



Sales and Inventory System.

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This project report has been submitted in fulfilment of the requirements for the degree of **Bachelor of Science in Software Engineering**

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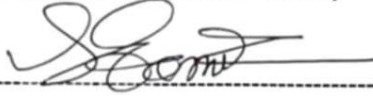
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Sales and Inventory System.

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Project submitted in fulfillment of the requirements
for the award of the degree of
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DEDICATION

I therefore declare that I have done this project under the oversight of **MD Rajib Mia, Lecturer (Sr. Scale)**, Department of Software Engineering, Daffodil International University. Also declare that neither entire record nor any portion of this record has been submitted somewhere else for my degree.

ABSTRACT

This project is a solution that is designed to help the departmental stores based in Bangladesh so as to help meet daily needs such as food products, sweets and pharmaceutical products. This project synthesizes the key functions of inventory control, point of sales, and e-commerce to construct an integrated system for inventory processing and customer satisfaction. This technology enables store owners to set up content levels, transact, and offer a purchasing option to clients from one platform. Solving such problems as manual inventory tracking, non-specific selling techniques, this solution provides store owners with an easily extensible and intuitive interface. These include product catalog, user authentication, sales management, space selling, discount and coupon management, and real time order search. Complex security principles enhance the protection of data and personal information and promoting modularity, which enhances mechanical ability and scalability. This project adopts a systematic development process in line with the software release life cycle (SRLC) ensure delivery of quality and reliable software. Testing of the system is also done to ensure that all the actual registers, login, and administration operations of the system work perfectly well on the clients' environment. Thus, the "Sales and Inventory System" is an example of middle-ground approach to unite traditional retail and digital commerce providing local companies with successful tools even in the conditions of the increase in competition.

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LIST OF ABBREVIATIONS

POS	Point of Sale
UI	User Interface
UX	User Experience
MERN	MongoDB, Express.js, React.js, Node.js
JWT	JSON Web Token
HTTP	HyperText Transfer Protocol
CSS	Cascading Style Sheets
ER	Entity Relationship
SRLC	Software Release Life Cycle

CHAPTER 1 INTRODUCTION

1.1 Background

The sector which has witnessed major changes in recent years is the retail shop like departmental shops, which more often are fulfilling the basic necessary beings in urban as well as semi urban communities. These are business entities that are mainly confined to trading in staple foods, sweets, and drugs and herb necessary for survival by the community's residents. However, many of these shops remain to operate with old and cumbersome methods when it comes to stock management, sales, and clients' relations. These outdated and sustained inefficiencies stem from maintaining bad and long-standing practices by finding themselves in a perpetual cycle of irregular inventory, holding expired merchandise, and slow check-out lines leading to both decreased operational and customer satisfaction. Nowadays, the situation has become even worse, due to the fast implementation of digital solutions into business, which resulted in significantly large retail chains and e-commerce companies leveraging technology to their advantage. The COVID-19 pandemic therefore lengthened the need for digitization as the clients shifted to the online and deliveries. However, e-Commerce implementation is a significant problem for the departmental shops due to high implementation costs, the inability to develop technological competence, and the lack of solutions developed for their single store needs. To address these issues, the present study has introduced the Sales and Inventory System as an integrated system where inventory, Point of Sale (POS) and e-business facilities are involved. This solution will enable the departmental shops to optimize the control of inventory, efficiency of check out and extend their market frontiers through a portal. Meant for the Bangladeshi market it will have provisions for local mobile payment methods such as bKash and Nagad, and will support Bangla as well as English interfaces. By addressing these operational discrepancies and closing the technology divide, this drive will help small to medium departmental shops to elevate their performance, operate profitably in the new digital economy, and meet the emerging consumers' demands.

1.1.1 Context and Relevance

Over the past few years there are has been some changes in the scenario of retail sector of Bangladesh where the departmental shops are occupying a very specific but an

important of Arabian hallmark of fulfilling the daily needs of the urban and semi-urban clients. They are mainly dependent on food, sweet and pharmaceutical products and thus these businesses act as a vital necessity in every home. Nevertheless, it was observed that most shop owners still use conventional methods of stock control, sales, and customer participation, enhancing problems like wrong-stock problems, expired products, and long waiting time checking out. The lack of automation is not only constraining operational productivity, but also undermines their ability to challenge other big chains, and online platforms that use smart solutions. The need for a broader solution was illustrated even more vividly when the COVID-19 pandemic forced the move towards more online and especially contactless purchasing. Today's customer wants the comfort of being able to see something online and then pay online with the goods being delivered to their doorstep. Nonetheless, most small and medium departmental shops face challenges that prevent the adoption of e-commerce solutions because of high costs, lack of technical skills, and the unavailability of solutions tailored to meet the specific needs of small business enterprises. The proposed Sales and Inventory System resolves the mentioned constraints by developing POS, inventory control, and e-commerce capabilities under one system. This solution enables store proprietors to sort their inventory, enhance their customers' check-out process and possibly expand their market through the online platform. Introduced by local mobile payment system bKash and Nagad, the system also supports Bangla and English, therefore allowing store owners and customers to easily operate the system. This project of course is timely and necessary in breaking the digital divide of small merchants, improving its operations output, and allowing this type of firms to grow in today's nascent but highly technological and competitive landscape.

1.1.2 Problem Identification

The various operational challenges encountered by the retail sector in Bangladesh especially by the departmental shops are the following: Such establishments mainly for basic consumption necessities such as food products, sweets, and medicines mostly use outdated manual methods to record stock and sales. Such procedures cause day to day mistakes such as over stocking, under stocking and even retaining expired products. Such risks are not only costly in terms of money but also make the consumers unsatisfied due to product stock and service working deficiencies. Besides, treatment at no integrated Point of Sale (POS) system poses operational challenges to the business, causes long time to check out whilst proper monitoring of actual sales and stock position at any given time

is also a challenge. Additionally, the extent of digital commerce increases at the same rate, departmental shops face challenges in competing with e-commerce platforms because of the following constraints; This is because they lack adequate technological expertise, capital, and readily available technologies. These firms are then left high and dry when they cannot make money because they cannot tap a larger market while at the same time, they are unable to offer such things as home delivery services or online ordering. The low level of use of digital payment solutions and even mobile wallets which are widely used in Bangladesh showing they lack the ability to adapt to new customer demands. Additionally, these issues highlight the need to have an integrated system that has integrated inventory, POS and e-commerce functionalities. Solving these pain areas would enable departmental shops to operate profitably, increase client satisfaction, and adapt better to a constantly evolving retail environment.

1.1.3 Purpose and Justification

The objective of Sales and Inventory System project is to develop an efficient, user friendly system for better control and efficient operation of the departmental shops at Bangladesh with features of inventory control, POS and e-Commerce. This is the case since the solution is intended to address the inefficiencies and challenges faced by store owners including manually tracking inventory, slow check out times and lack of an easy way of creating an online store. With such a model in place, the purpose of the initiative is to ensure that shop owners are provided with simple solutions to successfully run and even eliminate management mistakes their businesses, thereby increasing profitability. The rationale for this program is the potential ability to close the current technological divide in the retail business especially for the small and medium departmental stores. In the modern world and with the steady growth of the share of Internet users, it became not only important but necessary for the company to have a strong system that will work with the physical and online sales. The combination of local payment gateways, for example, bKash and Nagad, individually optimized to Bangladeshi market peculiarities and additional exclusive features assures its relevance to the target consumers. Furthermore, let open lines of purchasing and delivery, the project also meets the existing trend among customers to make it easy. It also makes a contribution to the attempts to help businesses develop, as well as the general need to promote IT solutions in the retail sector of Bangladesh.

