Restaurant Management System

A Project Report Submitted

to

MANIPAL ACADEMY OF HIGHER EDUCATION

For Partial Fulfillment of the Requirement for the

Award of the Degree

Of

Bachelor of Technology

in

Computer and Communication Engineering

by

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A Constituent Unit of MAHE, Manipal

March 2024

ABSTRACT

The Restaurant Management Software (RMS) is designed to reduce the difficulty of operational dynamics of restaurants. With a focus on automation, efficiency, and enhanced customer service, RMS offers a robust platform for managing all aspects of restaurant operations.

Key features of RMS include menu management, order processing, table allocation,. Administrators can effortlessly configure menus, and oversee employee activities through a user-friendly interface.

Servers benefit from streamlined order-taking processes, table reservations, and seamless payment processing, while kitchen staff efficiently manage orders and monitor inventory levels.

RMS is its secure login form, ensuring data integrity and access control. Users authenticate themselves using unique credentials, gaining access to functionalities based on assigned roles and permissions.

The Restaurant Management System consists of multiple users, including administrators, servers, and kitchen staff. Administrators have the authority to manage the system, including setting up menus, adding or removing dishes, and managing employee accounts. Servers utilize the system to take customer orders, manage table reservations. Kitchen staff use the system to view incoming orders, prepare dishes, and update inventory levels.

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List of Tables

category(catID, catName)

tables(tid, tname)

staff(staffID, sName, sPhone, sRole)

tblMain(MainID, aDate, Time, TableID, WaiterID, status, orderType, total, received, change)

tblDetails (DetailID, MainID, proID, qty, price, amount)

users(userID, username, upass, uName , uphone)

products (pID, pName, pPrice , CategoryID, pImage)

List of Figures

Chapter 1

Introduction

The objective of the **‘Restaurant Management Software’** operations of a restaurant by automating processes of order, tracking, table reservations and billing. The software aims to improve service, and provide a user-friendly interface for restaurant staff.

Restaurant Management Software has restaurant activities, including menu management, order processing, table allocation,. The software is designed to the needs of restaurant managers, servers, and kitchen staff, offering functionalities to track, manage customer orders, and generate reports on sales and expenses.

The System consists of multiple users, including administrators, servers, and kitchen staff. Administrators have the authority to manage the system, including setting up menus, adding or removing dishes, and managing employee accounts. Servers utilize the system to take customer orders, manage table reservations. Kitchen staff use the system to view incoming orders, prepare dishes, and update inventory levels.

The system includes a secure login form to ensure access control and data security. Users are required to enter valid credentials, such as a username and password, to access the system

The Restaurant Management Software aims to streamline restaurant operations through automation.

- Its primary objectives include improving service efficiency and providing a user-friendly interface.

- The software's scope encompasses order processing, tracking, table reservations, and billing automation.

- Designed to meet the needs of restaurant managers, servers, and kitchen staff.

- Seeks to replace manual processes with automated, digital solutions.

- Intended to increase productivity and reduce errors in restaurant operations.

- Supports the growth and scalability of restaurant businesses.

- Promotes data-driven decision-making through comprehensive reporting capabilities.

- Aims to stay aligned with industry standards and best practices in restaurant management.

Chapter 2

Literature Survey

Literature Survey for Restaurant Management Systems (RMS)

Introduction:

Restaurant Management Systems (RMS) play a crucial role in streamlining restaurant operations, enhancing customer experiences, and improving overall efficiency.

A Restaurant Management System is software designed specifically for the foodservice industry. Unlike traditional point-of-sale (POS) systems, RMS encompasses all back-end needs.

Point of Sale (POS): RMS includes POS functionality, allowing restaurants to capture transactions accurately. It simplifies order taking, billing, and payment processing.

Inventory Management: Efficient inventory management is critical for restaurants. RMS helps track stock levels, manage ingredients, and prevent wastage.

Staff Management: From employee scheduling to payroll processing, RMS handles various aspects of staff management. It ensures smooth coordination among servers, chefs, and other team members. Menu Customization: RMS allows restaurants to create and modify menus easily. It provides flexibility for adding new dishes, updating prices, and managing seasonal offerings. Table Management: Restaurants can optimize table assignments, track reservations, and manage waitlists using RMS. It ensures efficient seating and minimizes customer wait times. Reporting and Analytics: RMS generates reports on sales, inventory, and customer preferences. These insights help restaurants make informed decisions.

Evolution of Restaurant Management Systems

Over the years, RMS has evolved significantly. Let’s explore key milestones:

E-Menus: Digital menus (e-menus) have revolutionized the ordering process. Customers now have access to detailed information about menu items, including images, ingredients, and dietary information. E-menus enhance the dining experience and reduce ordering errors.

Real-Time Engagement: With digital tablets and touchscreens, menus have become interactive. Customers can place accurate orders associated with specific seats, customize dishes, and view real-time pricing.

Recommendation Algorithms: RMS can suggest dishes based on previous orders, making it easier for customers to explore new options. Personalized recommendations enhance customer satisfaction. Online Ordering Platforms: Many RMS platforms now offer online food ordering. Customers can browse menus, select items, and track their orders from the comfort of their homes.

Chapter 3

Problem Statement

In today's world , business environment, organizations are constantly exposed to a multitude of risks that have the potential to impact their operations, reputation, and financial performance.

Integrate Risk Management into Business Processes: Embed risk management practices into existing business processes and operations to facilitate proactive risk identification, mitigation, and response, aligning risk management activities with organizational objectives.

Automate Risk Reporting and Monitoring: Implement automated reporting and monitoring mechanisms to facilitate real-time tracking of key risk indicators (KRIs), trigger alerts for potential risk events, and generate actionable insights for risk management decision-making.

Ensure Regulatory Compliance: Ensure that the RMS complies with relevant regulatory requirements and industry standards, enabling the organization to address regulatory obligations and demonstrate adherence to risk management best practices.

Promote a Risk-aware Culture: Foster a risk-aware culture within the organization by providing training and awareness programs on risk management principles, encouraging proactive risk identification and reporting at all levels.

