR code from the student's android phone to produce the needed items with minimal delay and confusion.

# Chapter 2 - Literature Review

We went through a lot of different research papers to understand all the previous work done on the project that we have undertaken.

| Characterstics | Cashless Canteen Management System | Java Based Android Automation | Iet Canteen |
|---|---|---|---|
| Payment Gateway | ✓ | ✗ | ✓ |
| Kotlin Based | ✗ | ✗ | ✓ |
| Digital Wallet | ✗ | ✓ | ✗ |
| Support Location | ✓ | ✓ | ✓ |
| Mono Platform Interaction | ✓ | ✗ | ✓ |
| Data Caching | ✗ | ✗ | ✓ |
| Data Saving Mode | ✗ | ✓ | ✓ |
| Text To Speech | ✗ | ✗ | ✓ |

In the project canteen automation system we have used kotlin(Official language for Android development).

We have taken care of users' security by storing encrypted data into the database and have implemented Android's internal database(Sqlite) to support caching functionality.

# Chapter 3 - Methodology

Some of the initial features of the application will be as follows:

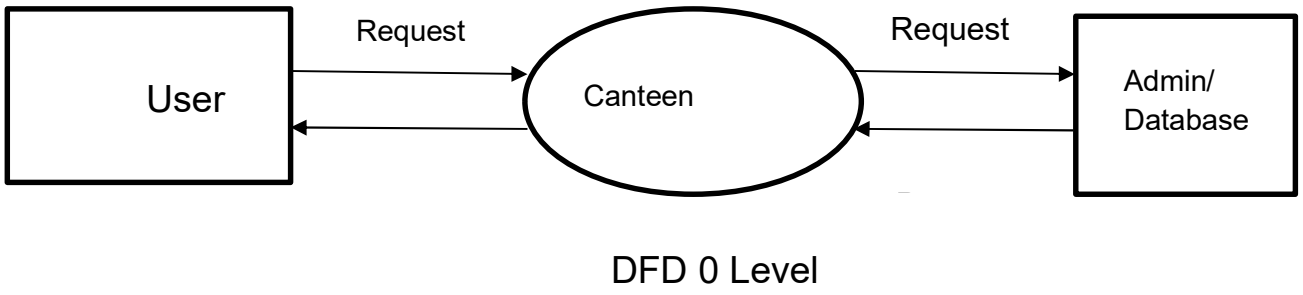
- Login / Logout functionality to allow only authenticated user to access the online food portal.
- Forgot Password functionality to support user update their passwords.
- Email verification required to access the portal.
- Simple, intuitive and interactive UI
- A personalized Canteen Android application that keeps data secured by using cryptography to store user data in encrypted manner.
- Easy Food Ordering
- Supports multi user tier of admin, faculty and students.
- Supported multiple Search criteria to filter orders by categories and keywords.
- Order history tracking and cancel/review order functionality.
- Supported device location to be used as an address
- Supported caching mechanism to store the snapshot of orders to support availability of food menu in case of low connectivity.
- Dedicated forms section for Contact support , Report bugs etc. with added functionality of sharing mobile application.
- Dedicated section for payment methods and integrated RazorPay Payment gateway.

## 3.1 System Design

### 3.1.1 Data Flow Diagram

The system design is described using data flow diagram

### Data Flow Diagram (level 0)




DFD 0 Level

Figure 3.1 Level 0 DFD.

### Data Flow Diagram for User (level 1)

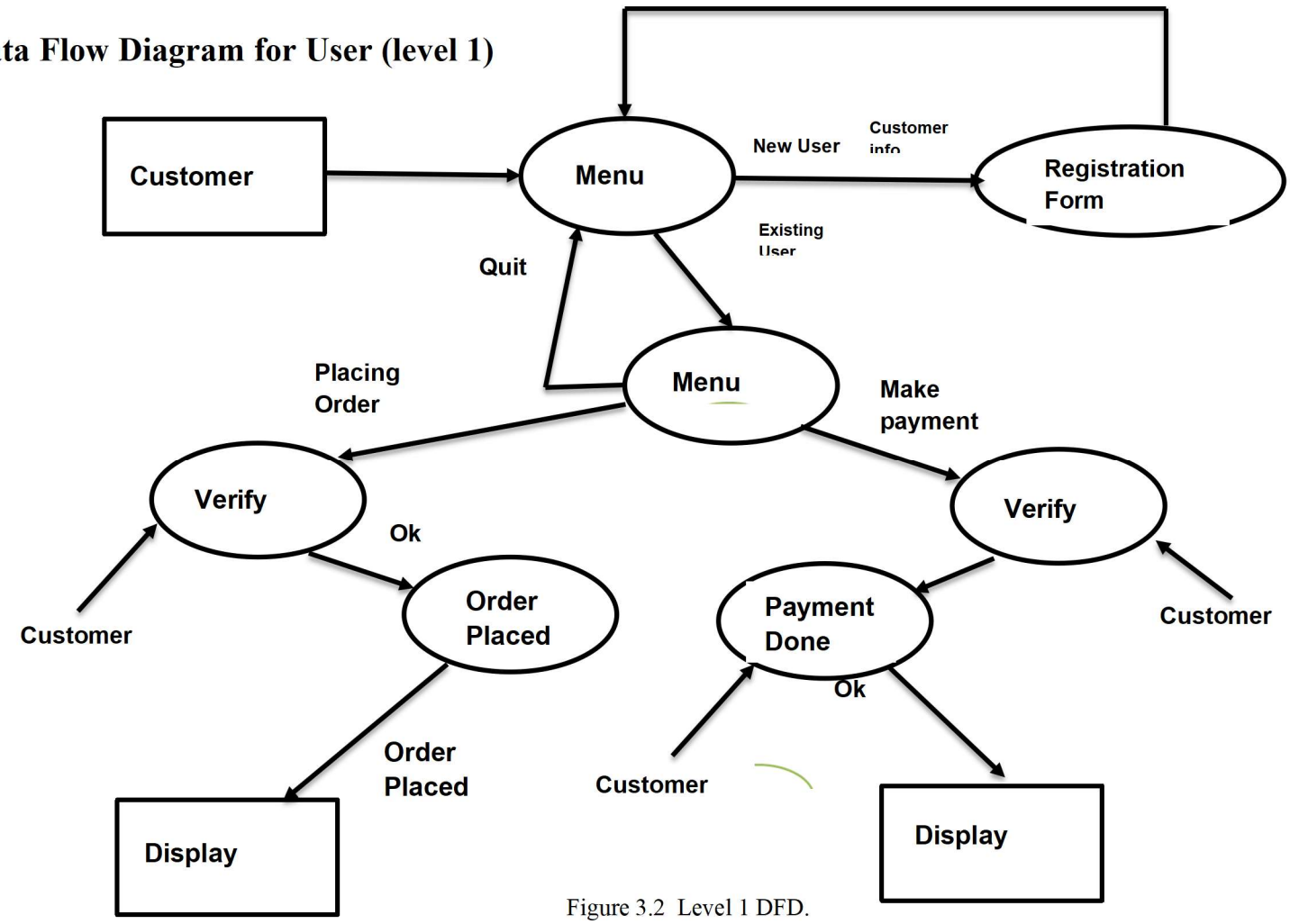



Figure 3.2 Level 1 DFD.

