SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF SCIENCE AND HUMANITIES
DEPARTMENT OF COMPUTER SCIENCE

PRACTICAL RECORD NOTE

STUDENT NAME:

REGISTRATION NO. :

CLASS: ***BSc Computer Science*** **SEC:** ***'B'***

YEAR & SEMESTER: ***III Year & V Semester***

SUBJECT CODE: ***USA20503J***

SUBJECT TITLE: ***SOFTWARE ENGINEERING AND TESTING***

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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND HUMANITIES

DEPARTMENT OF COMPUTER SCIENCE

SRM, KATTANKULATHUR – 603 203

CERTIFICATE

Certified to be the bonafide work done by

_____

Register No._____ of BSc Degree course for ***USA20503J – SOFTWARE ENGINEERING AND TESTING*** *in the Computer Science lab in SRM Institute of Science and Technology during the academic year 2024 and submitted for BSc Degree practical examination held on* _____

Faculty In-charge

Head of the Department

Examiner 1

Examiner 2

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1. Proposal Description

1.1. ABSTRACT

This document outlines the design and implementation of a Product Searching and Optional Delivery System. The system enables customers to search for products in nearby shops, view shop locations, and reserve items for in-store pickup or request delivery if the shopkeeper agrees to deliver the product. The solution includes mobile applications for both customers and shopkeepers, a backend system, and an admin web portal, each with distinct roles and functionalities.

Key features of the system include real-time product availability search, shop location visibility, and flexible reservation management. If a customer wishes to have a product delivered, the shopkeeper has the option to accept or decline the delivery request. The system is designed with comprehensive security measures to prevent scams and fraud, ensuring safe and trusted interactions between customers and shopkeepers. These measures include verified user accounts, secure payment processing, location-based services, and rigorous order and delivery confirmation protocols.

The document details the technical components, workflows, and security mechanisms, ensuring a scalable and reliable solution that adheres to data privacy regulations and local laws. The system's design emphasizes a seamless, secure, and user-friendly experience for both customers and shopkeepers, fostering trust and enhancing the efficiency of the shopping and delivery process.

1.2. How to implement

To implement the **Product Searching and Optional Delivery System**, start by developing mobile apps for both customers and shopkeepers using frameworks like Flutter or React Native. The customer app will allow users to search for products, view nearby shops on a map, and either reserve items for pickup or request delivery. The shopkeeper app will manage inventory, accept or decline delivery requests, and handle reservations. A backend system will handle user authentication, real-time inventory management, and payment processing using secure gateways like Stripe or PayPal. Additionally, an admin web portal will oversee user verification, manage disputes, and ensure data privacy and security. Integrate geolocation services for shop visibility, and implement robust security protocols for payments and user interactions.

2. REQUIREMENTS

2.1. System Requirements Specifications

2.1.1. Customer Mobile Application:

- Product Search: Allows customers to search for products in nearby shops.
- Reservation and Delivery Requests: Customers can reserve products for in-store pickup or request delivery, subject to shopkeeper approval.
- Shop Location and Details: Displays shop locations, operating hours, and availability status of products.
- Secure Transactions: Facilitates secure payment processing and provides reservation or delivery confirmations.

2.1.2. Shopkeeper Mobile Application:

- Inventory Management: Shopkeepers can update product availability in real-time.
- Order and Delivery Management: Enables shopkeepers to manage reservations and decide whether to accept or decline delivery requests.
- Notifications: Real-time alerts for new reservations, delivery requests, and inventory updates.
- Location Services: Ensures shop location is accurately reflected for customer searches.

2.1.3. Backend System:

- API and Database Management: Handles all data storage, user management, and processing of search, reservation, and delivery requests.
- Security Protocols: Implements secure authentication, encryption, and fraud detection algorithms.
- Real-Time Updates: Synchronizes inventory, reservation, and delivery status across customer and shopkeeper apps.ensuring that users with disabilities can easily interact with the system.

2.1.4. Admin Web Portal:

- User and Shop Management: Admins can manage shopkeeper and customer accounts, monitor activity, and resolve disputes.
- Analytics and Reporting: Provides insights into product search trends, reservation statistics, and system performance.
- System Configuration: Admins can adjust system settings, including security protocols, notification settings, and compliance management.

