# RESTAURANT MANAGEMENT SYSTEM

A PROJECT REPORT for Mini Project-I (K24MCA18P) Session (2024-25)

Submitted by

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# MASTER OF COMPUTER APPLICATION

Under the Supervision of Ms. Divya Singhal Assistant Professor



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**CERTIFICATE** 

Certified that Abhishek Mishra 202420116100008, Anubhav Verma 202410116100036,

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"Restaurant Management System" (Mini Project-I, K24MCA18P) for Master of Computer

Application from Dr. A.P.J. Abdul Kalam Technical University (AKTU) (formerly UPTU),

Lucknow under my supervision. The project report embodies original work, and studies are carried

out by the student himself/herself and the contents of the project report do not form the basis for

the award of any other degree to the candidate or to anybody else from this or any other

University/Institution.

Ms. Divya Singhal Assistant Professor Department of Computer Applications KIET Group of Institutions, Ghaziabad Dr. Arun Kr. Tripathi Dean Department of Computer Applications KIET Group of Institutions, Ghaziabad

#### **ABSTRACT**

The Restaurant Management System is a comprehensive web-based solution designed to streamline and enhance the operational efficiency of restaurants. This system aims to simplify the workflow for waitstaff, enabling them to send orders directly to the kitchen without manual intervention, thereby reducing service time and minimizing errors. From a management perspective, the system provides restaurant managers with real-time access to essential reports, order records, and employee performance data, empowering them to make data-driven decisions. The website offers various functionalities to improve task accuracy and operational speed. It incorporates an online food ordering feature, allowing customers to browse the menu, select dishes, and place orders with ease. The system relies on local storage for data storage and retrieval on the client-side, as no other database is used. Key functionalities include login authentication, search, cart, and checkout, all of which operate using client-side local storage. Payments are processed through a dummy payment system, ensuring that no real financial transactions occur. Secure user authentication is implemented through unique accounts for each customer, safeguarded by user-specific login credentials. This ensures data confidentiality and a more personalized experience.

The RMS also facilitates order tracking and maintains a localized customer database within the client-side storage, enabling restaurants to enhance their food delivery service. By reducing manual effort and optimizing resource utilization, the system significantly improves overall restaurant performance. Through this user-friendly platform, restaurants can achieve higher customer satisfaction, reduce operational bottlenecks, and drive business growth.

#### **Keywords:**

Restaurant Management System, menu management, efficiency, user authentication.

#### **ACKNOWLEDGEMENTS**

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Abhishek Mishra
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# 1. INTRODUCTION

#### 1.1 Overview:

The Restaurant Management System (RMS) is a new generation of restaurant management software. Major activities included in this project are menu management, order placement, table reservations, and bill settlement. When users/customers enter the website, he/she should have an account. If the user does not have an account, the user has to create a new account to order food. To create a new account user should enter a unique username, email, and password. Users fill in his/her address for food delivery. Once the user enters the website, you can see different types of food available in restaurants. First select the category of food from soups, starters, main course dishes, and desserts. After that search for food as your interest, select the food you want to order. After selecting all your meals place your order and confirm your address. Then website will show you various types of payment methods and your total bill amount Overall, it can fit with most innovative and efficient solutions or approaches for handling restaurant workflows to enhance customer satisfaction and supporting business growth.

# 1.2 Key Features:

The RMS includes multiple essential features aimed at improving restaurant operations. These include:

# • Menu and Order Management

The Restaurant Management System allows customers to easily browse the menu and place their orders online. Once an order is made, it is directly sent to the kitchen, making the process faster and more efficient. As staff, we can track the status of each order in real time, which helps us stay updated and make necessary changes if needed. This system reduces confusion, improves communication, and speeds up service for a better overall customer experience

#### • User Authentication

In restaurant management systems, user authentication is important in terms of allowing only authorities to access it; it separates the access based on roles and people. Wherein an administrator is a user who has all the rights and privileges and can manage system activities, a staff member is a user who mainly focuses on customer order processing, and finally, a customer can view a menu and add items to his/her cart for order placement.

### Responsive Design

Responsive design makes this website measure up with each and every other system, be it a desktop, tablet, or smartphone- whether staff or customers are accessing it. The entire layout simply shifts itself according to the screen size, providing a completely smooth user experience, whether managing orders in a restaurant or placing orders as a customer.