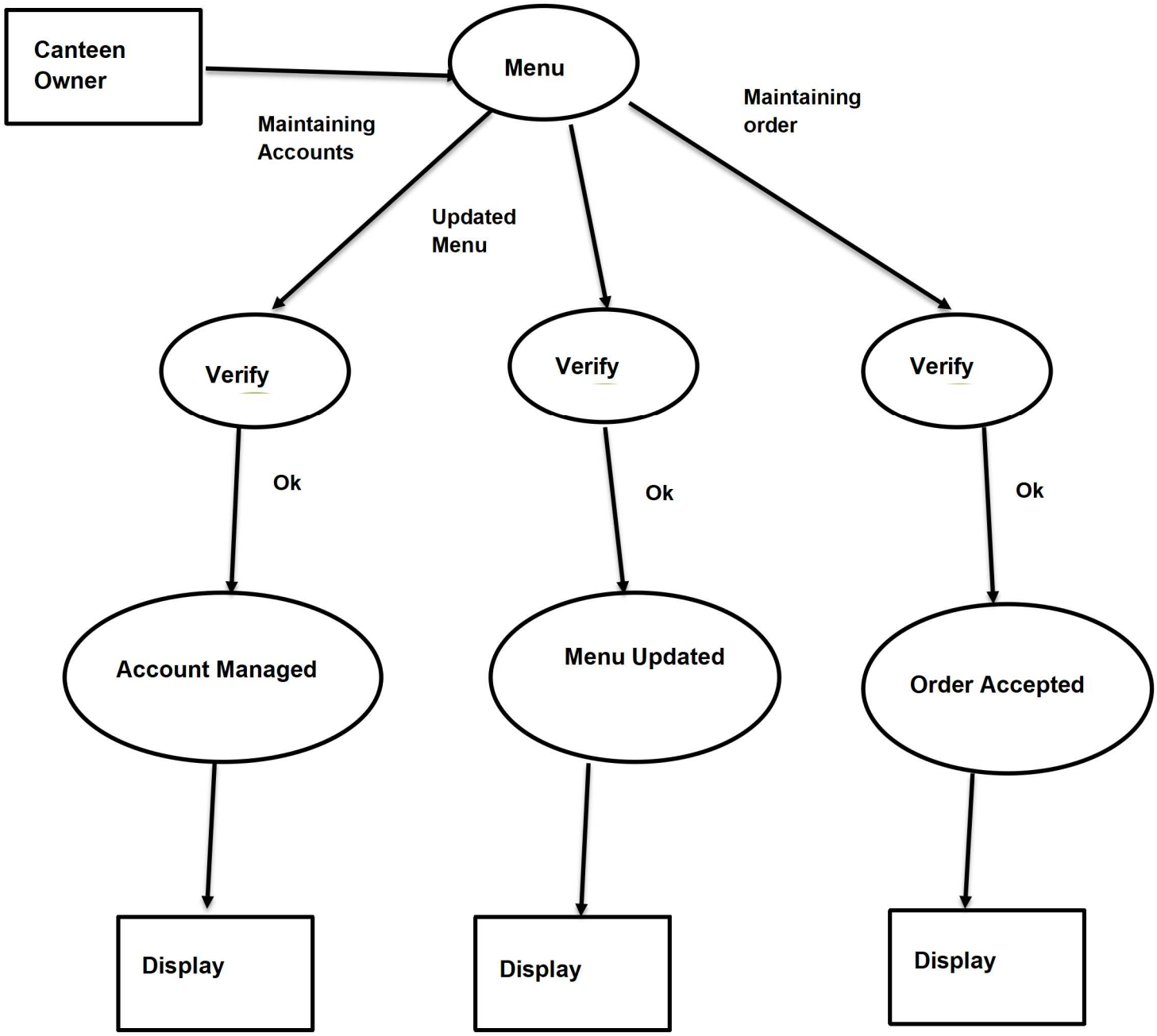



Figure 3.3 Level 1 DFD.

Figure3.3 shows the data flow diagram showing information exchange at the student user level. The diagram contains Payment Modules, Place Order and Add To Cart modules, Show/Search Module and Categories module.