Therefore, there is a critical need to develop a comprehensive Risk Management System (RMS) that addresses these challenges and enables organizations to proactively identify, assess, mitigate, and monitor risks in a systematic and integrated manner.

By addressing these objectives and developing an effective RMS, organizations can strengthen their resilience to risks, enhance stakeholder confidence, and achieve sustainable business success in an increasingly complex and uncertain operating environment

Chapter 4

Database Design

ER Diagram

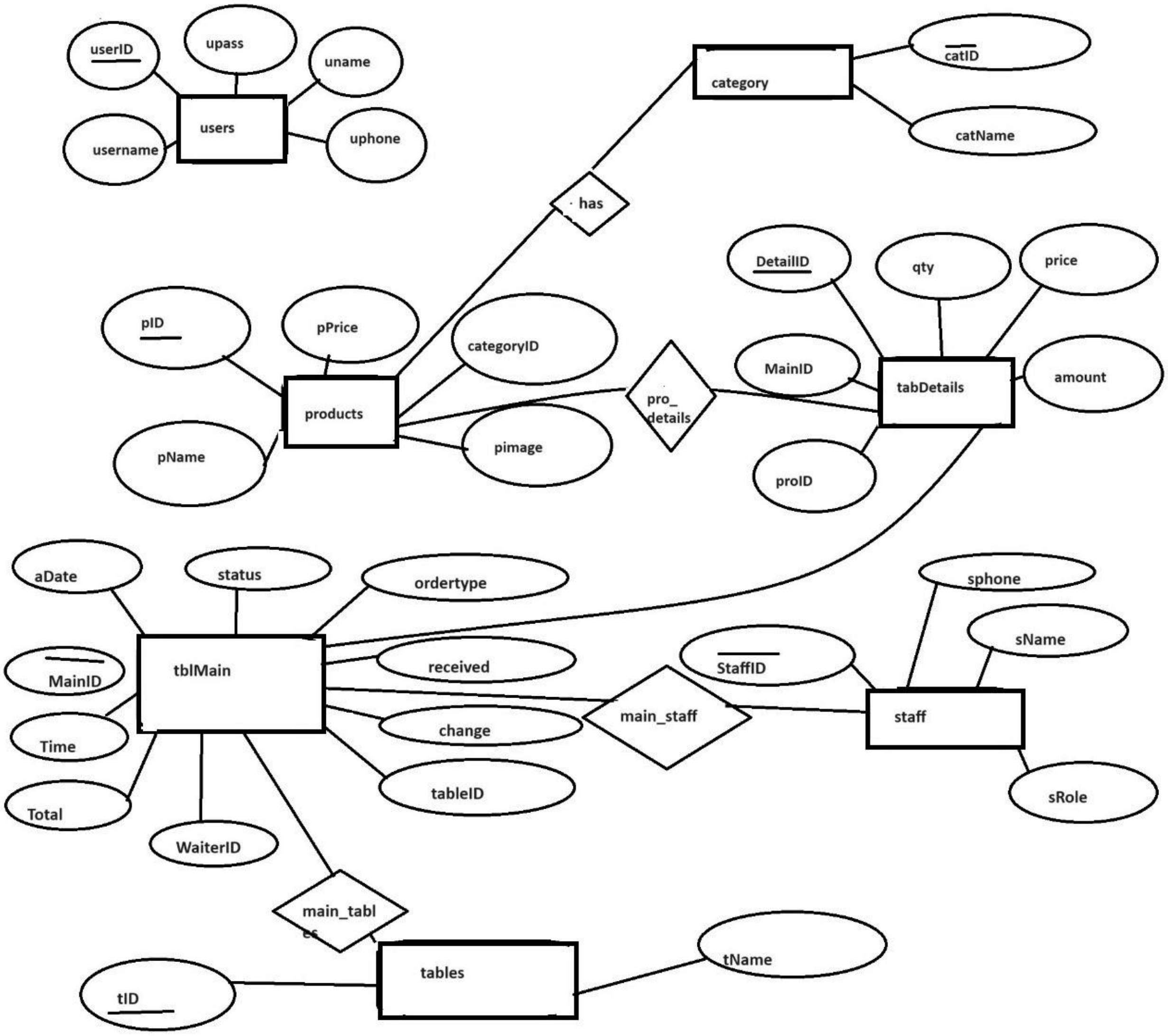


Figure 1: ER Diagram for restaurant management system (RMS)

Schema

category(catID, catName)

tables(tid, tname)

staff(staffID, sName, sPhone, sRole)

tblMain(MainID, aDate, Time, TableID, WaiterID, status, orderType, total, received, change)

tblDetails (DetailID, MainID, proID, qty, price, amoun)

users(userID, username, upass, uName , uphone)

products (pID, pName, pPrice , CategoryID, pImage)