# • Dummy Payment System

A dummy payment system has been implemented in the RMS to simulate the process of online payments. This feature provides users with a practical demonstration of how online transactions would work in the final version of the system.

# **FEASIBILITY STUDY**

The feasibility study focuses on the practical aspects of implementing the Restaurant Management System (RMS) in a real-world restaurant environment. Since the current version has limited backend functionality, the system's primary features are menu management, order placement, and a dummy payment system. However, the study highlights the potential for future improvements, such as integrating real-time order processing and enhancing backend functionality. We consider factors like development costs, time for implementation, and the resources required for future expansion.

### 2.1 Technical Feasibility

The technical feasibility assesses whether the project can be successfully implemented using the available technology, tools, and frameworks.

- **Data Persistence**: The RMS relies on local storage for data persistence instead of a dedicated backend, making it lightweight and reducing complexity. Local storage enables the storage of menu items, cart data, and user sessions directly on the client-side.
- **Authentication**: Firebase Authentication is used solely for secure user login, ensuring data privacy and protecting user credentials.
- **Frontend Development**: The system utilizes HTML, CSS, JavaScript, and Bootstrap to create an interactive, responsive, and user-friendly interface. These technologies ensure compatibility across multiple devices and browsers.
- Search and Cart Functionality: Local storage facilitates search and cart functionalities, allowing users to search for menu items and manage their orders in real time.
- Cross-Browser Compatibility: The system is tested to work smoothly on modern web browsers such as Google Chrome, Mozilla Firefox, and Safari.

# 2.2 Economic Feasibility

This subsection evaluates whether the project is cost-effective:

### • Cost of Development:

By using local storage and Firebase (only for authentication), the cost of development is minimized as no server or dedicated backend is required. Open-source frontend technologies (HTML, CSS, JavaScript) further reduce costs.

#### • Resource Allocation:

Since the system operates on local storage, there is no need for server maintenance or additional infrastructure. This results in significant cost savings in terms of server and database expenses.

#### • Return on Investment:

The project's primary focus is to provide a functional, efficient RMS that can later be monetized or scaled up by adding a backend or additional features like cloud-based data storage.

# 2.3 Existing Solutions and Literature

Existing systems primarily rely on complete backends to handle data storage, user authentication, and order management. Systems such as Zomato or Swiggy utilize server-side databases for dynamic updates. Traditional RMS platforms often require a backend database like MySQL, PostgreSQL, or Firebase Firestore for real-time data updates and user interactions.

However, this project takes a unique approach by leveraging local storage for data persistence and Firebase for login authentication only. This strategy eliminates the need for dedicated backend servers while still providing essential functionalities like search, cart, and login.

## 2.4 Gaps in Existing Systems

Despite the availability of comprehensive RMS platforms, several gaps remain:

#### • Backend Dependency:

Most existing systems require a dedicated backend for data storage and synchronization, which increases development time and costs.

#### Overhead and Complexity:

Traditional systems have higher maintenance costs and complexity due to backend integration, whereas this RMS is simple, cost-effective, and easy to maintain.

• Offline Usability: Existing systems rely on internet connectivity to access serverside data, while this RMS allows data persistence through local storage, enabling limited offline functionality.

### This project addresses these gaps by:

- Utilizing local storage for data persistence to avoid the need for a backend database.
- Using Firebase Authentication only for login purposes, ensuring data privacy without the complexity of backend user management.
- Creating a cost-effective and scalable solution that can be expanded in the future to include a backend, if needed.

### 2.5 Social and Practical Feasibility:

### • Impact on Small and Medium-Sized Restaurants

Enables small and medium-sized restaurant owners to manage their business efficiently without incurring the costs of server maintenance. Reduces reliance on third-party platforms like Zomato or Swiggy, enabling restaurants to maintain direct control of their operations.

# Educational Applications

The project serves as a learning platform for students and developers interested in understanding local storage, Firebase authentication, and the integration of essential frontend functionalities.

# Operational Efficiency

Enhances operational efficiency by providing essential features like cart management, order review, and secure login, all managed through local storage.

# Scalability

The system can be enhanced in the future to include a backend, cloud storage, and payment gateways to support more extensive restaurant operations.

