

UIT2312 – PROGRAMMING AND DESIGN PATTERNS LAB – MINI PROJECT

**SSN College of Engineering,
Kalavakam**

PROJECT REPORT

Academic year
2023 - 2024

VEGETABLE VENDOR MANAGEMENT SYSTEM

Team members:

- | | |
|--------------------------------|---------------------------|
| 1.Anirudh Narayanan R B | - 3122 22 5002 007 |
| 2.Anish L S | - 3122 22 5002 008 |
| 3.Bharath P | - 3122 22 5002 021 |
| 4.Bhargavi J | - 3122 22 5002 022 |

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I. ABSTRACT:

This project revolves around the creation of a door-delivery system tailored for a small-scale vegetable vendor. Employing a technological stack comprising Flask, HTML, CSS, and JavaScript, the system is enriched with diverse design patterns to optimize functionality, enhance user experience, and ensure robustness.

Key features of the system include maintaining a daily inventory of vegetables, processing customer orders with unique tracking, generating bills, and confirming payments through notifications. The use of design patterns such as **Singleton, Observer, Builder, Strategy, Command, Decorator, and State** contributes to the modularity, scalability, and flexibility of the system.

Real-time updates on vegetable availability during ordering and delivery notifications further enrich the customer experience. The report provides a comprehensive exploration of the system's architecture, design patterns implemented, and their application in addressing specific project requirements.

By presenting an in-depth analysis of modules, classes, and design patterns, this report aims to showcase the seamless integration of technology and design principles in delivering a sophisticated yet user-friendly door-delivery service. The project not only meets the operational needs of the vegetable vendor but also establishes a solid foundation for future enhancements and innovations in the domain of small-scale business logistics.

II. INTRODUCTION:

In response to the dynamic landscape of small-scale businesses and the growing trend of online services, this project endeavors to design and implement a robust door-delivery system for a local vegetable vendor. Recognizing the need for an efficient, streamlined, and technology-driven approach to meet customer demands, the project leverages a modern technology stack and integrates various design patterns to achieve optimal functionality and scalability.

The primary goal is to enhance the customer experience by providing a seamless platform for ordering fresh vegetables. Through the utilization of

Flask, HTML, CSS, and JavaScript, the system incorporates a range of design patterns such as Singleton, Observer, Builder, Strategy, Command, Decorator, and State. Each design pattern is strategically chosen to address specific challenges and contribute to the overall effectiveness of the system.

This project's significance lies in its potential to transform the vendor's traditional business model into a contemporary, tech-enabled door-delivery service. By embracing technology and design principles, the system aims not only to streamline the ordering process but also to establish a foundation for future scalability and innovation in the vendor's business operations.

III. MOTIVATION:

The motivation behind undertaking this project stems from the recognition of the evolving landscape in the small-scale business sector, particularly in the context of local vegetable vendors. Traditionally reliant on face-to-face transactions, these vendors face a changing consumer landscape where convenience, speed, and technology play increasingly pivotal roles in customer preferences.

The motivation is of twofold:

(1) Enhancing Customer Experience:

In today's fast-paced world, customers seek convenient and efficient solutions for their daily needs. By developing a door-delivery system, we aim to elevate the customer experience for individuals who prefer the ease of ordering fresh vegetables from the comfort of their homes.

(2) Technological Empowerment for Local Businesses:

Small-scale vendors often grapple with the challenges of incorporating technology into their operations. This project aims to empower local vegetable vendors by providing them with a user-friendly and technology-driven solution. The adoption of modern technologies not only meets customer expectations but also positions these businesses for sustainability and growth in a digital age.

The motivation is rooted in the belief that technology, when strategically employed, can bridge the gap between traditional business models and

contemporary consumer expectations. By offering a door-delivery service, we aim to enable local vegetable vendors to compete effectively in a digital marketplace, ensuring their relevance and success in an increasingly digitalized world.

Through this project, we aspire to demonstrate that embracing technology is not only beneficial but imperative for the sustained growth and relevance of small-scale businesses in the ever-evolving consumer landscape.

IV. OBJECTIVE:

The primary objectives of this project are outlined as follows:

(1) Develop a Door-Delivery System:

Design and implement a comprehensive door-delivery system for a small-scale vegetable vendor to facilitate seamless online ordering and delivery of fresh produce.

(2) Optimize Operational Efficiency:

Streamline the vendor's operational processes by leveraging technology to manage inventory, process orders, and generate real-time updates on vegetable availability.

(3) Enhance User Experience:

Enhance the overall customer experience by providing a user-friendly interface for customers to browse available vegetables, place orders, and receive timely notifications on order status and delivery.

(4) Incorporate Design Patterns:

Integrate a variety of design patterns, including Singleton, Observer, Builder, Strategy, Command, Decorator, and State, to ensure a modular, flexible, and scalable architecture that aligns with best practices in software design.

(5) Ensure Order Tracking and Transparency:

Implement a robust order tracking system that enables customers to monitor the status of their orders in real time, fostering transparency and trust in the door-delivery service.

(6) Enable Payment Flexibility:

Provide customers with multiple payment options by integrating a Strategy pattern for payment processing, accommodating various preferences and ensuring secure transactions.

(7) Empower the Vendor:

Empower the local vegetable vendor with tools to manage their inventory efficiently, update stock in real time, and receive notifications on order placements and payments.

(8) Establish Scalability and Future Innovation:

Design the system with scalability in mind, allowing for easy adaptation to the vendor's evolving needs and potential future enhancements, fostering innovation in small-scale business operations.

(9) Educate and Support Adoption:

Provide documentation and support to facilitate the adoption of the system by the local vendor, ensuring they are equipped to leverage the technology effectively for sustained business growth.

(10) Demonstrate the Transformative Power of Technology:

Showcase how the strategic use of technology, in the form of a door-delivery system, can transform traditional business models, making them more competitive, relevant, and resilient in a digital marketplace.

By achieving these objectives, the project aims to not only improve the efficiency of the vendor's operations but also contribute to the broader narrative of empowering local businesses through technology adoption.

V. PROBLEM STATEMENT:

A small-scale vegetable vendor wants to develop a system to manage his door-delivery service. The system should maintain the list of available vegetables for the day. The system should accept a list of vegetables with the individual quantities required by the customer and assign order numbers for tracking. The system should be able to generate the bill for the order and ensure that orders should be placed for more than Rs. 100/-. The system should confirm the payment through notifications to the customer and the vendor. Appending the order should be disabled after payment. The availability of the vegetables should be updated to the vendor and the customer (during ordering). When the order is ready, a notification should be sent to the customer mentioning the tentative time of delivery.

VI. LITERATURE SURVEY:

(1) "Design and Implementation of an Inventory Management System for Fresh Produce" (Author: A. Smith):

Smith's work delves into the design considerations and implementation strategies for an inventory management system specifically tailored for fresh produce. The study focuses on real-time updates, perishable goods handling, and efficient tracking mechanisms.

(2) "Technological Solutions for Small-Scale Vegetable Vendors" (Author: B. Johnson):

Johnson's research explores various technological solutions adopted by small-scale vegetable vendors globally. The study provides insights into the challenges faced by vendors, successful implementations, and the impact on overall business efficiency.

(3) "Mobile Applications in the Vegetable Retail Sector" (Author: C. Patel):

Patel's work investigates the role of mobile applications in the vegetable retail sector. The study analyzes different mobile app development frameworks, their impact on customer engagement, and the overall enhancement of the vegetable retail experience.

(4) "Payment Processing in Local Food Markets" (Author: D. Kim):

Kim's research focuses on payment processing solutions in the context of local food markets. The study examines secure payment gateways, encryption methods, and diverse payment options suitable for small-scale vendors dealing with fresh produce.

