

Digital Restaurant Management System: An Android Based Application

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of
Masters of Science in Computer Science and Engineering

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DAFFODIL INTERNATIONAL UNIVERSITY

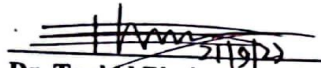
DHAKA, BANGLADESH

SEPTEMBER 2022

APPROVAL

This Project/Thesis titled “Digital Restaurant Management System:An Android Based Application”, submitted by Maisha Mumtaz Monsur , ID No: 212-25-968 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 19-01-2021.

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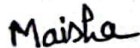
We hereby declare that, this project has been done by us under the supervision of **Raja Tariqul Hasan Tusher** (Assistant Professor) and **Md. Tarek Habib** (Assistant Professor), Department of CSE Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

My project is “**Digital Restaurant Management System**”. This system helps a restaurant to complete all the works digitally. In this application all work will be complete by digital way. From food order to food delivery full process will be complete by two application. Today's Bangladesh is digital Bangladesh. Most of the work in our country is completing digitally now. Many times people face many problems in restaurant services. Lack of waiter and lack of proper management system people can not get proper services . They faces difficulties by ordering food and getting food timely and most of the time customer can not give review about the food and services. So I made this application it will help the restaurant management and customer both. In this application customer can easily order foods and get the food timely and they can also review about the food and services. They can also get membership from the restaurant. In this application restaurant manager can easily maintain the total management system and by checking customer review they can improve their restaurant services.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Digital restaurant management system is a smart restaurant system. Where all work will be complete by digitally. Sometimes customer can not get proper services from the restaurant and restaurant management faces many difficulties to giving proper services. From this system customer and restaurant management can take and give their services easily. This application will manage the full work inside the restaurant. When customer come into the restaurant and sit in the table he can see a monitor or phone in the table and it will attached with the table and it will represent the table details...customers will select and order food by paying first...when he will order food he can see payment gateway and he will pay from them. After complete the order it will send to the manager.. Manager will check everything then accept the order and send to the chef. when chef accept the order and start cooking customers will see the time when his order will complete like Food pandas Timing system. After complete cooking chef sends a Notification to the all Waiter then which waiter will free he will take the food and serve to the customer table. After eating customer can give review about food and he can also apply for membership. When he will get membership from the restaurant send them Notification about food offers. There are four users. These are Manager users, Chef user, Waiter user, Customer user.

1.2 Motivation

This application is used for digital restaurant management process a. This application is used for managing the total process inside the restaurant by digitally. Because in most of restaurant customers are facing many difficulties for giving order and taking proper services. Lack of proper maintenance customer has to wait a long time for their order and they can not give any review about the foods and services. Lack of restaurant member and without customer review restaurant management cannot give proper services. So i made this application for customer can get proper services and restaurant can give customers proper services easily. I will update this system in future.

1.3 Objectives

The system focus on Smart Restaurant Management system and Maintaining full restaurant process digitally . Everyone can take service from this application in the restaurant.

The goals of our system are:

- Customer can registered there in any time.
- Customer can order food.
- Customer can give review.
- Customer can apply for membership.
- Registration and payment in online.
- .Manager ,Chef and Waiter has to register by their mobile number verification.
- Customer, Manager ,Chef and Waiter will get notification.
- Admin can manage the full system.
- Restaurant management have total control of the system.
- Registration for management members.

1.4 Expected Outcomes

This management system is made to help a restaurant management. A restaurant owner who wants to maintain proper restaurant system by digitally and give proper services to the customer can use this system. Those restaurant owner who wants to provide proper restaurant services they can get a proper platform by this system. At this moment we are going through a pandemic situation for Covid-19 so maintaining distance is most important now using this system can help people maintaining distance and get proper services in the restaurant in this situation. By using this system customer can easily give order and get their order timely they can also give a review about foods. Restaurant owner don't need to appoint many waiters and managers .Restaurant owner can manage the full work by appointing some people. Through this application workers has to enroll them self by phone number verification.so that there will no confusion of work.

1.5 Project Management and Finance

The system requires very little staff for project management. Organizers can manage all process and activities. The system requires less financial assistance. With less team management, the cost of this system is very low and maintenance costs are low.

1.6 Report Layout

A graduation degree allows us to learn a lot and apply it in real life. As a result, if we build this system, we will be able to put our ideas into action and use them to benefit humanity. The system is our concept, and it is brought to life through implementation. The first chapter includes an introduction to the task, goals, motivations, expected outcomes, and report design. The second chapter begins with an introduction to the project, related work, comparative studies, the scope of the problem, and the challenges of our task. The third chapter includes requirements specification, which includes use case modeling and description, a logical data model, and design requirements. The four

chapter shows a complete site rendering that is identified by design specifications such as front-end design, back-end design, interaction design, user experience (UX), and implementation requirements. Implementation and testing are covered in chapter five. This covers front-end design, interaction, test execution, test execution outcomes, and test results and reporting. The complete task is finished in the last section. This report includes details on our framework, its application, placement, and impact.

CHAPTER 2

BACKGROUND

2.1 Introduction

As a developing nation, ours places a high priority on having a digital restaurant management system. There isn't a digital restaurant management system in our nation. These people just want to maintain a proper restaurant management system and are very helpful. People can choose their table number and place their food orders through this app if they want to order food and receive good service in restaurants. Managers, chefs and waiters are required to verify their phone number and sign in to maintain a full job. In addition, if all his wide range of customers need to inspire enthusiasm for blessing, he can also take help of this app. is a rule privilege that allows you to This errand was designed to take advantage of a circular building with a uniform intelligence base boundary. Data limit requests have been cleaned up. Using the power of the Firebase Database, the entire user interface is organized using an XML design.

2.2 Preliminaries/Terminologies

The system has two panel:

1. Admin panel
 - Manager.
 - Chef.
 - Waiter.
2. Customer panel.

Admin panel can use only by any admin or Restaurant Management.

Customer panel is a panel for all Customer. In this panel customer can order food, give food review, pay online and apply for membership. In admin panel there is three panel Manager panel, chef panel and Waiter panel. In manager panel manager can add, edit and

delete any menu items. Manager can approve order after checking payment and he send the order to the chef. In the chef panel Chef can receive the order and give a notification to the waiter. In the waiter panel waiter can receive the food.

2.3 Related Works

There are some application and website available about this concept. I have study on these application and website. Digital Menu for Restaurant, Restaurant Digital Menu, Branded Apps ordering, Convenient Restaurant e-commerce, Self-ordering Kiosks and Restaurant QR Digital Menu.

2.4 Comparative Analysis

I researched several applications and websites concerning the concepts of online restaurants, digital restaurant services, and waste management systems in restaurants. The majority of them were created for people in the United Kingdom, the United States, and Australia. Unfortunately, there are no such projects in our country. As a result, I attempted to concentrate on Bangladesh's prospects. Our primary goal is to maintain the concept of a "digital restaurant system." So, we're introducing a never-before-seen digital restaurant maintenance system as an Android app. The system is not overly complex. The administration panel is simple to use, and a single administrator can manage the entire system. I attempted to back up my app.

2.5 Scope of the Problem

There are various types of problems that could arise in the system that we built.

- Web and Remote Services are not used.
- There is less safety.
- There is a reCAPTCHA test.
- When the errand is in progress, there is a risk of errors and data loss.
- There is no genuine collaboration between various Applications and Users.

2.6 Challenges

We all face challenges in our daily lives. For this project, we faced multiple difficult situations. We must include various details about the system and its work processes, which are extremely difficult to calculate. The hardest part was creating a normal Android app. User satisfaction and trust issues are the main challenges. Sometimes users want to change their data. User-friendliness is also a challenge. In that case, it would be very difficult to implement a payment method. In that case, collecting user opinions is much more difficult.