2.2. FUNCTIONAL REQUIREMENTS:

- **Product Searching:** Customers enter the product name. The system queries nearby shops within a specified radius. If a shop has the product listed, it shows the shop's details and availability status.
- **Shop Availability:** Shopkeepers are notified if a customer searches for a product not listed in their inventory. The notification allows the shopkeeper to quickly update the inventory. If the shopkeeper confirms the product's availability, the shop appears in the customer's search results.
- **Real-Time Location Tracking:** Shopkeepers must have their location services enabled. The system uses GPS to locate shops within the customer's proximity.
- **Operating Hours Compliance:** The system checks shop hours before processing searches. If a shop is closed, it will not appear in search results. Shopkeepers can set and update their operating hours via their app.

2.3. NON-FUNCTIONAL REQUIREMENTS:

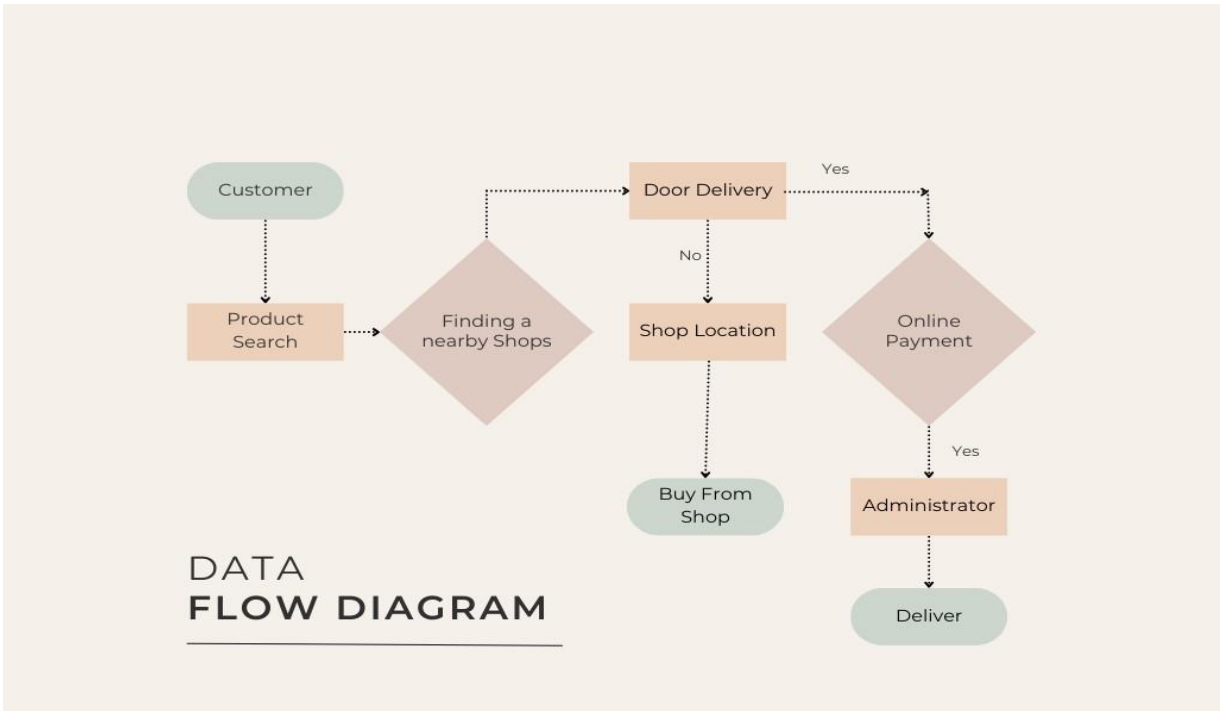
- Usability Requirements
  - **User-Friendly Interface**: The mobile app and web portal should have intuitive and easy-to-navigate interfaces. No task (e.g., searching for a product or confirming an order) should take more than 3 clicks.
  - **Cross-Platform Compatibility**: The system must support both Android and iOS devices for mobile applications and work on all major browsers (Chrome, Firefox, Safari, Edge) for the admin web portal.
  - **Accessibility**: The system should follow WCAG 2.1 accessibility standards,