1.1.4 Scope

The scope of the Sales and Inventory System project is to develop a system for the complex and improvement of departmental shops in Bangladesh which also includes stocks input, POS and e-commerce functions. The solution is designed to eliminate drawbacks and problems of store owners including manual management of inventory, slow check-out, and lack of opportunity to create an online profile. Hence, the goal of the initiative enables shop owners to run their business more efficiently, reduces management mistakes and increases profitability of the business. The rationale for this initiative is the potential for closing the current technology gap in the retail segment, particularly for small-and medium-sized departmental stores. As the customers moved more towards the online buying space, having a strong backend that caters to both offline as well as online sales has become not only a luxury but a necessity for dealers. Local payment gateways including bKash and Nagad are incorporated in the system, along with relevant features that will only be available in Bangladesh, ensuring that consumers will be getting a system designed and developed for Bangladeshi consumers. Besides, the project also meets the consumer's demand for convenience through offering customers an opportunity to buy stock online and get it delivered by the business owners. This effort is helpful not only in terms of business development but also helps in achieving the agenda of the Centre towards the digital transformation of the Retail Trade Franchise of Bangladesh.

1.2 Project Planning and Initiation

Feasibility Study (Step-by-Step)

The success of the Sales and Inventory System project rides on planning and initiative accurately. A full analysis of the feasibility of the study is established to ensure credibility of the project, viability, and usefulness for the small and medium departmental stores in Bangladesh. Here are the main parts of the feasibility study and their relation to this project. The feasibility assessment looks at the potential of a project with regard to how well it can be done in terms of the market requirements, technical possibility and cost implications. It comprises four basic stages: The early work and project, initial identification and characterizations including, market feasibility assessment, technical feasibility assessment, and financial feasibility assessment. Every phase is structured to

assess possible challenges and recommendation concerning the creation and implementation of sales and inventory systems.

Phase 1 Preliminary Analysis & Project Scope Definition:

In the preliminary analysis, the requirement of an integrated sales and inventory system was noted particularly for the DSs of Bangladesh that still operates depend on the manual system for inventory tracking and sales control. The scope of the project includes establishing a system with three essential components: forecasting systems, bar coding for inventory control, POS and selling through the web. Thus, the system tries to avoid such waste factors as imprecise stocks, long queues at the time of payment, and market's absence in the internet space. By defining the boundaries of the system, the project ensures that its objectives match with the original goal of the development of the system for the shop owners, aimed at increasing the efficiency of business and reaching out to more customers.

Phase 2 Market Feasibility Analysis (or Market Research):

Market research involves highlighting the challenges of the small and medium sized departmental retailers Currently in Bangladesh. This study suggested that these stores have inventory management challenges, do not have cheap online sales solution, and are challenged by massive retail stores and set e-commerce firms. Also, the customers' expectations towards online purchasing and the swift delivery services have risen sharply. As for the requirements: this analysis emphasizes the need for an inexpensive domestic product that supports options like mobile payment (bKash, Cash), among others, and is adapted to Bengali. The findings provide confidence to the suggested solution here and now in the current retail context.

Phase 3 Technical Feasibility Analysis:

Technical feasibility analysis focuses on the resources and technology which is needed for execution of the specific project. It will be designed and built utilizing current software solutions and technologies, comprising of a highly effective back end for merchandising and point-of-sale, as well as a mobile friendly store front. It is technically feasible to integrate with local payment gates such as bKash and Nagad to become essential for the success of the project. The technology will also enable offline POS operations, which will confirm its existence and continuous operation both online and

offline shopping. This stage assures that technical requirements of the project are in line with the abilities and tools which are available.

Phase 4 Financial Feasibility Analysis:

Financial feasibility analysis seeks to establish the financial requirements in the development of the system and its usage. This includes costs incurred on software and developing application, costs incurred on hardware facilities such as Point of Sale terminals, and costs incurred attached to the regular maintenance of the system. Regarding the solution for small and medium shop owners, the cost efficiency of the solution was also considered. Technology has been used to minimize costs and capable of setting competitive prices in order to make the project economically viable in the target market. However, increased operational productivity and the likelihood of more income through connection to Internet shops make the system a sound venture for store proprietors. By systematically going through these phases, the feasibility study ensures that the project as a logical, plausible and worthwhile attempt to enable the departmental stores in Bangladesh with a modern, effective and competitive solution.

1.3 Target User Profile and Tentative Elicitation Process

1.3.1 Target User

The primary target users of the sales and inventory system are small and medium-scale Departmental Shop owners of Bangladesh. It is established that these store owners tend to use outdated and traditional methods to carry out their inventory control, sales data analysis, and customers' engagement. They are vulnerable to a slow rate, numerous errors and dilly-dallying that can hamper on corporate expansion and consumer satisfaction. Further, these stores have a problem of competing with large format stores and established online merchants that have online enabled and digital proficiency. Due to the reason that majority of users do not have the money to invest or the technical know how to handle complex software a simple, affordable and intuitive solution is a necessity. The second target users are store managers and personnel, who will use the designed system for more or less daily activities, including inventory data update and changes, transactions, and orders. Such users require simple and easy-to-understand interface and features like language compatibility and linked payment methods of the corresponding country (like Payment for Bangladesh is bKash and Cash). The aim of this solution is to

help these users to become more effective by improving their operations, reducing error margin, and providing them access to market places, thus they can great the increasing consumer expectations of enhanced retail business and stay competitive in today’s world.

1.3.2 User profile

Table 1.3.1: User Profile for Medium-Scale Departmental Shop Owners

User Class	Note on Characteristics
Type of user	Shop owner, manager
Age range	30-50 years
Frequency of use	Daily, frequent interaction with the system
Mandatory	Yes, shop operations are dependent on the system
Computer experience	Moderate to high (familiar with basic computer operations)
Education	Secondary to higher education
goal	Efficient management of inventory, sales, and online presence
Language skills	Fluent in Bangla and Basic English
Number of users	1-5 users per shop (depending on size and number of employees)
Training	Requires some basic training to use the system effectively
Others system use	Familiar with point of sale (POS) systems and mobile payment tools
Way of working	Primarily manual inventory and sales record keeping, transitioning too digital

Table 1.3.2: User Profile for Small-Scale Departmental Shop Owners

User Class	Note on Characteristics
Type of user	Shop owner, manager
Age range	25-45 years
Frequency of use	Daily, with a focus on sales and inventory updates
Mandatory	Yes, system will help automate daily operations
Computer experience	Low to moderate (may not be familiar with advanced POS systems)
Education	Secondary to vocational education

goal	Streamlined operations and online presence to boost sales
Language skills	Primarily Bangla, may have some basic understanding of English
Number of users	1-3 users per shop (may involve family or close associates)
Training	Needs hands-on training and support for system use
Others system use	Minimal exposure to any digital systems (may use mobile phones for payments)
Way of working	Traditional inventory and sales methods, with slow adaptation to digital tools

Table 1.3.3: User Profile for Staff Members in Departmental Shops (for POS & Inventory Management)