Schema Diagram

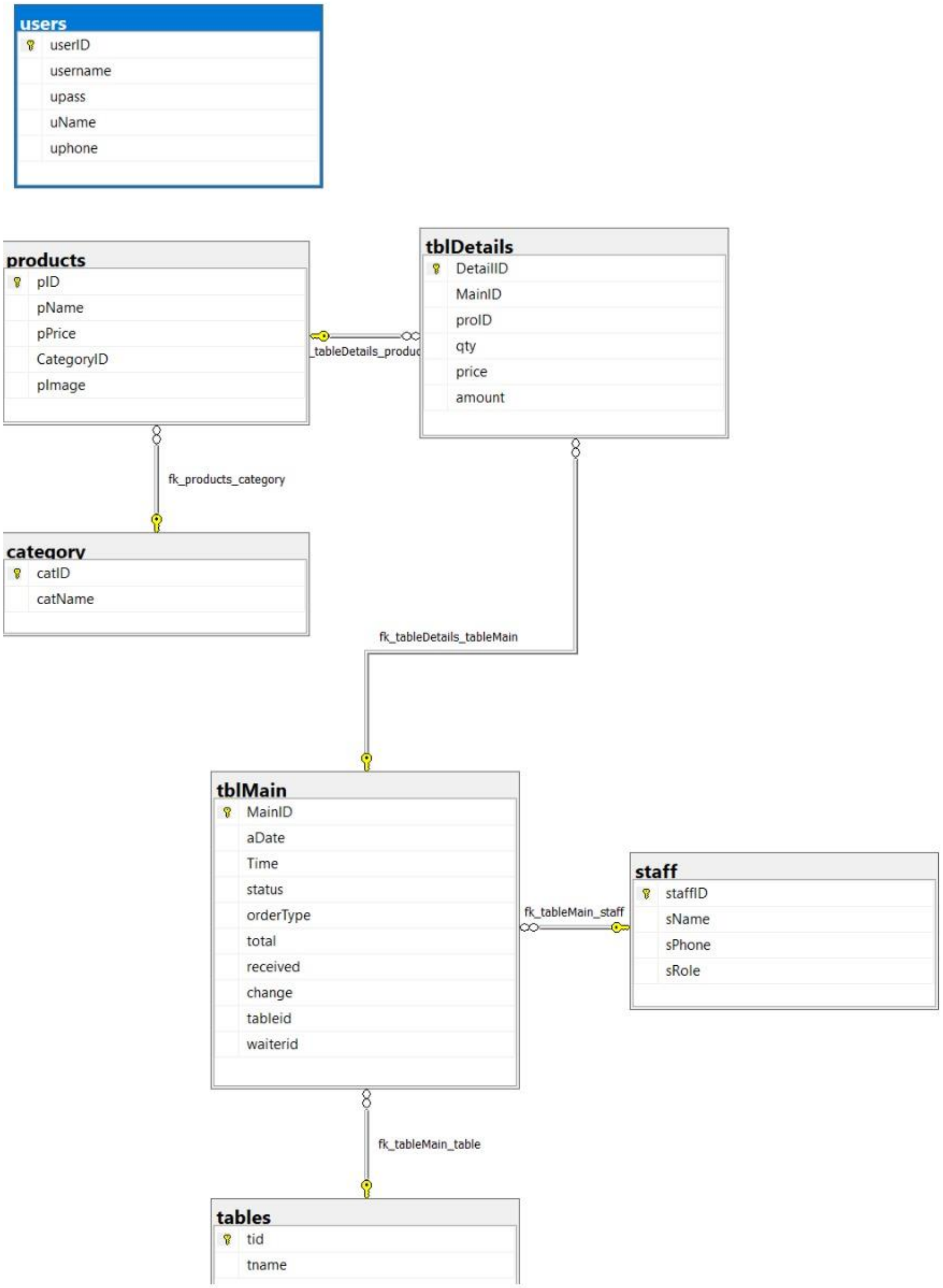


Figure 2: Schema Diagram for restaurant management system (RMS)

Functional Dependencies

Users:

userID -> username, upass, uname, uphone

username -> userID

uname -> userID

uphone -> userID

Category:

catID -> catName

catName -> catID

Tables:

tid -> tname

tname -> tid

Staff:

staffID -> sName, sPhone, sRole

sName -> staffID

sPhone -> staffID

sRole -> staffID

Products:

pID -> pName, pPrice, CategoryID, pImage

pName -> pID

CategoryID -> pID

pImage -> pID

tblMain:

MainID -> aDate, Time, TableName, WaiterName, status, orderType, total, received, change, tableid, waiterid

aDate, Time, TableName, WaiterName, status, orderType, total, received, change, tableid, waiterid -> MainID

tableid -> MainID

waiterid -> MainID

tblDetails:

DetailID -> MainID, proID, qty, price, amount

MainID, proID -> DetailID

qty, price, amount -> DetailID

Foreign Key Dependencies:

tableid -> tid (tblMain references Tables)

waiterid -> staffID (tblMain references Staff)

MainID -> MainID (tblDetails references tblMain)

proID -> pID (tblDetails references Products)

CategoryID -> catID (Products references Category)

1. First Normal Form (1NF)

Each cell contains atomic (indivisible) values.

There is a primary key for identification.

No duplicated rows or columns.

2. Second Normal Form (2NF)

To achieve 2NF, we need to ensure that all non-key attributes are fully functionally dependent on the entire primary key.

category Table:

The catID is the primary key, and catName depends entirely on it.

No partial dependencies exist.

The table is already in 2NF.

tables Table:

The tid is the primary key, and tname depends entirely on it.

No partial dependencies exist.

The table is already in 2NF.

staff Table:

The staffID is the primary key, and all other attributes (sName, sPhone, sRole) depend entirely on it.

No partial dependencies exist.

The table is already in 2NF.

products Table:

The pID is the primary key, and all other attributes (pName, pPrice, CategoryID, pImage) depend entirely on it.

No partial dependencies exist.

The table is already in 2NF.

tblMain Table:

The MainID is the primary key, and all other attributes (aDate, Time, TblID, WaiterID, status, orderType, total, received, change) depend entirely on it.

No partial dependencies exist.

The table is already in 2NF.

tblDetails Table:

The DetailID is the primary key, and all other attributes (MainID, proID, qty, price, amount) depend entirely on it.

No partial dependencies exist.

The table is already in 2NF.

3. **Third Normal Form (3NF)**

To achieve 3NF, we need to eliminate transitive dependencies.

category Table:

No transitive dependencies exist.

The table is already in 3NF.

tables Table:

No transitive dependencies exist.

The table is already in 3NF.

staff Table:

No transitive dependencies exist.

The table is already in 3NF.

products Table:

No transitive dependencies exist.

The table is already in 3NF.

tblMain Table:

No transitive dependencies exist.

The table is already in 3NF.

tblDetails Table:

No transitive dependencies exist.

The table is already in 3NF.

Conclusion

All the given tables are already in 1NF, 2NF, and 3NF. No further normalization is required.

First Normal Form (1NF): The given tables are already in 1NF because they satisfy the criteria:

Each cell contains atomic (indivisible) values.

