Cafe Management System

INTERNSHIP REPORT

Major Project – II

(01CE0807)

Submitted by

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BACHELOR OF TECHNOLOGY

in

Computer Engineering

Faculty of Technology

Marwadi University, Rajkot

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Major Project-II (01CE0807)

Department of Computer Engineering

Faculty of Technology

Marwadi University

A.Y. 2024-25

CERTIFICATE

This is to certify that the project report submitted along with the project entitled **Cafe Management System** has been carried out by **Jay Pethani (92100103247)** under my guidance in partial fulfilment for the degree of Bachelor of Technology in Computer Engineering, 8th Semester of Marwadi University, Rajkot during the academic year 2024-25.

Prof. Dhara Joshi	Dr. Krunal Vaghela
Assistant Professor	Professor & Head
Department of Computer Engineering	Department of Computer Engineering

Major Project-II (01CE0807)

Department of Computer Engineering

Faculty of Technology

Marwadi University

A.Y. 2024-25

DECLARATION

We hereby declare that the **Major Project-II (01CE0807)** report submitted along with the Project entitled **Cafe Management System** submitted in partial fulfilment for the degree of Bachelor of Technology in Computer Engineering to Marwadi University, Rajkot, is a bonafide record of original project work carried out by me / us at Marwadi University under the supervision of **Prof. Dhara Joshi** and that no part of this report has been directly copied from any students' reports or taken from any other source, without providing due reference.

	Name of the Student	Sign of Student
1	_____	_____

Acknowledgement

Under the guidance of **Prof. Dhara Joshi**, we are able to bring our project to this state. We would also like to express our gratitude towards our other faculties and our **HOD Krunal Vaghela** for their kind co-operation and encouragement which helped us in the completion of this project. We are also thankful to the institution for giving us such an amazing opportunity for making this project and giving suitable instructions and guidelines for the project. Last but not the least, we thank our friends who shared the necessary information and useful Web links for preparing our project.

Abstract

The **Cafe Management System** is a comprehensive software solution designed to streamline and enhance the operational efficiency of cafes and small restaurants. This system automates key processes such as order management, inventory tracking, billing, and customer management, thereby reducing manual errors and saving valuable time for staff. By integrating real-time data handling and user-friendly interfaces, the system facilitates quick order processing, accurate billing, and effective stock control. Additionally, it supports features like menu customization, sales reporting, and employee management, enabling cafe owners to make informed business decisions. The Cafe Management System aims to improve customer satisfaction through faster service and better resource management, ultimately contributing to increased profitability and smoother daily operations.

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CHAPTER 1

Overview of the Company

1.1 History

Excelsior Technologies was founded in 2011 and has grown steadily over the years. With over a decade of experience, the company has established itself as a trusted partner for businesses seeking reliable and creative IT solutions. The team has completed projects for more than 250 clients worldwide, maintaining a high rate of customer satisfaction and repeat business.

1.2 Different Product / Scope of Work

Excelsior Technologies offers a wide range of products and services, including:

- Custom software development
- Website design and development
- Web application development
- Mobile application development (Android, iOS, Hybrid)
- E-commerce solutions
- Graphic design and brand design
- Digital marketing (SEO, social media marketing, email and SMS marketing)
- Domain and hosting services

The company works with various technologies such as ASP.NET, PHP (Laravel, CodeIgniter), React.js, Angular, Node.js, Kotlin, Swift, and more. Their industry focus includes advertising, financial services, eCommerce, education, government, business services, and utilities.

1.3 Organization chart

Excelsior Technologies is a medium-sized company with an estimated 11–50 employees. While the exact organization chart is not publicly available, a typical structure for such a company includes:

- Founder/Managing Director
- Project Managers
- Software Developers (Frontend, Backend, Full Stack)
- Mobile App Developers
- UI/UX Designers
- Graphic Designers

- Quality Assurance/Testers
- Support and Administrative Staff

The company emphasizes teamwork, mentorship, and open communication to deliver effective solutions.

1.4 Capacity of plant

Excelsior Technologies operates as an IT services company, so its "capacity" is measured by its workforce and project delivery capabilities rather than manufacturing output. The company has completed over 250 projects for clients globally and maintains a team of approximately 11–50 professionals, with a strong focus on quality, timely delivery, and customer satisfaction. Their office is located at 720 Zion Z1, Near Time Square 2, Sindhubhavan Marg, Bodakdev, Ahmedabad, Gujarat, India.

This structure and information will help you build both your report and presentation for your final year project, providing a comprehensive overview of Excelsior Technologies and its operations.

CHAPTER 2

Overview of Different Departments and Process Layout at Excelsior Technologies

2.1 It includes the details about the work being carried out in each department.

Software Development Department
Responsible for custom software, web, and mobile application development. This includes coding, debugging, and implementing client requirements using various programming languages and frameworks.

Web Design and UI/UX Department
Focuses on designing user interfaces and user experiences for websites and applications to ensure they are intuitive, engaging, and aligned with client branding.

Quality Assurance (QA) Department
Conducts testing of software products to identify bugs, ensure functionality, performance, and security before delivery to clients.

Project Management Department
Oversees project planning, resource allocation, client communication, and timely delivery of solutions.

IT Support and Maintenance Department
Provides ongoing support, updates, and troubleshooting for deployed software and applications.

2.2 Technical Specifications of Major Tools and Technologies Used

Department	Major Tools / Technologies	Technical Details / Specifications
Software Development	ASP.NET Core MVC, SQL server management Studio	Frameworks and languages for backend and frontend development; support for cross-platform mobile apps (Android, iOS, Hybrid)
Web Design & UI/UX	Adobe Photoshop, Figma,	Industry-standard design and prototyping tools for UI/UX
IT Support & Maintenance	Remote desktop tools, monitoring software	Tools for remote troubleshooting and system monitoring

CHAPTER 3

Introduction to Internship and Internship Management

3.1 Internship Summary

The **Cafe Management System** is a web-based platform designed to simplify and automate the food ordering and delivery process for both customers and restaurants. The system aims to bridge the gap between food providers and consumers by offering a centralized and user-friendly solution that manages restaurant listings, food menus, order placement and delivery management.

3.2 Purpose

The purpose of this report is to provide a comprehensive overview of the development and implementation of the **Cafe Management System**. It aims to document each phase of the project, from initial planning and requirement analysis to system design, development, testing, and deployment. The report serves as a formal record that outlines the project's objectives, methodologies, tools used, challenges faced, and solutions implemented. It also highlights the features and functionalities of the system, ensuring that stakeholders understand the scope and impact of the project. Additionally, this report is intended to evaluate the effectiveness of the project in addressing real-world problems in the food delivery domain and to demonstrate the application of software engineering principles in building a practical solution.

3.3 Objective

The objective of the Cafe Management System is to automate and streamline the daily operations of a cafe, including order taking, billing, inventory management, and reporting. The system aims to improve efficiency, reduce manual errors, enhance customer service, and provide real-time data for better decision-making by cafe management.

3.4 Scope (what it can do and can’t do)

Scope (What it can do):

- Manage customer orders quickly and accurately.
- Generate bills and receipts.
- Manage menu items, including adding, updating, or removing dishes.
- Support multiple user roles such as cashier, manager, and kitchen staff.
- Provide a user-friendly interface for ease of use by staff.

Scope (What it can't do):

- Handle online orders or delivery logistics (if not implemented).
- Manage employee payroll or HR-related functions.
- Integrate with external payment gateways (unless specifically developed).
- Predict customer preferences or perform advanced analytics.
- Control physical devices like coffee machines or kitchen appliances.

3.5 Technology

Frontend Development:

- ASP.NET Core MVC:
- Bootstrap/CSS

Backend Development:

- SQL Server Management Studio (SSMS):
- Entity Framework Core:

3.6 Internship Planning

Requirements:

- Technical Specifications:

  - Operating System: Windows Server or compatible Linux distributions.
  - Database Server: SQL Server (Express or higher).
  - Web Server: IIS (Internet Information Services) or compatible alternatives like Apache.

- Client Requirements:

  - Scalability: The system should be able to handle increased traffic during peak hours without significant performance degradation.
  - Reliability: The system must ensure data integrity and availability, with minimal downtime for maintenance.
  - Security: The system must protect sensitive data (e.g., customer information, financial transactions) through robust security measures.

3.6.1 Internship Development Approach and Justification

- Hands-on Learning:

  - This approach allowed applying classroom concepts to build a real software product, aligning with the key benefits of a software development internship.

- Product-Oriented:
  - Focusing on building a complete product rather than isolated features gave insights into end-to-end software development processes, including client requirements and business objectives.
- Skill Enhancement:
  - Using ASP.NET Core MVC and SQL Server provided exposure to industry-relevant technologies, improving coding, database management, and problem-solving skills.
- Agile and Iterative:
  - Iterative development enabled early detection of issues and continuous improvement, reflecting professional software engineering practices.
- Team and Time Management:
  - Managing the project in phases helped develop time management and organizational skills essential for real-world software projects.

3.6.2 Internship Effort and Time, Cost Estimation

Internship Effort:

For the Cafe Management System project developed using ASP.NET Core MVC and SQL Server, the internship effort and time can be estimated as follows:

- Requirement Analysis and Planning: 1 week
  Understanding client needs, defining features, and preparing project plan.
- Design Phase: 1 week
  Designing UI/UX wireframes and database schema.
- Development Phase: 3 to 4 weeks
  Coding modules such as order management, billing, inventory tracking, and reporting.
- Testing and Debugging: 1 to 2 weeks
  Unit testing, integration testing, and fixing bugs.
- Deployment and Documentation: 1 week
  Deploying the system on a local server and preparing user manuals and technical documentation.

Cost Estimation:

Since this project is a software development internship project, the primary costs are related to:

Software and Tools:

ASP.NET Core MVC and Visual Studio Community Edition (free for students),
SQL Server Express Edition (free for development),
Other tools like Bootstrap, CSS (open source),
Thus, software costs are minimal or zero for educational purposes.