### PROJECT OBJECTIVE

The primary objective of the Restaurant Management System is to enhance the efficiency and productivity of restaurant operations by automating various manual tasks. The system is designed to improve both the backend and frontend processes, making it easier for restaurant staff and managers to handle day-to-day activities. The main objectives of the RMS are:

- Improve Customer Ordering Process: The system provides an intuitive interface for customers to view the menu, place orders, and make payments seamlessly.
- Order Management: the RMS ensures that staff can efficiently manage and fulfill customer orders. This feature helps reduce delays and ensures better communication between the kitchen and front-of-house staff.
- Provide a Secure and Scalable Platform: The RMS is designed with user authentication
  features, ensuring secure access for staff and customers. It offers a scalable solution
  that can grow with the restaurant, accommodating increased customer traffic, larger
  menus, and more complex operations as the business expands.

# 3.1 Key Objectives:

## **➤** User-Friendly Ordering Experience:

- Design an intuitive and seamless ordering system for users to browse the menu, select items, and customize orders easily.
- Implement a clear and straightforward cart system to manage selected items and facilitate quick checkouts.
- Optimize the interface for users of all age groups and technical backgrounds, ensuring an accessible and engaging user experience.

# > Efficient Order Management:

- Develop an efficient system for restaurant staff to manage orders in real time, ensuring smooth order processing and delivery.
- Allow for order modifications and cancellations in case of changes or customer requests.
- Provide users with notifications and updates regarding their order status (e.g., confirmation, preparation, out-for-delivery).

### Real-Time Search and Filter Functionality:

- Implement a robust search bar that allows users to search for specific dishes or menu items with high accuracy and speed.
- Provide filter options (e.g., by cuisine, dietary preferences) to help users narrow down their choices and find dishes quickly.

### **Reservation System:**

- Enable users to easily make and manage table reservations for dine-in services,
   reducing wait times and improving customer satisfaction.
- Ensure real-time availability of tables and allow users to customize their reservation based on seating preferences, number of guests, and time slots.

#### > User Authentication:

• Implement a secure user login system using Firebase.

#### **Cost-Effective and Scalable Solution:**

- Utilize local storage for data management, ensuring smooth functionality without the need for a backend.
- Design the RMS architecture to be scalable, allowing for future integration of new features such as loyalty programs, promotional offers, and additional payment gateways.

# 3.2 Broader Objectives

## > Enhancement of Dining Experience:

• Develop a user-centric platform that enhances the overall dining experience, from discovering menu items to placing orders and making reservations.

# > Efficient Restaurant Operations:

 Streamline the management of orders and reservations for restaurant staff, improving operational efficiency and customer service.

# > Accessibility and Inclusivity:

- Ensure that the system is accessible on multiple devices (e.g., desktops, tablets, smartphones) for a broader range of users.
- Provide multi-language support to accommodate diverse customer bases,
   making the platform inclusive for all.

#### > Scalable Business Growth:

- Build a scalable solution that can easily accommodate growing customer bases and additional restaurants in the future.
- Enable easy integration with third-party tools and services (e.g., payment gateways, marketing tools, delivery services).

### > Real-World Impact:

 Improve the accessibility and convenience of restaurant services, allowing customers to place orders easily, make reservations, and access exclusive offers.

### 3.3 Measurable Outcomes

### > Order Accuracy:

 Achieve high accuracy in processing customer orders, ensuring that orders are correctly reflected in the cart and passed to the local store without errors.

# > Platform Accessibility:

 Ensure the RMS website is fully functional across all modern devices (desktops, tablets, smartphones) and browsers (Chrome, Firefox, Safari).

# HARDWARE AND SOFTWARE REQUIREMENTS

To successfully implement and operate the Restaurant Management System (RMS), a combination of essential hardware and software components is required. These specifications ensure the system runs efficiently, offering smooth user interaction, real-time data management, and the ability to scale up as needed.

#### 4.1 Hardware Requirements:

The hardware components needed for both the server-side and client-side operation of the system are outlined below. These are necessary to support the smooth operation of the RMS, from running the application to handling orders and customer interactions.