There is a primary key for identification.

No duplicated rows or columns.

Second Normal Form (2NF): To achieve 2NF, we need to ensure that all non key attributes are fully functionally dependent on the entire primary key. All the tables are already in 2NF as there are no partial dependencies.

Third Normal Form (3NF): To achieve 3NF, we need to eliminate transitive dependencies. All the tables are already in 3NF as there are no transitive dependencies.

Conclusion: All the given tables are already in 1NF, 2NF, and 3NF.

Chapter 4

Results

Improved Operational Efficiency:

The RMS automates various restaurant processes, such as order management, table reservations, and billing, leading to smoother operations and reduced manual errors.

Enhanced Service Quality: With features like quick order processing, efficient table allocation, and streamlined communication between servers and kitchen staff, the RMS ensures faster service delivery and better customer satisfaction.

Optimized Resource Utilization: By providing real-time updates on inventory levels, the RMS helps kitchen staff plan and manage ingredient usage effectively, minimizing waste and optimizing resource utilization.

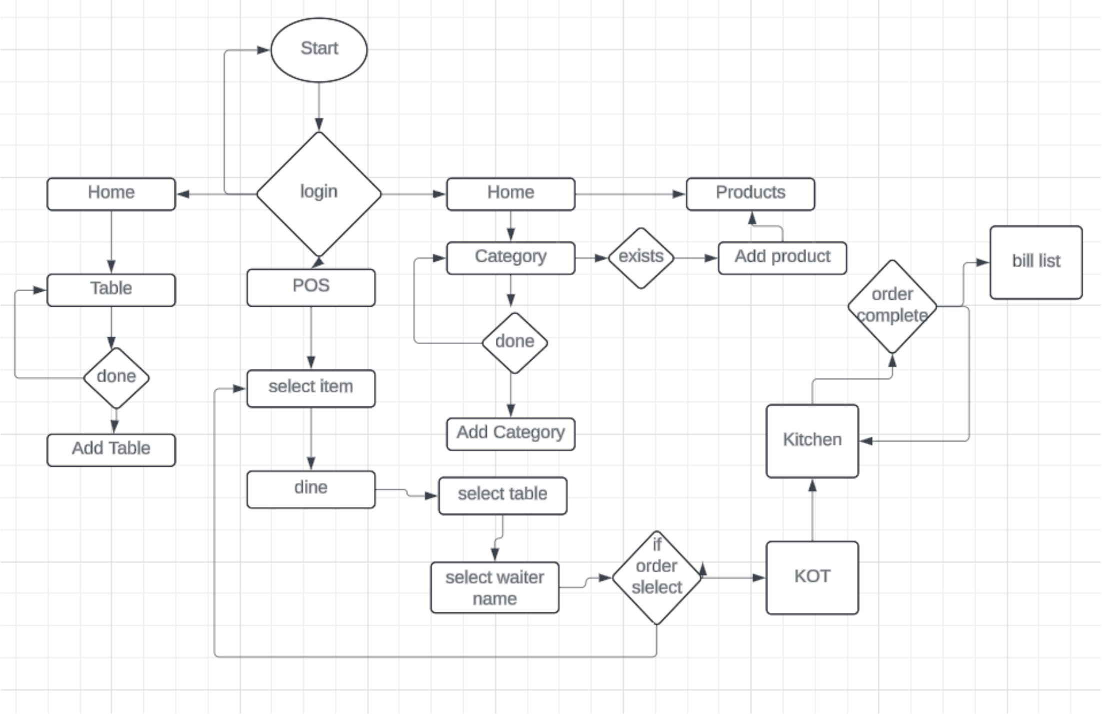
Increased Revenue: The system's ability to generate detailed financial reports allows restaurant managers to gain insights into sales trends, identify high-performing menu items, and make data-driven decisions to boost revenue.

Improved Employee Productivity: With user-friendly interfaces tailored to specific roles, the RMS simplifies tasks for restaurant staff, reducing training time and enabling them to focus on delivering exceptional service.

Enhanced Data Security: The secure login mechanism and access control features ensure that sensitive data, such as users information and financial records, remains protected from unauthorized access.

Chapter 5

Methodology



5.1 Implementation Approach for RMS:

Requirement Gathering and Analysis:

Collaborate with stakeholders including restaurant managers, servers, and kitchen staff to gather and analyze requirements.

Document functional and non-functional requirements to define the scope of the project and set clear objectives.

Database Design:

Design the database schema using Microsoft SQL Server Management Studio (SSMS) or a similar tool.

Define tables for entities such as users, products, orders, tables, and staff.

Establish relationships between tables, including primary and foreign keys, to ensure data integrity.

Optimize the database schema for efficient storage and retrieval of data.

Frontend Development with C#:

Utilize C# with ASP.NET MVC or ASP.NET Core for frontend development.

Design user interfaces using HTML, CSS, and JavaScript, leveraging C# Razor syntax for server-side rendering.

Implement responsive and intuitive UI components using frontend frameworks or libraries such as Bootstrap or Material Design,Guna frame wiorks.

Backend Development with C#:

Develop the backend logic of the RMS using C# and the .NET framework.

Implement RESTful APIs or server-side endpoints to handle requests from the frontend.

Write business logic in C# to manage user authentication, menu management, order processing, and inventory management.

Integrate with the Microsoft SQL Server database using Entity Framework or ADO.NET for data access.

Database Integration:

Connect the backend application to the Microsoft SQL Server database using connection strings and database drivers.

Perform CRUD (Create, Read, Update, Delete) operations on the database using SQL queries or ORM (Object-Relational Mapping) frameworks.

Design Libraries Integration:

Select design libraries or frameworks such as Bootstrap, Materialize CSS, or Semantic UI for frontend design.

Customize design elements to match the branding and aesthetic preferences of the restaurant.

Use pre-built UI components and styling to accelerate frontend development and ensure consistency across the application.