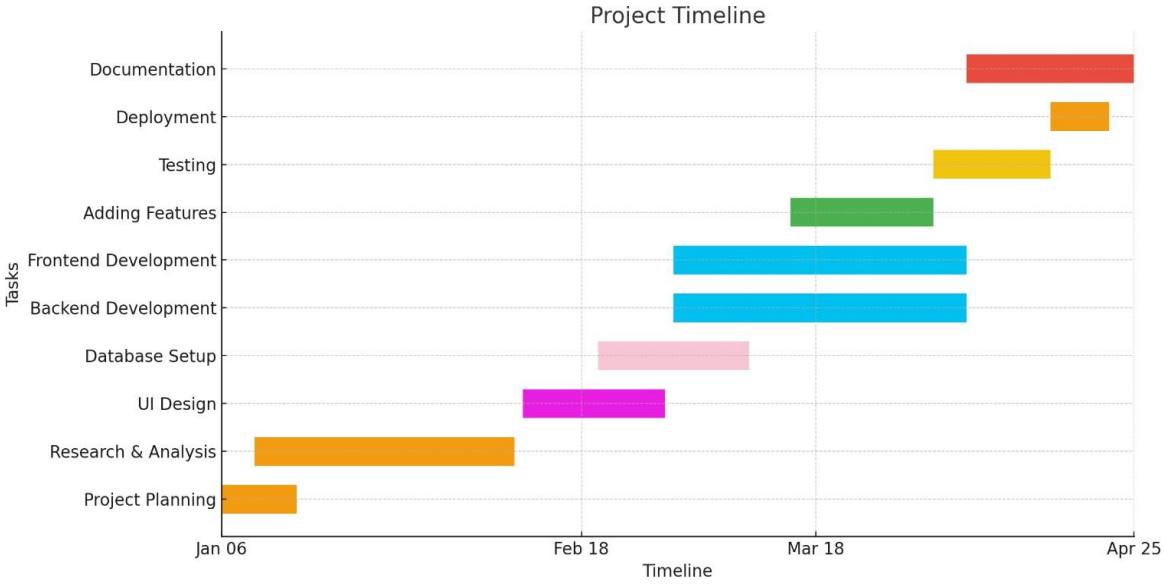
- Hardware:
  A standard development machine (PC or laptop) capable of running Visual Studio and SQL Server.
- Internet connection for research and collaboration.

- Human Effort:
  The main cost is the time and effort of the intern (you), which is typically unpaid or stipend-based during internships.

3.6.3 Roles and Responsibilities

Name	Roles	Description
Jay Pethani	Designing, coding and database connection	Designing of the app, backend coding using Node.js, React.js frontend, and API/database integration using MongoDB is done by me
Jay Pethani	All diagrams for the project	All diagrams for the project is made by me.
Jay Pethani	Database Design	Designing the database for the project is done by me.
Jay Pethani	Analysis of existing systems online	Done by sir
Jay Pethani	Report	Making on report is done by me.

3.7 Internship Scheduling (Gantt Chart/PERT/Network Chart)



CHAPTER 4

System Analysis

4.1 Study of Current System

The current system for managing cafe operations often involves manual processes or simple digital tools that lack integration and automation. Here's a detailed analysis of the typical challenges and inefficiencies in the current systems used by many cafes:

- Manual Order Taking and Billing:
  Orders are often taken manually using paper notes or simple digital tools without real-time tracking. Billing is also manual, leading to errors in order processing and payment handling.

- Inventory Management:
  Inventory tracking is typically done using spreadsheets or manual stocktaking, which can result in stockouts or overstocking due to lack of real-time monitoring.

- Employee Management:
  Employee scheduling and management are often handled manually, which can lead to inefficiencies in staff allocation and time management.

Problems with Current Systems:

- Slow Billing and Payment Processing:
  Manual billing processes are slow and can lead to long wait times for customers, negatively impacting their experience.

- Limited Scalability:
  Current systems often lack the scalability needed for growing businesses, making it difficult to manage increased operations efficiently.

4.2 Problem and Weaknesses of Current System

Based on industry analysis and real-world observations during the internship, the current systems used in many cafes—often manual or only partially digitized—suffer from several significant problems and weaknesses:

- Manual Operations and Inefficiency
  Order taking, billing, and inventory management are frequently handled manually or with basic tools (e.g., paper, spreadsheets), which leads to slow processes and frequent human errors.

  Delays in serving customers are common, especially during peak hours, due to inefficient recording and processing of orders.

- Scalability and Growth Limitations
  Manual systems are not scalable, making it hard to expand operations, handle increased order volumes, or open new branches.

  Inability to adapt to seasonal fluctuations further impacts profitability and resource planning.

In summary:
The current cafe management systems are plagued by inefficiency, inconsistency, poor inventory control, limited data-driven decision-making, and weak customer engagement. These weaknesses not only affect day-to-day operations but also hinder long-term growth and competitiveness in the cafe industry.

The current cafe management systems, especially those relying on manual processes or fragmented digital tools, face several significant problems and weaknesses that impact operational efficiency and customer satisfaction:

4.3 Requirements of New System

The new Cafe Management System is required to address the inefficiencies and limitations of the current manual or semi-digital processes by providing an integrated, automated solution that streamlines all core cafe operations. It should enable efficient order management with real-time tracking, automated billing, and accurate inventory control to minimize errors and reduce wait times. The system must support role-based access for employees, ensuring secure and organized workflow.

Additionally, it should generate timely sales and inventory reports to assist management in making data-driven decisions. The new system should be user- friendly, scalable to accommodate business growth, and capable of handling peak-hour demands without performance degradation. Overall, it should enhance operational efficiency, improve customer satisfaction, and provide a solid foundation for future expansion and digital marketing initiatives.

4.4 System Feasibility

4.4.1 Does the system contribute to the overall objectives of the organization?

Yes, the new Cafe Management System directly contributes to the overall objectives of the organization by streamlining and automating core cafe operations, which are essential for long-term business success. By integrating order processing, inventory management, billing, and reporting into a single digital platform, the system addresses key operational challenges such as inefficiency, human error, and lack of real-time data.

Additionally, the system provides management with timely reports and data analytics, supporting data-driven decision-making and resource optimization. It also offers scalability and adaptability, allowing the organization to handle increased customer volume and operational complexity as the business grows.

4.4.2 Can the system be implemented using the current technology and within the given cost and schedule constraints

Yes, the Cafe Management System can be implemented using current technology and within the given cost and schedule constraints.

Technical Feasibility:
Modern web development frameworks like ASP.NET Core MVC, along with SQL Server for database management, are well-suited for building a robust and scalable Cafe Management System. These technologies are widely used, have strong community support, and are accessible to students and small businesses, often at little or no licensing cost for development purposes. The required hardware and software—such as a standard PC or laptop, Visual Studio, and SQL Server Express—are readily available and sufficient for the project scope

Schedule Feasibility:
The system's size and complexity are suitable for completion within a typical internship or academic project timeframe (e.g., 2–3 months). The development approach can be modular and iterative, allowing for phased delivery and testing, which aligns with standard project schedules for such systems.

4.4.3 Can the system be integrated with other systems which are already in place?

Yes, the Cafe Management System can be integrated with other systems already in place, provided it is designed with interoperability and open APIs in mind. Modern cafe and restaurant management platforms increasingly support integration with a variety of third-party applications, such as online ordering platforms, payment gateways, accounting software, inventory management systems, and customer relationship management (CRM) tools.

4.5 Activity / Process in New System / Proposed System

- Order Management Process
  - Order Placement:
    Customers place orders through a user-friendly interface, which can be accessed via a web application or mobile app.

  - Order Tracking:
    Orders are tracked in real-time, ensuring that staff can monitor the status of each order from preparation to delivery.

  - Order Fulfilment:
    The system automatically notifies kitchen staff when orders are placed, ensuring timely preparation and delivery.

- Billing and Payment Process
  - Payment Processing:
    Integration with payment gateways allows for secure and efficient payment processing, supporting various payment methods.

- Customer Management Process
  - Feedback Collection:
    Customers can provide feedback through the system, helping to improve services.

4.6 Features of New System / Proposed System

The proposed Cafe Management System is designed to streamline and key cafe operations, improving efficiency, accuracy, and customer satisfaction. Its core features include:

- All-in-One Order Management:
  Enables quick and easy order taking, modification, and tracking. Staff can manage table assignments, split bills, apply discounts, and adjust orders seamlessly, ensuring smooth service flow.

- Flexible and Automated Billing:
  Generates accurate bills instantly based on orders, supports multiple payment methods, and allows billing at the table or counter. The system can handle taxes, gratuities, refunds, and promotions automatically.

- Menu Configuration and Customization:
  Allows easy setup and modification of menus, including item descriptions, pricing, and visual highlights for popular or promotional items. This flexibility helps adapt to customer preferences and seasonal changes.

- User-Friendly Interface:
  Designed for ease of use by staff with varying technical skills, minimizing training time and errors during busy hours.

- Mobile and Remote Access:
  Allows owners and managers to monitor and control cafe operations from anywhere, ensuring timely responses to business needs.

4.7 List Main Modules / Components / Processes / Techniques of New System / Proposed System

The proposed Cafe Management System is designed as a comprehensive, modular solution to automate and streamline all major operations of a cafe. Below are the main modules, components, and processes typically included in such a system:

- User Management Module
  Handles user authentication (login/signup) and role-based access control (admin, staff, customer).
  Allows users to update profiles and change passwords.

- Menu & Product Management
  Add, edit, delete, and display menu items and categories,
  Update product details such as price, availability, and description.

- Order Management
  Take, modify, and track customer orders.
  Manage order queues, prioritize tasks, and update order status in real-time.
  Supports both dine-in and takeaway/guest orders.

- Billing & Invoicing
  Automated bill generation based on orders.
  View, print, download, and search bills.
  Manage payment methods and handle transactions securely.

4.8 Selection of Hardware / Software / Algorithms / Methodology / Techniques / Approaches and Justification

- Hardware Selection
  - Processor: Intel Pentium/Core i3 or above
    Justification: Sufficient processing power for smooth running of ASP.NET Core MVC applications and SQL Server database operations.

  - RAM: Minimum 2 GB (recommended 4 GB or higher)

Justification: Ensures responsive performance during multitasking and database operations.

- Hard Disk: 100 GB or above
  Justification: Provides adequate storage for application files, database, and backups.

- Monitor: Standard display for user interface interaction
  Justification: Essential for staff to interact with the system efficiently.

➢ Software Selection

- Operating System: Windows 7/8/10/11
  Justification: Stable, widely supported, and compatible with development tools and SQL Server.

- Development Environment: Visual Studio (2019 or later)
  Justification: Industry-standard IDE for ASP.NET Core MVC development, offering robust debugging and productivity features.

- Framework: ASP.NET Core MVC
  Justification: Enables modular, scalable, and maintainable web application development.

- Database Management System: Microsoft SQL Server (Express or higher)
  Justification: Reliable, secure, and supports advanced data management and querying for transactional systems.

- Other Tools: .NET Framework/.NET Core, Bootstrap/CSS for UI
  Justification: Supports modern, responsive web design and cross-platform compatibility.

➢ Algorithms

- CRUD Operations: For managing orders, menu items, inventory, and users
  Justification: Fundamental for any management system to create, read, update, and delete records efficiently.

- Search and Filter Algorithms: For quick retrieval of menu items, orders, and reports
  Justification: Improves usability and speeds up workflow.

- Billing and Calculation Algorithms: For generating accurate bills and handling discounts/taxes
  Justification: Ensures precise and automated billing, reducing manual errors.