User Class	Note on Characteristics
Type of user	Cashiers, inventory managers, shop assistants
Age range	18-40 years
Frequency of use	Frequent use (daily interaction with POS and inventory system)
Mandatory	Yes, dependent on system for processing sales and managing stock
Computer experience	Basic to moderate (familiar with operating POS systems)
Education	Secondary education, vocational training
goal	Ensure smooth checkout process, accurate stock updates
Language skills	Fluent in Bangla, some understanding of English
Number of users	1-10 users depending on shop size
Training	Basic training on the POS and inventory management system
Others system use	Familiar with simple digital tools, such as mobile wallets for payments
Way of working	Handles customer transactions and updates stock levels manually

Table 1.3.4: User Profile for E-commerce Platform Admins

User Class	Note on Characteristics
Type of user	Admins managing the online store
Age range	25-45 years
Frequency of use	Daily, responsible for managing the online store and orders
Mandatory	Yes, ensures the online store operates smoothly
Computer experience	High (familiar with e-commerce platforms, website management tools)
Education	Higher education in business, e-commerce, or IT
goal	Ensure seamless online sales experience and manage orders
Language skills	Fluent in Bangla and English
Number of users	1-3 users (admin team)
Training	Training on system-specific features and order management tools
Others system use	Experience with online sales platforms and inventory systems
Way of working	Manages online store, processes orders, and updates product listings

Table 1.3.5: User Profile for Customers (Online Platform Users)

User Class	Note on Characteristics
Type of user	Customers buying products from the online platform
Age range	18-65 years
Frequency of use	Occasional to frequent (based on shopping habits)
Mandatory	Not mandatory, but encouraged for online shopping
Computer experience	Basic to high (depends on age and familiarity with online shopping)
Education	Varies, but most are educated to at least secondary level
goal	Convenient shopping experience, home delivery, easy payment methods
Language skills	Primarily Bangla, some may understand English
Number of users	Thousands of users (depending on the shop's reach and popularity)

Training	No formal training required, uses platform via mobile or computer
Others system use	Familiar with e-commerce and mobile payment apps like bKash, Nagad
Way of working	Browses products, places orders, and makes payments online

1.3.3 Elicitation Process

The elicitation process for my project is aimed at gaining the most detailed information about the requirements of target users in order to ensure system effectively meets the purpose behind it. The process starts at the identification of stakeholders to know who the important players in the process are, such as the shop owners in the department, the employees and the target consumers. Online questionnaires and preliminary questionnaires will be distributed to gain information on typical challenges, changes needed, and expectations in relevance to the system. This data will serve as the foundation for further study during one-on-one interviews with the shop owners to appraise the shop's operation procedures, areas repertoire, and dream concerning the use of the system. Field trials including observation of existing practices such as inventory management and sales transactions in real life setting will also be conducted. Real and virtual tools and designs of the system will be constructed and then shown to the users during the feedbacks. This will enable stakeholders give their suggestions on the first dynamic capability and enable them to visualize the possible solution, in terms of usability, required functionality both from practical use and accessibility, as well as its aesthetics. Using personas and user journey mapping will help make the system as specific as possible to the needs of store owners, employees and customers it's targeting. The elicitation process will therefore be concluded by a final check was that requirements gathered were checked and validated with the stakeholders to ensure that these met their expectations. This structured manner makes the solution appropriate and focused on the problems of the departmental shops in Bangladesh.

1.4 Project Block Diagram

Figure 1.3.1 shows that the block diagram of my project. This project will be implemented by following MERN stack architecture. For the front-end interface I will

use HTML, CSS and React JS as framework. For backend I will use Node JS and Express. And MongoDB will use for database.

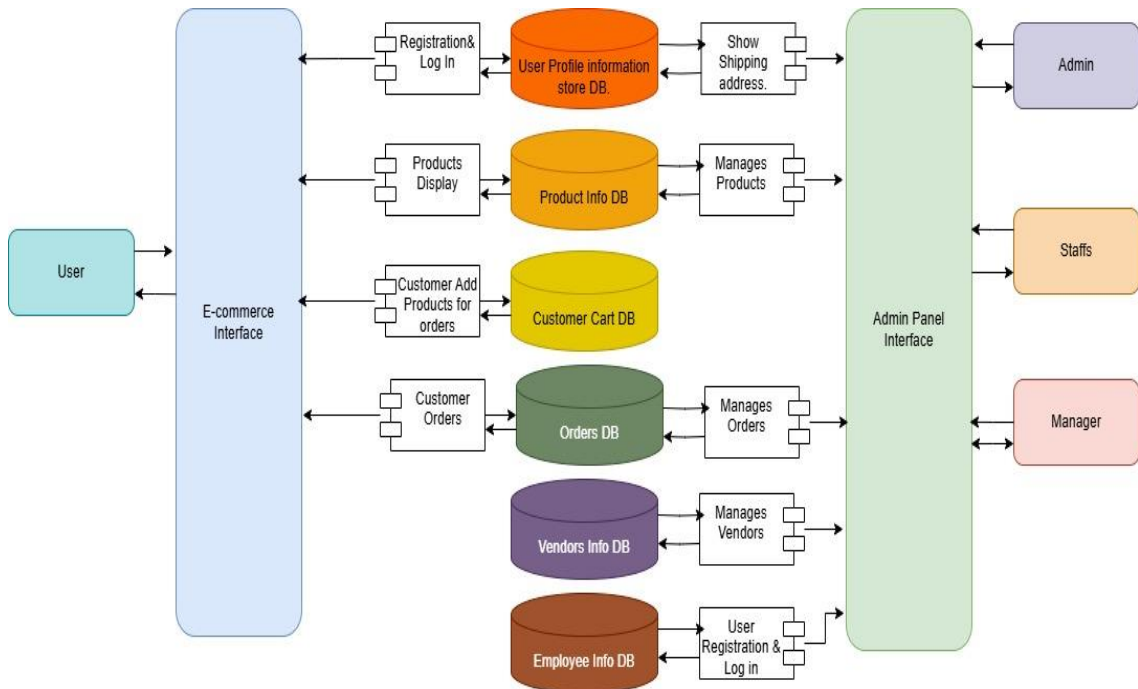


Figure 1.4.1: System Block Diagram

1.5 System Requirements

1.5.1 Hardware Requirements

This project needs specific hardware to work efficiently and properly installed for the departmental shops. Shop owners are advised to have a sound computer for the system; the recommended requirements are: a plain desktop or laptop, a minimum of a dual core processor, 4 GB of RAM and 128 GB hard disk. The system should also support current or more updated operating system like windows 10 or Mac OS or even Linux os. For the enhancement of the management of inventory, there is need to include a barcode scanner to enhance quick recognition of the product and stock control. A receipt printer is used to print invoices and POS transactions as well as store in a cash drawer for accounting for cash transactions by establishments that sell their products online, need to have a reliable internet connection as it is used in transferring the data between POS system and online gateway. Tablet computers and Internet connected mobile phones can also be utilized by the business people to manage and operate this system from any localized region. Customers using the e-commerce platform will require internet-enabled devices

be it a smartphone, a tablet or a PC; The system also requires compatible POS or mobile payment scanner for processing payments via digital indirectly through bKash or Nagad. To enhance the reliability, back up electricity supply- UPS should be used to prevent interferences during power failure. This combination of hardware ensures that the system achieves its desired goal of satisfying in-store as well as online requirements.