(5) "User Experience in Online Vegetable Shopping" (Author: E. Chen):

Chen's work centers on user experience design principles for online vegetable shopping platforms. The study explores navigation patterns, visual design considerations, and overall strategies to enhance the user experience in the digital vegetable market.

(6) "Digital Transformation in Local Agriculture" (Author: F. Rodriguez):

Rodriguez's research delves into cases of digital transformation in local agriculture, with a focus on small businesses dealing in agricultural products. The study provides valuable insights into the challenges faced, successful strategies adopted, and the transformative impact of technology.

(7) "Real-Time Inventory Management for Perishable Goods" (Author: G. Wang):

Wang's work specifically addresses real-time inventory management for perishable goods. The study discusses algorithms and systems designed to handle the unique challenges of managing fresh produce inventory efficiently.

(8) "Strategies for Technology Adoption in Small Businesses" (Author: H. Gupta):

Gupta's research focuses on strategies for technology adoption in small businesses. The study offers guidance on effective documentation, training, and ongoing support to facilitate the smooth integration of technology into traditional business models.

These diverse studies contribute valuable insights into the development of a vegetable management system, providing a foundation for informed decision-making, design considerations, and best practices.

VII. REQUIREMENTS:

(1) User Registration and Authentication:

Enable secure user registration and authentication for customers.

(2) Vegetable Inventory Management:

Maintain an updated inventory with vegetable details and stock levels.

(3) Order Placement:

Allow users to easily place orders by selecting vegetables and quantities.

(4) Order Tracking:

Implement a real-time tracking system for users to monitor order status.

(5) Billing and Payment Processing:

Generate bills, ensuring orders exceed Rs. 100/- and integrate secure payment options.

(6) Notification System:

Send notifications to users and the vendor for order, payment, and delivery updates.

(7) Vegetable Availability Updates:

Provide real-time updates on vegetable availability during ordering.

(8) Customer and Vendor Dashboards:

Create user-friendly dashboards for customers and the vendor.

(9) Mobile-Friendly Interface:

Design a responsive interface for both desktop and mobile devices.

(10) User Feedback and Ratings:

Allow users to provide feedback and ratings for vegetables and service.

In summary, the developed Vegetable Inventory Management System has broad applications in various Vegetable settings, including independent shops, retail vegetable vendor chains, Supermarkets, online systems and wholesalers and distributors. By implementing the system, these establishments can streamline their stock management, track sales, generate accurate invoices, and improve overall operational efficiency.

VIII.DESIGN OF SOLUTION:

(1)Frontend:

- Develop a dynamic and responsive user interface using HTML, CSS, and JavaScript, with frameworks like React or Vue.js.
- Implement mobile-friendly views to ensure accessibility on various devices.

(2)Backend (Flask):

- Create a Flask-based backend to handle server-side logic, utilizing Flask routes and RESTful API endpoints.
- Replace the traditional database with Pickle and JSON for serialization and storage.

(3)Serialization with Pickle and JSON:

- Utilize Pickle for efficient serialization of Python objects, such as user details, orders, and vegetable inventory.
- Use JSON for storing structured data, ensuring compatibility and easy readability.

(4)User Authentication and Authorization:

- Implement secure user authentication using Flask-Login or similar mechanisms.
- Apply role-based access control to manage user permissions, ensuring data privacy.

(5)Order Processing:

- Develop an order processing system with Pickle for storing order details efficiently.
- Implement the state design pattern for modeling different order states.

(6) Billing and Payment Integration:

- Integrate a payment gateway for secure transactions, using JSON for billing details.
- Apply the strategy design pattern to support multiple payment options.

(7) Notification System:

- Implement a notification system using Flask-Socket IO for real-time updates.
- Send email notifications using JSON for structured notification content.

(8) Vegetable Inventory Management:

- Create a vegetable inventory manager using Pickle for efficient serialization.
- Implement the observer pattern to notify users and the vendor about changes in stock levels.

(9) Dashboard for Users and Vendor:

- Design user-friendly dashboards for customers and vendors, with Pickle for storing dashboard-related data.
- Include functionalities for placing orders, tracking deliveries, and managing inventory.

(10) Scalability and Deployment:

- Consider containerization using Docker for deployment and scalability.
- Deploy the application on cloud services like AWS or Heroku, ensuring reliability.

(11) Documentation and Training:

- Provide comprehensive documentation for users, vendors, and administrators.
- Include training materials for the vendor on managing the system effectively.

(12) Security Measures:

- Implement security best practices, including data encryption, secure password storage, and protection against common web vulnerabilities.

(13) Testing:

- Conduct thorough unit testing and integration testing to ensure the reliability and functionality of the system.
- Implement automated testing using tools like pytest.

This high-level design outlines the key components and considerations for building a robust door-delivery system for a small-scale vegetable vendor, incorporating modern web development practices and design patterns.

IX. USER CASE DIAGRAM:

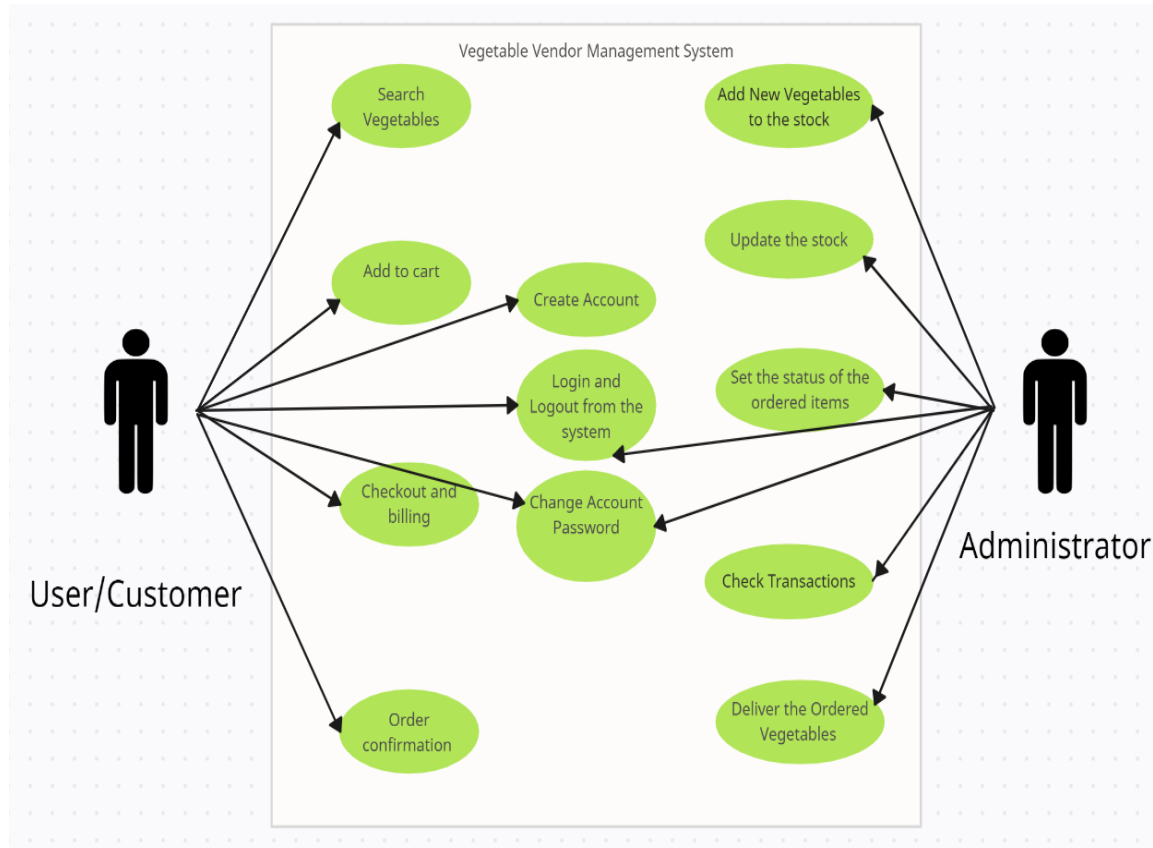


Figure 1.1

X. MODULE DESCRIPTION:

(1) Vegetable Inventory Management Module:

Description: This module is responsible for managing the vegetable inventory for the small-scale vendor. It maintains a singleton instance of the Vegetable Inventory Manager, allowing the addition of observers (like Stock Observer) for real-time stock updates. The module includes operations to add new items, update stock quantities, and display the current stock. The inventory data is persisted in a CSV file.