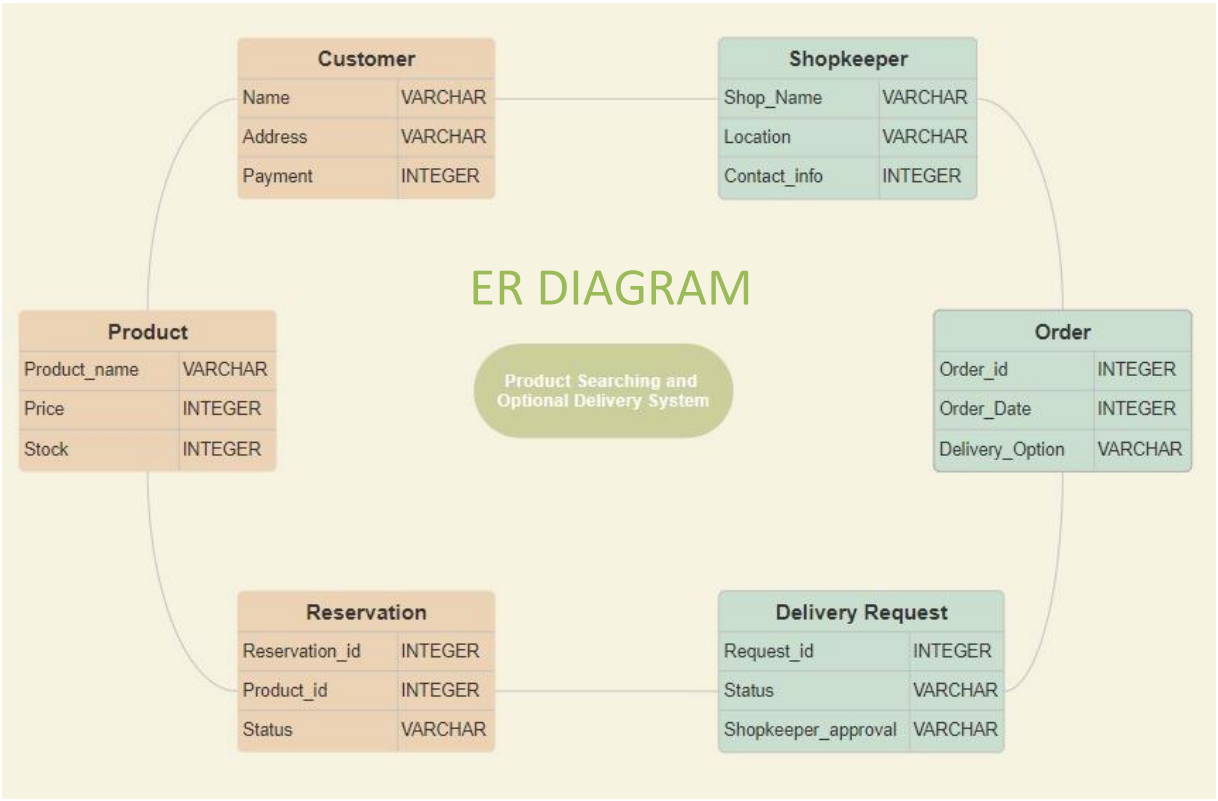
- Performance Requirements
  - **Response Time**: The system should provide search results within 2-3 seconds after a query is made. Other actions, such as placing reservations or delivery requests, should be processed within 5 seconds.
  - **Throughput**: The system must be able to handle at least 500 concurrent user requests during peak usage times without significant performance degradation.
  - **Latency**: The maximum allowable latency for data retrieval from the database should be under 1 second in most cases, with occasional spikes allowed under heavy load.
- Compatibility Requirements
  - **Horizontal Scaling**: The system should be designed to scale horizontally, allowing for the addition of more servers or instances as user traffic increases.
  - **Load Balancing**: A load-balancing mechanism should distribute incoming traffic evenly across all available servers to ensure the system remains responsive during peak loads.
  - **Elasticity**: The system must be able to automatically adjust resources (compute, storage) based on traffic demands, ensuring optimal performance and cost efficiency.