CHAPTER 3

REQUIREMENT SPECIFICATION

In this chapter, I will go over all of the requirements that will be required to complete the proposed system. This chapter describes the use case diagram, description, and other requirements.

3.1 Business Process Model:

A business process model is implemented to describe a project's data flow. It symbolizes the partnership between the program and the user and can be modified as the business sees fit.

Business Process Model for the Entire Restaurant System:

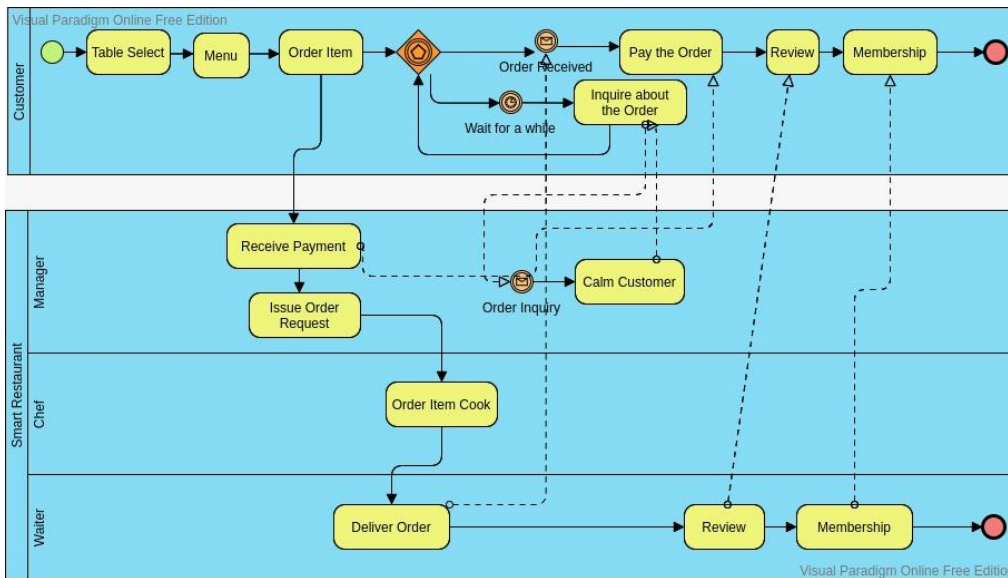


Fig 3.1: Business Process Model for the Entire Restaurant System

3.2 Business Process Model Description:

Fig 3.1 First of all, Customer come into the restaurant and sit in the table he can see a monitor or phone in the table and it will attach with the table and it will represent the table details...customers will select and order food by paying first...when he will order food, he can see payment getaway and he will pay from them. After complete the order it will send to the manager. Manager will check everything then accept the order and send to the chef. when chef accept the order and start cooking customers will see the time when his order will complete like Food pandas Timing system. After complete cooking chef sends a Notification to the all Waiter then which waiter will free, he will take the food and serve to the customer table. After eating customer can give review about food and he can also apply for membership. When he will get membership from the restaurant send them Notification about food offers. There are four users. These are Manager user, Chef user, Waiter user, Customer user.

3.3 Use Case Modeling:

A use case diagram depicts all of the system's action flows with primary and secondary users. In general, primary users are human beings, while secondary users are technological creations. For administrators and users, I've attached a use case model.

Use case Diagram for Customer:

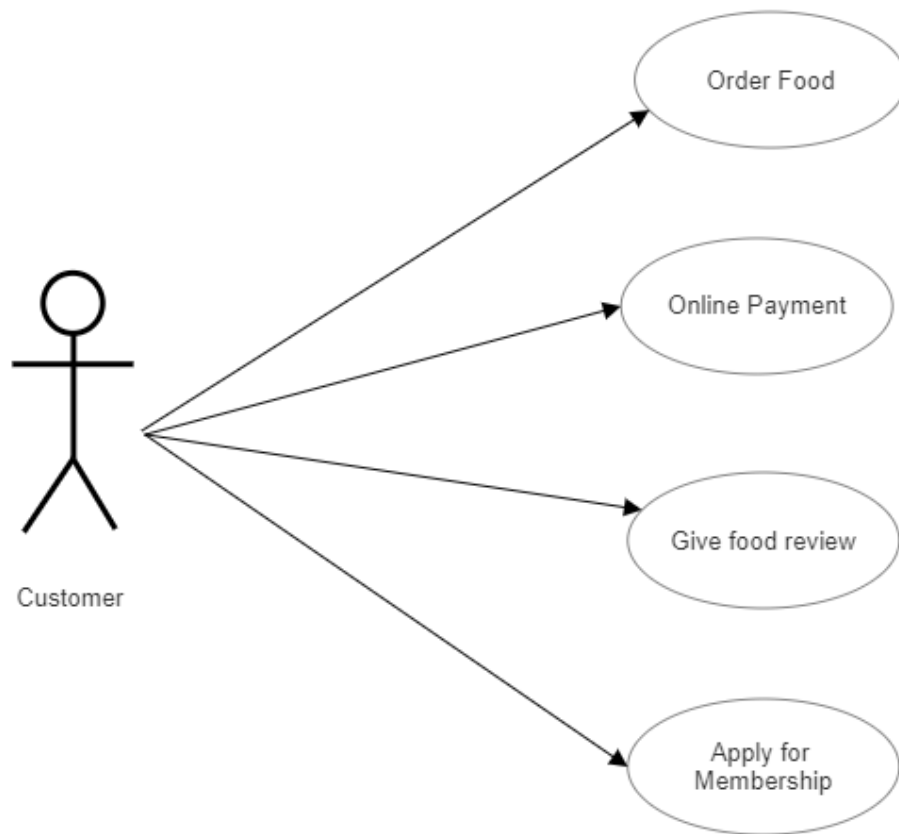


Fig 3.2: Use case Diagram for Customer

Use case Diagram for Admin:

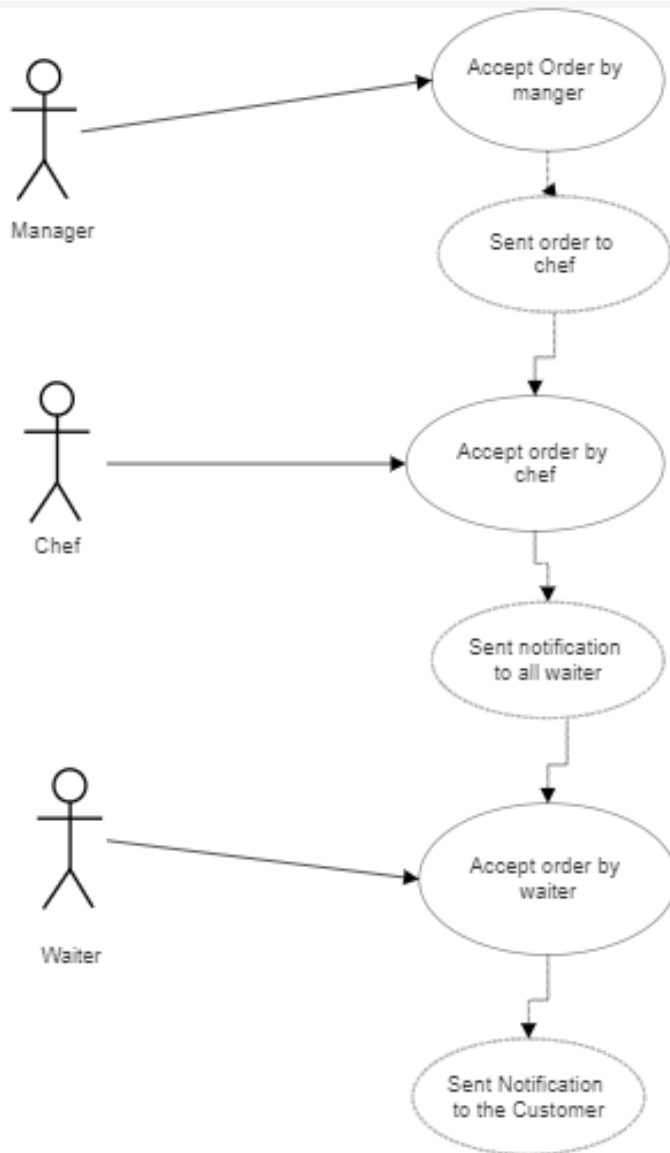


Fig 3.3: Use case Diagram for Admin

3.4 Use Case Description

Fig 3.2 Provide a description of the project's use case diagram for the user. Customer can add food in the favorite list, add food in the cart, order food, give food review and also apply for restaurant membership. Customer has to payment in online.