## Data Flow Diagram for User Authentication

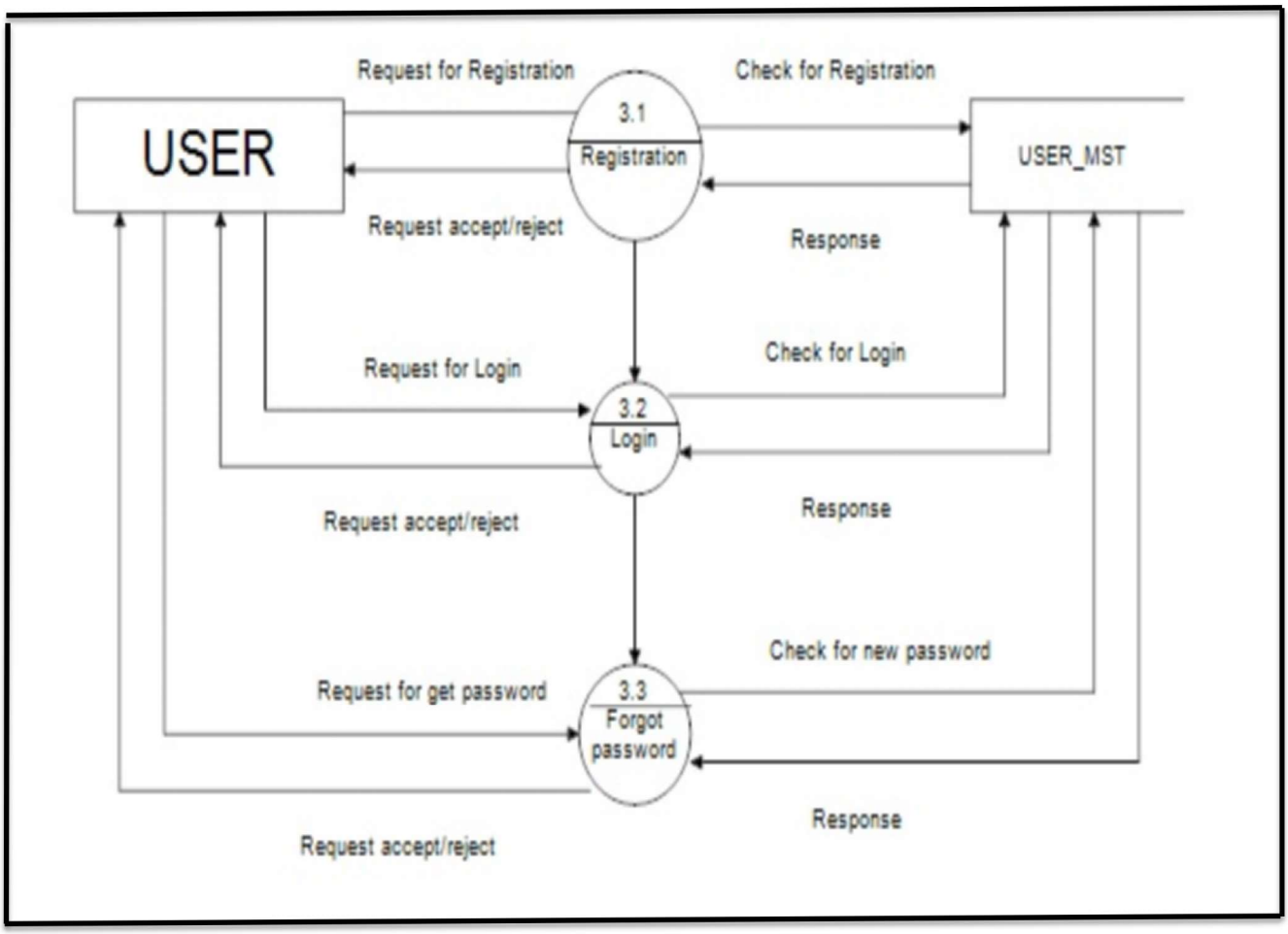



Figure 3.4 describes Authentication Flow.

DFD level 1 for user validation module is shown above in figure 3.4. Validation of user module is the top most part in the hierarchy. All the remaining modules are at same-level and contains the processes related to the three different categories of users- student , faculty and owner/admin.

References will be used for connecting between different Database models instead of encapsulating data in the student model.

Some of the Database models will be as follows:

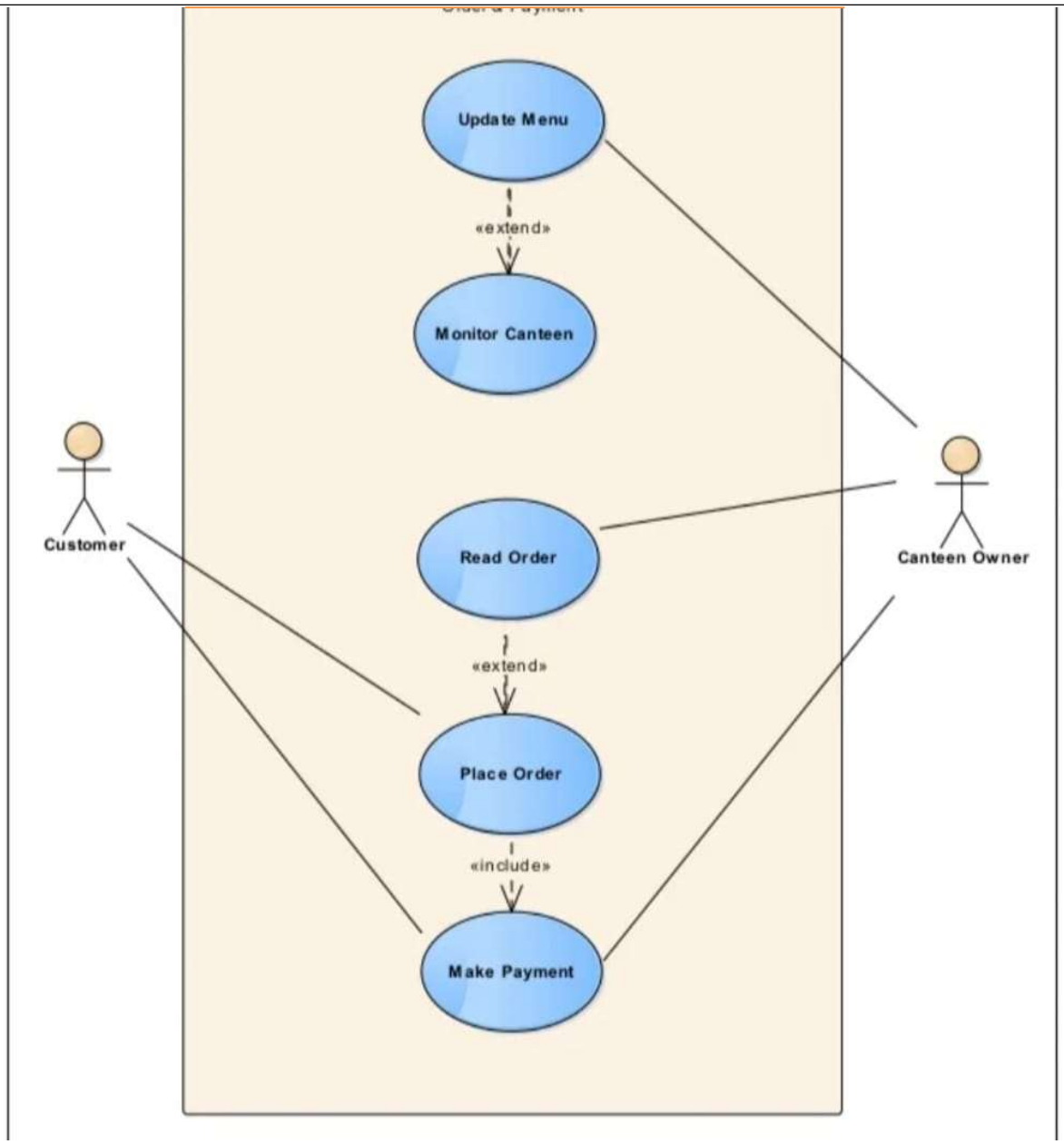



Figure 3.4.1 describes Use Case Diagram

- Cart
- CurrentOrder
- Menu
- OrderHistory
- IdCard
- Customers

## Entity-Relationship Diagram

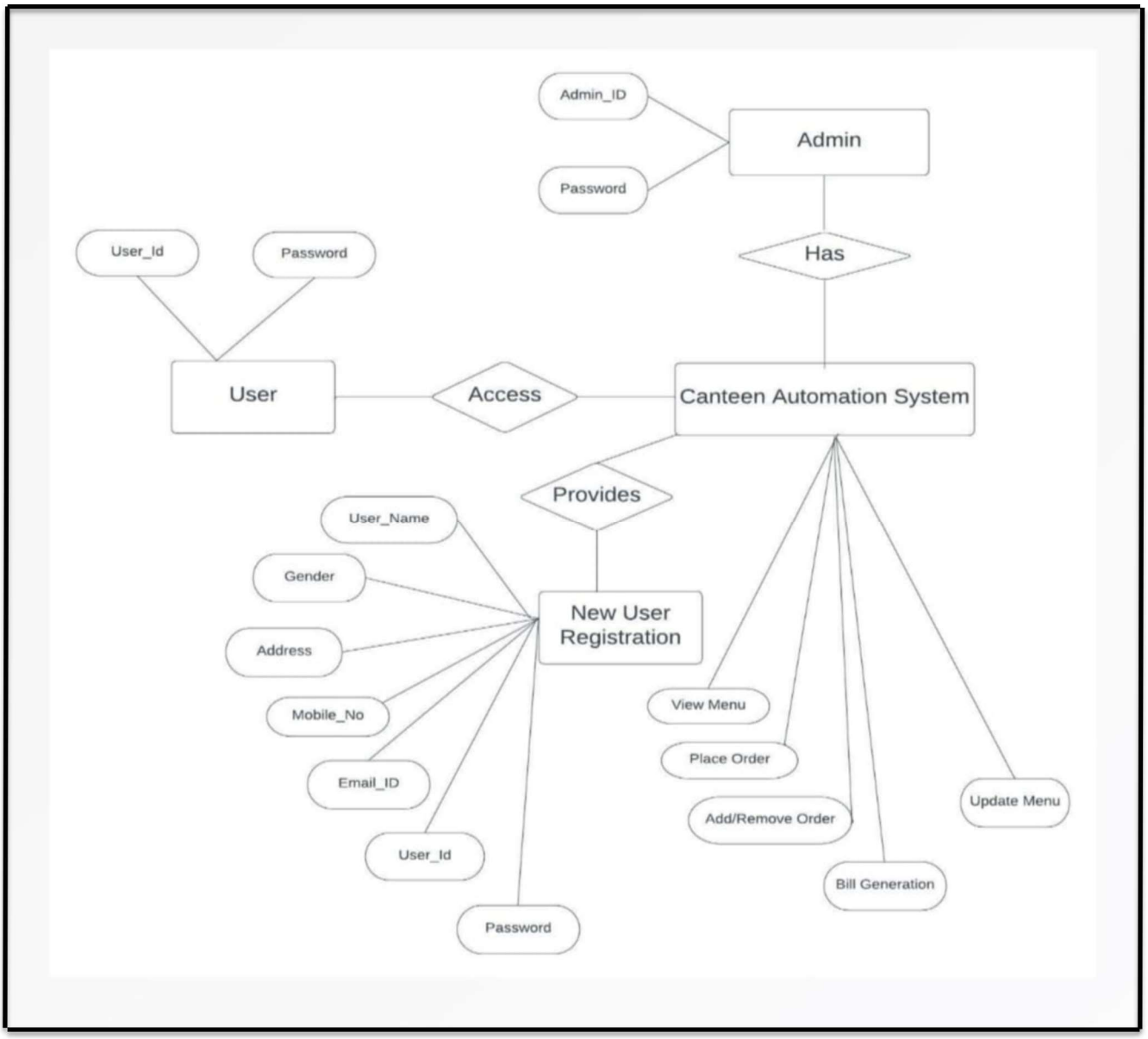



Figure 3.4.2 E-R Diagram

## Class Diagram

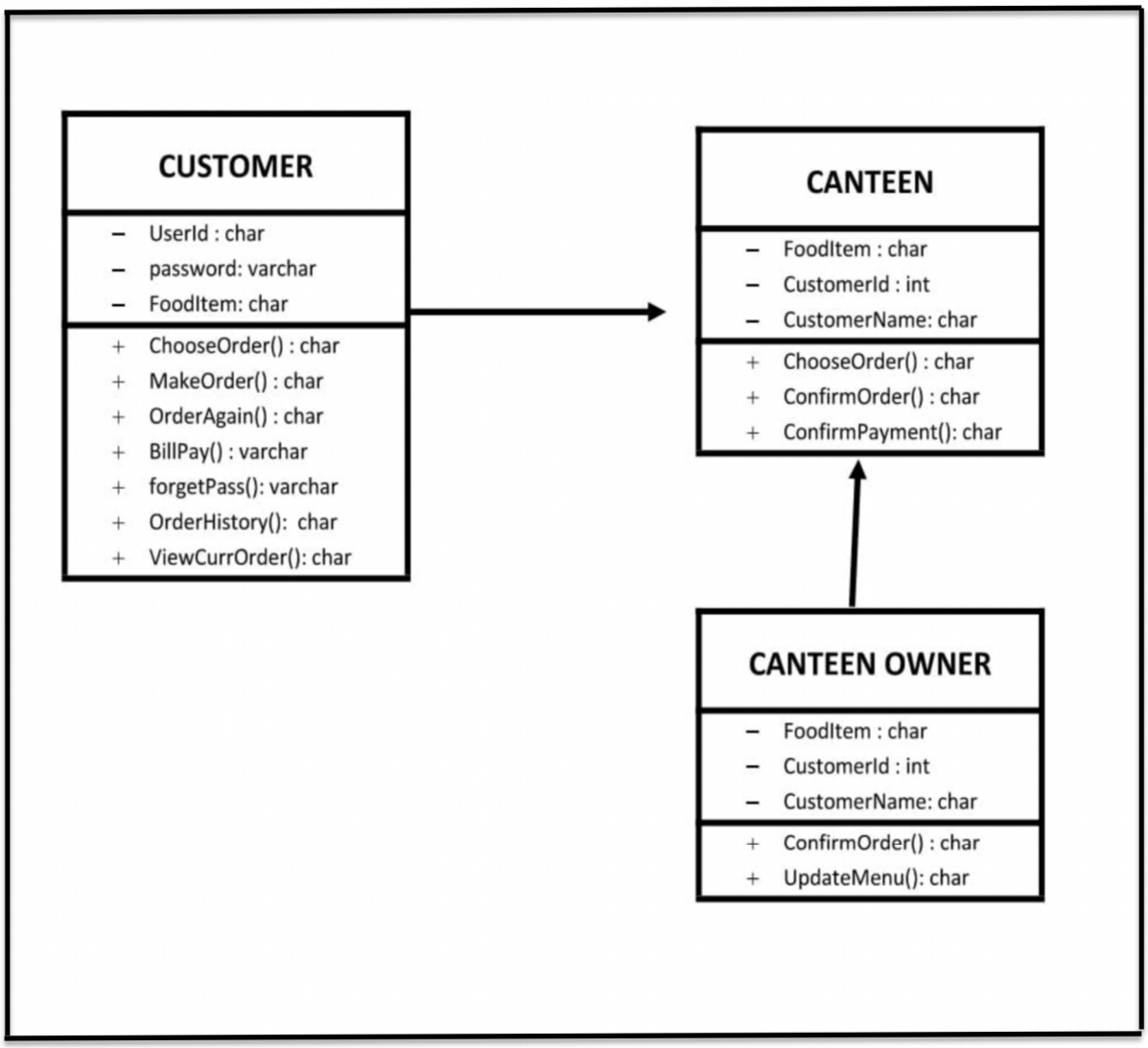



Figure 3.4.3 Class Diagram

**Major technologies used** in the whole process are described as follows:

- Backend - Firebase UI , Firebase Core.
- GUI Frontend - XML,  Kotlin , Material Design.
- IDE- Intellij Idea, Android Studio.
- Database - Firebase Firestore.
- API Usage - RazorPay  Open Source APIs.
- Version Control System - Git Bash, Github.
- Deployment- Google Play Store.