1.5.2 Software Requirements

Specific software is necessary for this project to provide seamless functionality and interoperability with departmental store operations. The system will run on conventional operating systems, such as Windows 10 or later, Linux distributions such as Ubuntu 20.04 or later, and macOS. For server environments, Node.js will be utilized as the backend runtime environment, while the database will be maintained using MongoDB, store's preferences and scalability needs. The frontend will be designed using React.js, HTML, CSS delivering a responsive and user-friendly interface for store owners, employees and customers. To enable POS operations, the system will be connected with software drivers for barcode scanners, receipt printers and cash drawers. Compatibility with payment gateways such as bKash, cash and card payment systems will be secured through API connection. For the e-commerce component, the system will support modern web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge and Safari to enable customers to explore and shop online. Additional software requirements include a steady Internet connection for cloud-based synchronization between the POS system and the e-commerce platform. The project will also include documentation and training resources, including user manuals and lesson videos, so that business owners and employees can use the system successfully.

1.5.3 Constraints and Dependencies

The project is bound by a variety of constraints and dependencies, which one has to consider for the success of the project. The first one is lack of funds; many small and medium sized departmental shop owners may not be financially capable of breaking the bank for new technologies. There is a need to undertake extensive cost reduction during development as well as cheap price strategies of the system. Also concerning is how well it integrates with current hardware in stores including barcode scanners, receipt printers, and even cash drawers. Businesses that may not have required hardware could incur other costs which may form a barrier to its adoption. Internet connection is another dire

necessity especially for e-commerce part, and real-time connection between platform on the website and Point of Sale system. The system must be able to continue ‘offline’ everywhere which has an unstable or slow internet connection. The integration with the local payment gateways such as Baksh and Nagad depends on their APIs and operational availability hence, frequent performance is essential for a smooth digital transaction. The other constraint is technical competency of the target customers. Store owners and employees may not be knowledgeable with advanced technology, thus may result to a design where emphasis is given on easy to navigate system. It is necessary to provide exhaustive training and support services for this issue be addressed. In addition, legal requirement concerning its operations, for instance, the VAT and tax regulations in Bangladesh, which is a reliance that needs to be integrated into the system framework lest the users face the law. These are restrictions, and it shall be important addressing them appropriately and do so to enhance the operational success of the system within the intended market.

1.6 Project Scheduling

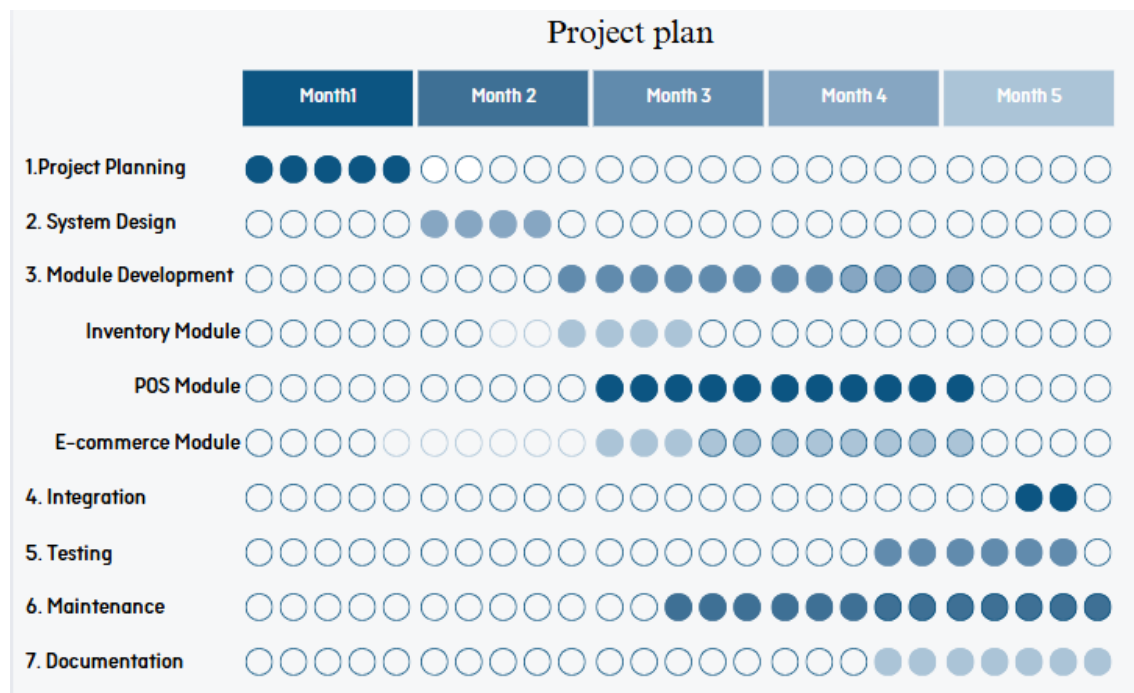


Figure 1.6.1: Project Scheduling Gantt Chart.

Figure 1.5.1 shows the time-bound division of development into phases with simplified time references for achieving planned goals in development. This project is to be accomplished in 5 months where 1st month is for basic planning through gathering user

needs for requirement analysis. The design phase will extend into the second month, focusing on establishing system architecture, wireframes, and database schemas. In the third and fourth months, the development phase will take place, when the inventory management, POS and e-commerce integration modules will be created and tested individually. The integration and testing phase will take place in the fifth month, ensuring that all modules work flawlessly together with comprehensive testing for functionality, safety and performance. Finally, the documentation and maintenance phase in the sixth month will deploy the system to the production environment and provide user training for shop owners and staff. Regular milestones will be followed through a Gantt chart to monitor progress and guarantee adherence to deadlines.

1.7 Summary

Chapter One introduces the foundational aspects of the departmental shop management system project. First, I have the purpose and objectives of the project where the goal is oriented towards enhancing the departmental shop owners' efficiency through the utilization of the right approach towards Inventory Management, integration of POS and E-commerce Integration. The chapter also shows how the project is useful for streamlining the monitoring of stocks, automating the various sales steps involved, and expanding online businesses among shop owners. The planning and commencement phase defines the computerized investigation of market, technical and financial factors, the aim of which is to determine the project's viability. The intended customers for the project include principally, medium-scale and small-scale departmental shop owners thus making the following table a user profile. Also, the elicitation method is explained comprehensively, how the user needs were collected from interviews, surveys, and market analysis to ensure that the project meets the users' expectations. The block diagram visually shows the three primary modules Inventory Management, POS, and E-commerce Integration demonstrating their interconnection. The project schedule is then put out, breaking the timetable into seven distinct phases: planning, system design, development, testing, maintenance, and final documentation, with a time range of 20 weeks. In conclusion, Chapter One presents a complete review of the project's origins, objectives, users, and roadmap, laying the foundation for its effective implementation. It ensures clarity and direction for the succeeding phases of development.