Fig 3.3 Illustrate the use case diagram for the project as it appears to the admin. There are three admins in the system. Manager, chef and waiter. Manager can add and delete and update items from the menu. Manager can accept order after checking everything. After accepting order manager send the order to the chef. Chef can accept the order. After completing the cooking chef can send a notification to the waiter. Waiter can accept the food and send a notification to the customer.

3.5 Flowchart:

A flowchart is a diagram that depicts an algorithm. To solve a problem, programmers frequently use it as a program-planning tool. It employs symbols that are linked together to represent the flow of information and processing. "Flowcharting" refers to the process of creating a flowchart for an algorithm.

Flowchart for Login:

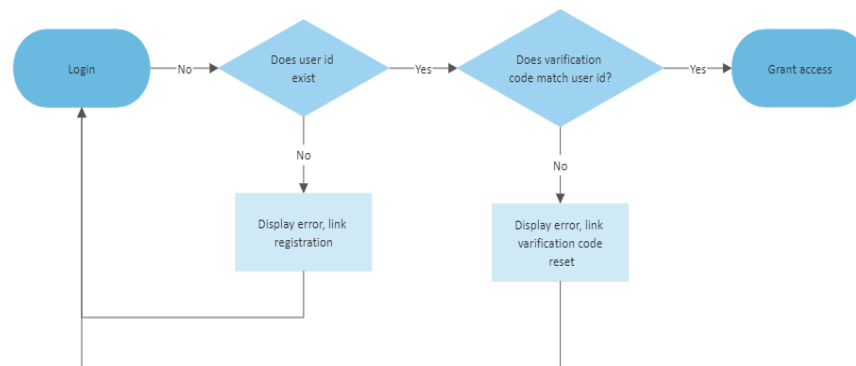


Fig 3.4: Flowchart for Login

Flowchart for Customer:

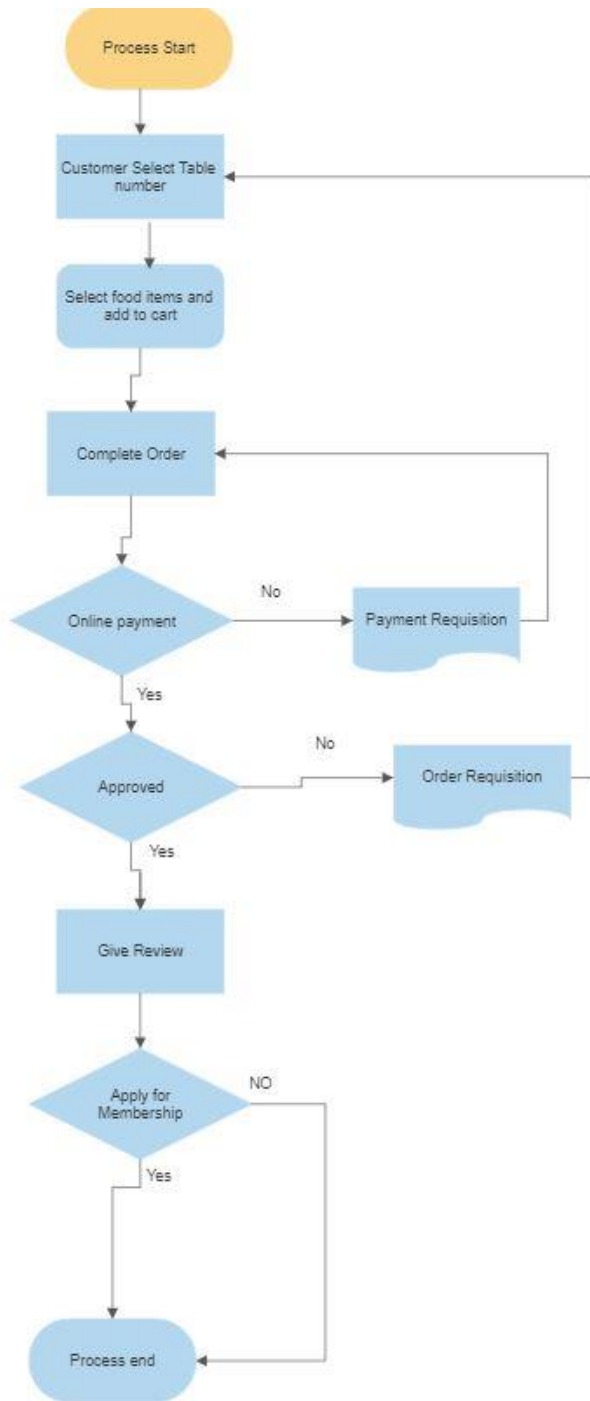


Fig 3.5: Flowchart for Customer

Flowchart for Admin:

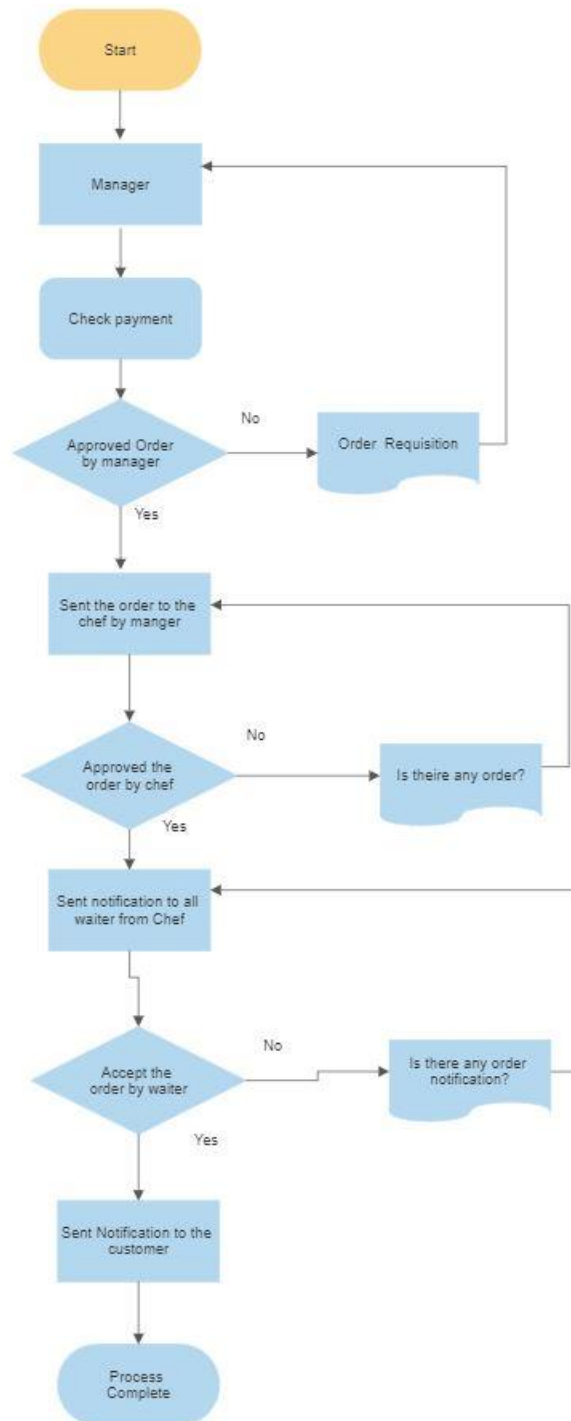


Fig 3.6: Flowchart for Admin

3.6 Flowchart Description

Fig 3.4 Describe the login flowchart diagram of this project. Login process is only for admins. Manager, Chef and waiter are admins in the system. They have to login by their phone number. After that they have to apply the verification code. This verification code will come in their phone number via message or call. If the verification code is matched, they can enter to the system if the code is not matched, they cannot enter the system.