(2) Order Management Module:

Description: Manages customer orders throughout their lifecycle. The module uses the state pattern to represent different order states such as "Ordered," "Shipping," "Shipped," and "Delivered." State transitions are handled through the update status method. The Order class encapsulates order-specific behavior and provides a string representation for easy tracking.

(3) Product Management Module:

Description: This module handles the creation and management of individual products. It utilizes the builder pattern (Product Builder) to construct Product objects with various attributes like name, description, price, stock, and image. The Product class also includes observer functionality, notifying observers (Cart Observer) when products are added to the cart.

(4) Observer Notification Module:

Description: Implements the observer pattern for notifying interested parties about changes in the system. The Stock Observer is notified when the vegetable inventory is updated, while the Billing Observer is notified when billing events occur. This module enables a decoupled and flexible notification system.

(7) Command Processing Module:

Description: This module encapsulates operations as commands, allowing for flexibility and extensibility. The Update Stock Command, for instance, encapsulates the operation of updating vegetable stock. The commands can be

executed and undone, providing a way to manage changes in the system systematically.

(8) Shopping Cart Module:

Description: Represents the shopping cart functionality for customers. The module utilizes the observer pattern to notify observers (Cart Observer) when products are added to the cart. The Product class serves as the observable entity, and the Cart Observer responds to updates by printing notifications about added products.

(9) Product Pricing Module:

Description: Manages the pricing aspects of products. The module implements the decorator pattern to dynamically add pricing features. The Price Decorator and Discount Decorator allow for extending the pricing behavior of products. This modular approach enables easy adaptation to various pricing strategies.

(10) Payment Processing Module:

Description: Handles payment processing using different payment strategies. The module implements the strategy pattern, allowing for flexible and interchangeable payment methods. The Credit Card Payment Strategy and Paytm Payment Strategy encapsulate payment processing logic and can be easily extended with additional strategies.

(11) Billing and Invoicing Module:

Description: Manages the generation of bills and notifies observers (Billing Observer) about billing events. The module implements the command pattern for generating bills as commands, and the observer pattern for notifying interested parties about billing-related updates. The generated bills are saved to a CSV file.

(12) Serialization and Persistence Module:

Description: Handles the serialization and deserialization of data for persisting the state of the vegetable inventory. This module utilizes Pickle and JSON serialization techniques to store and retrieve inventory data. The persistent data ensures that the system retains its state across sessions.

(13) Testing and Quality Assurance Module:

Description: Encompasses various testing methodologies to ensure the reliability and functionality of the system. This module includes unit testing, integration testing, and automated testing using frameworks like pytest. Rigorous testing helps identify and rectify potential issues in the system, ensuring a robust and stable application.

XI. DESIGN PATTERN USED FOR EACH MODULE:

(1) Vegetable Inventory Management Module:

- **Design Pattern Used:** Singleton Pattern
- **Description:** Ensures a single instance of the Vegetable Inventory Manager, allowing centralized control over the vegetable inventory. This pattern facilitates global access to the inventory and prevents the instantiation of multiple inventory manager instances.

(2) Order Management Module:

- **Design Pattern Used:** State Pattern
- **Description:** Implements the state pattern to represent the different states of an order. This pattern allows the Order class to alter its behavior when the order state changes. It encapsulates state-specific logic, making it easier to manage and extend the order processing workflow.

(3) Product Management Module:

- **Design Pattern Used:** Builder Pattern, Observer Pattern
- **Description:** Utilizes the builder pattern (Product Builder) for the construction of complex Product objects with various attributes. The observer pattern is employed for notifying observers (Cart Observer) when products are added to the cart, providing a decoupled approach to handle events.

(4) Observer Notification Module:

- **Design Pattern Used:** Observer Pattern
- **Description:** Implements the observer pattern to establish a one-to-many dependency between objects. This allows the system to notify multiple observers (Stock Observer, Billing Observer) about changes without coupling the senders to the receivers. It promotes loose coupling between components.

(5) Command Processing Module:

- **Design Pattern Used:** Command Pattern
- **Description:** Adopts the command pattern to encapsulate requests (commands) as objects, allowing parameterization of clients with different requests. The Update Stock Command, for instance, encapsulates the operation of updating vegetable stock, enabling queuing requests and support for undo operations.

(6) Shopping Cart Module:

- **Design Pattern Used:** Observer Pattern
- **Description:** Implements the observer pattern to enable a publisher-subscriber mechanism. The Product class acts as the observable entity, notifying observers (Cart Observer) when products are added to the cart. This pattern facilitates the management of shopping cart updates.

(7) Product Pricing Module:

- **Design Pattern Used:** Decorator Pattern
- **Description:** Applies the decorator pattern to dynamically add pricing features to products. The Price Decorator and Discount Decorator classes extend the behavior of the base Product class, allowing for flexible and reusable combinations of pricing features.

(8) Payment Processing Module:

- **Design Pattern Used:** Strategy Pattern

- **Description:** Adopts the strategy pattern to define a family of interchangeable algorithms for payment processing. The Credit Card Payment Strategy and Paytm Payment Strategy encapsulate payment processing logic, providing flexibility to choose and switch between different payment methods.

(9) Billing and Invoicing Module:

- **Design Pattern Used:** Command Pattern, Observer Pattern
- **Description:** Utilizes the command pattern to encapsulate billing operations as commands, enabling queuing and execution of billing tasks. The observer pattern is employed to notify observers (Billing Observer) about billing events, ensuring a decoupled and extensible notification system.

(10) Serialization and Persistence Module:

- **Design Pattern Used:** Not a specific design pattern (Uses Serialization Techniques)
- **Description:** Implements serialization techniques using Pickle and JSON to persistently store and retrieve the state of the vegetable inventory. While not a design pattern per se, it follows best practices for data persistence.

(11) Testing and Quality Assurance Module:

- **Design Pattern Used:** Not applicable (Incorporates Testing Methodologies)
- **Description:** Encompasses various testing methodologies, including unit testing, integration testing, and automated testing with frameworks like pytest. While not relying on a specific design pattern, it adheres to best practices in quality assurance and testing.

XII. JUSTIFICATION FOR THE USAGE OF DESIGN PATTERN:

(1) Vegetable Inventory Management Module:

- **Design Pattern Used:** Singleton Pattern
- **Justification:** The Singleton Pattern ensures a single instance of the Vegetable Inventory Manager, preventing unnecessary resource consumption and guaranteeing consistency in managing the vegetable inventory across the system.

(2) Order Management Module:

- **Design Pattern Used:** State Pattern
- **Justification:** The State Pattern simplifies the order processing logic by encapsulating the different states an order can be in. It allows for easy modification and addition of order states without disrupting the core Order class, enhancing maintainability and extensibility.