- **Processor**: A dual-core processor, such as the **Intel i3** or its equivalent, is sufficient for the server-side operations. This ensures that the system can handle basic data processing, communication between clients, and interaction with the database efficiently.
- RAM: A minimum of 8 GB RAM is essential for smooth operation of the backend processes. This memory will support the running of the real-time database and the multiple tasks handled by the RMS server.
- **Storage**: The system should use a 100 GB SSD (Solid-State Drive) to provide fast access to data. The faster read and write speeds of SSDs compared to traditional hard drives allow quick processing of orders and management of customer information.
- Network: A stable Ethernet connection or Wi-Fi is required for reliable internet connectivity. This ensures seamless communication between the server and client devices, facilitating real-time order updates and system interactions.
- **Display**: Devices should have a screen resolution of at least 1366 x 768 pixels to ensure that the RMS interface is displayed clearly and effectively. This is crucial for viewing and interacting with the system's menus, orders, and reports.

#### **4.2 Software Requirements**

To implement the RMS, specific software tools and technologies are used. These tools allow the development, operation, and management of the system, ensuring that it meets all functional and performance requirements.

# **Operating System:**

The system will operate efficiently on Windows 10/11, Ubuntu Linux, or macOS or a more recent version, which provides the stability, compatibility, and security necessary to run the RMS without issues.

### **Frontend Development Tools:**

- HTML5, CSS3, and JavaScript: Core technologies to design a user-friendly and responsive user interface.
- Bootstrap: A front-end framework to ensure a clean and responsive design.

### **Storage:**

• LocalStorage: For storing user data (e.g., order history, cart items) and session information directly in the browser without the need for a backend.

### **Development Environment:**

• Visual Studio Code: A versatile code editor for development.

#### **Version Control:**

• GitHub or GitLab: Hosting repositories and collaborating with team members.

# **Browser Support:**

• Google Chrome, Mozilla Firefox, or any modern web browser for running and testing the frontend application.

# **Payment Integration (for Dummy Payments):**

 Dummy Payment Gateway API: To simulate payment processes during the checkout procedure (for testing purposes).

# **PROJECT FLOW**

# **5.1 Sequence Diagram for Login Process:**

The Sequence Diagram for Login shows the step-bystep interaction between the user, browser, and system during the login process. It demonstrates how login credentials are verified and how access is granted.

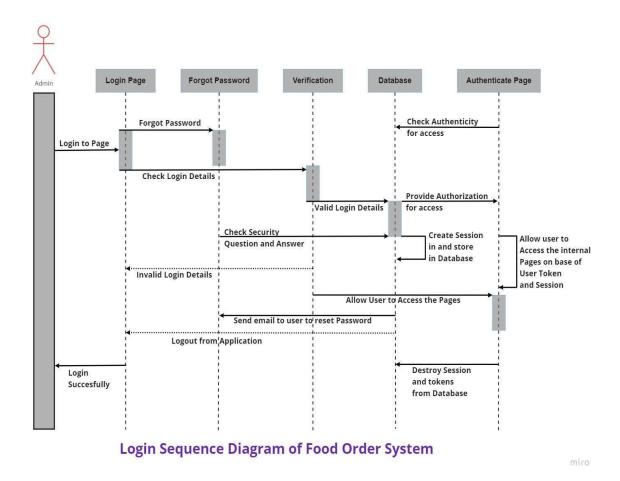


Figure 1: Sequence Diagram for User Login Process in RMS

### 5.2 Activity Diagram:

#### 1. User Login Activity Diagram

Purpose: To visualize the steps a user follows to log in.

Actors: User, System, Database

#### **Activity Flow:**

- 1. Start
- 2. User enters Email and Password
- 3. System validates input
- If incorrect, error message is displayed and the user re-enters details.
- If correct, system checks credentials in the User Database.
- 4. If user exists and credentials match, Access is granted.
- 5. User is redirected to the Dashboard.
- 6. End

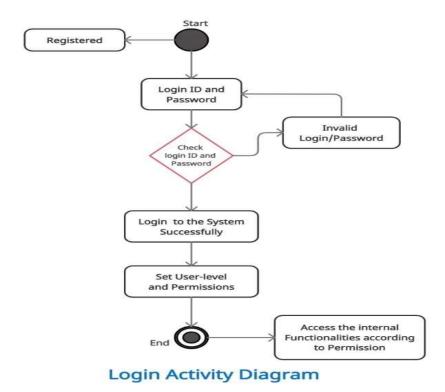


Figure 2: Activity Diagram for User Login Process in RMS

# 5.4 Project Flowchart and Algorithm:

- o Start
- User Login → If successful → Dashboard
- Dashboard
- View Menu → Add Items to Cart
- Search Menu → Search Items → Add to Cart
- View Cart → Proceed to Checkout
- Logout  $\rightarrow$  End
- Checkout → Confirm Order → Dummy Payment
- Order Confirmation
- Logout  $\rightarrow$  End

# Algorithm:

- Login: Authenticate user credentials.
- Display Dashboard: Show options like View Menu, Search Menu, View Cart, Logout.
- View Menu/Search Menu: Browse or search menu items and add selected items to the cart.
- Checkout: Display cart details and confirm the order.
- Payment: Simulate payment process (dummy payment).
- Order Confirmation: Display confirmation message.
- Logout: End user session and return to login screen.