CHAPTER 2 DESIGN AND IMPLEMENTATION

2.1 Introduction

The working strategy of the project aims for integrated system which is appropriate for departmental shops in Bangladesh. This phase revolves round transforming the identified requirements into running system comprising of inventory, POS, and e-commerce. The design strategy focuses on ease of use by every user, expandability and compatibility with the current shop processes. Implemented with such things like React.js for front end part, Node.js for back end and MongoDB for administration the system guarantees stable and fast performance. The implementation method used here is the agile method, which can be adopted because of its ability to foster the development-process in small, therefore enabling the stakeholders to feedback constantly. The major design aspects are user-friendly interface for shop owners and employees, the ability to work with English, and the details of shippers that allow connecting with the popular payment services of Bangladesh, for example, bKash and Nagad. It will also have functionality like real-time stock management, sales report generation, and client's order management to enhance functionality. Furthermore, the integrated e-commerce solution will help stores grow by creating an online store with support for easy navigation and online payments. The process of design also includes setting and making again and again tests to identify and fix as many failure points as possible for the program or product to be as stable as possible at the end of the development. Technological advancement and pragmatic strategy in the design cum implementation phase will achieve the consumers' expectation and improve department shops' fate in this ever-growing digital world.

2.2 Functional Requirements

The functional requirements of the departmental store management system outline the precise capabilities and features that the system must deliver in order to suit the needs of the users. These criteria are arranged into three key parts of the system: Inventory Management, Point of Sale (POS), and E-Commerce Integration.

FR01	Registration
Description	Shop owners and employees must register with the system to gain access to inventory management, POS, and e-commerce features.
Stakeholder	Shop Owner, Employee

FR02	Login
Description	Registered users must log in, and role-based access should ensure that employees have limited permissions while shop owners have full system access.
Stakeholder	Shop Owner, Employee

FR03	Sales Processing's
Description	Shop staff, admin, manager can Check out for Offline Customer.
Stakeholder	Admin, Employee, Shop Owner

FR04	Product Categorization
Description	Organize products into predefined categories like groceries, sweets, and medicines for easier management.
Stakeholder	Admin

FR05	Add, Update, and Delete Products
Description	Shop owners, Admin, Manager can add new products, update details of existing products, or remove products that are no longer available.
Stakeholder	Admin

FR06	Real-Time Stock Monitoring
Description	Allows shop owners to view the current stock levels of all products in real time.
Stakeholder	Shop Owner, Manager

FR07	Order Management
Description	Facilitate the management of online orders, including tracking, packing, and delivery updates.
Stakeholder	Admin, Shop Owner, Manager

FR08	Customer Management
Description	Maintain a database of customers to support loyalty programs and targeted marketing campaigns.
Stakeholder	Shop Owner, Manager, Admin

FR09	Analytics and Reporting
Description	Offer performance metrics such as sales trends, website traffic, and customer behavior analytics.
Stakeholder	Shop Owner, Manager, Admin

FR10	Expiry Date Alerts
Description	Notify shop owners of products nearing their expiry dates to ensure timely action.
Stakeholder	Shop Owner, Manager, Admin

FR11	Low Stock Alerts
Description	Automated notifications should alert shop owners when any product's stock falls below the threshold.
Stakeholder	Shop Owner, Manager, Admin

FR12	Inventory Reports
Description	Generate detailed reports of stock levels, product movements, and overall inventory performance.
Stakeholder	Shop Owner, Manager, Admin, Employee

FR13	Discount and Promotion Management
Description	Enable shop owners to apply discounts and promotional offers during sales.
Stakeholder	Shop Owner, Manager, Admin

FR14	Vendor Management
Description	Maintain a database of vendors to hassle free reorders products.
Stakeholder	Shop Owner, Manager, Admin

FR15	Expense Management.
Description	Maintain a database for expense.
Stakeholder	Shop Owner, Manager, Admin

FR16	Employee Management.
Description	Add new employee, modify employee details, delete employee.
Stakeholder	Shop Owner, Manager.

FR17	Product Searching or Browsing
Description	Customer can browse product by searching or filtering.
Stakeholder	Customer

FR18	Add to Cart
Description	Customer can add product in cart, modify cart items, also can delete.
Stakeholder	Customer

FR19	Add to Wishlist
Description	Customer can add product in Wishlist.
Stakeholder	Customer

FR20	Checkout
Description	Customer can place an order via checkout, filling the shipping details also choosing payment method.
Stakeholder	Customer

FR21	Tracking Order
Description	Customer can track their orders.
Stakeholder	Customer

2.3 Non-Functional Requirements

To choose a system that is correct and efficient, the non-functional requirements of the departmental store management system should meet the organization's performance

needs. These requirements define the quality qualities that is expected from the developed system so as to provide a smooth ride to the users.

2.3.1 Performance

The system should work smoothly with other users during the store owners or personnel perform the activities they need. Continual inventory enhancements, quick financial transaction processing, and rapid data availability are conditions necessary to maintain operational viability.

2.3.2 Scalability

This must also cater for the constantly increasing number of items, users and transactions in the firm. It will promote an easy connection with other modules or other parties' technologies like payment processor and carriers without massive modifications.

2.3.3 Availability and Reliability

The system has to have high availability to minimize downtime, which will not impact the operations of the store. It is important that regularly driven fault-control measures should be put in place to have steady performance.

2.3.4 Usability

The interface should be user-friendly, with straightforward navigation and accessible functionality for users with diverse degrees of technical skill. Role-based access control ensures that each user can only access functionality relevant to their role, keeping the system simple and secure.

2.3.5 Security

The system requires measures for protection of the data and especially for securing personnel passwords, customer data as well as any kind of financial transaction mechanisms. Data privacy on the other hand requires that a secure form of authentication for the data be embraced as well as the encryption of data stored and/or transferred.

2.3.6 Portability

The system should be optimized to be used in many devices and platforms including; Personal computers, tablets, mobile phones and the likes. This makes it that a user can access the system from wherever; increasing the ease and functionality of the system.

2.3.7 Maintainability

The system has to be in line with legal and regulatory requirement of the country with regard to aspects such as the data privacy and tax.

By meeting these non-functional requirements, an integrated department store management system may provide a reliable, secure and easily to use solution that can meet the requirements of department store owners and their consumers.

2.4 Object-oriented System design using UML

2.4.1 Use Case Diagram

The Use Case Diagram for this project illustrates the interaction between various actors and the system's core functionalities. It provides a visual representation of the system's scope and the relationships between the system's modules and its stakeholders. Figure 2.4.1 shows that there are four types of actors named Customers, Admins, Manager and Shop Owner. Customers can Product Searching or Browsing, they also add product their Wishlist or Cart. Then can check out. After successfully completed their orders, they can track the orders. On the other hand, Admins, Manager, Shop Owner maintain the shop. In this case these actors will be vary depending on the shop size. Admins can Manage the products like adding, update or delete products, they also can sales Processing, order management, discount and promotion management, expense management, vendor Management, real-Time stock monitoring. Manager also can do this work but he has more power like he can manage Employee Management with the permission of shop owner, he also can show low stock product, expiry date alerts, and inventory reports. Shop Owner can access everything in this project.