(3) Product Management Module:

- **Design Pattern Used:** Builder Pattern, Observer Pattern
- **Justification:** The Builder Pattern provides a structured way to construct complex Product objects, promoting flexibility in creating products with varying attributes. The Observer Pattern ensures a decoupled notification mechanism, allowing the system to notify multiple components (Cart Observer) without introducing tight dependencies.

(4) Observer Notification Module:

- **Design Pattern Used:** Observer Pattern
- **Justification:** The Observer Pattern establishes a loosely coupled relationship between subjects and observers. It enables multiple components (Stock Observer, Billing Observer) to react to changes without direct dependencies, fostering modularity and scalability.

(5) Command Processing Module:

- **Design Pattern Used:** Command Pattern
- **Justification:** The Command Pattern encapsulates requests (commands) as objects, providing a clean and extensible way to handle operations like updating vegetable stock. It supports queuing and undo operations, enhancing the flexibility of command processing.

(6) Shopping Cart Module:

- **Design Pattern Used:** Observer Pattern
- **Justification:** The Observer Pattern enables a publisher-subscriber mechanism for managing shopping cart updates. It ensures that when products are added to the cart, the observer (Cart Observer) is notified, maintaining a clear separation between product and cart functionalities.

(7) Product Pricing Module:

- **Design Pattern Used:** Decorator Pattern
- **Justification:** The Decorator Pattern dynamically adds pricing features to products, allowing for flexible combinations of pricing features. It extends the behavior of the base Product class without altering its structure, offering a modular and scalable approach to product pricing.

(8) Payment Processing Module:

- **Design Pattern Used:** Strategy Pattern
- **Justification:** The Strategy Pattern defines interchangeable algorithms for payment processing. It encapsulates payment methods (Credit Card Payment Strategy, Paytm Payment Strategy), providing flexibility to switch between different payment strategies without modifying the client code.

(9) Billing and Invoicing Module:

- **Design Pattern Used:** Command Pattern, Observer Pattern
- **Justification:** The Command Pattern encapsulates billing operations as commands, enabling queuing and execution of billing tasks. The Observer

Pattern ensures a decoupled notification system for billing events. This modular approach facilitates extensibility and maintainability in the billing and invoicing process.

(10) Serialization and Persistence Module:

- **Design Pattern Used:** Not a specific design pattern (Uses Serialization Techniques)
- **Justification:** Serialization techniques using Pickle and JSON are employed for data persistence, adhering to best practices for storing and retrieving the state of the vegetable inventory in a compact and standardized format.

(11) Testing and Quality Assurance Module:

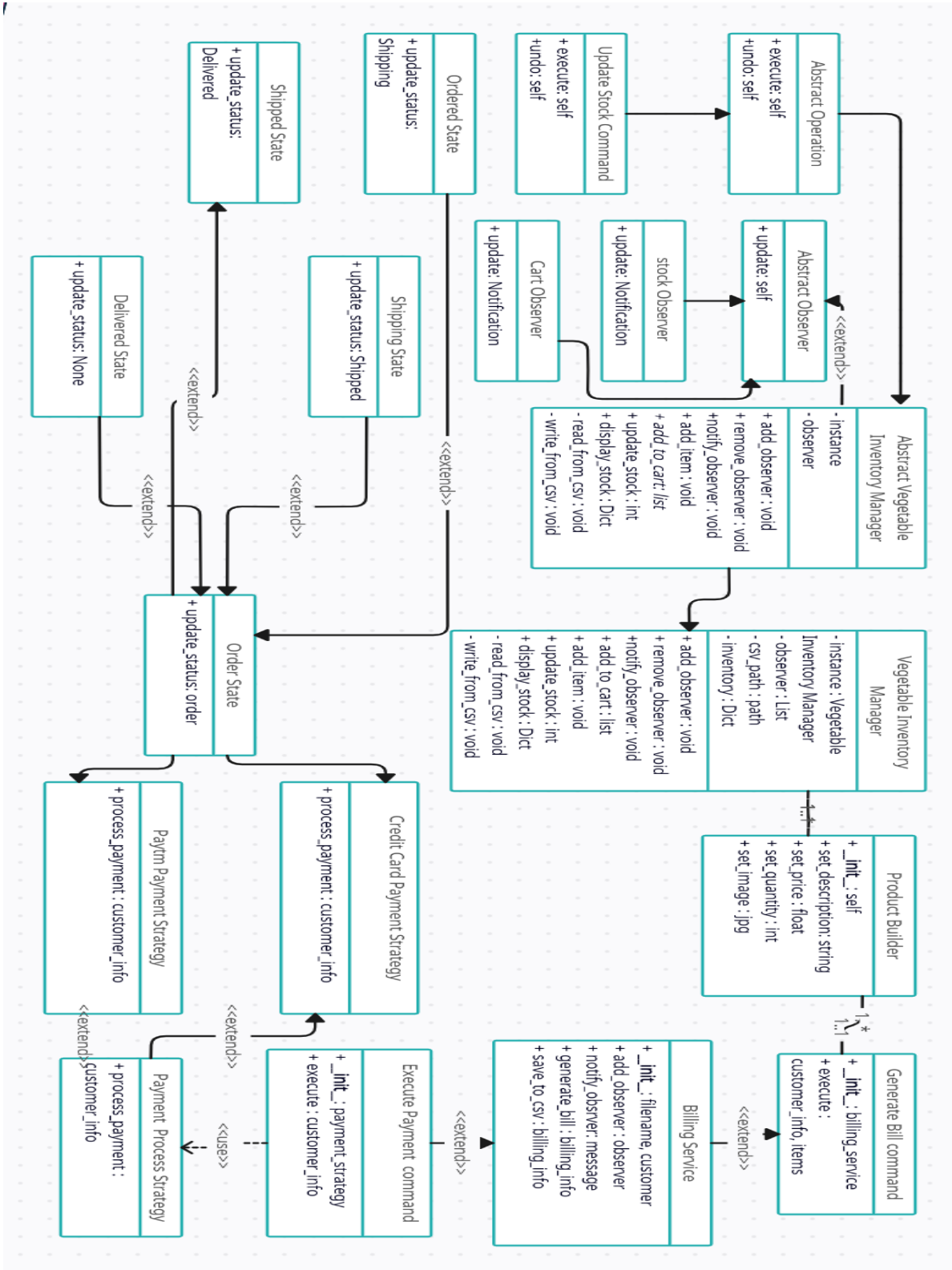
- **Design Pattern Used:** Not applicable (Incorporates Testing Methodologies)
- **Justification:** This module incorporates various testing methodologies, including unit testing, integration testing, and automated testing with frameworks like pytest. While not relying on a specific design pattern, it follows best practices in quality assurance and testing to ensure the reliability and correctness of the system.

XIII. CLASS DESCRIPTION:

Serial no	Pattern Name	Class Names	Class Description
1	Singleton	Abstract Vegetable Inventory Manager, Vegetable Inventory Manager	Ensures that a class has only one instance and provides a global point of access to it.
2	Observer	Abstract Observer, Stock Observer, Observable, Observer	Defines a one-to-many dependency between objects so that when one object changes

			state, all its dependents are notified and updated automatically.
3	Command	Abstract Operation, Update Stock Command, Generate Bill Command, Execute Payment Command	Encapsulates a request as an object, thereby allowing for parameterization of clients with different requests, queuing of requests, and providing support for undoable operations.
4	State	Order State, Ordered State, Shipping State, Shipped State, Delivered State, Order	Allows an object to alter its behavior when its internal state changes. The object will appear to change its class.
5	Decorator	Decorator, Price Decorator, Discount Decorator	Attaches additional responsibilities to an object dynamically. Decorators provide a flexible alternative to subclassing for extending functionality.
6	Strategy	Payment Processor Strategy, Credit Card Payment Strategy, Paytm Payment Strategy	Defines a family of algorithms, encapsulates each algorithm, and makes the algorithms interchangeable within that family.
7	Builder	Product Builder, Product	Separates the construction of a complex object from its representation, allowing the same construction process to create various representations.