3. PRELIMINARY SCHEDULE AND BUDGET:

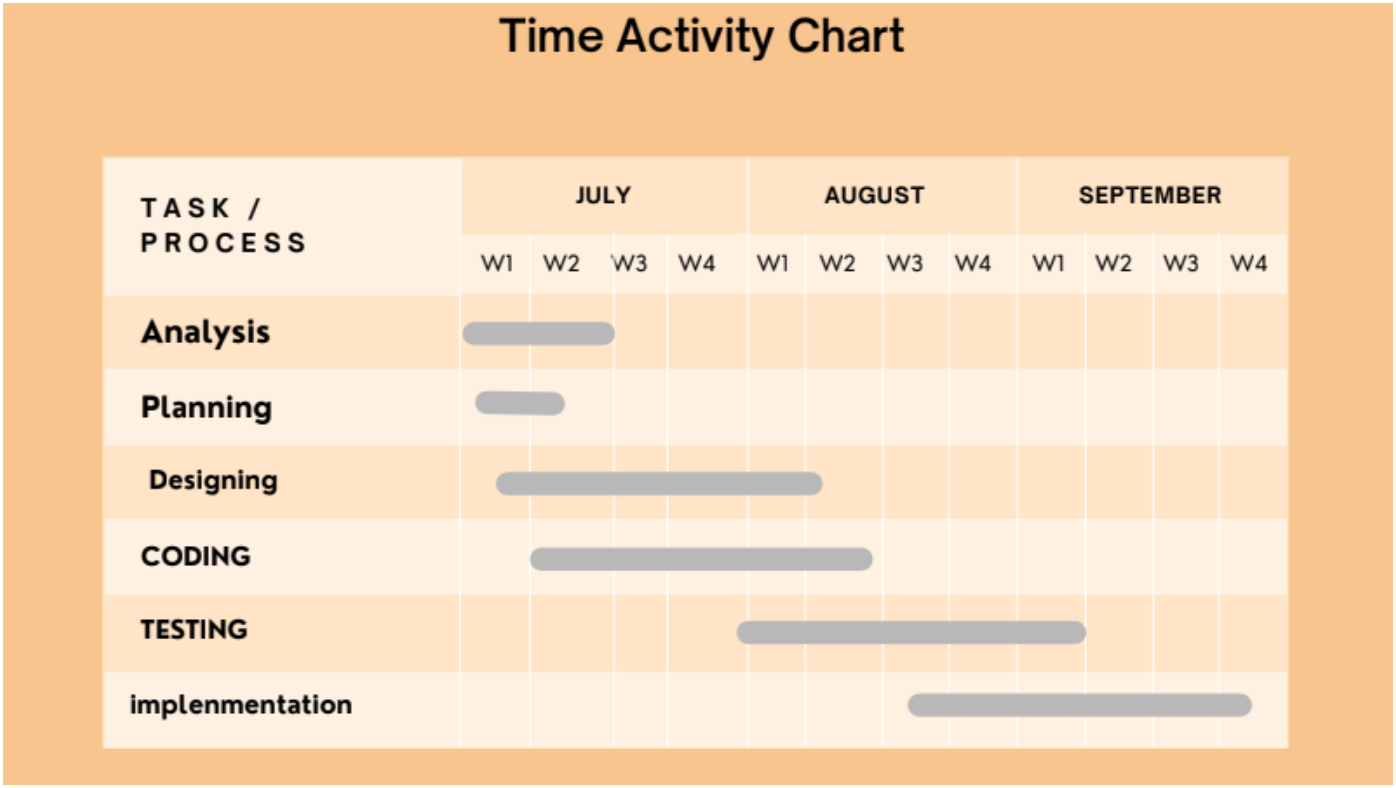
Item	Cost (INR)
Phone (iOS & Android)	54,58,000
Development Costs	1,20,000
Design Costs	12,45,000 - 24,90,000
Database	10,000
Domain Charges (per year)	5,000

4. Conceptual Design





5. Time Activity Chart



6. Software / Module Used

A Three Level System Architecture used in the project to gain fastperformance and efficiency in the working of the system.
The three level consists for:

- Front-End / Design Layer
- Backend Layer/ Logic Layer
- Database Layer

6.1. The Front End

- **Technology**: Use **React Native** or **Flutter** for cross-platform mobile app development.
- **Customer App**: Allows users to search products, view shop locations, reserve products, and request deliveries.
- **Shopkeeper App**: Enables shopkeepers to manage inventory, accept/decline reservations, and process delivery requests.
- **Admin Web Portal**: Built with **React.js** or **Angular**, used to manage shops, verify users, and monitor transactions.