### 3.1.2 Terminologies Used

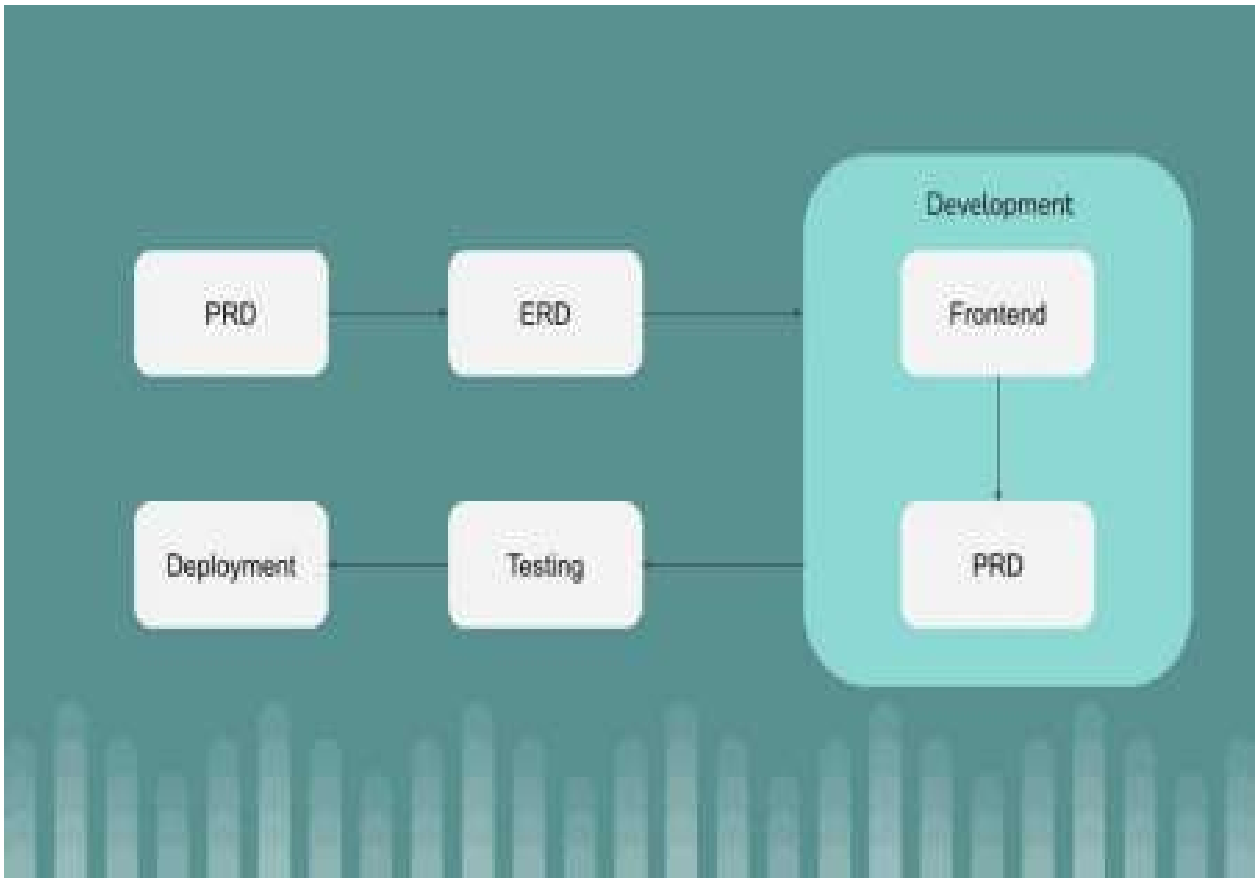



Figure 3.5 shows different stages of the Software Cycle Action plan.

- **PRD (Product Requirement Document)**

  PRD is a document which contains all the requirements for the  particular product. This document is generally written to make user understand why the project is created.

A PRD should, however, generally avoids to anticipate and define how the product will be doing the things in order to allow interface designers and engineers to use their expertise so that they can provide optimal solution to the requirement.

- **ERD (Engineering Requirement Document)**

  ERD is a statement that describes the goal and purpose of the new component added in the system. Unlike a product requirements document (PRD), which tells engineers what they have to build, an Engineering Requirement Document specifies why a specific component is being built and how its design fuels its purpose. After following the engineering requirements outlined in an ERD, engineers can ensures that the component they are building will satisfy customer needs.

**Software Development Life Cycle (SDLC) model:**

- **Agile model**

  Agile software development refers to iterative development based group of software development methodologies , collaboration between self-organising cross-functional teams helps requirements and solutions to evolve. It promote a disciplined project management process which supports frequent inspection and adaptation, a leadership philosophy which promotes teamwork, self-organisation and accountability, a set of engineering best practices which are intended to allow for fast delivery of high-quality software, and a business approach which is aligned for development with customer needs and company goals. Agile development is also defined as a development process which is aligned with the hypothesis of the Agile Manifesto.

Deployment Phases:

- Staging (on Github)
- Production (on Google PlayStore)

Each Sprint will be of duration one month. First and Second sprints will be used for the PRD, ERD and UI development as it will be a static part and it makes the testing and integration of the process a lot easier.

Agile model will be used for the backend features. In the first prototype, some of the primary features i.e. Authentication, user model etc will be implemented. In the subsequent prototypes of the application, multiple features will be added and integrated to the solution. Backend will take minimum of three dedicated sprints after the first two sprints.

## 3.2 Onboarding Flow

### 3.2.1 Sign-up Flow

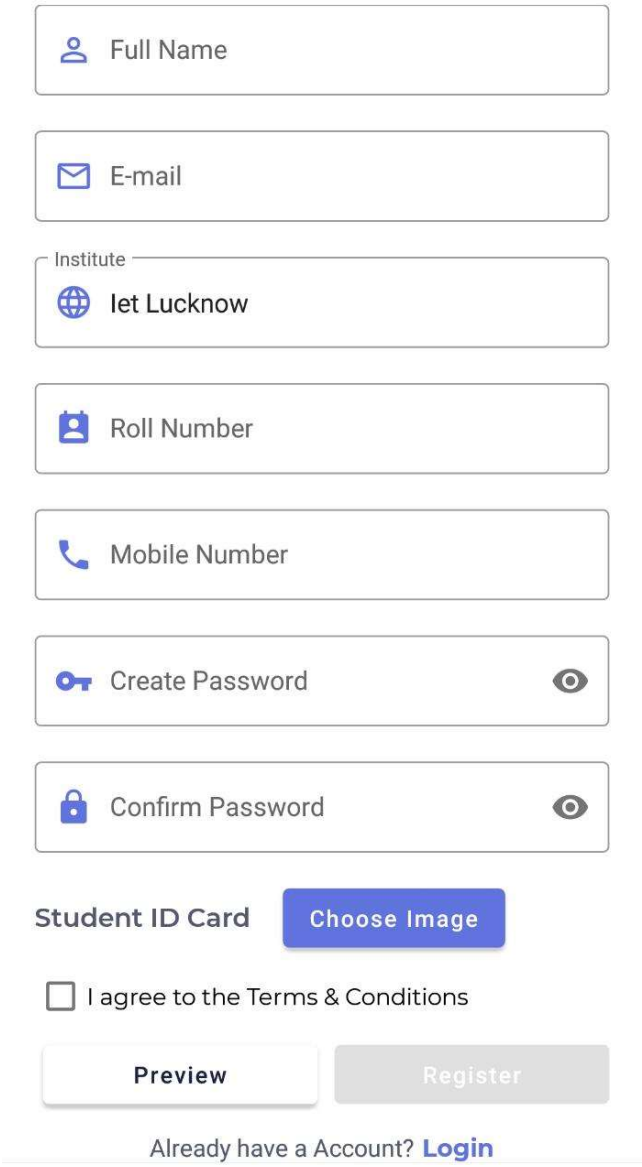



Figure 3.6 shows Signup screen UI

To get a user onboard, they have to register on the screen(shown above) first. During the registration/sign-up, we are storing the user's information as Customer_name ,Customer_id , Roll_no , Mobile_no , Password and Confirm_password(to be generated), and a file of a College_id_card. This will allow users to get registered with IET Canteen. To get started, a user is required to sign-in.