# Project Flow for Restaurant Management System (RMS)

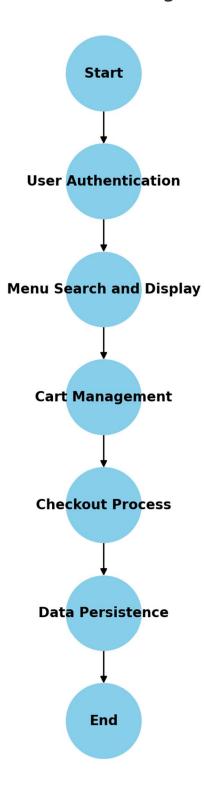


Figure 3: Flowchart

### PROJECT OUTCOME

The primary goal of the Restaurant Management System (RMS) project is to develop a fully functional and user-friendly web application designed to enhance the overall operations of a restaurant. The system aims to automate critical tasks, such as order management, billing, and reservations, By implementing features like user authentication, and easy-to-use interfaces for both customers and staff.

### **6.1 KEY OUTCOMES**

### **Login Authentication:**

The system ensures secure access for users by implementing a login authentication feature using Firebase Authentication. Each user is required to create an account with unique credentials.

# **Search Functionality:**

The RMS includes a powerful search feature that allows users to quickly locate menu items. The search functionality makes it easy to filter and access the desired items in real time.

# Cart System:

Users can add multiple items to a cart as they browse through the menu. The cart system allows users to view, edit, and remove items before finalizing their orders. This functionality mimics modern e-commerce platforms, ensuring familiarity and convenience for users.

#### **Checkout Process:**

The checkout process offers users a seamless method to review their order, select a payment option, and complete the transaction. The system supports dummy payments.

### **Dummy Payment System:**

Payments are simulated through a dummy payment system, ensuring that no real financial transactions occur.

### **6.2 USER INTERFACE**

### **Home Page:**

The Home Page serves as the central hub for users visiting the restaurant's website. It offers a clean, intuitive layout that highlights the restaurant's key offerings, such as menu items, popular dishes, and daily specials. The main goal of this page is to capture the user's attention immediately and direct them to various features of the site. Key elements on this page include:

- **Restaurant Overview:** A brief description of the restaurant's ambiance, cuisine, and mission statement, making the site more engaging and establishing trust with potential customers.
- **Navigation to Key Features:** Easy access to other sections like the menu, reservation system, and special offers.
- **Visual Appeal:** High-quality images of popular dishes or a rotating carousel of current promotions.