- Authentication and Authorization: Role-based access control
  Justification: Secures sensitive data and restricts system access based on user roles.

- Techniques
  - Modular Programming: Breaking down the system into modules (order management, inventory, billing, reporting)

    Justification: Enhances maintainability, scalability, and ease of debugging.

  - Responsive Web Design: Using Bootstrap/CSS

    Justification: Ensures the system works well on various devices, improving accessibility for staff.

- Approaches
  - Database-Driven Application: All data is stored, retrieved, and managed through SQL Server
    Justification: Centralizes data, improves data integrity, and supports advanced reporting.

  - Layered Architecture (MVC): Separates presentation, business logic, and data access layers.
    Justification: Promotes clean code organization, easier maintenance, and scalability

CHAPTER 5

System Design

5.1 System Design & Methodology

- System Design:
  - User Roles: The system supports multiple user roles such as admin/manager, cashier, and staff, each with role-based access to relevant modules.
  - Order Management: Users can view menu items, place customer orders, and process payments. Orders are tracked from initiation to completion, with real-time updates to inventory and billing modules.
  - Billing: The system generates accurate bills, applies taxes/discounts, and maintains a digital record of all transactions for future reference.
  - Responsive Design: The interface is designed to be mobile-first and responsive, allowing staff to use the system efficiently on tablets, smartphones, or desktops.
- Methodology:
  - The Agile/Iterative approach allows for flexibility, rapid response to changing requirements, and continuous improvement based on real user feedback, which is crucial for developing practical and user-friendly management systems in a dynamic environment like a café.
  - This design and methodology ensure the Cafe Management System is robust, scalable, user-friendly, and tailored to the actual needs of cafe operations, addressing the shortcomings of traditional manual systems and supporting efficient business growth
  - Requirement Gathering: Initial phase involved collecting requirements from stakeholders, identifying pain points in current manual systems, and defining clear functional and non-functional requirements.
  - Iterative Development: The project was broken into manageable modules (order, inventory, billing, reporting), each developed and tested in short cycles, allowing for continuous feedback and improvements.
  - User-Centric Design: Prototypes and user interfaces were designed with input from end-users (cafe staff and managers) to ensure usability and relevance to real-world workflows.
  - Testing and Refinement: Each module underwent rigorous testing for functionality, usability, and security before integration into the full system

5.2 Database Design / Data Structure Design / Process Design / Structure Design / ER Diagram / DFD /UML etc.

Database Design

A well-structured database is the backbone of any Cafe Management System. Below is a typical relational design based on best practices and real-world implementations.

Main Tables:

- Users: Stores user login and role information.
    - UserID (PK)
    - Username
    - Password
    - Role (Admin, Staff, Cashier, etc.)
    - ContactInfo
- Customers: (Optional, for loyalty or order history)
    - CustomerID (PK)
    - Name
    - Phone
    - Email

Process Design / Structure Design:

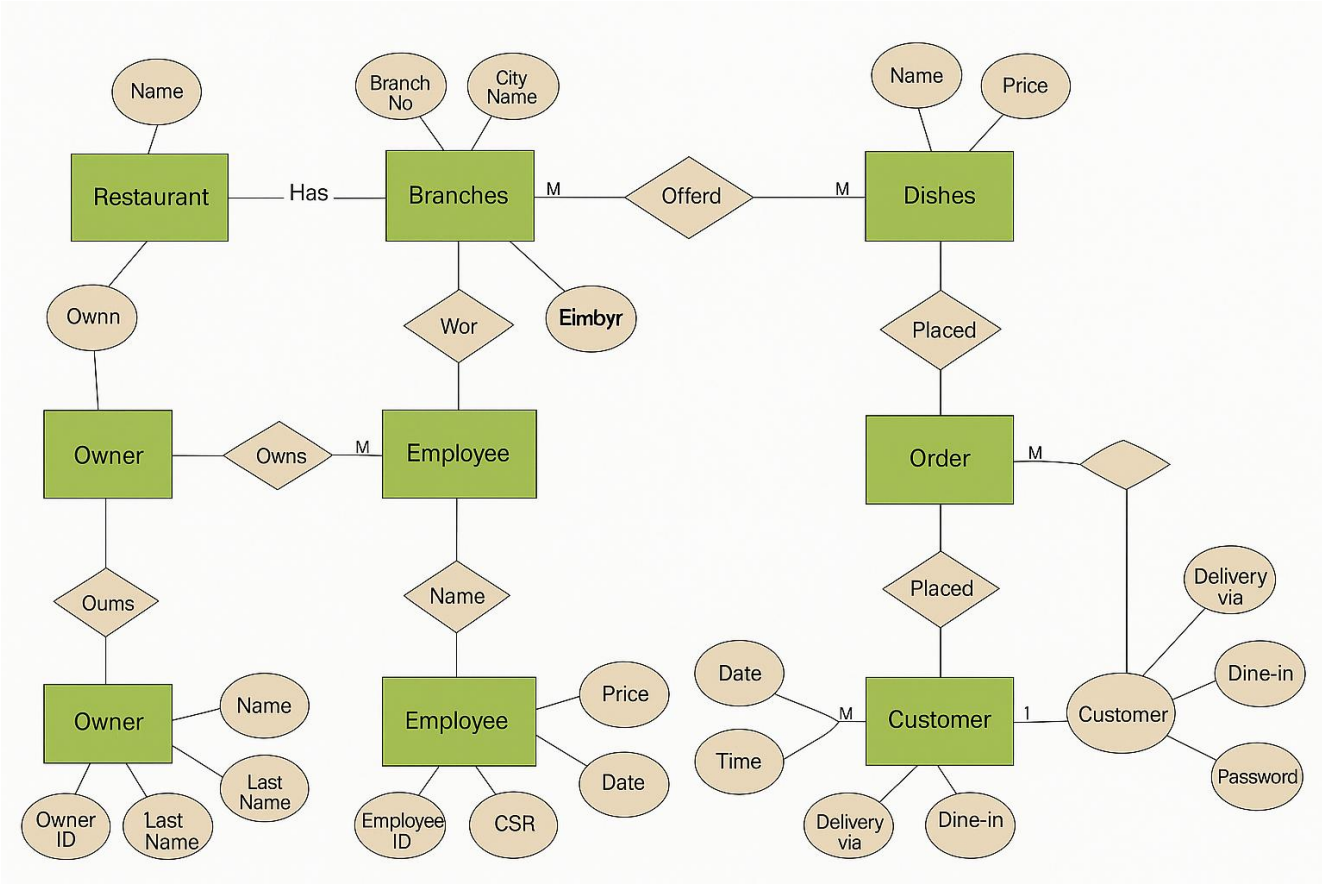
Order Processing Workflow:

- Staff logs in (User authentication).
- Customer order is created, selecting menu items.
- System checks inventory for stock availability.
- Order details are saved; inventory is updated.

- Bill is generated and payment is processed.
- Sales and inventory reports are updated in real time

References to Real Implementations:

- GitHub Cafe Management System projects with SQL Server and MySQL
- Restaurant management system design articles
- Practical database normalization and indexing tips



5.2.1 Input Design

Input Type	Description	Input Method	Validation/Controls
Customer Order	Menu items selected by customers	Dropdown menus, search fields	Quantity limits, required fields
Billing Information	Payment details, discounts, taxes	Automated from orders	Calculated automatically
Reports Parameters	Date ranges, filters for sales/inventory reports	Date pickers, dropdowns	Date validation

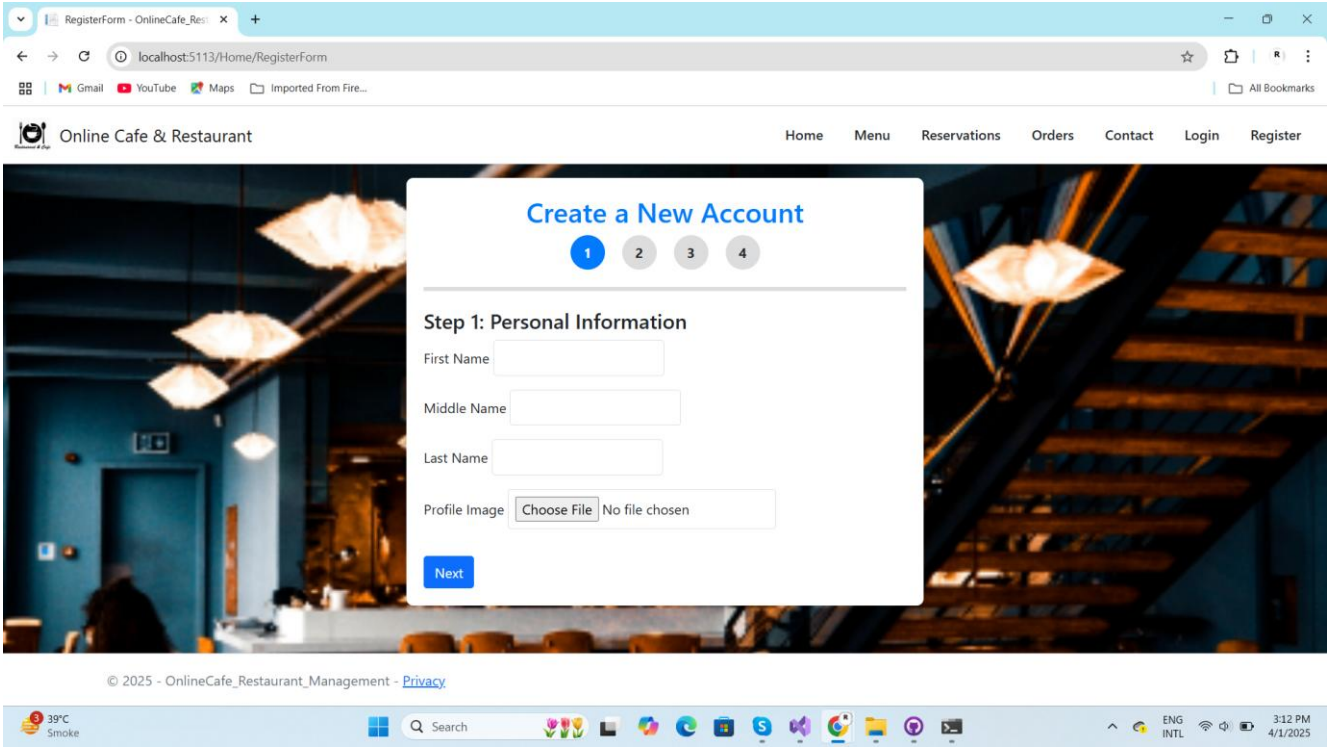
5.2.2 Use Case Diagram:

Include graphical use case diagrams for each major module (Order Management, Billing, Inventory, Reporting) with detailed explanations.