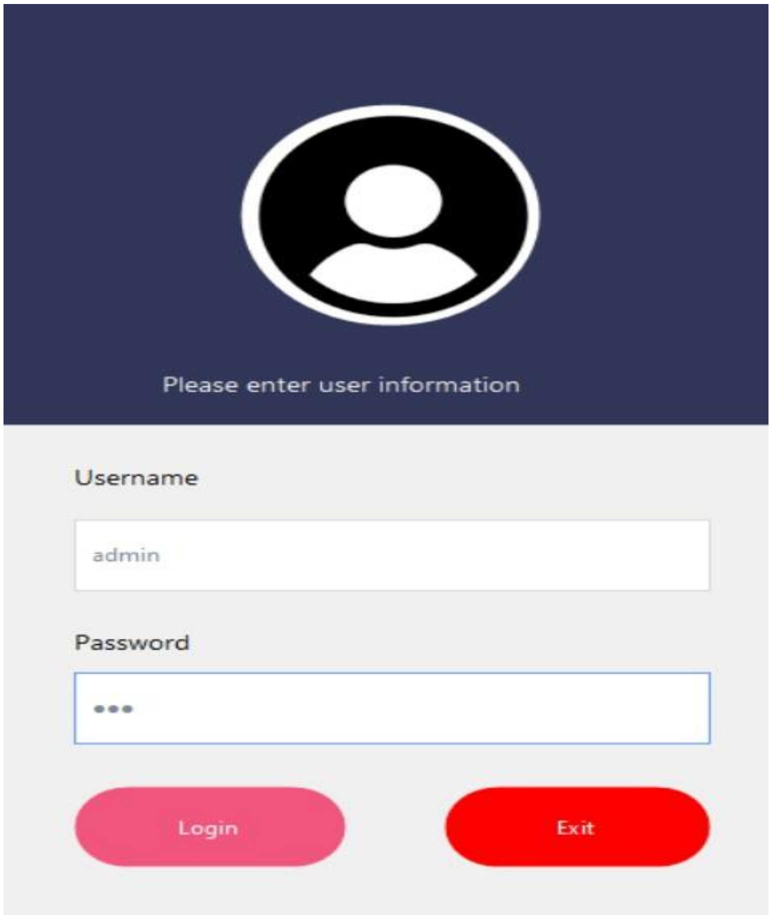
Testing and Quality Assurance:

Conduct unit testing for individual components using testing frameworks like Unit or Manual Test.

Perform integration testing to validate the interaction between frontend and backend components.