Fig 3.5 Describe the Customer 's flowchart of this project. At first customer has to choose table number. Then Customer can add items in favorites and cart. After that he can select food and order food by online payment. After finishing eating customer can give a review and customer wants, he can apply for restaurant membership.

Fig 3.6 Describe the Admins flowchart of this project. Manager, Chef and waiter are admins in the system. They all have to login in the system by phone number verification. At first manager has to accept order by checking everything. After accepting order, he will send the order to the chef. Chef will accept the order and after finishing cooking he will send a notification to the whole waiter. Waiter will accept the order and send a notification to the customer that his order is ready to serve.

3.7 Design Requirement

Design requirements are usually the only thing that gives an idea of the overall workings of a project. Our master plan is simple to implement. We are attempting to plan the application so that our customers can use it.

Design requirement for Customer:

- Select Table Number
- Add to favorites
- Add to cart
- Delete from cart and favorites
- Order Food

- Online Payment
- Give Review
- Apply For Membership
- View Status
- View Transaction
- View Images to Slider View

Design requirement for Admin:

- Login
- View Order
- Add, delete, update items from menu
- Able to Approve Order
- Able to send Notification
- View Transaction
- Add Image to Slider View

Chapter 4

DESIGN SPECIFICATION

4.1 Front-end Design

The front-end design is where your application's users interact with it. I attempted to make the UI (user interface) as simple as possible. The front-end design of the application is done in XML, which stands for Extensible Markup Language. The application was prototyped using additional tools such as Adobe XD and Photoshop.

XML: Extensible Markup Language

Extensible Markup Language (XML) is a markup language with a set of rules for coding documents for human and machine readability. XML is defined by the W3C XML 1.0 configuration and several other system parameters. Unicode provides extensive support for a wide range of human languages. Due to Android's excellent XML support and user-friendliness, I used it in this application.

SVG: Scalable Vector Graphics

SVG is an XML-based vector image that represents 2D graphics and can be animated and interacted with. The World Wide Web Consortium, also known as the W3C, created SVG. SVG images and behaviors can be edited and changed using XML code because they are clearly defined in XML files. SVG files can be opened and edited in virtually any text editor, including vim, nano, and others.

Adobe Photoshop:

Adobe Photoshop was only available for Windows and Mac computers. Photoshop is highly customizable and simple to use, with a wide range of tools. Newer terms like Photoshopping are also popular these days. Photoshop supports a variety of color spaces,

including RGB and CMYK. Though since Photoshop is so popular and simple to use, I used it for my preliminary sketches of the application design.

4.2 Back-end Design

Backend design is, in essence, what happens behind the scenes of your program. Java is the most widely used language worldwide for developing Android applications. Java thus functioned as the main backend language for this project. We used the real-time, user-friendly Firebase database as the database, which is easy to link into your application.

Kotlin:

Kotlin is a general-purpose, cross-platform, statically typed programming language featuring type inference. The Java Class Library is used by the Kotlin standard library's JVM implementation, which supports more concise syntax thanks to type inference. Although it can also be compiled to JavaScript or native code via LLVM, Kotlin primarily targets the JVM. The Kotlin Foundation is in responsibility of trademark protection, whereas JetBrains is in charge of language development expenditures.

Firebase:

Firebase is referred regarded as a real-time database since each alteration to the database is visible to the instance. Firebase databases are sometimes known as tree databases. because databases do not follow the traditional row and table format of databases to which we are used. Utilize NoSQL for querying and Volley for data transport.

4.3 Interaction Design and User Experience (UX)

Interaction design is the process of creating dialogue between users of systems or services. This is one of the most important aspects of your application. Well-designed interactions lead to an excellent user experience. User experience should be considered first before developing.

4.4 Implementation Requirements

We utilized a variety of tools, properties, and components to properly construct this Android app. The tools, qualities, and elements used to create an Android application project and make it appealing to your users are all described in the Implementation Requirements section.

4.4.1 Android Studio

Google's official IDE for building Android applications is entitled Android Studio. This IDE allows you to design apps and launch them on the Android operating system. Numerous programming languages and development tools are supported by this IDE. contains rich libraries to aid developers in creating apps quickly. So, I made this project on Android Studio.

4.4.2 Basic Android Overview

There are several apps available on Android. To put it plainly, a complete software stack for mobile devices. It includes numerous upgrade libraries that will make creating this application easier and quicker. The design of the program was done in XML, and it was built in Java. I used the Firebase Tools option in the IDE to connect to Firebase services. The project development process takes time.

4.4.3 The Emulator

An emulator, also referred to as an Android Virtual Device, is required to run Android applications on your desktop computer (AVD). I have attempted the application several times with this emulator. You can create many Android devices and test your application on them with the aid of this emulator.

4.4.4 Android SDK

Software development kit is referred to as SDK. For the Android platform, the Android SDK is a collection of development tools that may be used to create various types of Android applications. This is a crucial tool for creating and running any Android application.

4.5 Permissions Required

- Internet permission.
- Media & storage permission

Chapter 5

IMPLEMENTATION AND TESTING

I'll provide a sample implementation of our project in this chapter and assess the project as a whole for efficiency.

5.1 Database Implementation

Data for applications is kept in databases. Secure databases are frequently used by developers to store data. Additionally, database users can add, update, and delete data. There are various kinds of databases, including Firebase, MySQL, and NoSQL.

5.1.1 Database Design

To store data in my Android application, I chose Firebase as a data manager. Realtime database is not available if you use MySQL server instead of Firebase. I used Firebase in my project to take advantage of the real-time database. I've attached a screenshot of the project's backend database.