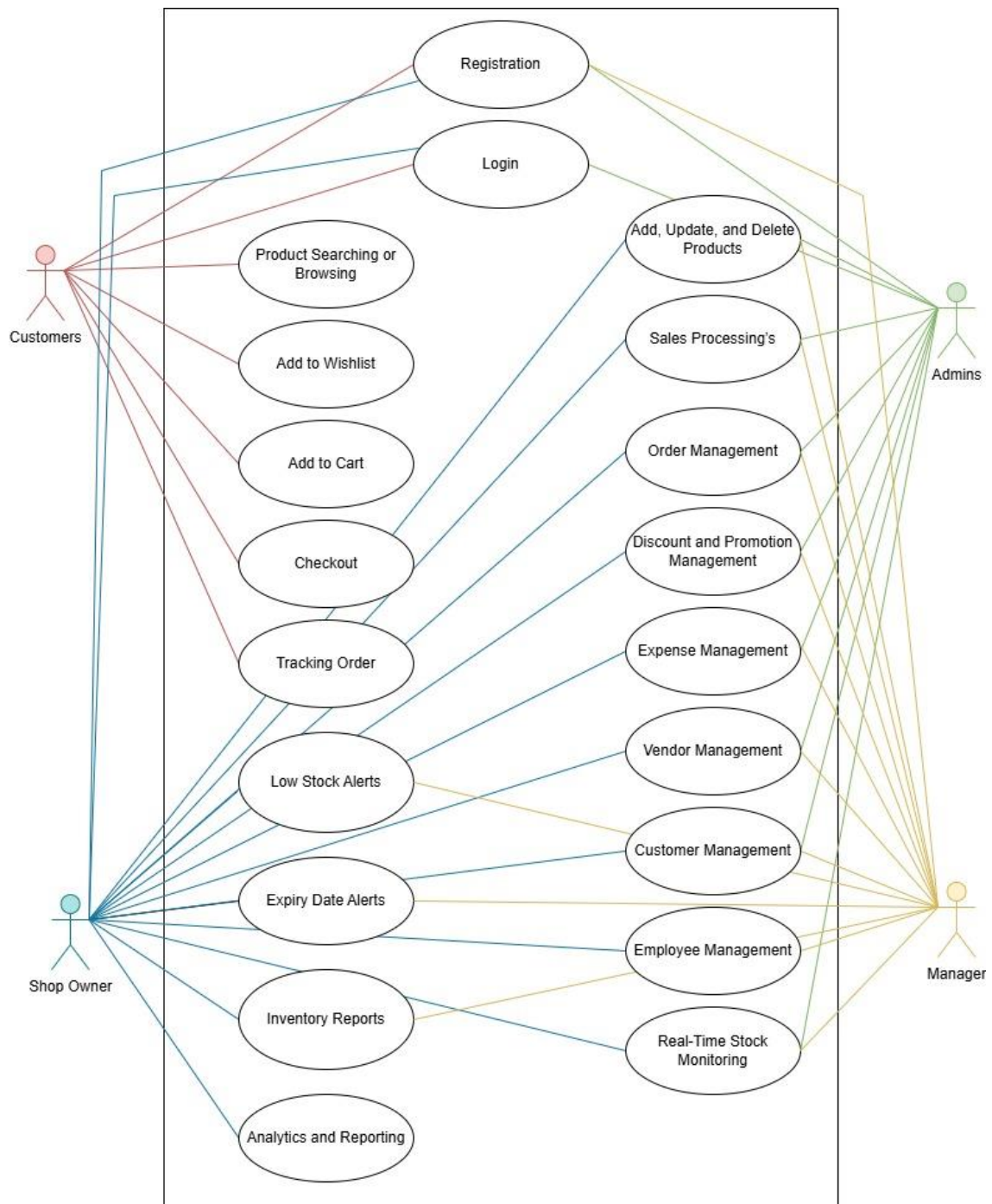


Figure 2.4.1: Use case Diagram

2.4.2 Case Description

Table2.4.1: Case Description-01 User Registration

Use Case	User Registration												
Goal	Users can register to sign in to the system.												
Precondition	Users must access the registration page.												
Success End Condition	Notification: "Successfully Registered!"												
Failed End Condition	Notification: "Registration Failed."												
Primary Actors: Secondary Actors:	Customer												
Trigger	User requests a registration form.												
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Press "Create Account" button.</td> </tr> <tr> <td>2.</td> <td>The system provides a registration form.</td> </tr> <tr> <td>3.</td> <td>The user fills in the required details.</td> </tr> <tr> <td>4.</td> <td>Clicks the "Register" button.</td> </tr> <tr> <td>5.</td> <td>The system validates the information and saves the details.</td> </tr> <tr> <td>6.</td> <td>Notify the user: "Successfully Registered!"</td> </tr> </table>	1.	Press "Create Account" button.	2.	The system provides a registration form.	3.	The user fills in the required details.	4.	Clicks the "Register" button.	5.	The system validates the information and saves the details.	6.	Notify the user: "Successfully Registered!"
1.	Press "Create Account" button.												
2.	The system provides a registration form.												
3.	The user fills in the required details.												
4.	Clicks the "Register" button.												
5.	The system validates the information and saves the details.												
6.	Notify the user: "Successfully Registered!"												
Alternative Flows	<table border="1"> <tr> <td>1.1</td> <td>System Error</td> </tr> <tr> <td></td> <td>1.1.a Notify: "System Error! Please try again."</td> </tr> <tr> <td>3.1</td> <td>User leaves fields empty.</td> </tr> <tr> <td></td> <td>3.1.a Notify: "Please fill in all required fields."</td> </tr> <tr> <td>5.1</td> <td>System fails to save details.</td> </tr> <tr> <td></td> <td>5.1.a Notify: "Registration Failed! Please try again."</td> </tr> </table>	1.1	System Error		1.1.a Notify: "System Error! Please try again."	3.1	User leaves fields empty.		3.1.a Notify: "Please fill in all required fields."	5.1	System fails to save details.		5.1.a Notify: "Registration Failed! Please try again."
1.1	System Error												
	1.1.a Notify: "System Error! Please try again."												
3.1	User leaves fields empty.												
	3.1.a Notify: "Please fill in all required fields."												
5.1	System fails to save details.												
	5.1.a Notify: "Registration Failed! Please try again."												
Quality Requirements	Registration process must be completed within 2 minutes.												

Table2.4.2: Case Description-02: User Login

Use Case	User Login
Goal	Users can log in to access the system.
Precondition	User must already be registered.

Success End Condition	Notification: "Login Successful!"												
Failed End Condition	Notification: "Invalid Credentials."												
Primary Actors: Secondary Actors:	Customer												
Trigger	User provides login credentials.												
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Press "Login" button.</td> </tr> <tr> <td>2.</td> <td>Enter email.</td> </tr> <tr> <td>3.</td> <td>Enter password.</td> </tr> <tr> <td>4.</td> <td>The system validates credentials.</td> </tr> <tr> <td>5.</td> <td>Grant access to the user.</td> </tr> <tr> <td>6.</td> <td>Notify: "Login Successful!"</td> </tr> </table>	1.	Press "Login" button.	2.	Enter email.	3.	Enter password.	4.	The system validates credentials.	5.	Grant access to the user.	6.	Notify: "Login Successful!"
1.	Press "Login" button.												
2.	Enter email.												
3.	Enter password.												
4.	The system validates credentials.												
5.	Grant access to the user.												
6.	Notify: "Login Successful!"												
Alternative Flows	<table border="1"> <tr> <td>2.1</td> <td>Invalid email.</td> </tr> <tr> <td></td> <td>2.1.a Notify: "Invalid Credentials."</td> </tr> <tr> <td>3.1</td> <td>Invalid password.</td> </tr> <tr> <td></td> <td>3.1.a Notify: "Invalid Credentials."</td> </tr> <tr> <td>3.1</td> <td>System error.</td> </tr> <tr> <td></td> <td>3.1.a Notify: "System Error! Please try again."</td> </tr> </table>	2.1	Invalid email.		2.1.a Notify: "Invalid Credentials."	3.1	Invalid password.		3.1.a Notify: "Invalid Credentials."	3.1	System error.		3.1.a Notify: "System Error! Please try again."
2.1	Invalid email.												
	2.1.a Notify: "Invalid Credentials."												
3.1	Invalid password.												
	3.1.a Notify: "Invalid Credentials."												
3.1	System error.												
	3.1.a Notify: "System Error! Please try again."												
Quality Requirements	Login process must complete within 5 seconds.												