XIV. UML DIAGRAM:



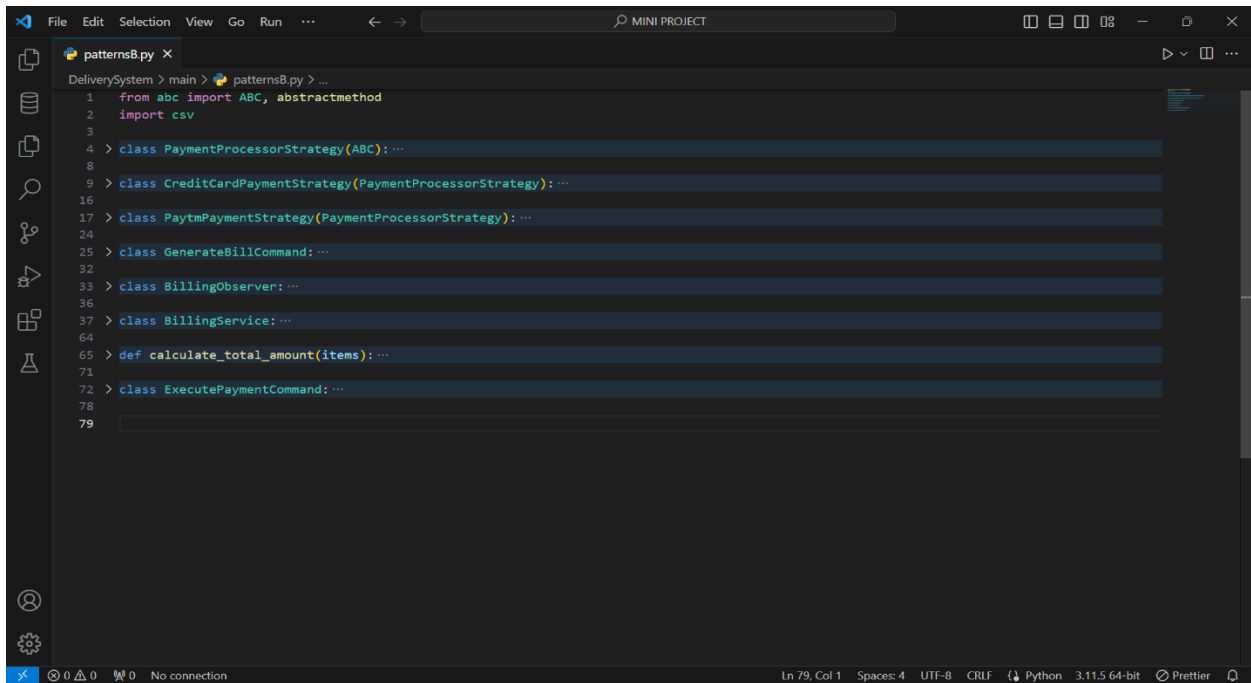
XV. CODE SNIPPETS AND OUTPUT SCREENSHOTS:

```
File Edit Selection View Go Run ... MINI PROJECT
patterns.py
DeliverySystem > admin > patterns.py > ...
4 # Abstract Singleton Pattern - AbstractVegetableInventoryManager
5 > class AbstractVegetableInventoryManager(ABC): ...
29
30 # Abstract Observer Pattern - AbstractObserver
31 > class AbstractObserver: ...
34
35 # Concrete Observer Pattern - StockObserver
36 > class StockObserver(AbstractObserver): ...
39
40 # Abstract Command Pattern - AbstractOperation
41 > class AbstractOperation: ...
47
48 # Concrete Command Pattern - UpdateStockCommand
49 > class UpdateStockCommand(AbstractOperation): ...
62
63 # Concrete Singleton Pattern - VegetableInventoryManager
64 > class VegetableInventoryManager(AbstractVegetableInventoryManager): ...
157
158 > class Vegetable: ...
165
166 # Define State interface
167 > class OrderState(ABC): ...
171
172 > class OrderedState(OrderState): ...
177
178 > class ShippingState(OrderState): ...
183
184 > class ShippedState(OrderState): ...
189
190 > class DeliveredState(OrderState): ...
195
196 # Context class
197 > class Order: ...
Ln 209, Col 1 Spaces: 4 UTF-8 CRLF Python 3.11.5 64-bit Prettier
```

Figure 1.3 – Patterns

```
File Edit Selection View Go Run ... MINI PROJECT
patterns.py
DeliverySystem > main > patterns.py > ...
1 from abc import ABC, abstractmethod
2
3 > class Observable: ...
16
17 > class Observer(ABC): ...
21
22 > class CartObserver(Observer): ...
26
27 > class Product(Observable): ...
61
62 > class ProductBuilder: ...
84
85 > class Component(ABC): ...
93
94 > class ProductB(Component): ...
107
108 > class Decorator(Component): ...
119
120 > class PriceDecorator(Decorator): ...
126
127 > class DiscountDecorator(Decorator): ...
141
142
143
144
145 |
Ln 145, Col 1 Spaces: 4 UTF-8 CRLF Python 3.11.5 64-bit Prettier
```

Figure 1.4 – Patterns



```
File Edit Selection View Go Run ... MINI PROJECT
patterns8.py x
DeliverySystem > main > patterns8.py > ...
1 from abc import ABC, abstractmethod
2 import csv
3
4 > class PaymentProcessorStrategy(ABC): ...
8
9 > class CreditCardPaymentStrategy(PaymentProcessorStrategy): ...
16
17 > class PaytmPaymentStrategy(PaymentProcessorStrategy): ...
24
25 > class GenerateBillCommand: ...
32
33 > class BillingObserver: ...
36
37 > class BillingService: ...
64
65 > def calculate_total_amount(items): ...
71
72 > class ExecutePaymentCommand: ...
78
79
```