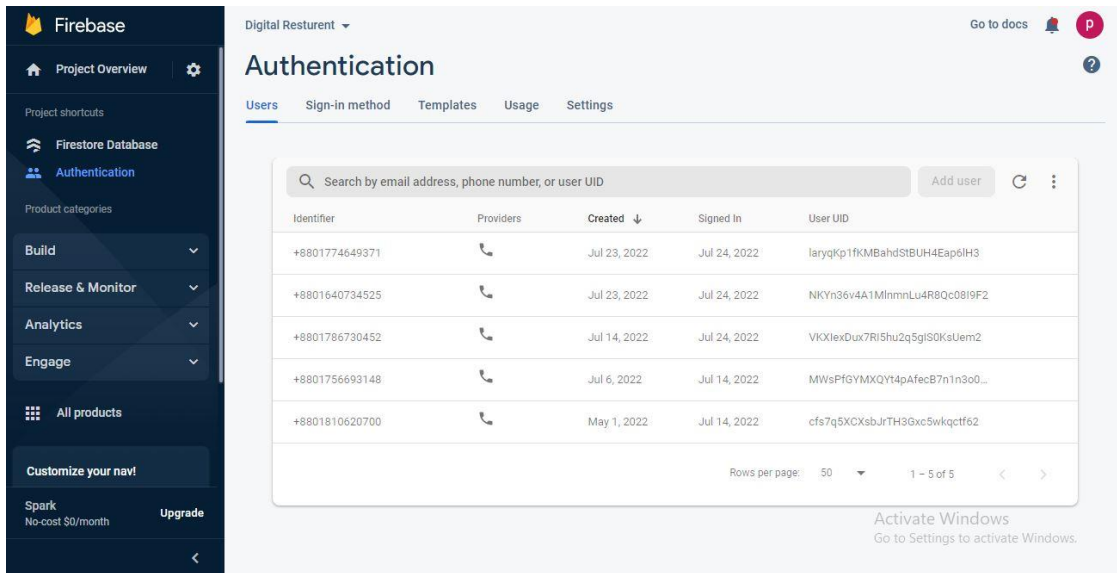


Fig. 5.1 Firebase Authentication

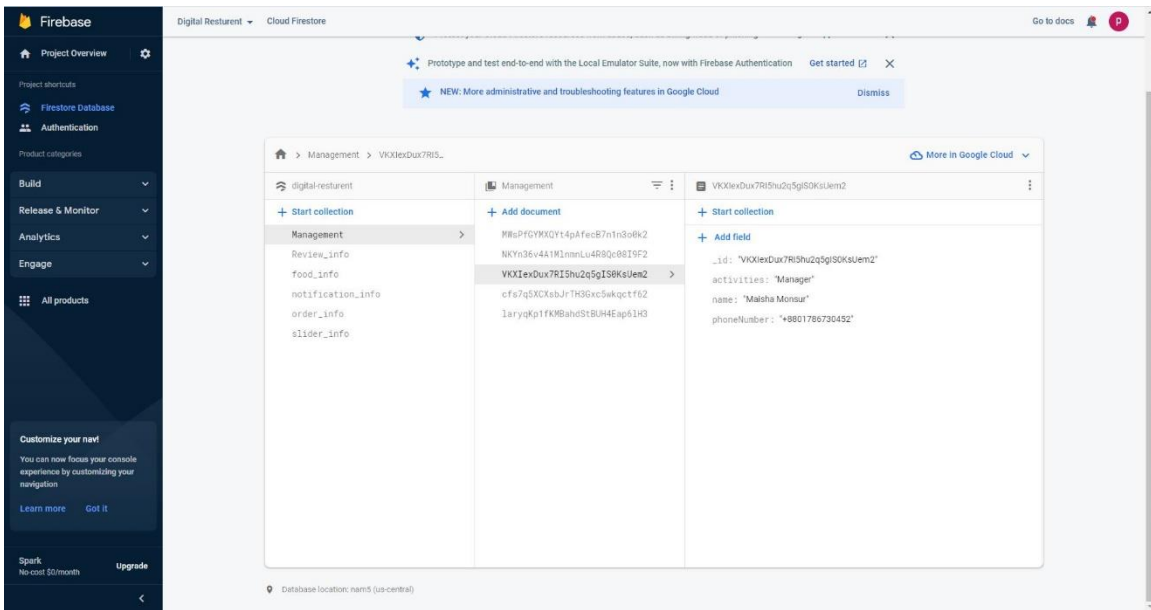


Fig. 5.2 Cloud Fire store Database

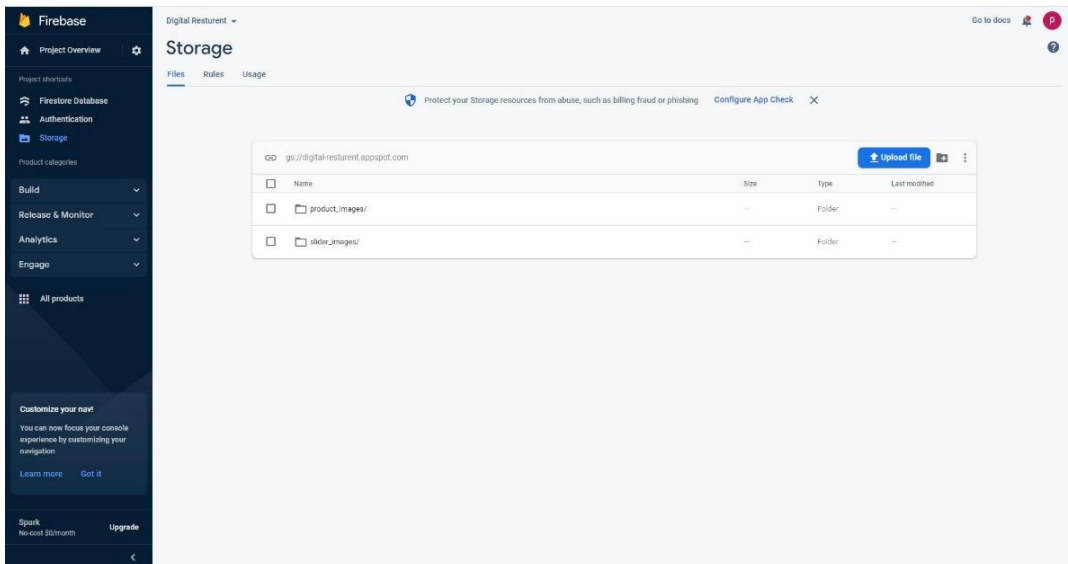


Fig. 5.3 Firebase Storage

5.2 Implementation of Front-end Design

The main challenge is to develop a visually appealing and simple front-end design that enables users to immediately understand the functionality of the program and utilize it effectively. For the front-end design, I used XML.

A snapshot of our app's splash screen with the logo on the home page is shown in Figure 5.4.

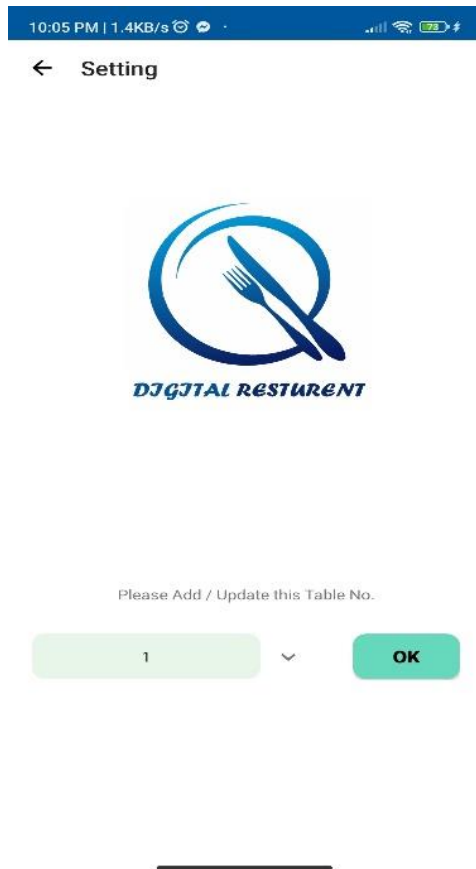


Fig. 5.4 A Screenshot of Splash Screen

Admin panel

I've included a screenshot of our application's Register/Login page with the logo, tagline, and login button in figure 5.5. In order to utilize the application, the management, chef, and waiter must validate their phone numbers.