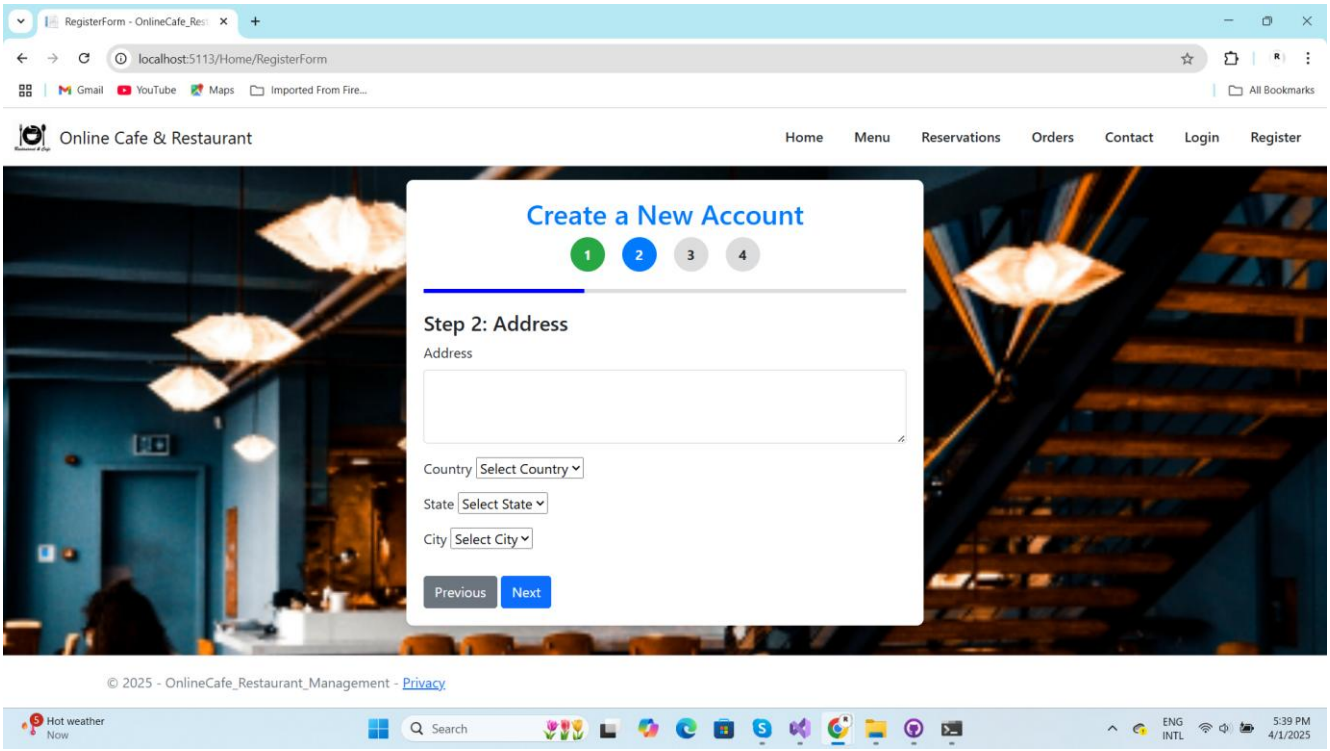
Sample:
Use Case: Order Management
The order management module allows staff to take customer orders, modify them, and send them to the kitchen. The use case diagram illustrates actors such as Cashier and Kitchen Staff interacting with the system. Key use cases include “Place Order,” “Modify Order,” and “Cancel Order.” This module ensures orders are tracked accurately, reducing errors and improving service speed.

5.2.3 Outcomes:

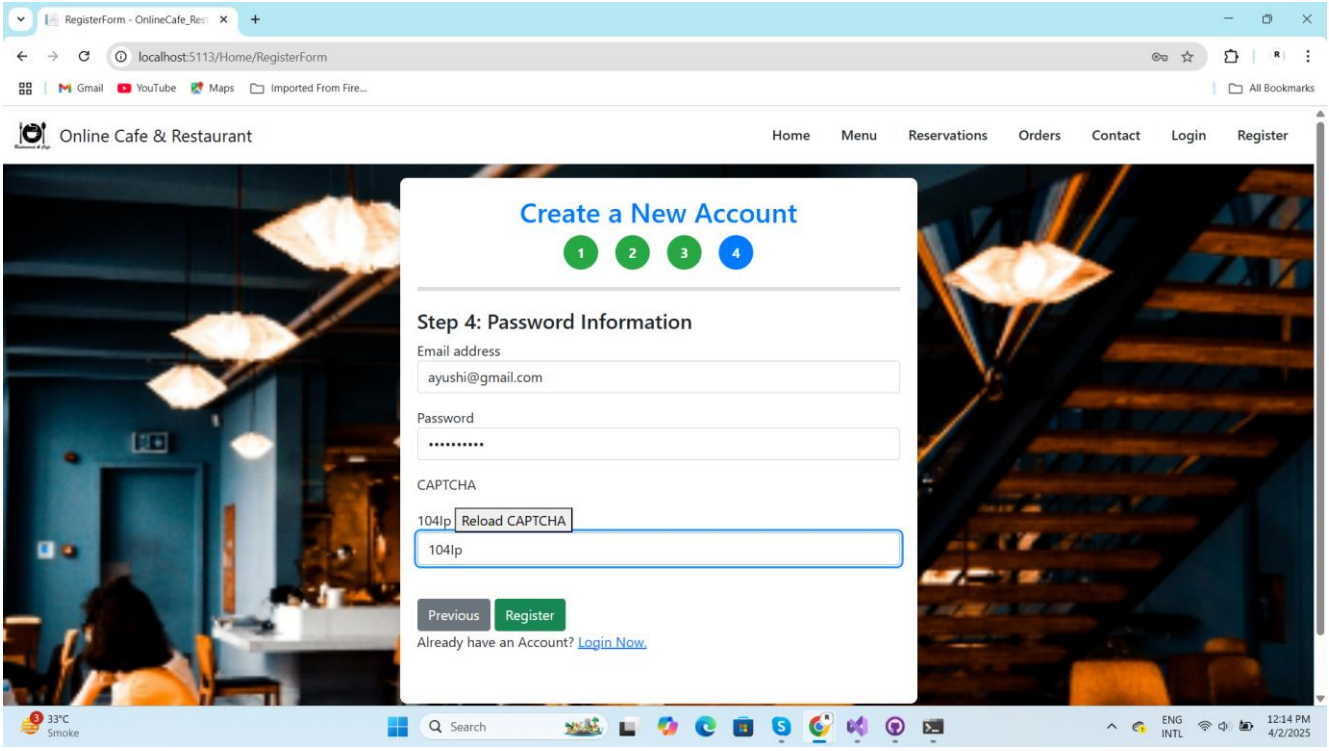
- Sign Up & Dashboard:



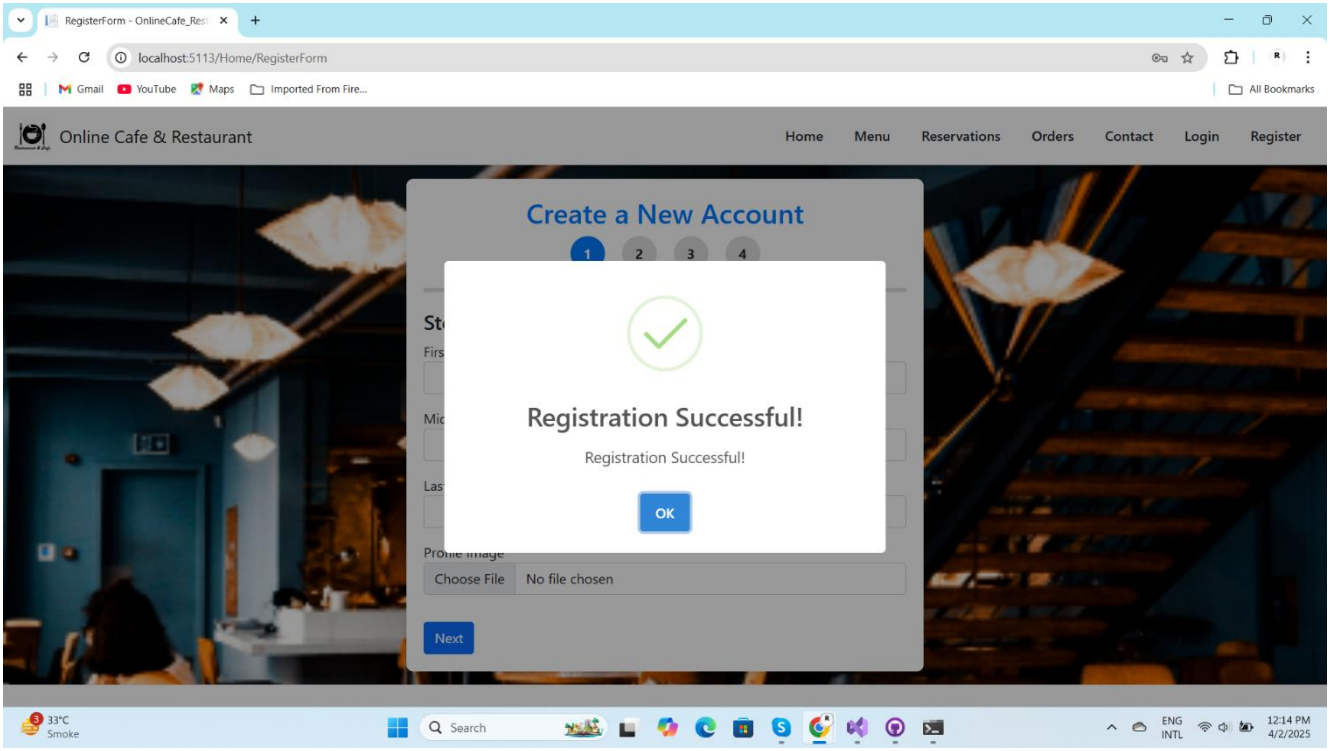
Sign UP – Step 1



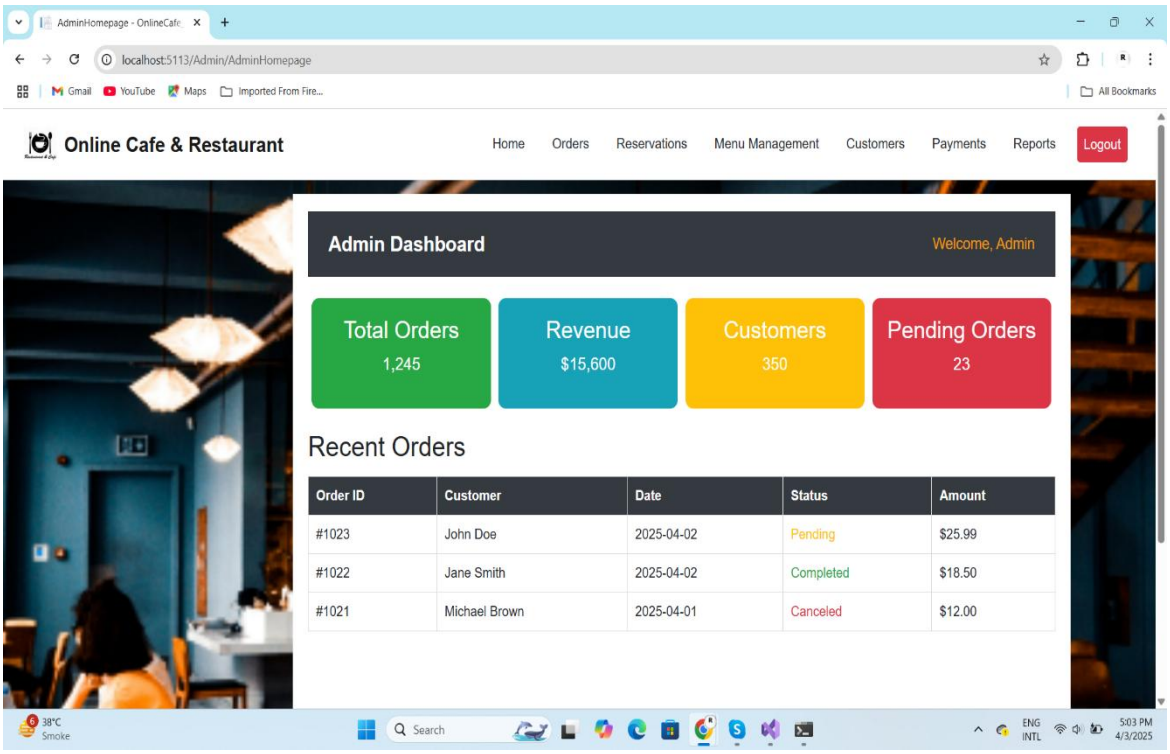
Sign UP – Step 2


RegisterForm - OnlineCafe_Res
localhost:5113/Home/RegisterForm
Online Cafe & Restaurant
Home
Menu
Reservations
Orders
Contact
Login
Register
Create a New Account
1
2
3
4
Step 4: Password Information
Email address
ayushi@gmail.com
Password
CAPTCHA
104lp
Reload CAPTCHA
104lp
Previous
Register
Already have an Account? Login Now.

Step-3

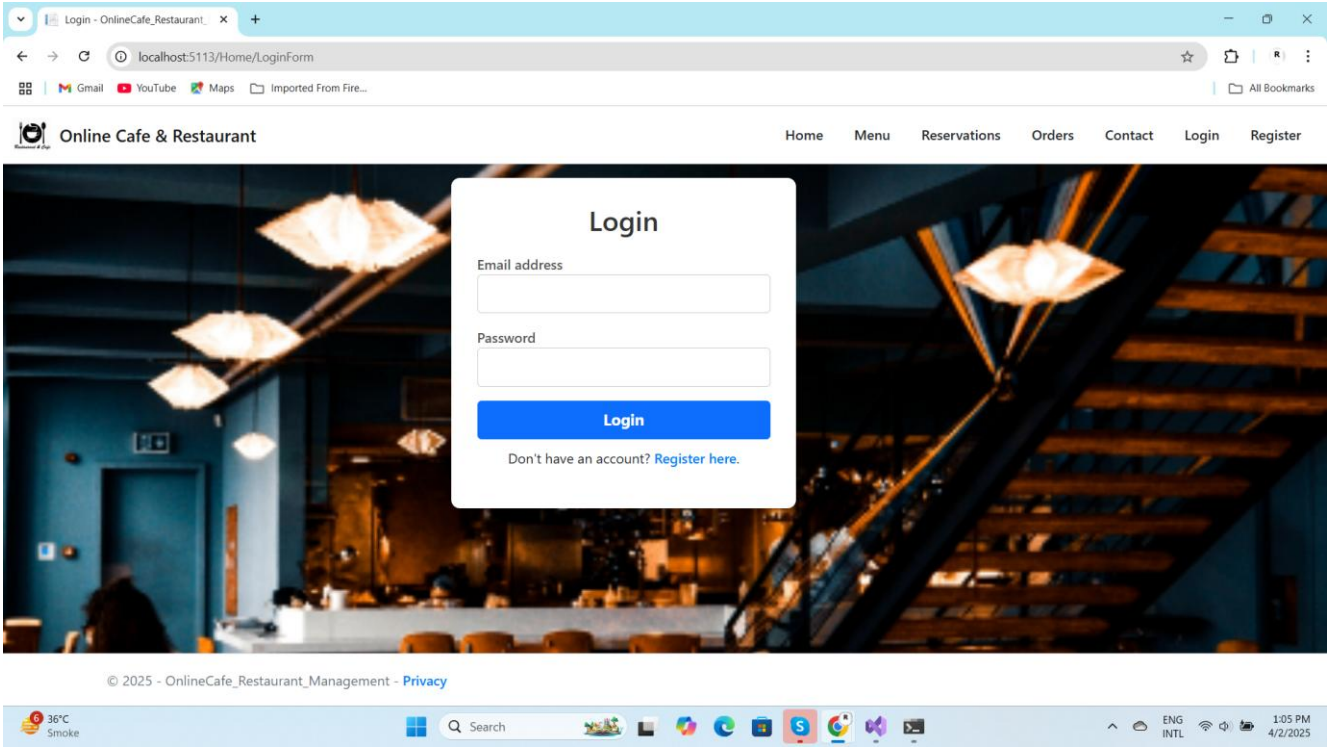

RegisterForm - OnlineCafe_Res
localhost:5113/Home/RegisterForm
Online Cafe & Restaurant
Home
Menu
Reservations
Orders
Contact
Login
Register
Create a New Account
Registration Successful!
Registration Successful!
OK
Choose File
No file chosen
Next

Step-4

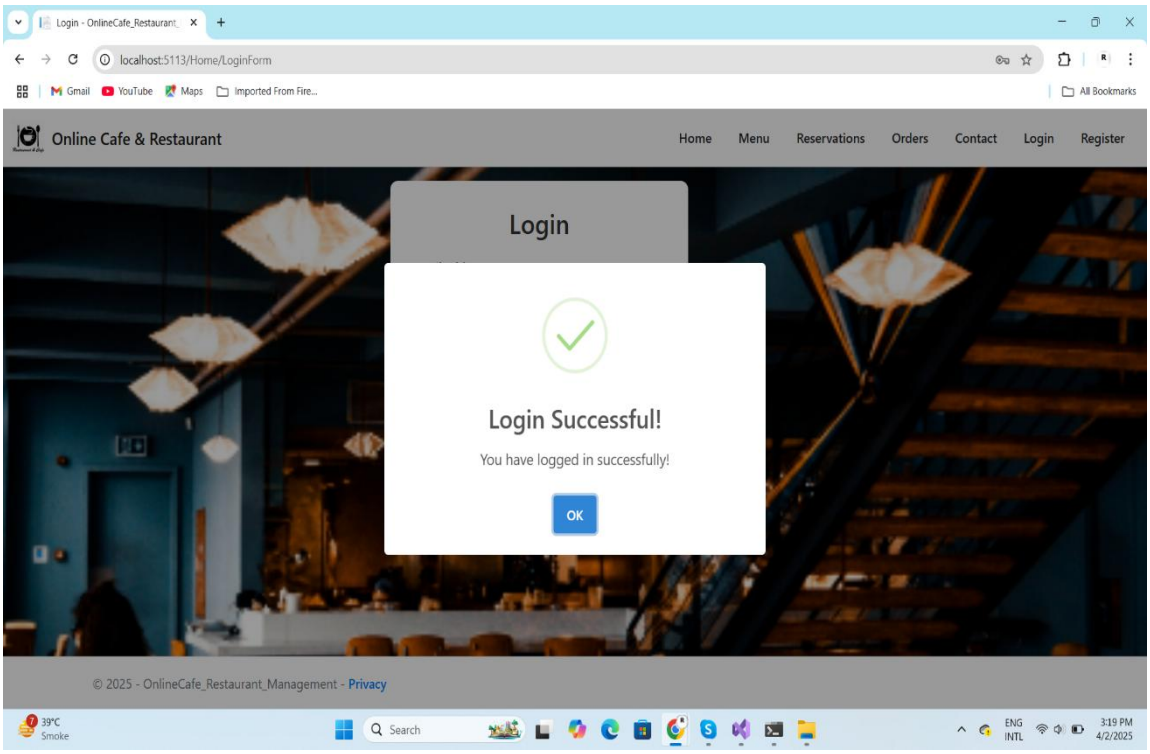


DashBoard

- Login Page:

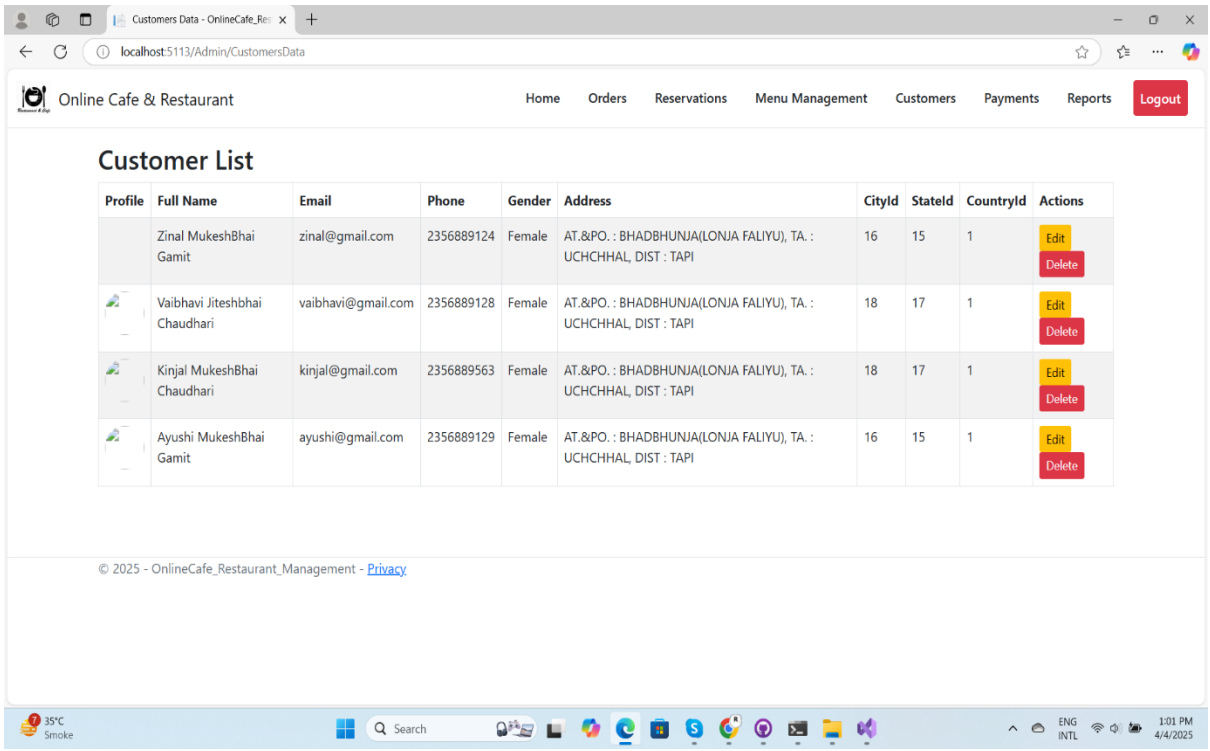


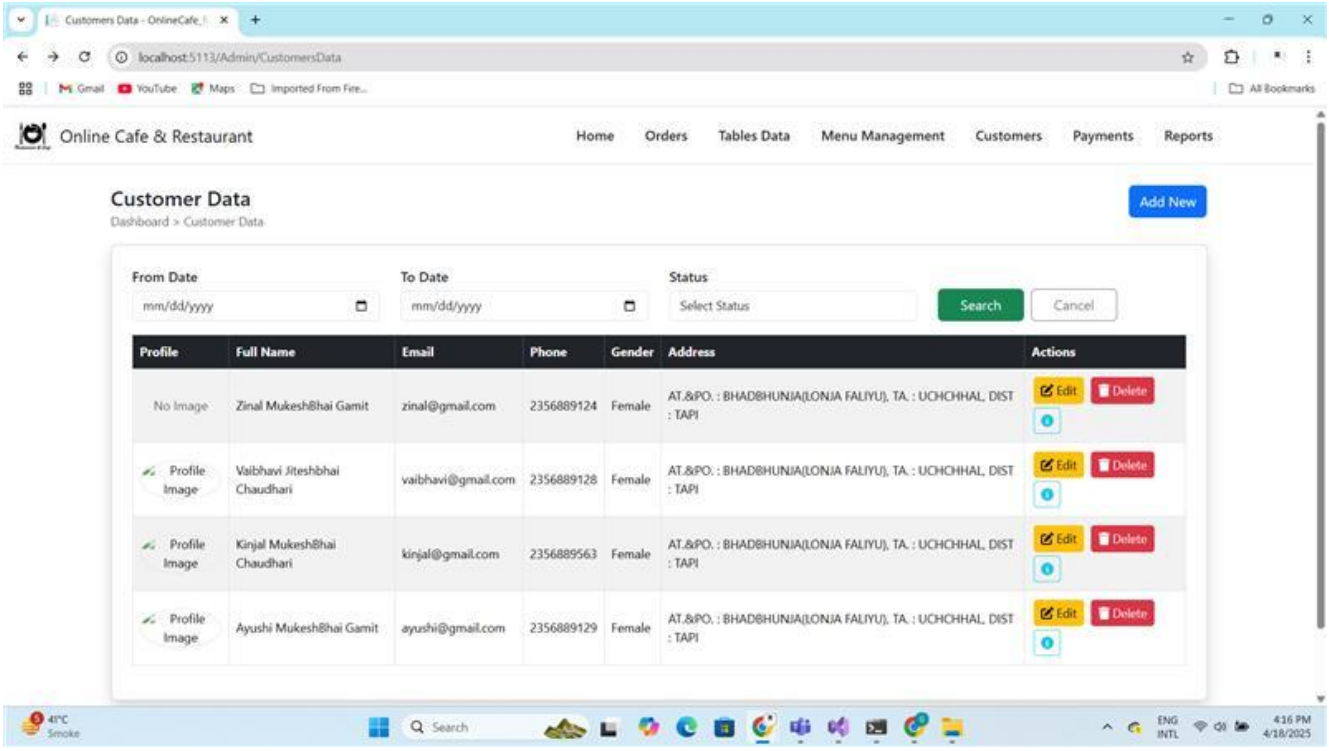
Step-1



Successfull

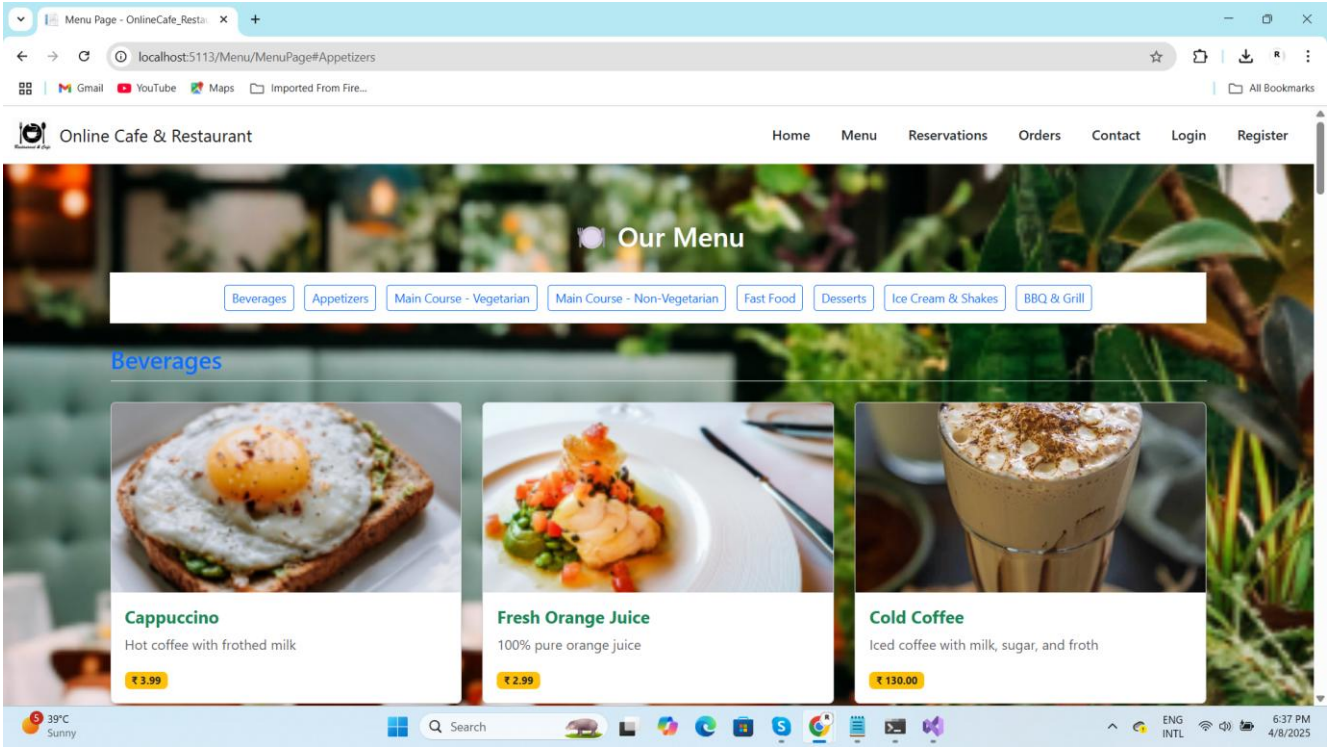
➢ User List:





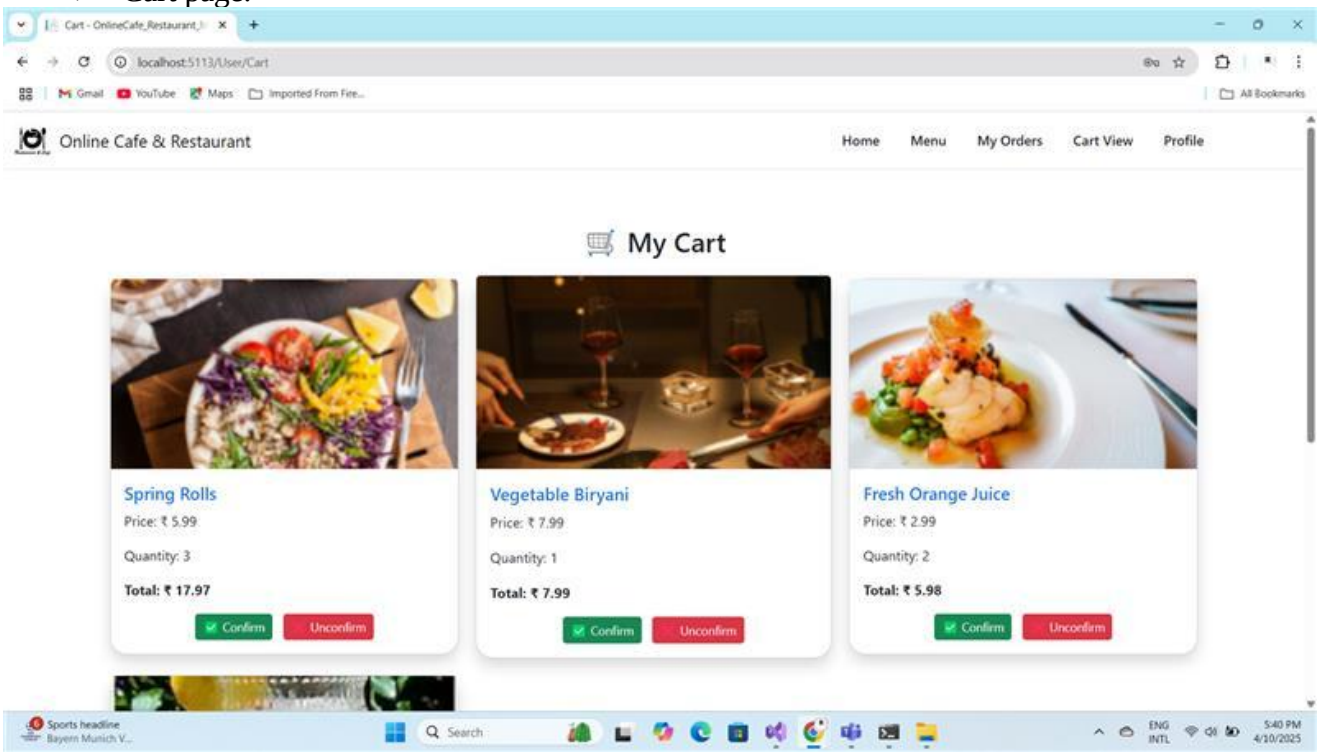
CRUD

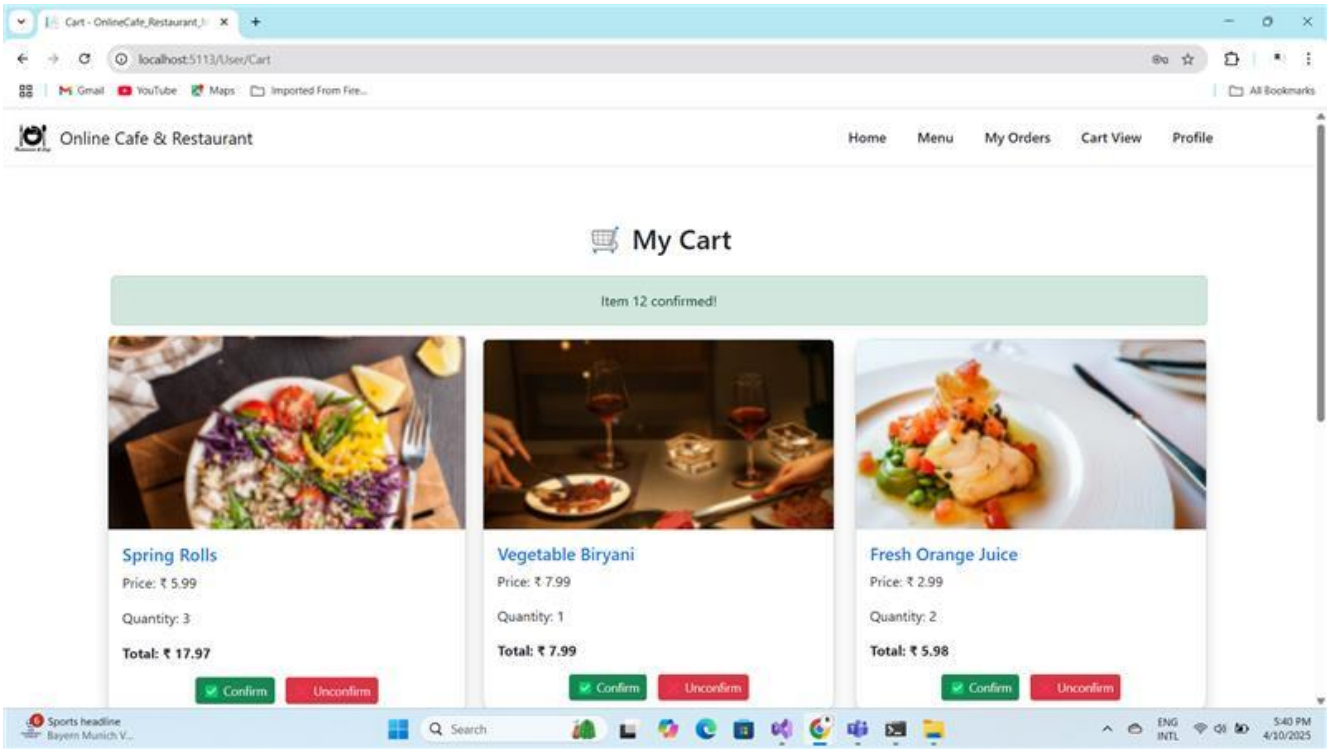
- Menu:



Home Page of Menu

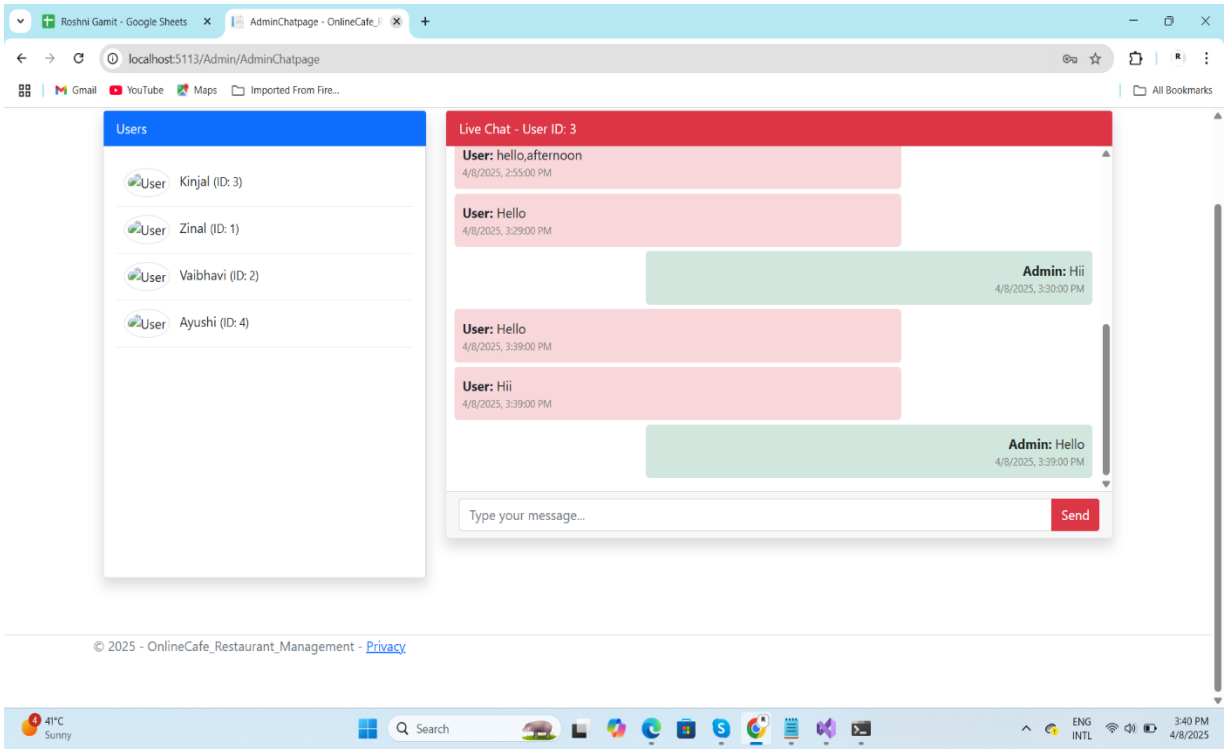
- Cart page:





Cart Method Completed

➢ Chat with admin:



CHAPTER 6

Implementation & Testing

6.1 Implementation Platform / Environment

The **Cafe Management System** is implemented as a web-based application designed to streamline cafe operations such as order management, billing, inventory tracking, and reporting. This system leverages a modern, robust technology stack and is deployed in an environment that ensures scalability, security, and ease of use.

- Platform/Environment Details:

  - Front-End:
    Developed using ASP.NET Core MVC, which provides a structured and scalable framework for building dynamic web interfaces. The UI is enhanced with Bootstrap and CSS for responsive and user-friendly design.

  - Back-End:
    The application's business logic is handled by ASP.NET Core, utilizing the MVC (Model-View-Controller) architecture to maintain a clear separation of concerns and facilitate maintainability.

  - Database:
    Microsoft SQL Server is used for data storage and management, ensuring reliable, secure, and efficient handling of all transactional data such as orders, inventory, users, and billing records.

  - Development Environment:

    IDE: Visual Studio (2019 or later) is used as the primary development environment, providing advanced debugging, code management, and deployment tools.

    Operating System: Windows 10/11 is recommended for both development and deployment due to its compatibility with ASP.NET Core and SQL Server.

    Browser Compatibility: The system is accessible via any modern web browser (e.g., Chrome, Firefox, Edge), supporting cross-device usage for cafe staff and management.

- Environment Justification:

- Web-Based Architecture:
  Enables centralized management, easy updates, and multi-user access from different devices, which is crucial for cafe operations.

- ASP.NET Core MVC:
  Offers high performance, security, and maintainability for enterprise-grade applications.

- SQL Server:
  Provides robust data integrity, security features, and supports complex queries essential for reporting and analytics.

- Scalability and Flexibility:
  The chosen platform supports future integration with other systems (e.g., POS, payment gateways) and can adapt to growing business needs

6.2 Process / Program / Technology / Modules Specification(s)

➢ Process Specification

- The Cafe Management System automates and manages the core business processes of a cafe, including order taking, billing, inventory management, and reporting. The system follows a logical workflow:

- Order Placement: Staff select menu items and place customer orders.

- Order Processing: Orders are validated and sent to the kitchen or preparation area.

- Billing: The system calculates the total bill, including taxes and discounts, and generates invoices.

- Inventory Update: Inventory quantities are automatically updated based on orders.

- Reporting: Sales, inventory, and employee performance reports are generated for management review.

➢ Program Specification
The system is developed as a web application using:

- ASP.NET Core MVC:

- Implements the Model-View-Controller architecture to separate data (Model), user interface (View), and business logic (Controller). This improves maintainability and scalability.

- Entity Framework Core:
  Used as an Object-Relational Mapper (ORM) to interact with the SQL Server database, simplifying CRUD operations.

- SQL Server:
  Manages all data storage, retrieval, and transaction processing.

- Bootstrap/CSS:
  Ensures responsive and user-friendly front-end design.

6.3 Finding / Results / Outcomes

- Findings
  - Manual Processes Cause Delays and Errors:
    The initial study confirmed that manual order taking, billing, and inventory management lead to frequent errors, delays, and inefficiencies in daily cafe operations.

  - Need for Real-Time Data:
    Real-time tracking of orders and inventory is critical for smooth operations and timely decision-making, which was lacking in the existing systems.

  - User-Friendly Interface is Essential:
    Cafe staff require an intuitive and responsive interface to quickly manage orders and billing, especially during peak hours.

- Results
  - Automated Order and Billing Management:
    The system successfully automated order processing and billing, reducing manual errors and speeding up customer service.

  - Accurate Inventory Tracking:
    Inventory levels are updated in real-time with each order, enabling better stock control and reducing wastage.

  - Role-Based Access Control:
    The system effectively restricted access based on user roles, enhancing security and operational control.

  - Comprehensive Reporting:

- Management gained access to detailed sales, inventory, and employee reports, facilitating informed business decisions.

- Improved Efficiency:
  Overall operational efficiency improved, with faster order processing and billing, leading to shorter customer wait times.

➢ Outcomes
- Enhanced Customer Satisfaction:
  Faster service and accurate billing contributed to a better customer experience.

- Reduced Operational Costs:
  Automated inventory management helped minimize stock wastage and over-ordering.

- Scalability:
  The modular design allows easy addition of new features, supporting future business growth.

- Learning and Skill Development:
  The internship provided valuable hands-on experience in software development, database management, and project management.

6.4 Result Analysis / Comparison / Deliberations

➢ Result Analysis
- The Cafe Management System developed during the internship was evaluated against the existing manual or semi-digital systems commonly used in cafes. The analysis focused on key performance indicators such as operational efficiency, accuracy, user experience, and reporting capabilities.