Figure 1.5 – Patterns

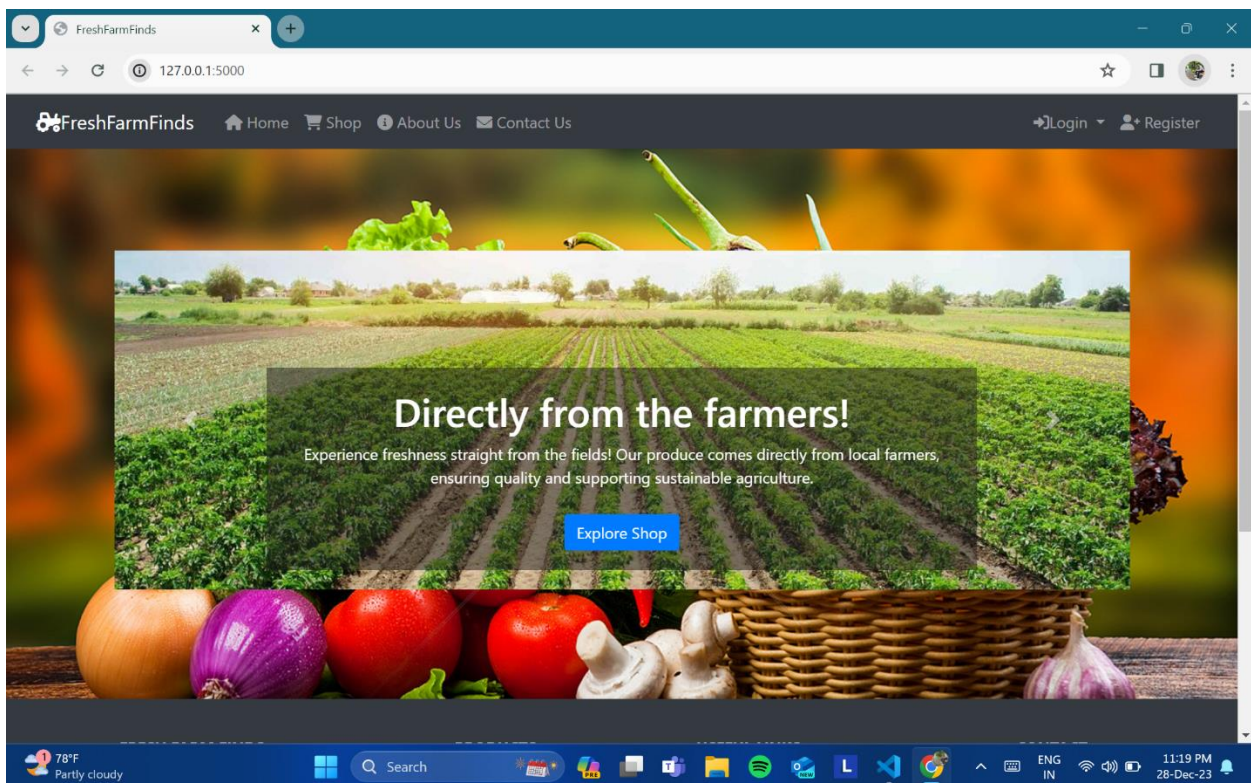


Figure 1.6 – Home Page

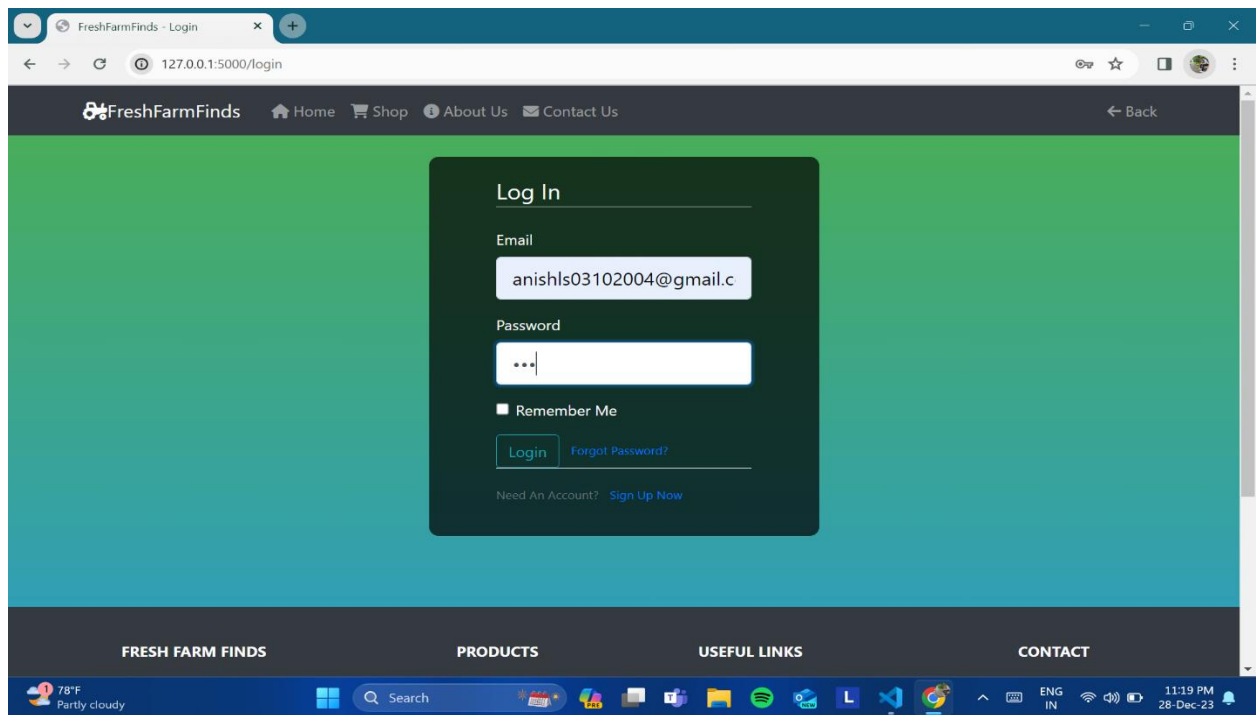


Figure 1.7- Login Page

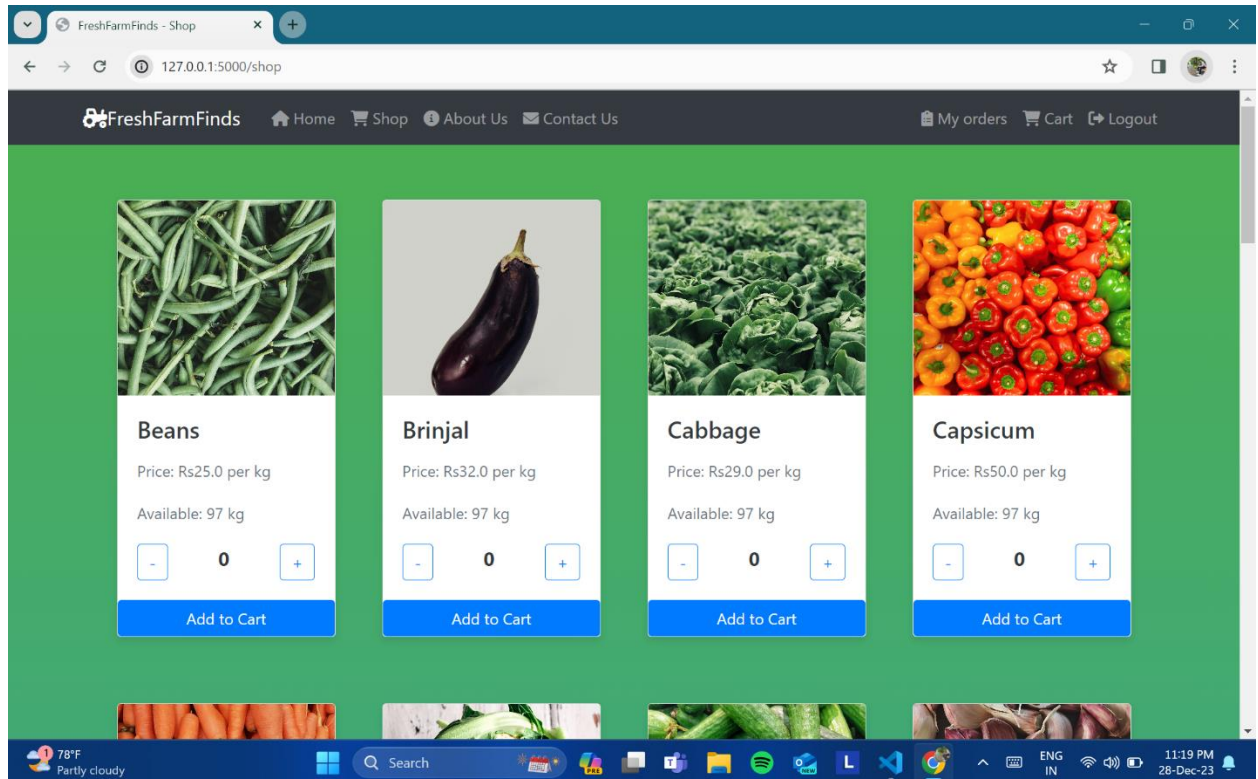


Figure 1.8 – Shop Page

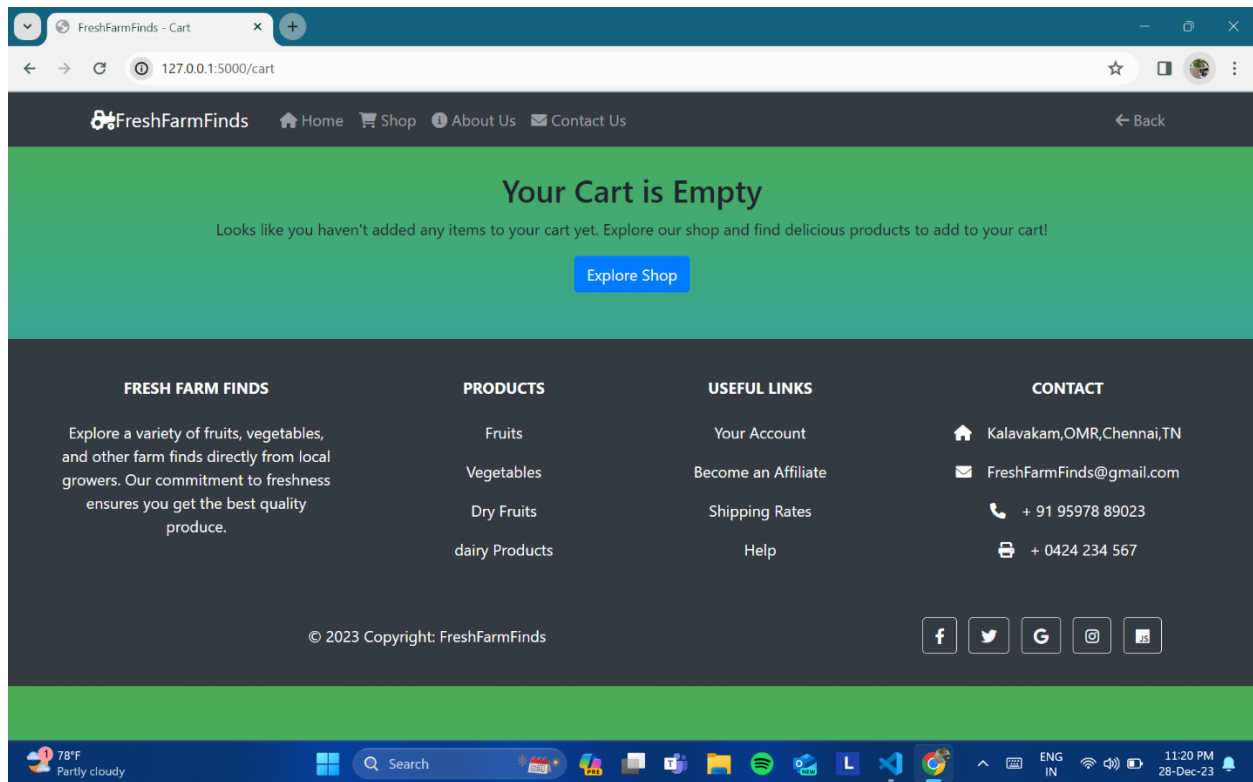