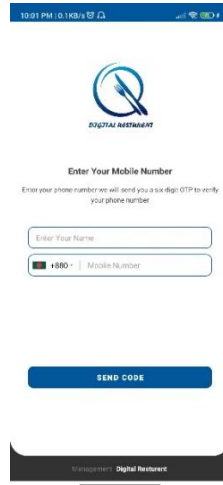


Fig. 5.5 A Screenshot of Phone Number Verification

Figure 5.6 shows phone number verification activities. The verification code will be filled out automatically by our program. By using the option to "Resend code," the user can request a fresh OTP. The user can confirm their phone number after entering the code. It is necessary to verify your phone number in order to register or log in to the application.



Fig. 5.6 A Screenshot of Receive OTP

Figure 5.7 depicts an administrative dashboard. Since the jobs of the manager, chef, and waiters change, we need to know where we can view who has logged into the system. Also available here are options for setting, rating, terms and conditions, and logging out.

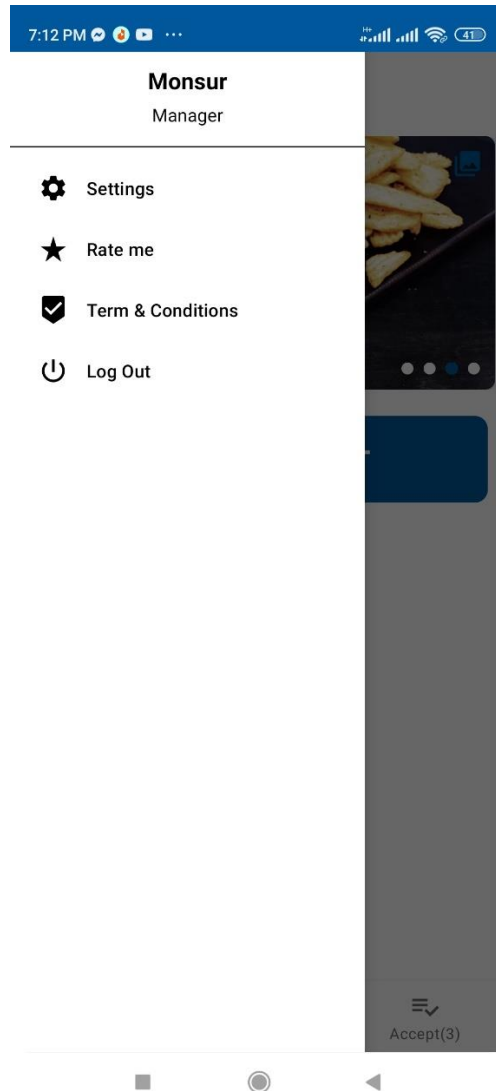


Fig. 5.7 A Screenshot of Admin Dashboard

Manager can observe a slider view with menu images in figure 5.8. The management has the option of adding new photographs and removing some pictures.

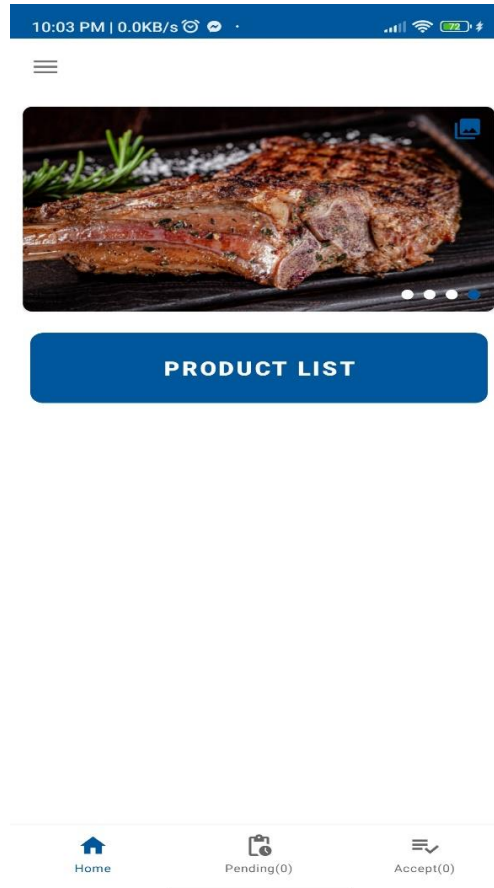


Fig. 5.8 A Screenshot of Slide view

In figure 5.9, Manager can add new items, price, and cooking time in the menu. He can also update menu from here.

10:03 PM | 0.1KB/s

DIGITAL RESTURANT

Product Name

Product Details

Product Old Price

Product Current Price

Estimated Cooking Time

Regular

SAVE

Fig. 5.9 A Screenshot of adding items and updating menu

In figure 5.10. Manager can delete items from menu by clicking delete option.

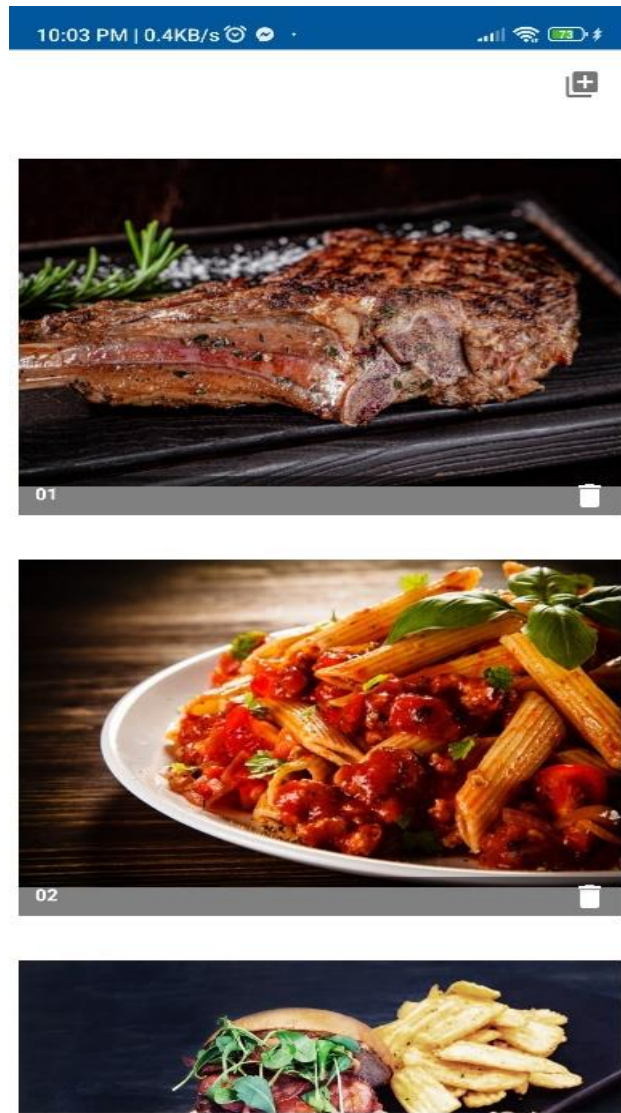


Fig. 5.10 A Screenshot Delete items

In figure 5.11, we can see screen of adding and deleting items.