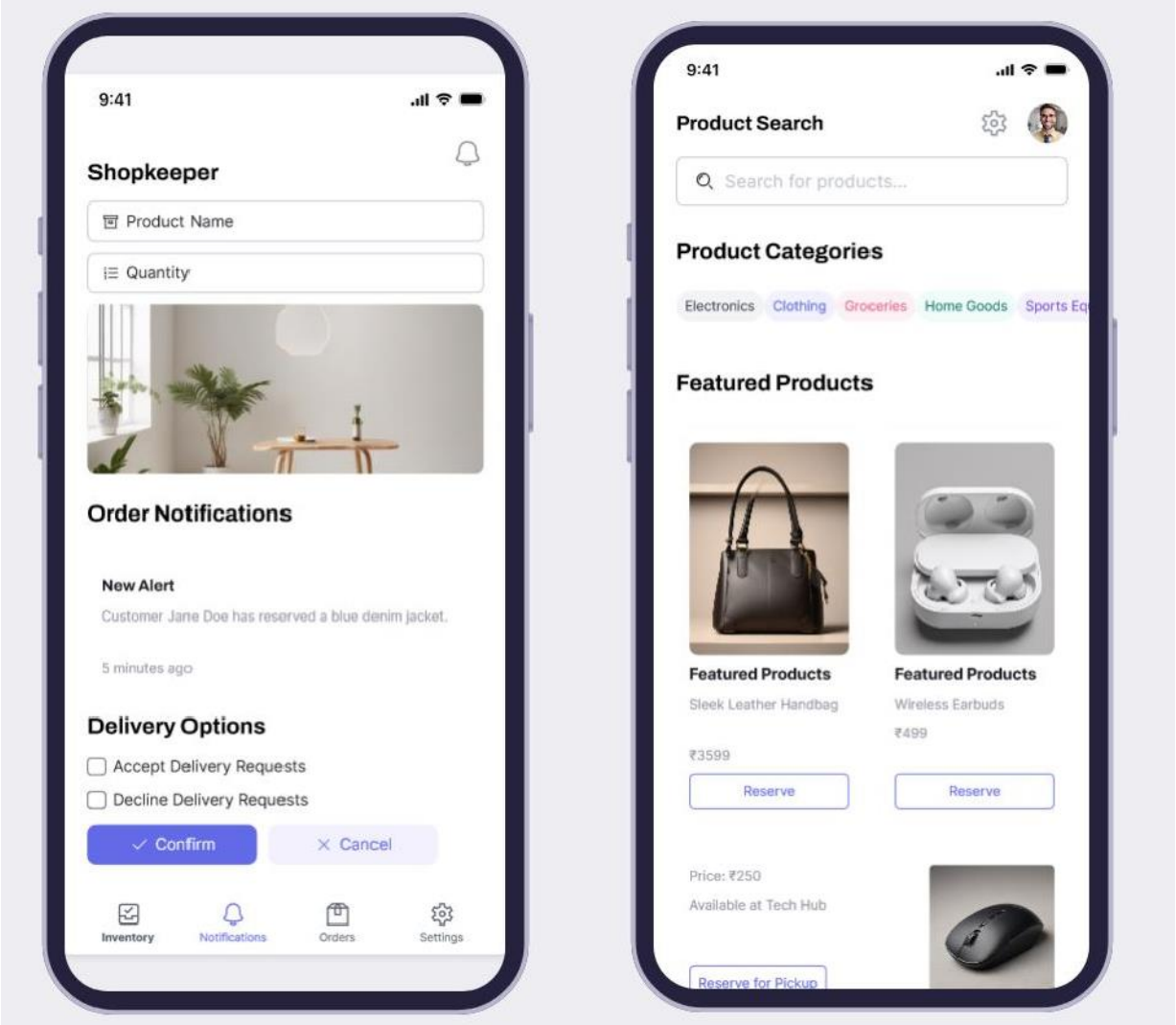
6.2. The Back End

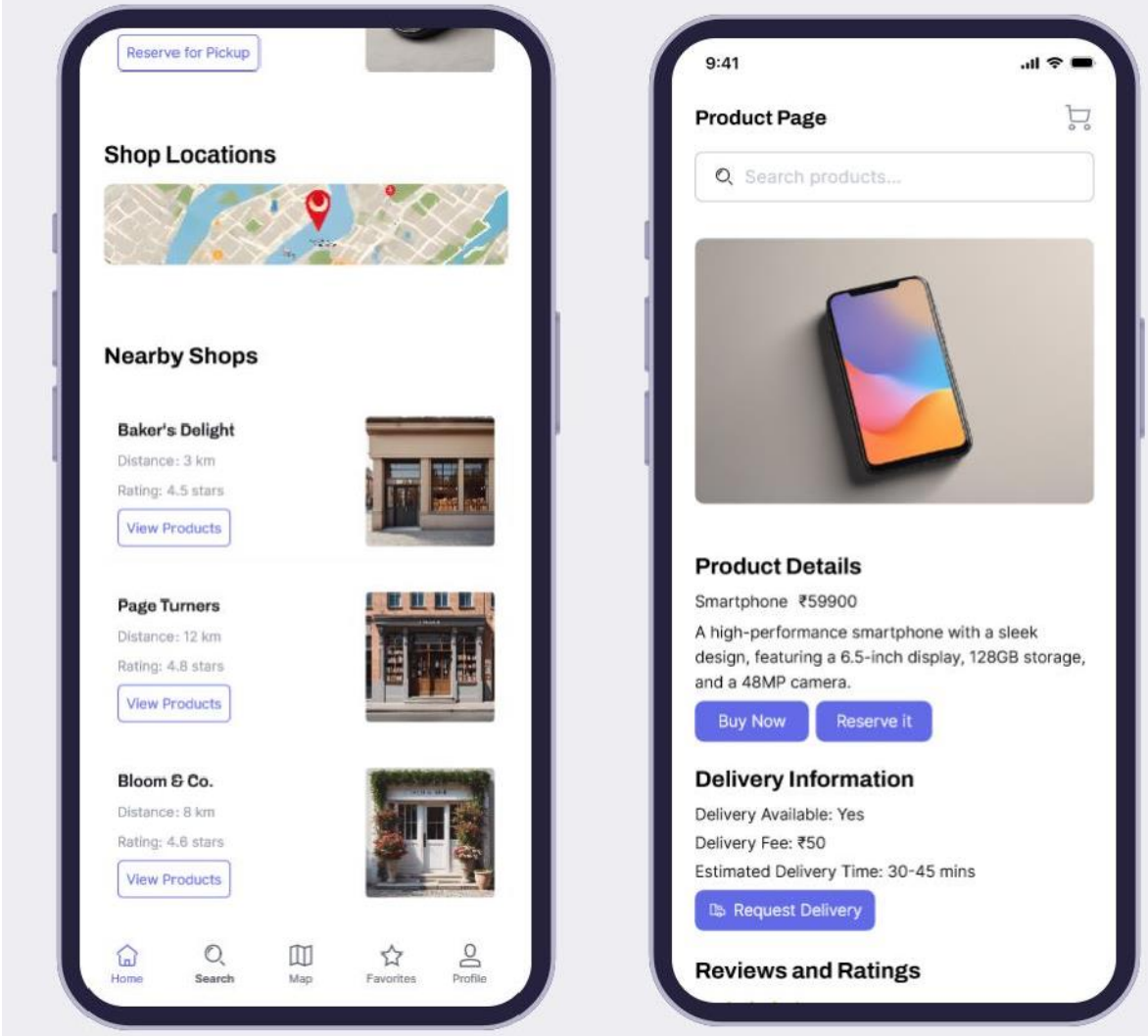
- **Technology**: Use **Node.js** with **Express.js** for REST API development.
- **Features**: Handles user authentication, inventory management, order processing, payment gateway integration, and real-time updates.
- **Security**: Implement JWT for user authentication, encryption for sensitive data, and secure payment handling.