Chapter 6

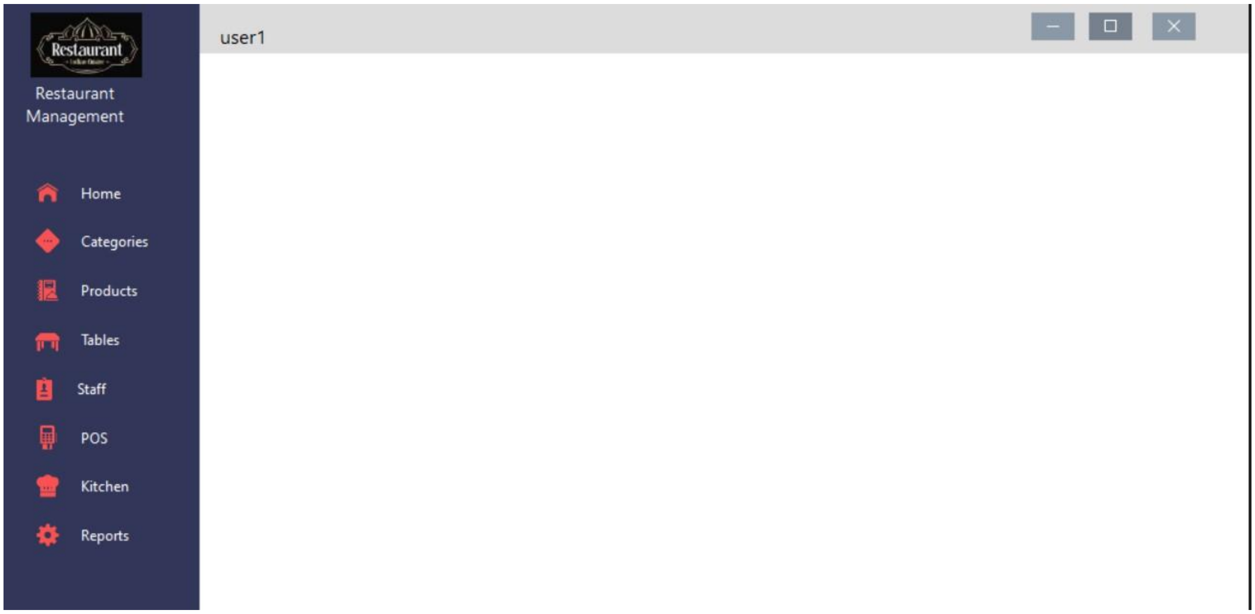
Results


Please enter user information

Username: admin

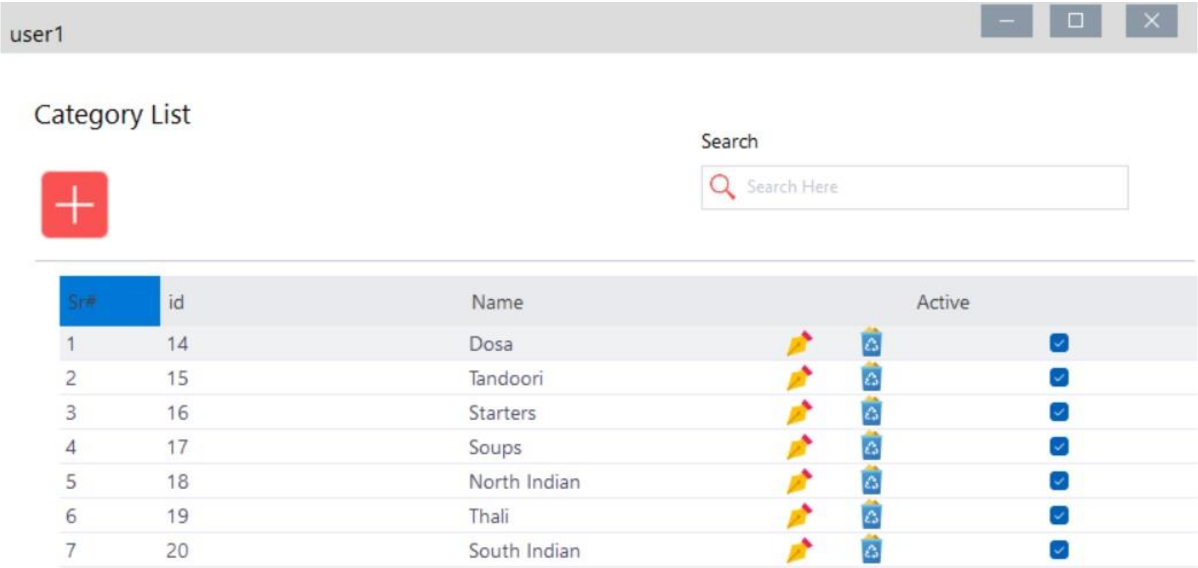
Password: •••

4.login page



5.home screen

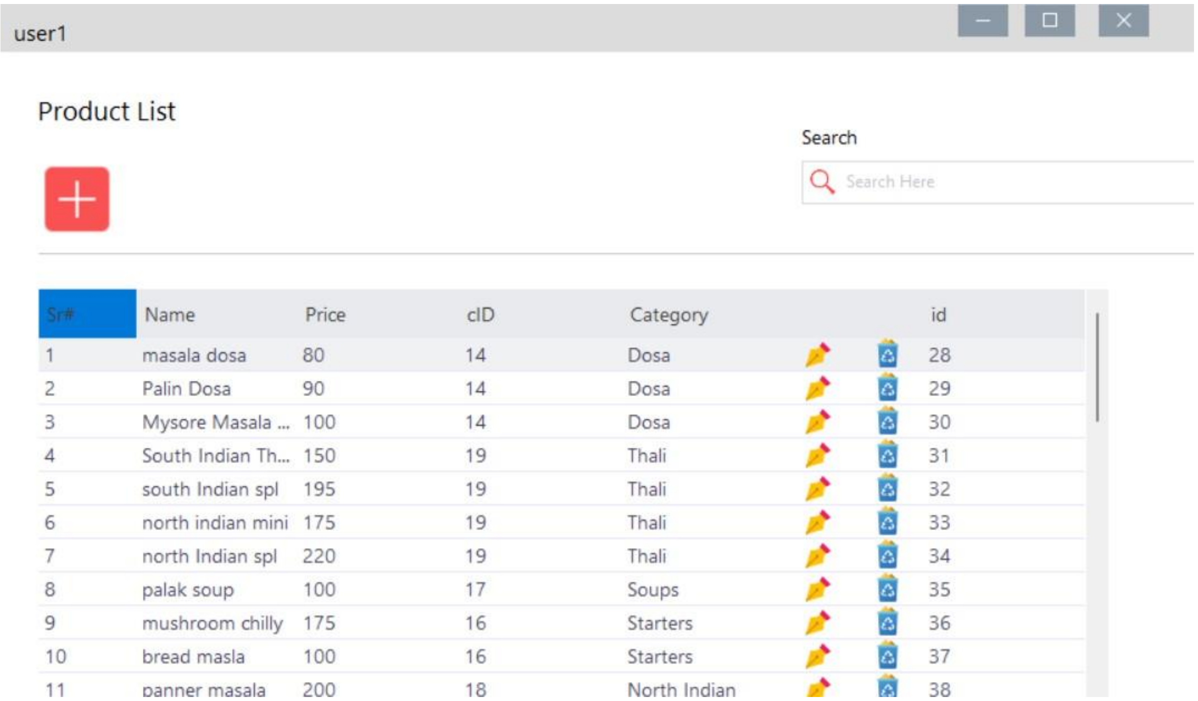
6. category list



Category List

Search

Sr#	id	Name			Active
1	14	Dosa	✎	🗑	☑
2	15	Tandoori	✎	🗑	☑
3	16	Starters	✎	🗑	☑
4	17	Soups	✎	🗑	☑
5	18	North Indian	✎	🗑	☑
6	19	Thali	✎	🗑	☑
7	20	South Indian	✎	🗑	☑