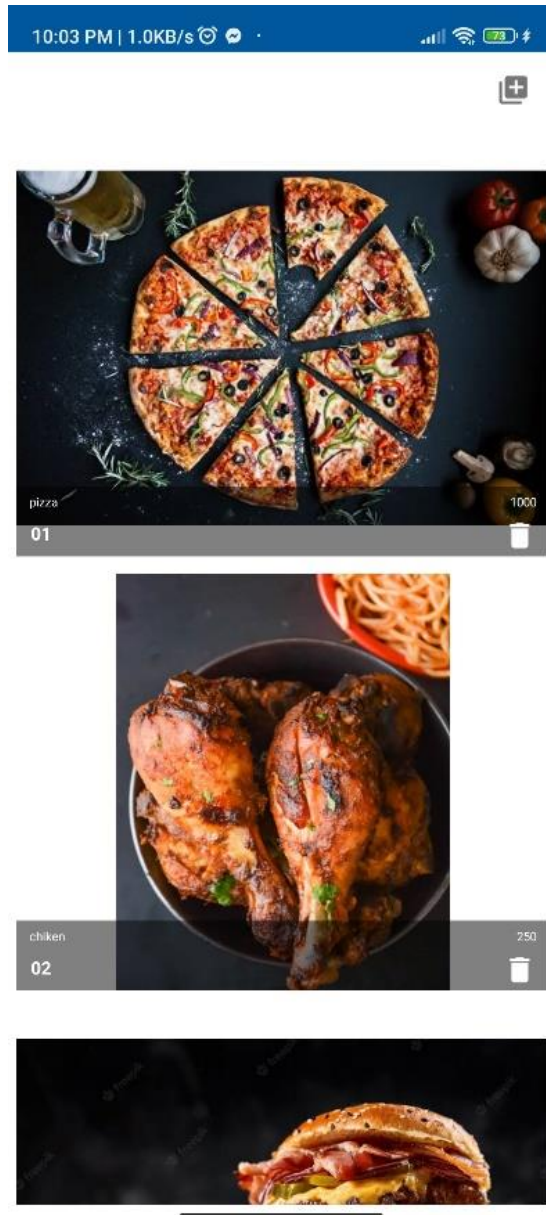


Fig. 5.11 A Screenshot of after adding items

In figure 5.12, Manager, Chef and Waiter can see pending items by notification and also can accept pending orders from here.



Fig. 5.12 A Screenshot of pending items

In figure 5.13, Manager, Chef and Waiter can see Accepted items by notification.

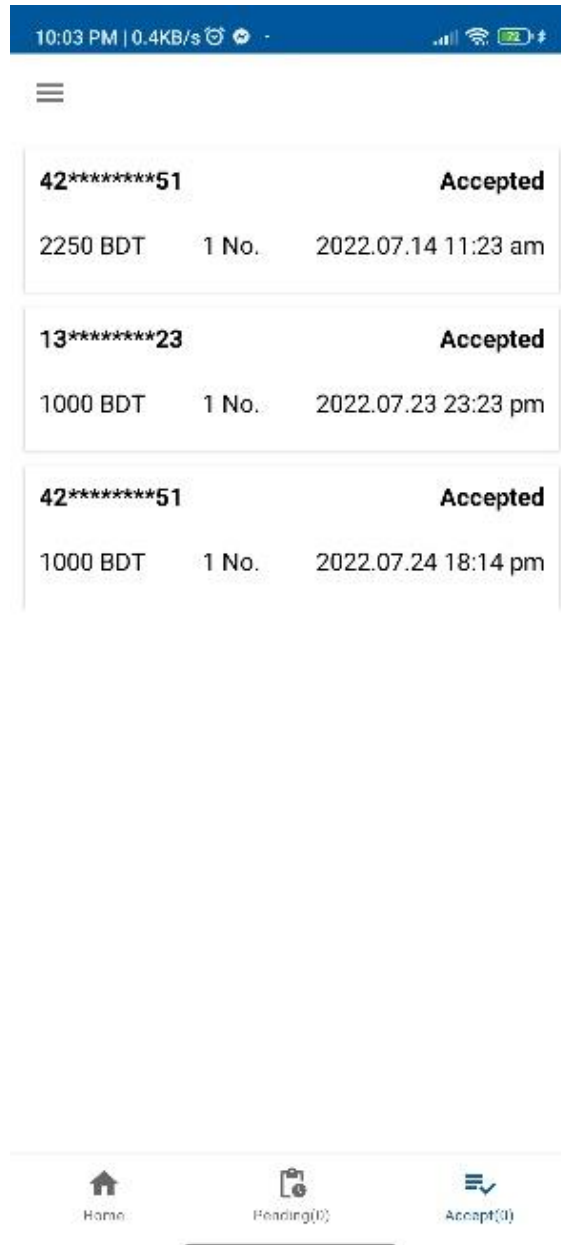


Fig. 5.13 A Screenshot of Accepted items

Customer panel

In figure 5.14, When customer sit in a table, he can see a monitor. In the monitor at first, he will see a dropdown list where customer has to select his table number.

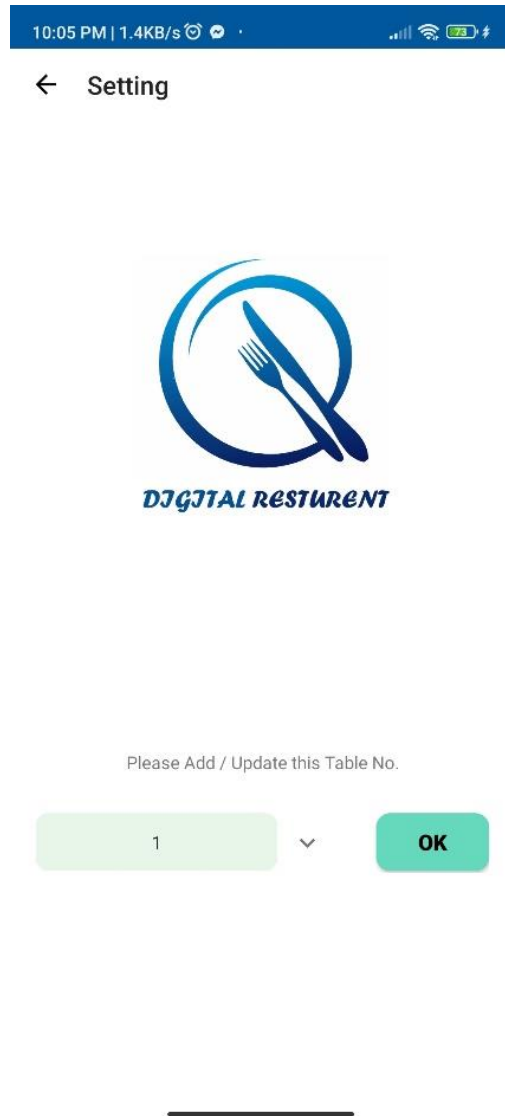


Fig. 5.14 A Screenshot of Select Table Number

In figure 5.15, Customer can see the home page where he can see the menu, regular items and top of the week items. From here he can add items in the cart, add to the favorite items and can order food also.

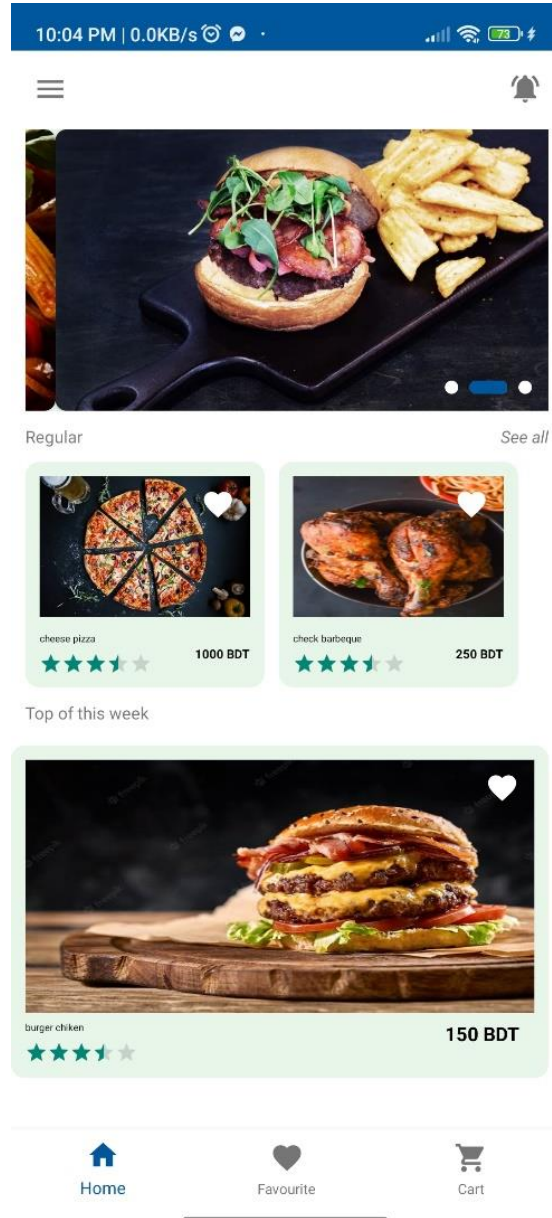


Fig. 5.15 A Screenshot of Home Screen

In figure 5.16, Customer can add item to favorites and remove from favorites.