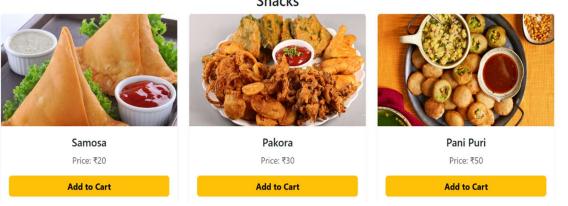


# **Categories Section:**



# **Our Popular Categories**

#### **Snacks**

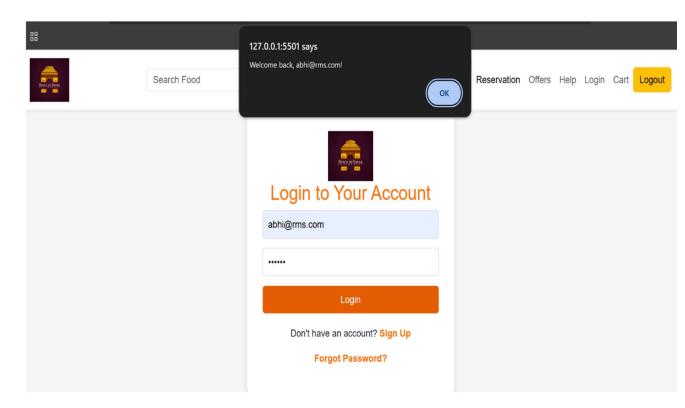


### Login:

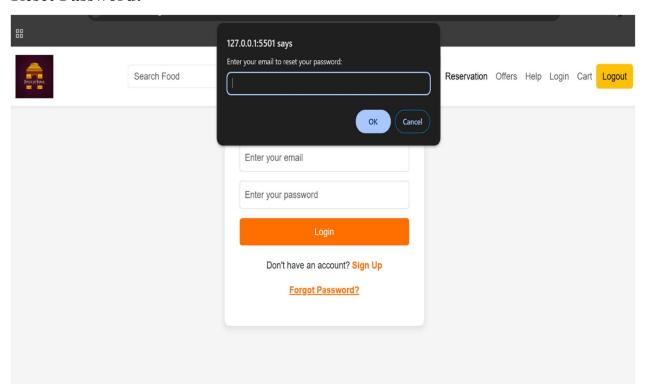
The Login section is a critical part of user authentication, enabling users to access personalized features and manage their account information. This feature uses Firebase Authentication to ensure the highest levels of security and data protection. Key details of this section include:

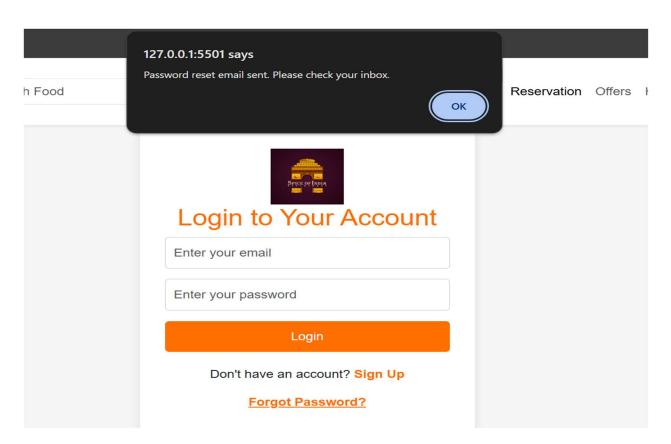
- **Secure Login:** Users can log in using their email and password or social media accounts, depending on the available authentication methods integrated with Firebase.
- **Security:** Firebase ensures the protection of user data, and the login process adheres to best practices in security, such as encrypted passwords and secure authentication tokens.
- Forgot Password Option: A simple way for users to reset their passwords if they forget their credentials.

### Login and Signup:



### **Reset Password:**



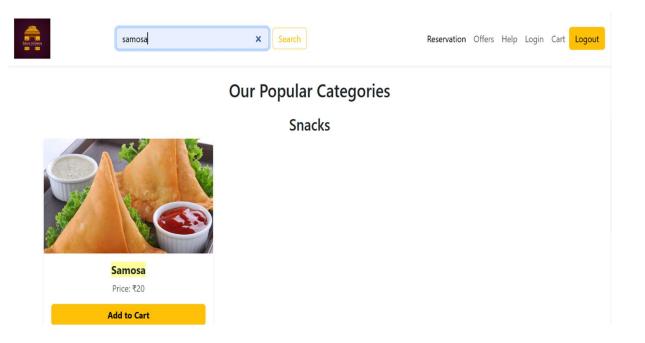


#### Search Bar:

The Search Bar is an essential feature that streamlines the browsing process, allowing users to quickly find specific dishes or menu items. This section enhances the user experience by making navigation more efficient. Features include:

- **Keyword Search:** Users can type keywords, dish names, or ingredients to search the menu for relevant items.
- **Auto-suggestions:** As users type, the search bar may provide auto-suggestions, making it easier for users to find exactly what they're looking for without needing to type the full name of the dish.
- **Filtering:** The search bar can integrate with filters (e.g., dietary preferences, cuisines) to help users narrow down results based on their preferences.