### 3.2.2 Sign-in Flow

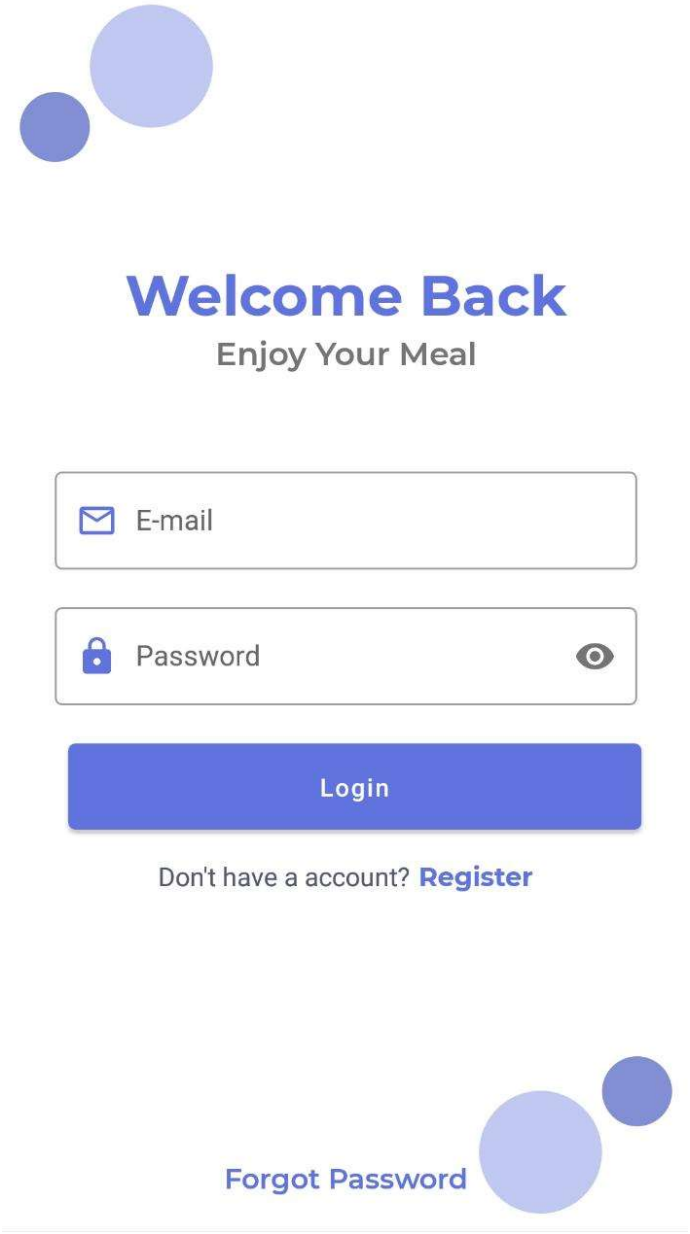



Figure 3.7 shows sign in screen UI

After getting registered, one should sign-in at the canteen. For this, they have to verify their Email-id using a link sent to them , also they will be required to enter the email-id they have used and password they have created while registering. Then, if the details get verified, the user is allowed to sign-in.

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## 3.3 Activities

### 3.3.1 User Profile

User profile activity is one screen which fetches data used for registration from realtime database and all these details are displayed using Material design functionality of Android.This is a static page and confirms the identity of the user who is using the canteen application.

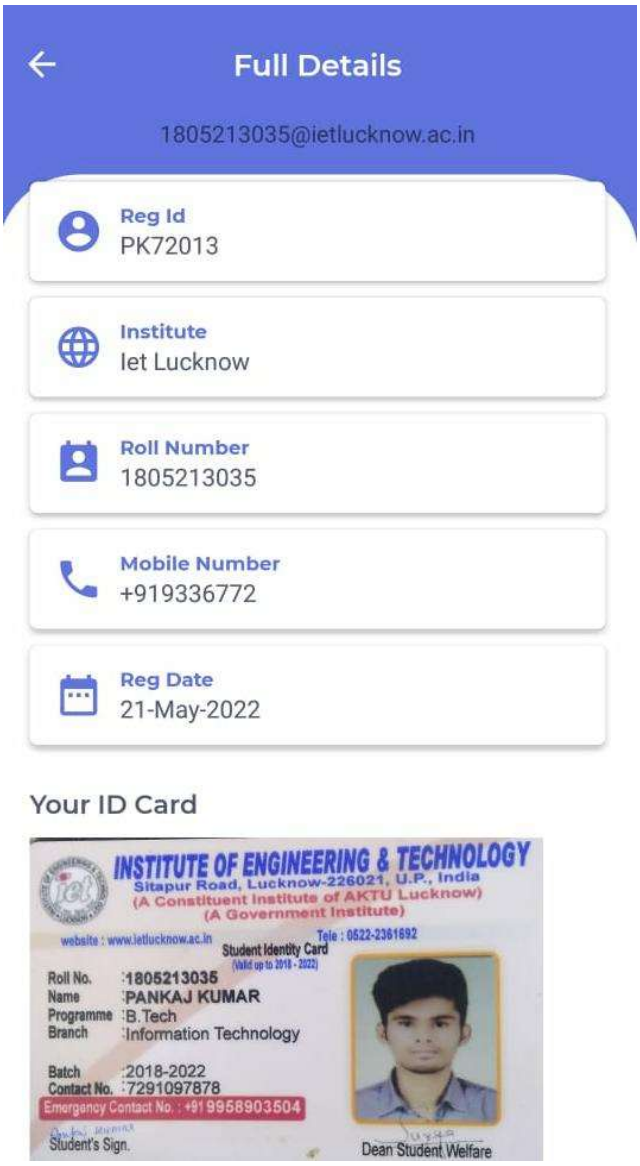



Figure 3.8 shows user profile.

### 3.3.2 Food Menu

Food Menu is the main channel of IET Canteen which is dedicated to all the information regarding Food available at canteen . This will include the information and the link through which the user will order food. The motive of this section is to provide an interactive user interface to our customers and to provide multiple features like filtering the food on the basis of category , keyword , etc Users are allowed to add any quantity of food any number of times , Add to cart functionality is supported using up-arrow button at bottom right corner.