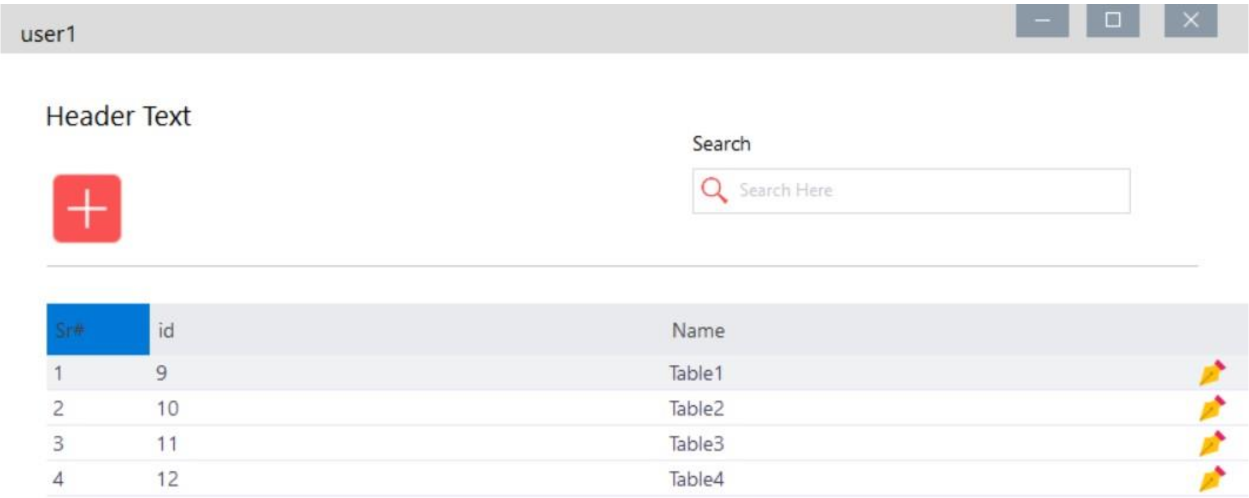
Product List

Search

Sr#	Name	Price	cID	Category			id
1	masala dosa	80	14	Dosa	✎	🗑	28
2	Palin Dosa	90	14	Dosa	✎	🗑	29
3	Mysore Masala ...	100	14	Dosa	✎	🗑	30
4	South Indian Th...	150	19	Thali	✎	🗑	31
5	south Indian spl	195	19	Thali	✎	🗑	32
6	north indian mini	175	19	Thali	✎	🗑	33
7	north Indian spl	220	19	Thali	✎	🗑	34
8	palak soup	100	17	Soups	✎	🗑	35
9	mushroom chilly	175	16	Starters	✎	🗑	36
10	bread masla	100	16	Starters	✎	🗑	37
11	panner masala	200	18	North Indian	✎	🗑	38