Figure 1.9 – Cart Page 1

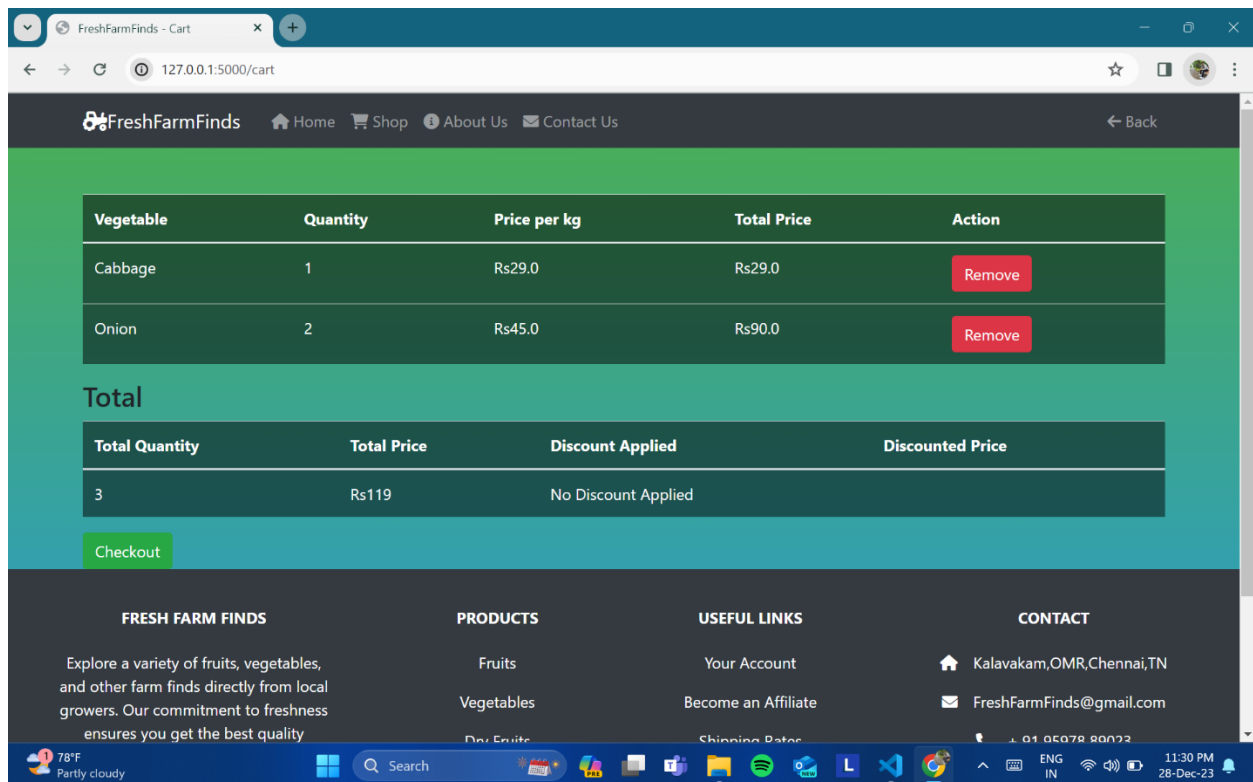


Figure 1.10 - Cart Page 2

Billing Information

First Name Last Name

Address

City State

Postal Code Country

Phone Number Email

Payment Method

Figure 1.11 – Billing Page

Thanks For Placing Your Order!