Table2.4.3: Case Description-03: Product Browsing/Searching

Use Case	Product Browsing/Searching
Goal	Customers can browse or search for available products.
Precondition	Customers must access the system via a web interface.
Success End Condition	Customers successfully find their desired product(s).
Failed End Condition	Notification: "No Products Found."
Primary Actors: Secondary Actors:	Customer
Trigger	Customer requests a search or browses product categories.

Description / Main Success Scenario	1.	Customer selects the “Browse” or “Search” option.
	2.	The system provides the product list or search bar.
	3.	The customer enters the search term or navigates through categories.
	4.	The system fetches the matching product details.
	5.	The product list is displayed.
	6.	The system shows the results and notifies the user with “Search Completed!”
	Alternative Flows	1.1
		1.1.a Notify the user: “System Error! Please try again.”
3.1		No matching product found.
		3.1.a Notify the user: “No Products Found!”
5.1		The system takes too long to fetch results.
		5.1.a Notify the user: “Request Timeout! Try again later.”
Quality Requirements	The search or browsing process must complete within 5 seconds.	

Table2.4.4: Case Description 04: Product Wishlist/Cart Management

Use Case	Product Wishlist/Cart Management	
Goal	Customers can add desired products to their Wishlist or shopping cart.	
Precondition	The customer is logged into the system.	
Success End Condition	Products are successfully added to the Wishlist or cart.	
Failed End Condition	Notification: “Failed to Add Product to Wishlist/Cart.”	
Primary Actors:	Customer	
Secondary Actors:		
Trigger	The customer selects the "Add to Wishlist" or "Add to Cart" button.	
Description / Main Success Scenario	1.	The customer selects a product.
	2.	The system provides the “Add to Wishlist” or “Add to Cart” option.
	3.	The customer clicks the option.
	4.	The system verifies the product availability.
	5.	The system adds the product to the Wishlist or cart.
	6.	Notify the user: “Product Successfully Added to Wishlist/Cart!”

Alternative Flows	1.1	System Error
		1.1.a Notify the user: "System Error! Please try again."
	4.1	The product is out of stock.
		4.1.a Notify the user: "This Product is Currently Out of Stock."
	5.1	The system fails to save the product.
		5.1.a Notify the user: "Failed to Add Product! Please Try Again."
Quality Requirements	Products should be added to the cart or Wishlist within 2 seconds.	

Table2.4.5: Case Description-05: Checkout

Use Case	Checkout	
Goal	Customers can purchase products.	
Precondition	Products must be in the shopping cart.	
Success End Condition	Notification: "Order Placed Successfully!"	
Failed End Condition	Notification: "Order Failed."	
Primary Actors:	Customer	
Secondary Actors:	Bank, Payment Gateway	
Trigger	User initiates checkout.	
Description / Main Success Scenario	1.	User clicks "Checkout" button.
	2.	The system verifies cart details.
	3.	Enter the shipping Address
	4.	User provides payment information.
	5.	The system processes payment and confirms the order.
	6.	Notify: "Order Placed Successfully!"
Alternative Flows	2.1	Cart is empty.
		2.1.a Notify: "Cart is empty. Add items before checkout."
	3.1	Not given shipping Address.
		3.1.a Notify the user: "Couldn't found shipping address."
	4.1	Payment fails.
		4.1.a Notify: "Payment Failed! Please retry."

Quality Requirements	Checkout process must complete within 3 minutes.
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Table2.4.6: Case Description-06: Tracking Orders

Use Case	Tracking Orders													
Goal	Customers can track the status of their orders.													
Precondition	Customer must have an active order.													
Success End Condition	Order tracking information displayed.													
Failed End Condition	Notification: "Unable to fetch tracking information."													
Primary Actors:	Customer													
Secondary Actors:														
Trigger	Customer requests order tracking.													
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Customer logs in and selects "Track Order" option.</td> </tr> <tr> <td>2.</td> <td>The system provides search bar and list of active orders.</td> </tr> <tr> <td>3.</td> <td>The customer enters the tracking number or order id</td> </tr> <tr> <td>4.</td> <td>The system fetches order status.</td> </tr> <tr> <td>5.</td> <td>Display the current status to the customer.</td> </tr> <tr> <td>6.</td> <td>Notify: "Tracking Information Updated!"</td> </tr> </table>		1.	Customer logs in and selects "Track Order" option.	2.	The system provides search bar and list of active orders.	3.	The customer enters the tracking number or order id	4.	The system fetches order status.	5.	Display the current status to the customer.	6.	Notify: "Tracking Information Updated!"
1.	Customer logs in and selects "Track Order" option.													
2.	The system provides search bar and list of active orders.													
3.	The customer enters the tracking number or order id													
4.	The system fetches order status.													
5.	Display the current status to the customer.													
6.	Notify: "Tracking Information Updated!"													
Alternative Flows	<table border="1"> <tr> <td>3.1</td> <td>No order found.</td> </tr> <tr> <td></td> <td>3.1.a Notify the user: "No order found! Please try again."</td> </tr> <tr> <td>4.1</td> <td>System error fetching data.</td> </tr> <tr> <td></td> <td>4.1.a Notify: "Unable to fetch tracking information."</td> </tr> </table>		3.1	No order found.		3.1.a Notify the user: "No order found! Please try again."	4.1	System error fetching data.		4.1.a Notify: "Unable to fetch tracking information."				
3.1	No order found.													
	3.1.a Notify the user: "No order found! Please try again."													
4.1	System error fetching data.													
	4.1.a Notify: "Unable to fetch tracking information."													
Quality Requirements	Order status must refresh in real time.													

Table2.4.7: Case Description-07: Admin Portal Login

Use Case	Admin Portal Login
Goal	Admins can log in to manage the system.
Precondition	Admin must have valid login credentials.
Success End Condition	Notification: "Login Successful!"
Failed End Condition	Notification: "Login Failed."

Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee										
Trigger	Admin provides login credentials.										
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Admin enters username and password.</td> </tr> <tr> <td>2.</td> <td>The system verifies credentials.</td> </tr> <tr> <td>3.</td> <td>Grant access to the admin portal.</td> </tr> <tr> <td>4.</td> <td>The system fetches the matching product details.</td> </tr> <tr> <td>5.</td> <td>Notify: "Login Successful!"</td> </tr> </table>	1.	Admin enters username and password.	2.	The system verifies credentials.	3.	Grant access to the admin portal.	4.	The system fetches the matching product details.	5.	Notify: "Login Successful!"
1.	Admin enters username and password.										
2.	The system verifies credentials.										
3.	Grant access to the admin portal.										
4.	The system fetches the matching product details.										
5.	Notify: "Login Successful!"										
Alternative Flows	<table border="1"> <tr> <td>1.1</td> <td>Invalid credentials.</td> </tr> <tr> <td></td> <td>1.1.a Notify: "Login Failed! Please try again."</td> </tr> </table>	1.1	Invalid credentials.		1.1.a Notify: "Login Failed! Please try again."						
1.1	Invalid credentials.										
	1.1.a Notify: "Login Failed! Please try again."										
Quality Requirements	Admin portal login must complete within 5 seconds.										