7.product list

8.Table list

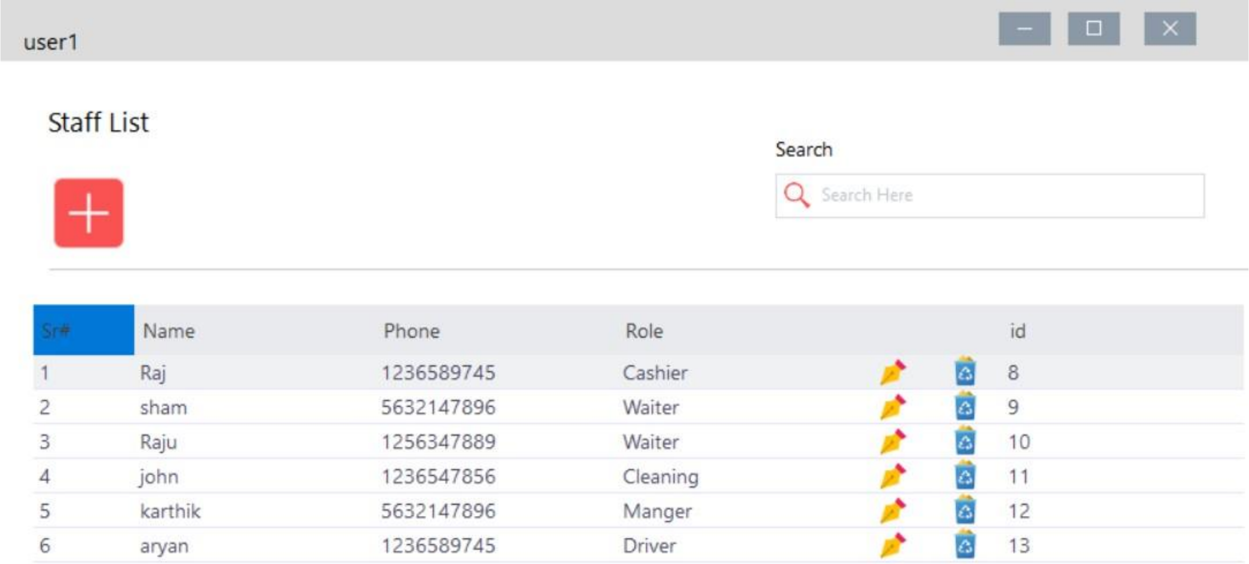


Header Text

Search

Sr#	id	Name	
1	9	Table1	✎
2	10	Table2	✎
3	11	Table3	✎
4	12	Table4	✎

9.staff list

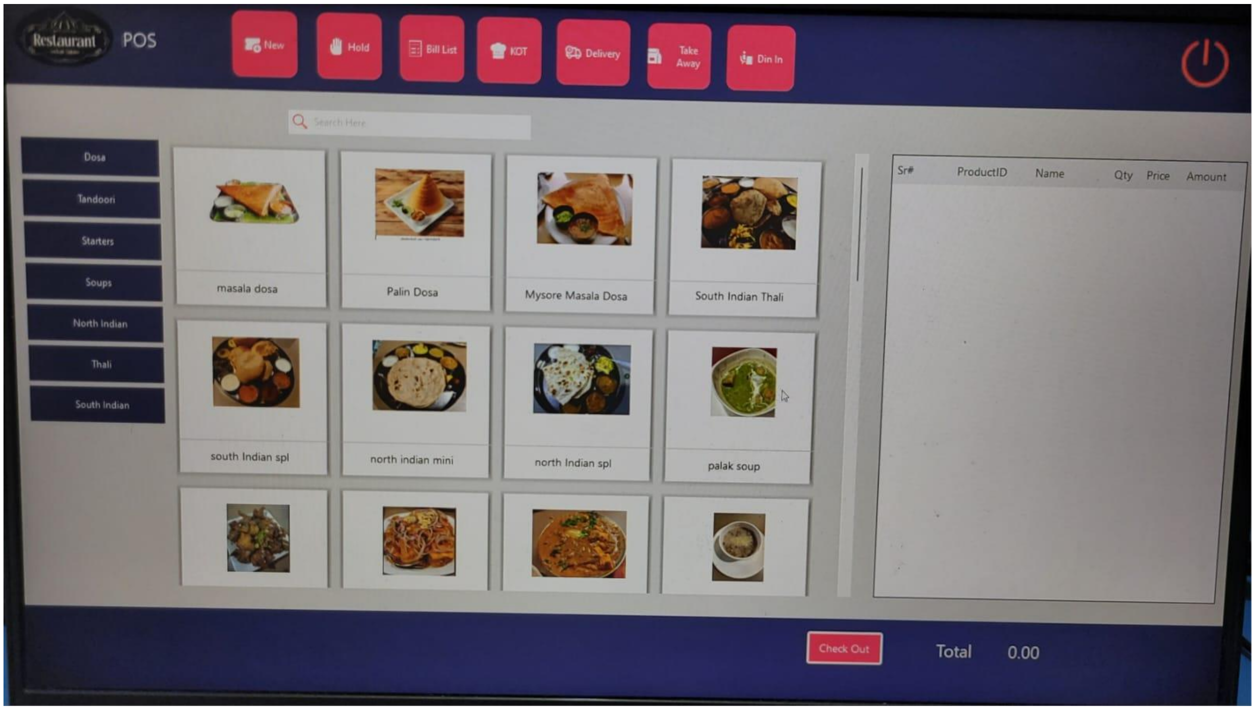


Staff List

Search

Sr#	Name	Phone	Role			id
1	Raj	1236589745	Cashier	✎	🗑	8
2	sham	5632147896	Waiter	✎	🗑	9
3	Raju	1256347889	Waiter	✎	🗑	10
4	john	1236547856	Cleaning	✎	🗑	11
5	karthik	5632147896	Manger	✎	🗑	12
6	aryan	1236589745	Driver	✎	🗑	13

10.POS



11.kitchen

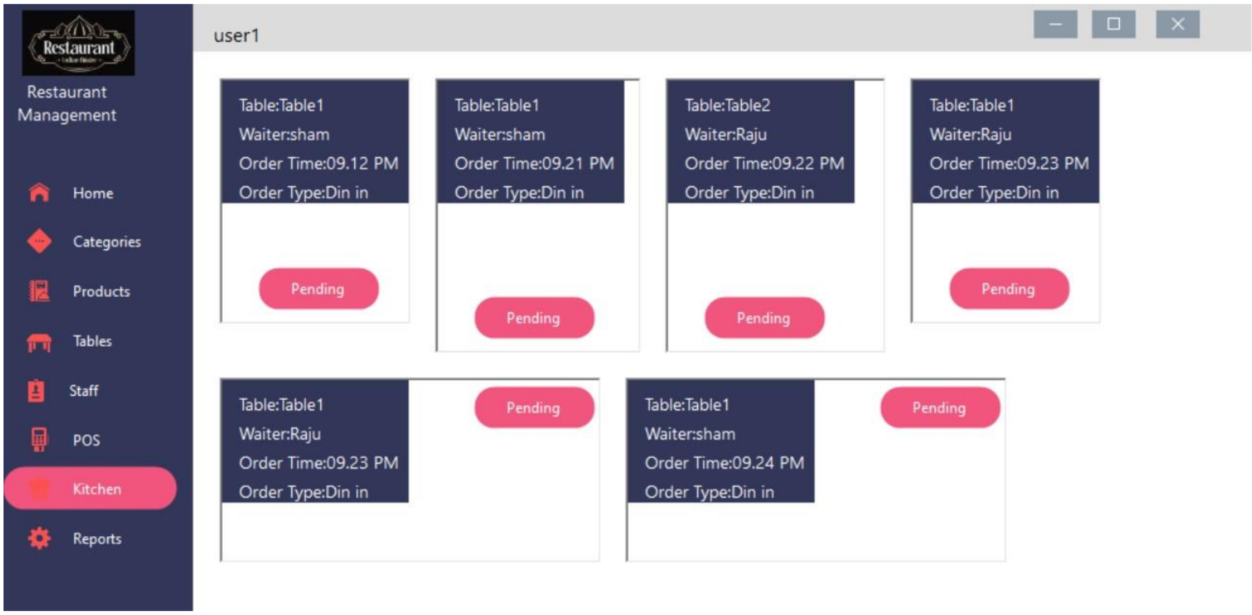


Table:Table1
Waiter:sham
Order Time:09.12 PM
Order Type:Din in
Pending

Table:Table1
Waiter:sham
Order Time:09.21 PM
Order Type:Din in
Pending

Table:Table2
Waiter:Raju
Order Time:09.22 PM
Order Type:Din in
Pending

Table:Table1
Waiter:Raju
Order Time:09.23 PM
Order Type:Din in
Pending

Table:Table1
Waiter:Raju
Order Time:09.23 PM
Order Type:Din in
Pending

Table:Table1
Waiter:sham
Order Time:09.24 PM
Order Type:Din in
Pending

Chapter 7

Conclusion and Future Works

Conclusion:

The development of the Restaurant Management Software (RMS) represents a significant step forward in the realm of restaurant operations. Through automation and digitalization, RMS offers a comprehensive solution to streamline various tasks, from order processing to employee management, ultimately aiming to enhance efficiency, service quality, and user satisfaction.

Throughout the project, we have meticulously designed and implemented functionalities tailored to the needs of restaurant managers, servers, and kitchen staff. By providing features such as menu management, order tracking, table reservations, and billing automation, RMS empowers users to optimize their workflows and focus on delivering exceptional dining experiences.

Security has been a paramount consideration in the development of RMS. With robust authentication mechanisms and role-based access control, we ensure that sensitive data remains protected and accessible only to authorized personnel. Compliance with industry standards and regulations further reinforces our commitment to data security and privacy.

The scalability and flexibility of RMS allow it to adapt to the evolving needs of restaurant businesses, accommodating changes in menu offerings, staffing requirements, and customer demands. Furthermore, the user-friendly interface and intuitive design make RMS accessible to users of all technical backgrounds, facilitating seamless adoption and integration into existing restaurant operations.

In conclusion, the Restaurant Management Software represents a significant advancement in restaurant management technology. By harnessing the power of automation and digital innovation, RMS empowers restaurants to operate more efficiently, deliver superior service, and ultimately thrive in an increasingly competitive industry landscape. We are confident that RMS will revolutionize restaurant operations and set new standards for excellence in the hospitality sector.

Future works for the Restaurant Management Software include implementing features such as comprehensive sales reports, employee management efficient inventory management, user and order management functionalities, as well as providing users with notifications for table reservations and orders to enhance the overall dining experience.

Chapter 8

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