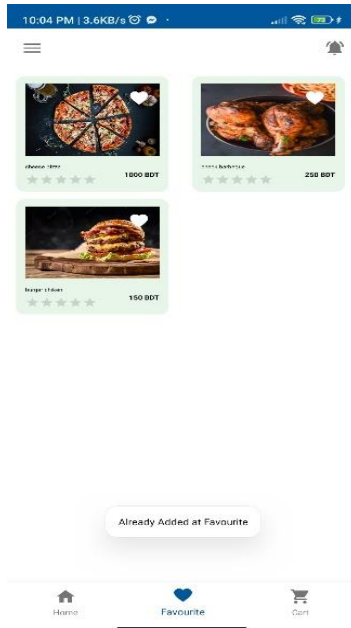


Fig. 5.16 A Screenshot of Favorite Items

In figure 5.17, Customer can add item to cart and remove from cart. Customer can also order food from cart.



Fig. 5.17 A Screenshot of Ad items In Cart

In figure 5.18, Customer can order food from menu. They can select how many foods they can order and they can see the price of the food. He has to complete order by paying first.

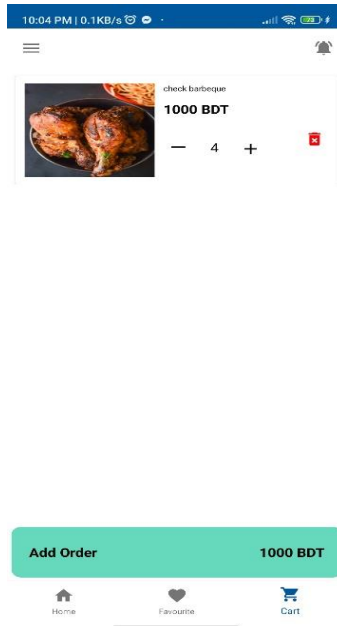


Fig. 5.18 A Screenshot of Food Order

In figure 5.19, Customer has to payment online. They can pay by Master Card, Visa Card, Bkash and Nagad.

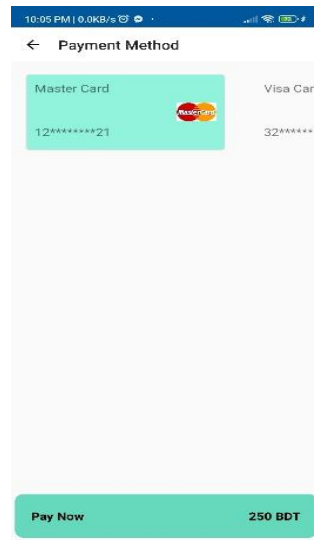


Fig. 5.19 A Screenshot of Payment Method

In figure 5.20, Customer can see in the notification that his order is accepted or pending.

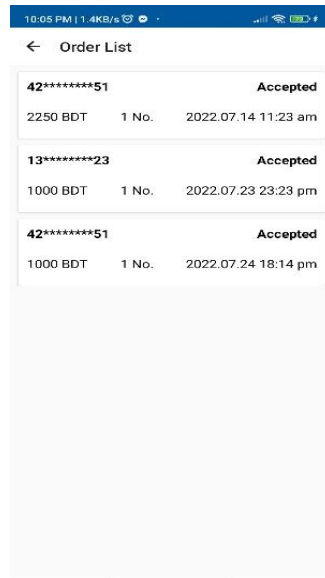


Fig. 5.20 A Screenshot of Accepted and Pending order

In figure 5.21, Customer can see when his order will be complete. After complete eating customer can give a review and if he want he can apply for membership of the restaurant

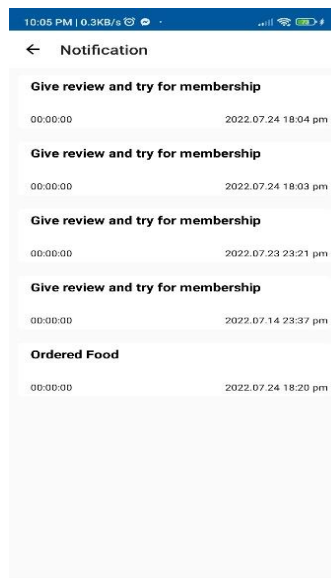


Fig. 5.21 A Screenshot of Review and Apply Membership

5.3 Implementation of Interaction Design

My app has a lot of interactivities. We created a welcoming user interface to provide users of this program with a richer user experience. I utilized an image view, a text button, and a recycler view to simplify things. The UI design of this program is user-friendly.

5.4 Testing Implementation

The tests for this project have been implemented. Testing is crucial for developing a complete, seamless, and error-free system. I basically tested it to find bugs, fix them, and make it easier to use. We'll come up with some unique requirements for this test.

Table 5.1: Testing Objective of our application

01	To check the program is running or not
02	To analysis register work
03	To analysis login is working or not
04	Check OTP sending successfully or not
05	check Admin can upload food successfully or not
06	check file uploaded to firebase successfully or not
07	Explore error of double action
08	check gallery option is working or not
09	check slider view is working or not
10	Explore User can place order
11	Check Payment place successfully
12	Check Admin/Chef/Waiter can logout or not

Table 5.1 contains a summary of these testing criteria. We received real-time user feedback on these requirements. Based on that, we have the results of our tests.

5.5 Test Results and Reports

Table 5.2 displays the test results based on the test cases mentioned in the chapter's preceding section.

Table 5.2: Result of Test Objectives

01	To check the program is running or not	Success
02	To analysis register work	Success
03	To analysis login is working or not	Success
04	Check OTP sending successfully or not	Success
05	check Admin can upload food successfully or not	Success
06	check file uploaded to firebase successfully or not	Success
07	Explore error of double action	Success
08	check gallery option is working or not	Success
09	check slider view is working or not	Success
10	Explore User can place order	Success
11	Check Payment place successfully	Success
12	check Admin/Chef/Waiter can logout or not	Success

CHAPTER 6

CONCLUSION

6.1 Conclusion

In reality, the majority of people in our country face several difficulties when managing restaurants. because the majority of restaurant patrons want outstanding service, and restaurant owners want simple access to excellent service. So, I hope my system will help people to give order, and food reviews and get proper services easily and owners can also provide good services and improve their restaurant management. I made an all-in-one solution which can solve restaurant management problems and easy to use.

6.2 Limitation

1. After completing the order customer can not cancel the order.
2. After completing the order customer can not add any item ,he has to order again.
3. Customer and admin cannot do anything without internet.

6.3 Future Scope

My future goal is to implement this idea in our country and online to help others who want to maintain a proper restaurant system. We want to expand not just our nation but also the world. I'm working very hard to make using and administering this program easier. By using this application, I hope many restaurants of our country can manage all the system easily and customer can get proper services. All our restaurants will be digital to maintain their work one day.

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