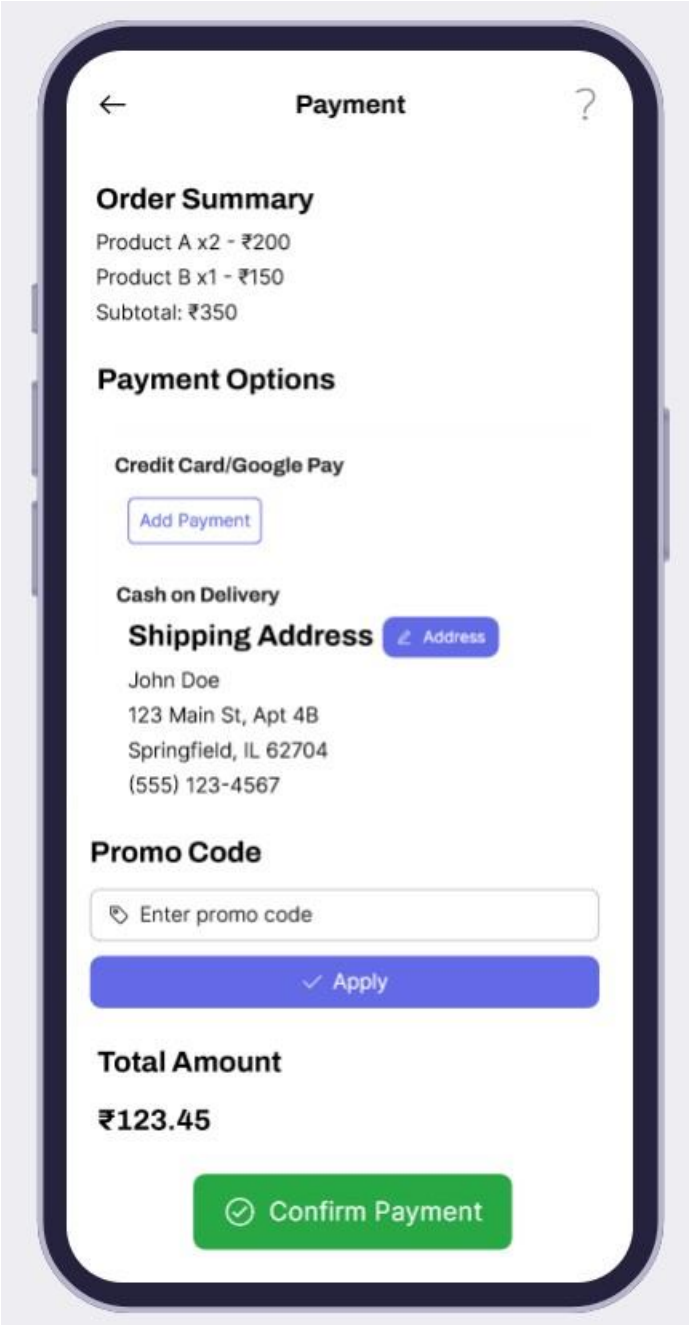
6.3. Database

- **Type**: Use **MySQL** or **PostgreSQL** for relational database management.
- **Entities**: Store details of customers, shopkeepers, products, orders, reservations, and payment transactions.
- **Features**: Supports indexing for faster product searches, relational mapping for orders, and inventory management.

7. UI/UX Designs




Reserve for Pickup
Shop Locations
Nearby Shops
Baker's Delight
Distance: 3 km
Rating: 4.5 stars
View Products
Page Turners
Distance: 12 km
Rating: 4.8 stars
View Products
Bloom & Co.
Distance: 8 km
Rating: 4.6 stars
View Products
Home
Search
Map
Favorites
Profile
9:41
Product Page
Search products...
Product Details
Smartphone ₹59900
A high-performance smartphone with a sleek design, featuring a 6.5-inch display, 128GB storage, and a 48MP camera.
Buy Now
Reserve it
Delivery Information
Delivery Available: Yes
Delivery Fee: ₹50
Estimated Delivery Time: 30-45 mins
Request Delivery
Reviews and Ratings


Payment
Order Summary
Product A x2 - ₹200
Product B x1 - ₹150
Subtotal: ₹350
Payment Options
Credit Card/Google Pay
Add Payment
Cash on Delivery
Shipping Address
Address
John Doe
123 Main St, Apt 4B
Springfield, IL 62704
(555) 123-4567
Promo Code
Enter promo code
Apply
Total Amount
₹123.45
Confirm Payment

8. Test Cases

ID	Test Case	Pre-condition	Test Step	Input	Expected Result	Pass/Fail Priority	Comment
1	Search for a product	Product available in shop inventory	Search for a product	Enter a product name (e.g., 'Laptop') and set search radius	Shops within the radius that have the product in stock are displayed, with availability status	Pass (HP)	Works as expected
2	Search for unavailable product	Product not available in nearby shops	Search for a product	Enter a product name not available in nearby shops (e.g., 'Rare gadget')	A message is displayed saying no shops with the product were found	Pass (LP)	Edge case verified
3	Reserve a product	Product is available in the shop	Select and reserve the product	Select a product and reserve for pickup	Reservation confirmation message is displayed, and a notification is sent to the shopkeeper	Pass (HP)	Reservation successful
4	Request delivery	Product is available in the shop	Select product and request delivery	Select a product and request delivery	Delivery request confirmation is shown, and a notification is sent to the shopkeeper for approval	Pass (HP)	Works as expected
5	Declined delivery request	Shopkeeper declines delivery request	Shopkeeper declines delivery request	Request delivery for a product, and shopkeeper declines	A notification is received informing the customer of the declined delivery, and the reservation is canceled	Pass (LP)	Decline feature works