#### Search:

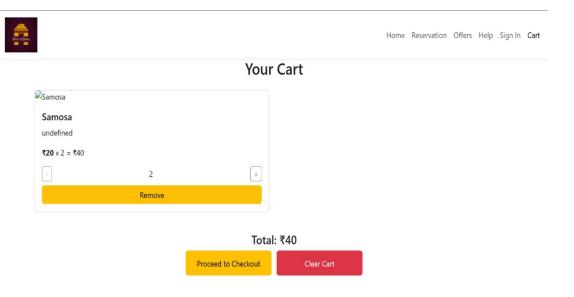


#### Cart:

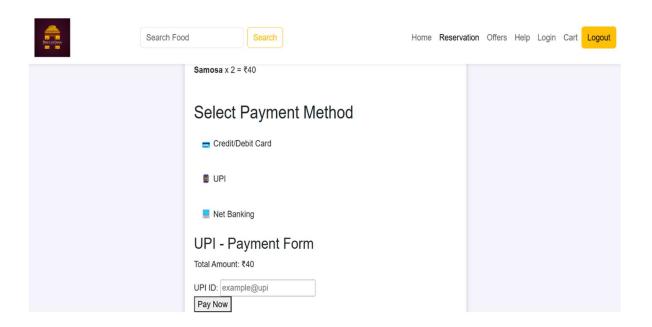
The Cart section allows users to manage the items they plan to order. It acts as a shopping cart for the restaurant's offerings, with the ability to review, or modify selections before proceeding to checkout. Features include:

- Cart Icon: A prominent icon on the page displays the total number of items currently added to the cart, making it easy for users to track their selections at all times.
- Order Review: When clicked, the cart icon opens a summary of the user's selected items, including quantities, prices, and any customizations or special requests.
- **Modifications:** Users can modify their cart by adding or removing items, updating quantities.
- **Proceed to Checkout:** The cart section also provides a direct link to the checkout page, where users can confirm their order and finalize the transaction.

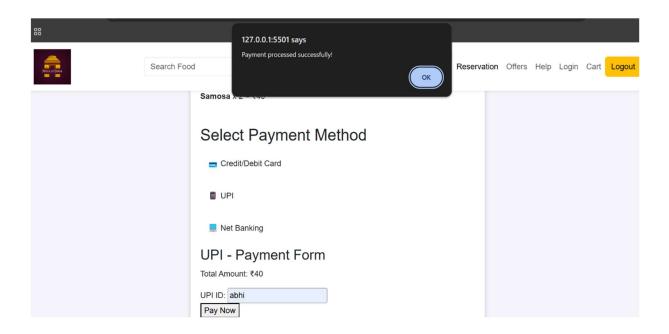
#### Cart:



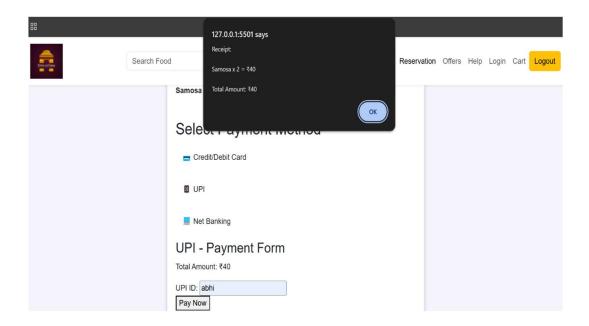
### **Checkout:**



# **Completion:**



### **Receipt:**



### Logout:

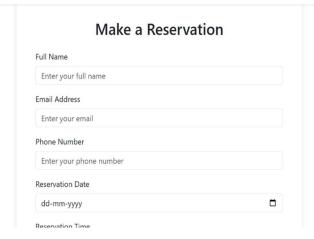
The Logout option is a simple but important feature that ensures user privacy and security. With just one click, users can log out of their accounts, preventing unauthorized access. Details include:

- Easy Access: The logout button is placed in a clear, accessible location (in the top-right corner of the page).
- **Session Termination:** Upon clicking, the system terminates the active session and redirects the user to the login page.

# **Reservation Page:**

The Reservation feature enables users to book tables in advance, which can enhance their dining experience by reducing wait times.





### **References:**

Following links and websites were referred during the development of this project:

- <u>Bootstrap Documentation</u> For responsive design and UI components.
- <u>Firebase Documentation</u> For real-time database and user authentication services.
- <u>Stack Overflow Community</u> For solving coding challenges and getting developer insights.
- <u>MDN Web Docs</u> For HTML, CSS, JavaScript, and web development best practices.
- <u>W3Schools</u> For tutorials and examples on web technologies like HTML,
   CSS, and JavaScript.
- <u>Visual Studio Code</u> For the development environment and code editing.