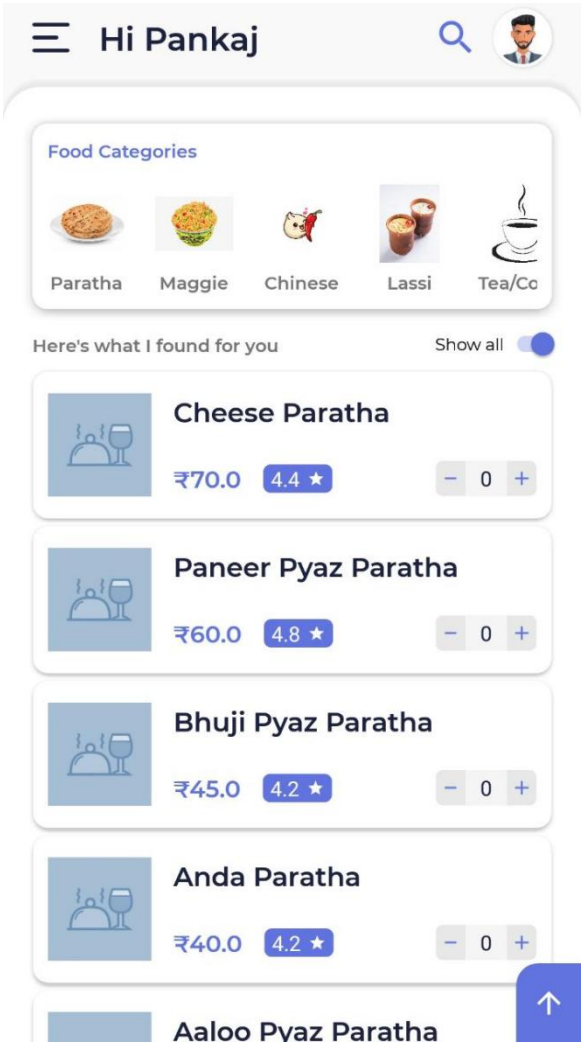
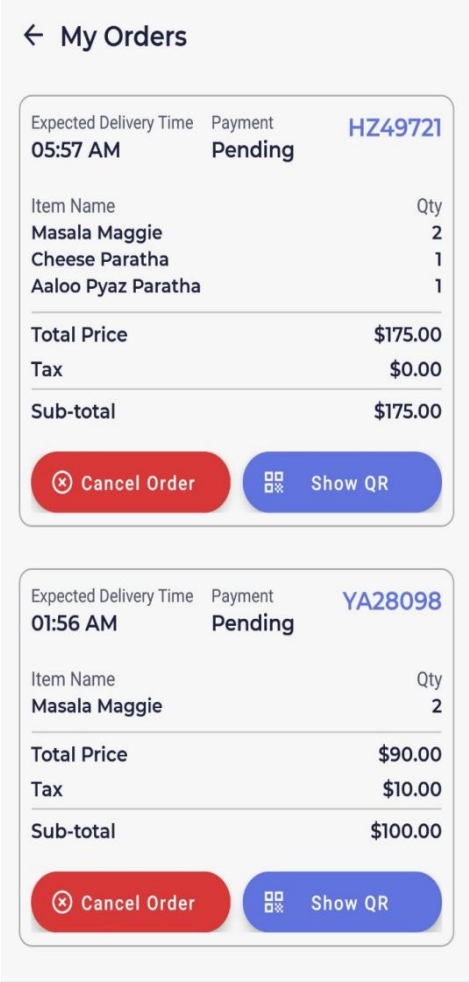



Figure 3.9 shows the main screen.



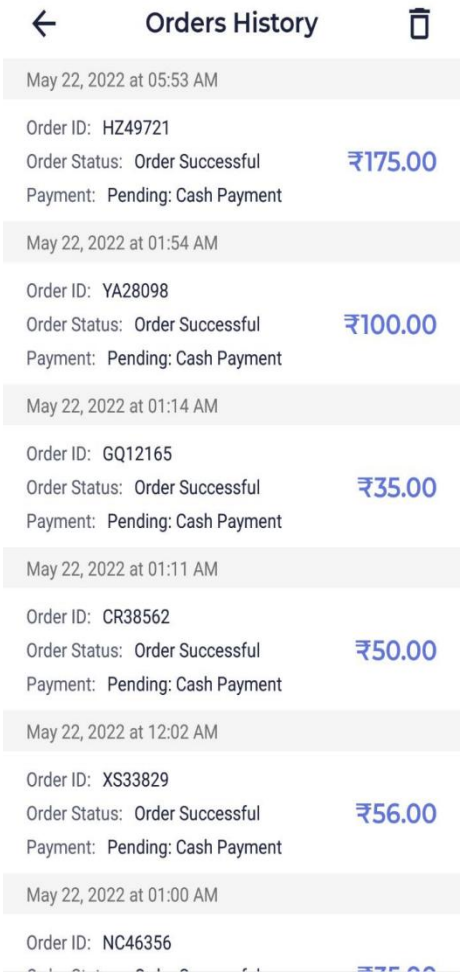
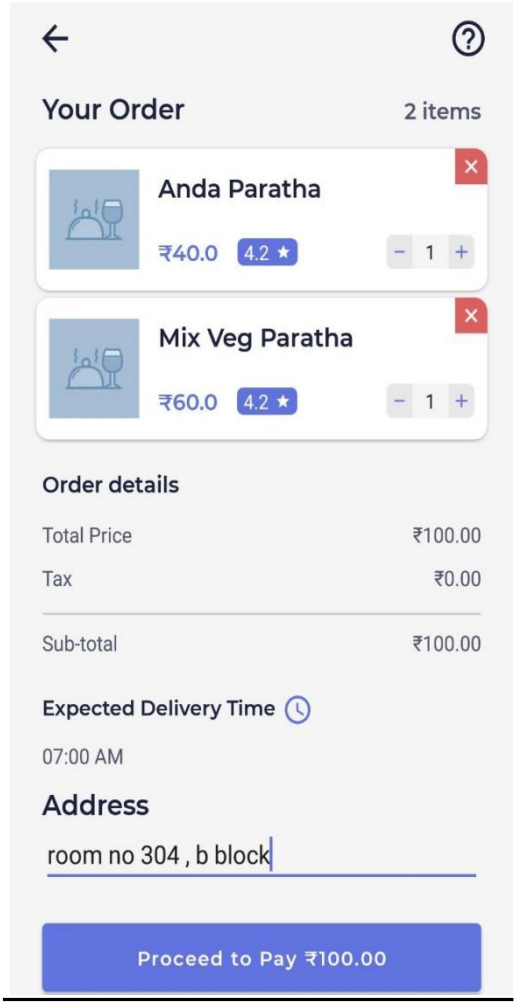




Figure 3.10 and 3.11 shows information related to all the current orders and all previous orders respectively


3.12 and 3.13 shows , QR for order and cart screen

## 3.4 Admin Support

### 3.4.1 Contact Us

This section allows the customers to submit the problem faced while using the application . Customers are also allowed to contact canteen owner directly using Mobile number or Email , Canteen_id and canteen_number are stored under canteen_info collection , fetching these details from Firebase Realtime database , In realtime.