6	View shop details	Shop exists in search results	Select shop from search results	Select a shop from the search results	The shop's location, operating hours, and available products are displayed	Fail (HP)	Incorrect operating hours displayed
7	Update product availability	Shopkeeper logged in to the system	Update inventory or add new product	Shopkeeper adds a new product or updates stock for an existing product	The updated product appears in customer searches in real-time	Pass (HP)	Instant updates
8	Add out-of-stock product	Shopkeeper logged in to the system	Add new product with zero stock	Add a product with zero stock	The product is added but does not show up in customer searches	Pass (LP)	Works as expected
9	Update delivery address	Customer has an active delivery request	Update the delivery address	Customer navigates to the delivery request and updates the address	The system updates the delivery address and confirms the change to the customer	Fail (HP)	System fails to update the delivery address
10	Receive notification	New reservation or delivery request from customer	Monitor for notification	A customer places a new order or reservation	Shopkeeper receives a real-time notification about the new reservation or delivery request	Pass (LP)	Notification Is working fine

(i) If this is a new line of inquiry for you, briefly explain why you decided to pursue it.

This inquiry into developing a **Product Searching and Optional Delivery System** is driven by the growing need for efficient, secure, and flexible e-commerce solutions that connect customers with nearby shops. The ability to search for products in real-time and view shop locations improves the shopping experience, making it easier for users to find what they need quickly and conveniently. Post-pandemic, local shops increasingly need digital platforms to engage with customers, and this system provides both reservation and delivery options to enhance convenience. The integration of robust security and privacy mechanisms ensures safe transactions, making this a reliable solution for product searching and shopping.

(ii) What are your objectives, or the specific questions/problem/ hypothesis you will address?

Enhance Product Accessibility: Develop a system where customers can easily search for products available in nearby shops, improving local shopping convenience.

Facilitate Reservation and Delivery: Allow customers to reserve products for in-store pickup or request delivery if shopkeepers are willing, providing flexibility.

Improve Shop Visibility: Help local shops showcase their products and locations, increasing customer reach through digital platforms.

Ensure Secure Transactions: Implement security features, including user verification, secure payment gateways, and delivery confirmation, to prevent fraud and ensure safe interactions.

Provide an Efficient Admin Platform: Create an admin portal to manage users, verify shopkeepers, and oversee transactions to maintain system integrity and trust.

(iii) Describe the product opportunity that has been identified(identify such as market need, size, shortcomings of the existing product etc..)

The product opportunity focuses on addressing the limitations faced by local shops in reaching customers digitally. Additionally, current solutions don't offer flexible options such as reserving items for in-store pickup or giving shopkeepers the choice to accept or decline delivery requests.

This system meets the growing demand for mobile commerce by providing customers with real-time product availability, secure transactions, and shop location visibility.

It also empowers local shopkeepers by offering a platform to manage inventory, engage with customers directly, and choose whether to offer delivery services, which differentiates it from existing platforms. The system creates a valuable opportunity by modernizing local retail while meeting consumer needs for convenience, trust, and flexibility.

9. Conclusion

In conclusion, the **Product Searching and Optional Delivery System** offers significant advantages by allowing customers to search for products in nearby shops, enhancing local shop visibility, providing flexible reservation and delivery options, and ensuring secure transactions. It caters to both customer convenience and shopkeeper needs, helping modernize local retail.

However, potential disadvantages include challenges in shopkeeper adoption due to unfamiliarity with digital tools, limitations in delivery availability based on shopkeeper approval, and initial setup costs for implementation. Despite these drawbacks, the system presents a valuable opportunity to enhance the shopping experience and support local businesses.

A digital platform that allows for real-time product searches, flexible reservations, and secure transactions will enhance local shopping convenience, increase shop visibility, and build customer trust, leading to improved business for small shops.