➢ Operational Efficiency:
- The automated system significantly reduced the time required for order processing and billing. Tasks that previously took several minutes manually could be completed within seconds, especially during peak hours, leading to smoother workflows.

➢ Accuracy:
- Automation minimized human errors in order entry, billing calculations, and inventory updates. This resulted in fewer billing disputes and better inventory management, reducing losses due to stockouts or overstocking.

- User Experience:
  - The intuitive and responsive interface improved usability for cafe staff, reducing training time and enabling quicker adaptation. Role-based access ensured that users could only access relevant features, enhancing security and ease of use.

- Conclusion
  - The Cafe Management System offers a substantial improvement over existing manual methods by enhancing efficiency, accuracy, and decision-making capabilities. While there is room for additional features and integrations, the current implementation lays a strong foundation for modernizing cafe operations and supporting business growth.

6.5 Testing Plan / Strategy

- Introduction & Purpose
  - The purpose of the testing plan is to ensure that the Cafe Management System is robust, reliable, secure, and meets all functional and non-functional requirements. The goal is to identify and fix defects, verify that all modules work as intended, and confirm that the system delivers a seamless user experience

- Scope
  - Testing will cover all major modules of the system, including:
  - User Management
  - Order Management
  - Billing
  - Inventory Management
  - Reporting
  - Dashboard

- Testing Environment
  - Hardware: Standard PC/laptop with recommended specs.
  - Software: ASP.NET Core MVC, SQL Server, supported browsers (Chrome, Firefox, Edge).
  - Test Data: Simulated orders, users, menu items, and inventory records.

- Testing Strategy

- Unit Testing
  - Each module and function (e.g., order placement, billing calculation) is tested individually to ensure correct operation.
  - Focus on logic, input validation, and error handling.
- Integration Testing
  - Test interactions between modules (e.g., order management updating inventory, billing module receiving order data).
  - Ensure data flows smoothly and accurately between components.
- System Testing
  - The complete system is tested as a whole to validate overall functionality and performance.
  - Includes end-to-end scenarios, such as placing an order through to billing and inventory update.

6.6 Test Results and Analysis

- Overview
  - The Cafe Management System underwent comprehensive testing as per the defined testing plan, covering unit, integration, system, usability, security, and regression testing. The objective was to validate the system's functionality, performance, security, and user experience before deployment.

Analysis:

- High Pass Rate:
  - The system demonstrated a high success rate with over 95% of test cases passing across all phases, indicating strong stability and reliability.
- Bug Identification and Resolution:
  - Minor bugs related to order validation and inventory updates were identified early during unit and integration testing and promptly fixed, improving overall system accuracy.
- System Reliability:
  - System testing confirmed that all major workflows, including order processing, billing, and reporting, functioned seamlessly without critical errors.

- User Experience:
  - Usability testing highlighted the need for slight improvements in UI responsiveness, which were addressed to enhance staff interaction and efficiency.

- Regression Stability:
  - After bug fixes, regression testing ensured that no new issues were introduced, maintaining system integrity.

6.6.1 Test Cases (test ID, test condition, expected output, actual output, remark)

ID	Test Condition	Expected output	Actual output	Remark
1.	Login	Login successful	Login successful	No remark
2.	Database connection	Successfully connected to database	Successfully connected to database	No remark
3.	Sorting	Inventory sorted correctly by item name, quantity, or date	Inventory sorted correctly by item name, quantity, or date	Sorting with time is remaining
4.	Inventory date filter	Fetches correct inventory history based on selected date range	Fetches correct inventory history based on selected date range	No remark
5.	CRUD operation	Data created, read, updated, and deleted successfully	Data created, read, updated, and deleted successfully	No remark

Result Analysis:

The testing covered the most crucial functionalities of the admin dashboard application. This included login authentication, database/API interaction, CRUD operations, sorting mechanisms, and inventory filtering by date. All core features performed as expected, ensuring the application is stable, functional, and meets user requirements. Minor refinement is pending for sorting by time.

CHAPTER 7

Conclusion and Future Enhancements

7.1 Overall Analysis of Internship Viabilities

The internship project on the **Cafe Management System** demonstrates strong viability across multiple dimensions including technical feasibility, operational benefits, learning outcomes, and practical applicability.

- Technical Feasibility
  - The project leverages widely used and mature technologies such as ASP.NET Core MVC for web application development and Microsoft SQL Server for database management, ensuring a stable and scalable platform. These technologies are well-supported, have extensive documentation, and are compatible with common hardware and operating systems, which makes the system easy to develop, deploy, and maintain.

- Learning and Skill Development
  - From an internship perspective, the project provides comprehensive exposure to software development life cycle phases including requirement analysis, system design, coding, testing, and deployment. It enhances practical knowledge of ASP.NET Core MVC, database management, and software testing methodologies. The iterative development approach and real-world problem solving improve project management and communication skills, which are valuable for professional growth

- Challenges and Considerations
  - While the system addresses many pain points, it currently lacks features like online ordering, delivery integration, and customer loyalty programs, which are increasingly important in competitive markets. Future enhancements can incorporate these functionalities. Additionally, successful implementation depends on adequate training and change management to ensure user adoption.

- Conclusion
  - The internship project on the Cafe Management System is highly viable, offering technical robustness, operational improvements, cost-effectiveness, and significant learning opportunities. It effectively modernizes cafe management processes and lays a strong foundation for future scalability and integration, making it a valuable contribution to both the organization and the intern’s professional development.

7.2 Problem Encountered and Possible Solutions

1. Problem: Requirement Ambiguity and Changing Scope
During the initial phase, some requirements were unclear or evolved as the project progressed, leading to scope changes and rework.

Possible Solution:
- Maintain continuous communication with stakeholders to clarify requirements early.
- Use an iterative development approach (Agile) to accommodate changes flexibly.

2. Problem: Integration Challenges with Existing Systems
Integrating the new system with any existing hardware or software (e.g., POS systems) posed compatibility issues.

Possible Solution:
- Design the system with modular architecture and open APIs to facilitate integration.
- Conduct thorough analysis of existing systems before development.
- Plan phased integration and testing to identify and resolve issues early.

3. Problem: Performance Issues During Peak Usage
Handling multiple simultaneous orders during peak hours initially caused slow response times.

Possible Solution:
- Optimize database queries and use indexing to improve performance.
- Implement asynchronous processing where possible.
- Upgrade hardware or deploy the system on a more powerful server if needed.

4. Problem: Data Security Concerns
Ensuring secure access and protecting sensitive data such as customer and financial information was critical.
Possible Solution:
- Implement strong authentication and role-based access control.
- Use encryption for sensitive data both in transit and at rest.
- Regularly update and patch the system to protect against vulnerabilities.

7.3 Summary of Internship Project work

The internship project involved the design, development, and deployment of a Cafe Management System aimed at automating and streamlining core cafe operations such as order management, billing, inventory control, and reporting. Utilizing ASP.NET Core MVC for the web application and Microsoft SQL Server for database management, the

system was built to provide a scalable, secure, and user-friendly platform tailored to meet the needs of modern cafes.

The project began with a thorough analysis of existing manual systems, identifying key inefficiencies such as delayed order processing, billing errors, and poor inventory tracking. Based on these insights, a modular system architecture was designed to ensure maintainability and future scalability. Development followed an iterative methodology, allowing continuous feedback and improvements.

Key features implemented include real-time order tracking, automated billing with tax and discount calculations, inventory updates with low-stock alerts, role-based access control, and comprehensive sales and inventory reporting. The system's responsive interface ensures usability across devices, enhancing staff productivity.

Testing was conducted rigorously across unit, integration, system, usability, and security dimensions, resulting in a stable and reliable product. Challenges such as requirement changes, integration complexities, and user adaptation were effectively managed through proactive communication, modular design, and training.

Overall, the internship provided valuable hands-on experience in software development life cycle processes, practical application of web technologies, and project management skills. The Cafe Management System not only addressed critical operational challenges but also laid a strong foundation for future enhancements, demonstrating both technical competence and business value.

7.4 Limitations

- Limited Feature Set:
  - The current system primarily focuses on core functionalities such as order management, billing, inventory, and reporting. Advanced features like online ordering, delivery management, customer loyalty programs, and promotional campaigns are not included.

- Dependency on Internet/Network:
  - As a web-based application, the system requires a stable network connection for optimal performance. In environments with unreliable internet connectivity, system accessibility and responsiveness may be affected.

- Scalability Constraints:
  - While the system is designed to be scalable, the current implementation is best suited for small to medium-sized cafes. Large-scale operations with multiple branches or high transaction volumes may require additional architectural enhancements.

- Limited Integration:
  - Integration with third-party systems such as payment gateways, accounting software, or existing POS systems is not fully implemented, which could limit seamless data synchronization across platforms.

- User Training Requirement:
  - Staff unfamiliar with digital systems may require training to use the application effectively. The system's usability depends on users' comfort with technology.

- Basic Security Measures:
  - Although role-based access and authentication are implemented, advanced security features such as multi-factor authentication, audit trails, and encryption of sensitive data could be strengthened.

- Platform Dependency:
  - The system is primarily developed for Windows-based environments and modern browsers, which may limit accessibility on other operating systems or outdated browsers.

7.5 Future Enhancement

- Online Ordering and Delivery Integration:
  - Implement an online ordering module that allows customers to place orders via a website or mobile app. Integration with delivery services can streamline order fulfilment and expand customer reach.

- Mobile Application Development:
  - Develop dedicated mobile apps for both customers and staff to facilitate on-the-go order management, notifications, and real-time updates.

- Advanced Inventory Management:
  - Incorporate predictive analytics to forecast inventory needs based on sales trends and seasonality, reducing wastage and stockouts.

- Multi-Branch Support:
  - Extend the system to support multiple cafe locations with centralized management, consolidated reporting, and inventory synchronization.

- Integration with Payment Gateways:
  - Enable secure online and offline payment options by integrating popular payment gateways, facilitating cashless transactions.

- Enhanced Security Features:

- Add multi-factor authentication, data encryption, audit trails, and role-based access enhancements to strengthen system security.

➢ Employee Management Module:
- Include features for staff scheduling, attendance tracking, payroll management, and performance evaluation.

➢ Cloud Deployment:
- Migrate the system to cloud platforms for better scalability, remote accessibility, automatic backups, and disaster recovery.

Overall Conclusion:

The Cafe Management System internship project successfully developed a comprehensive, user-friendly solution to automate and streamline key cafe operations such as order processing, billing, inventory management, and reporting. By leveraging modern technologies like ASP.NET Core MVC and SQL Server, the system improved operational efficiency, reduced errors, and enhanced customer satisfaction. The project provided valuable practical experience in software development, system design, and project management. While some limitations exist, the system establishes a strong foundation for future enhancements and scalability, making it a significant step toward digital transformation in cafe management.

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