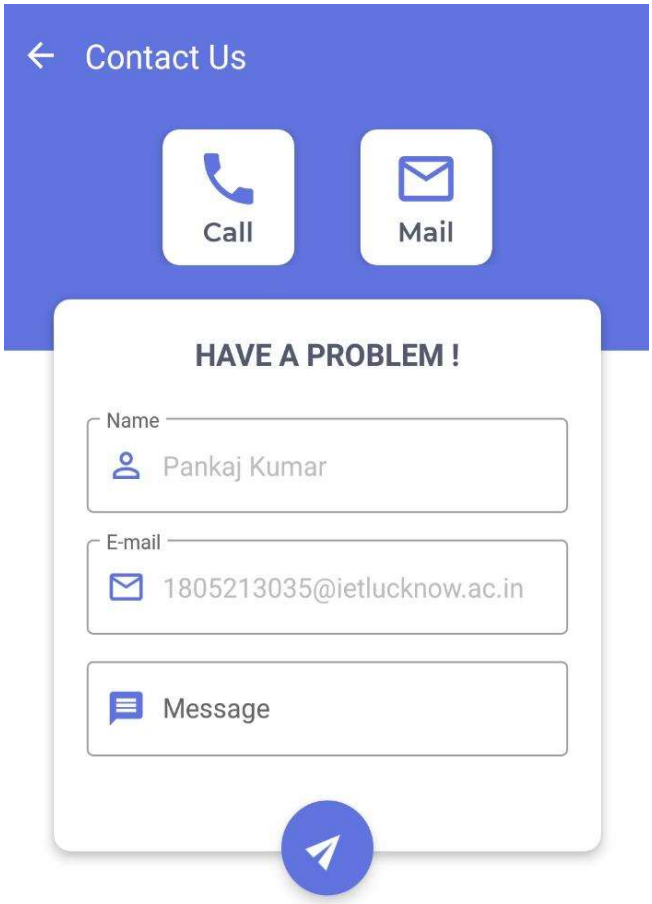



Figure 3.14 shows contact support screen.

### 3.4.2 Settings

This section allows the customer to use multiple settings like data saving mode , manage offline menus using cache memory (Sqlite database) , and delete orders history. Data saving mode allows application to use default image for food items available in the canteen and Offline menu is updated and deleted on the basis of user convenience.

Deleting orders history will remove all the past orders from the database.

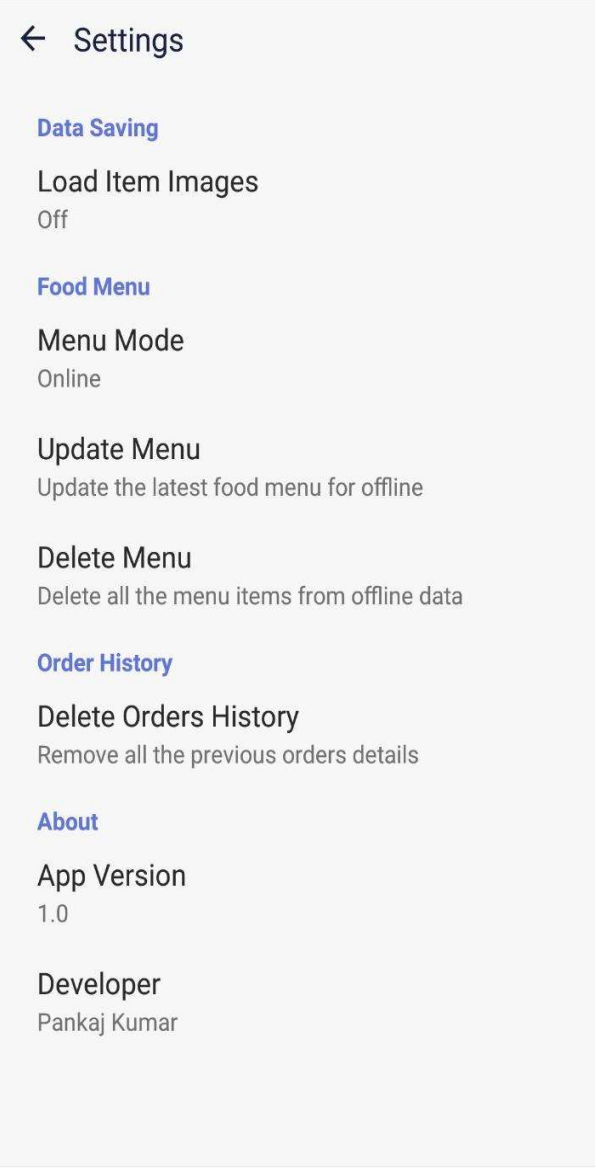



Figure 3.15 shows Setting UI

# Chapter 4 - Plan of Action

## 4.1 Plan of Action Timechart

| | February | | | | March | | | | April | | | | May | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Activities | W 1 | W 2 | W 3 | W 4 | W 1 | W 2 | W 3 | W 4 | W 1 | W 2 | W 3 | W 4 | W 1 | W 2 | W 3 | W 4 |
| Documentation, TechStack Review , Design | W1 -Documentation W2 - Api Reviews W3 - Designing | | | | | | | | | | | | | | | |
| Frontend Coding | | | | | Coding Frontend using XML and material Design | | | | | | | | | | | |
| Backend Coding | | | | | | | | | Backend using Firebase and integrated its Apis using Kotlin. | | | | | | | |
| Testing and Debugging | | | | | | | | | | | | | Testing/Debugging various screens of application on multiple devices. | | | |

Figure 4.1 shows plan of Action TimeChart

# Chapter 5 - Conclusion

## 5.1 Conclusion

The end result of the mentioned methodology and planned action will be a highly interactive UI with working functionalities of a Canteen Automation System, which will keep user data secure and will be able to handle low connectivity issue using caching mechanism . This application aims to aggregate all the activities related to food ordering on a homogeneous ecosystem, which greatly enhances the user experience and streamline user flow.

## 5.2 Future Works

IET Canteen is very useful in many aspects for the students as well as teachers of the institutions to provide food online at one platform in an organized manner. Through this, we are reducing rush on canteens and also simplifying the ordering process for both the customer and the canteen .

Though this is currently solving several issues but can be improved in many dimensions.

There will be a chat support system in the application where customers can connect with canteen owners in real time , they can share their views and opinions, future career opportunities etc.

We can also include a section for recommendations which will recommend food on the basis of past behavior of customers .

As of now, we are using gmail to send order details to the canteen owner but we are also working on admin portal to facilitate admin to manage Food menu and orders using that portal .Currently management of Menu is done through firebase console.

Due to the constraint of time as well as resources, we couldn’t implement these features but this part could be done in the future as it will widen the scope of the application.

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