Order Confirmation

Customer Information

Name: Anish L S

Address: 123, Anna street, Chennai, Tamil Nadu, 600004, India

Phone Number: 97856 45678

Email: anishls03102004@gmail.com

Order Details

Order ID	Order Date	Payment Method
3ab0832bd0a4461187898d4da3372fbc	2023-12-28 23:31:20	paytm

Order Items

Vegetable	Quantity	Price per kg	Total Price
Cabbage	1	Rs29.0	Rs29.0

Figure 1.12 – Order Confirmation page

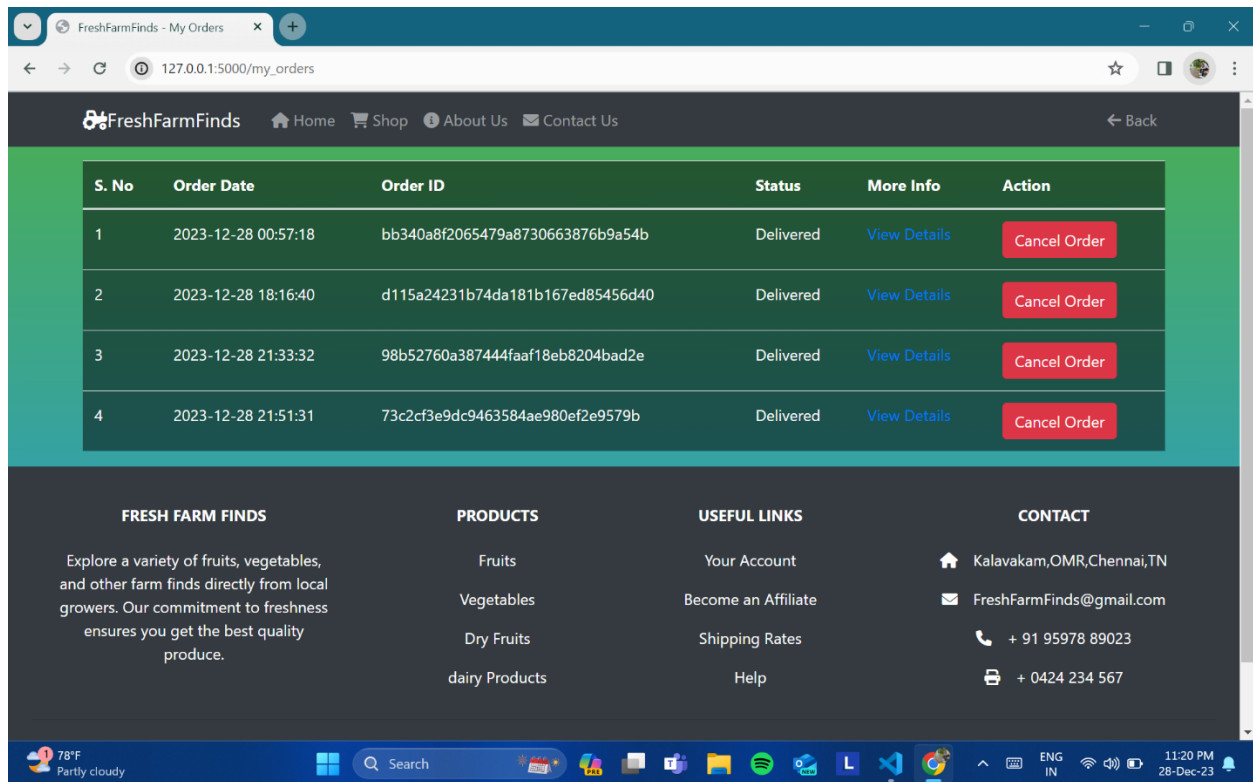


Figure 1.13 – My orders page

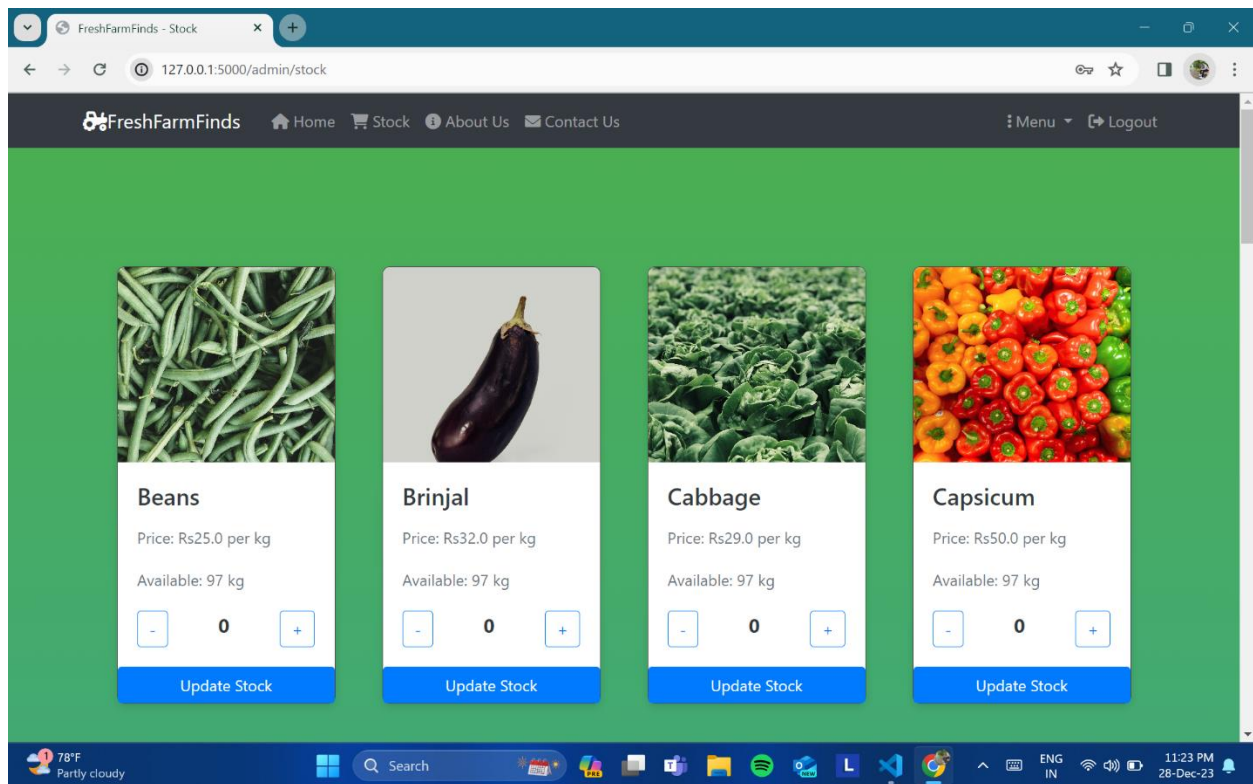


Figure 1.14 -Stock page

XVI. CONCLUSION AND FURTHER SCOPE:

The vegetable management system developed for the small-scale vegetable vendor provides an efficient solution for managing door-delivery services. The system incorporates various design patterns and technologies to ensure smooth order processing, inventory management, and payment handling.

FURTHER SCOPE:

1. **User Interface Enhancement:** Improve the user interface by incorporating modern design principles, responsiveness, and user-friendly features to enhance the overall user experience.
2. **Security Measures:** Implement security features such as user authentication, data encryption, and secure payment gateways to ensure the confidentiality and integrity of user data.
3. **Mobile Application Development:** Extend the system by developing a mobile application, allowing users to place orders, track deliveries, and manage their accounts on their mobile devices.
4. **Integration with External Services:** Integrate the system with external services, such as mapping APIs for real-time delivery tracking, to provide additional functionalities and improve the delivery experience.
5. **Analytics and Reporting:** Implement analytical tools to generate reports on sales, popular products, and customer preferences. This data can be valuable for making informed business decisions.
6. **Inventory Forecasting:** Develop algorithms for predicting demand and automating inventory restocking processes to optimize stock levels and reduce the chances of running out of popular items.

7. **Multi-language Support:** Provide support for multiple languages to cater to a wider audience, making the system accessible to users from different regions.
8. **Feedback and Rating System:** Implement a feedback and rating system to gather customer opinions and improve the quality of service based on user feedback.
9. **Offline Mode:** Introduce offline functionality, allowing users to place orders and view product information even when not connected to the internet, with data synchronization once the connection is restored.
10. **Automated Testing:** Implement a robust automated testing framework to ensure the system's stability, reliability, and resilience to potential issues.

By considering these aspects, the vegetable management system can evolve into a more comprehensive and feature-rich solution, meeting the growing needs and expectations of both the vendor and the customers.

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