Table2.4.8: Case Description-08: Add, Update, and Delete Products

Use Case	Add, Update, and Delete Products										
Goal	Admins, Manager, Shop Owner can manage product details.										
Precondition	Admins, Manager, Shop Owner must log in to the portal.										
Success End Condition	Notification: "Product Added Successfully!", "Product Updated Successfully!", "Product Deleted Successfully!"										
Failed End Condition	Notification: "Operation Failed."										
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee										
Trigger	Admin selects a product management option.										
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Admin selects "Add," "Update," or "Delete" option.</td> </tr> <tr> <td>2.</td> <td>System provides relevant forms or details.</td> </tr> <tr> <td>3.</td> <td>Actor enters or modifies the information.</td> </tr> <tr> <td>4.</td> <td>Clicks "Submit" to confirm changes.</td> </tr> <tr> <td>5.</td> <td>Notify: "Operation Successful!"</td> </tr> </table>	1.	Admin selects "Add," "Update," or "Delete" option.	2.	System provides relevant forms or details.	3.	Actor enters or modifies the information.	4.	Clicks "Submit" to confirm changes.	5.	Notify: "Operation Successful!"
1.	Admin selects "Add," "Update," or "Delete" option.										
2.	System provides relevant forms or details.										
3.	Actor enters or modifies the information.										
4.	Clicks "Submit" to confirm changes.										
5.	Notify: "Operation Successful!"										
Alternative Flows	<table border="1"> <tr> <td>1.1</td> <td>System error during operation.</td> </tr> <tr> <td></td> <td>1.1.a Notify: "Operation Failed! Please retry."</td> </tr> </table>	1.1	System error during operation.		1.1.a Notify: "Operation Failed! Please retry."						
1.1	System error during operation.										
	1.1.a Notify: "Operation Failed! Please retry."										
Quality Requirements	Product updates must reflect immediately.										

Table2.4.9: Case Description-09: Sales Processing

Use Case	Sales Processing										
Goal	Shop Owner, Admins or Managers can process sales for customers.										
Precondition	Products must be in stock, and payment systems functional.										
Success End Condition	Notification: "Sale Completed!"										
Failed End Condition	Notification: "Sale Failed."										
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee										
Trigger	Shop Owner /Admin/Manager initiates sales processing.										
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Select "Process Sale" option.</td> </tr> <tr> <td>2.</td> <td>System verifies product availability.</td> </tr> <tr> <td>3.</td> <td>Enter customer and payment details.</td> </tr> <tr> <td>4.</td> <td>System processes payment.</td> </tr> <tr> <td>5.</td> <td>Notify: "Sale Completed!"</td> </tr> </table>	1.	Select "Process Sale" option.	2.	System verifies product availability.	3.	Enter customer and payment details.	4.	System processes payment.	5.	Notify: "Sale Completed!"
1.	Select "Process Sale" option.										
2.	System verifies product availability.										
3.	Enter customer and payment details.										
4.	System processes payment.										
5.	Notify: "Sale Completed!"										
Alternative Flows	<table border="1"> <tr> <td>2.1</td> <td>Product is out of stock.</td> </tr> <tr> <td></td> <td>2.1.a Notify: "Product is out of stock."</td> </tr> <tr> <td>4.1</td> <td>Payment fails.</td> </tr> <tr> <td></td> <td>4.1.a Notify: "Payment Failed! Please retry."</td> </tr> </table>	2.1	Product is out of stock.		2.1.a Notify: "Product is out of stock."	4.1	Payment fails.		4.1.a Notify: "Payment Failed! Please retry."		
2.1	Product is out of stock.										
	2.1.a Notify: "Product is out of stock."										
4.1	Payment fails.										
	4.1.a Notify: "Payment Failed! Please retry."										
Quality Requirements	Sales must be processed within 2 minutes.										

Table2.4.10: Case Description-10: Order Management

Use Case	Order Management
Goal	Shop Owner, Admins or Managers can manage customer orders.
Precondition	Orders must exist in the system.
Success End Condition	Notification: "Order Updated Successfully!"
Failed End Condition	Notification: "Order Update Failed."
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee
Trigger	Shop Owner/Admin/Manager selects an order management option.

Description / Main Success Scenario	1.	Select "Manage Orders" option.
	2.	System displays list of orders.
	3.	Shop owner/ Admin/Manager selects an order and updates status/details.
	4.	Clicks "Save Changes" button.
	5.	Notify: "Order Updated Successfully!"
Alternative Flows	2.1	No orders exist.
		2.1.a Notify: "No orders available to manage."
	4.1	System error while updating order.
		4.1.a Notify: "Order Update Failed! Please retry."
Quality Requirements	The search or browsing process must complete within 5 seconds.	

Table2.4.11: Case Description-11: Discount and Promotion Management

Use Case	Discount and Promotion Management	
Goal	Shop Owner, Admins or Managers can create and manage discounts or promotions.	
Precondition	Admins, Manager, Shop Owner must be logged in.	
Success End Condition	Notification: "Promotion Updated Successfully!"	
Failed End Condition	Notification: "Operation Failed."	
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee	
Trigger	Shop Owner/Admin/Manager selects a Coupons management option.	
Description / Main Success Scenario	1.	Select "Manage Coupons " option.
	2.	Admins, Manager, Shop Owner creates or updates promotion details.
	3.	Clicks "Submit" button.
	4.	System validates and saves promotion details.
	5.	Notify: "Promotion Updated Successfully!"
Alternative Flows	3.1	System error while saving details.
		3.1.a Notify: "Operation Failed! Please retry."
Quality Requirements	Changes to promotions must be reflected within 10 seconds.	

Table2.4.12: Case Description-12: Expense Management

Use Case	Expense Management										
Goal	Shop Owner, Admins or Managers can track and manage expenses.										
Precondition	Shop Owner, Admins or Managers must be logged in.										
Success End Condition	Notification: "Expense Details Saved Successfully!"										
Failed End Condition	Notification: "Failed to Save Expense Details."										
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin, Employee										
Trigger	Shop Owner/Admin/Manager selects "Manage Expenses" option.										
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Select "Manage Expenses" option.</td> </tr> <tr> <td>2.</td> <td>Admin enters expense details.</td> </tr> <tr> <td>3.</td> <td>Clicks "Submit" button.</td> </tr> <tr> <td>4.</td> <td>System validates and saves expense details.</td> </tr> <tr> <td>5.</td> <td>Notify: "Expense Details Saved Successfully!"</td> </tr> </table>	1.	Select "Manage Expenses" option.	2.	Admin enters expense details.	3.	Clicks "Submit" button.	4.	System validates and saves expense details.	5.	Notify: "Expense Details Saved Successfully!"
1.	Select "Manage Expenses" option.										
2.	Admin enters expense details.										
3.	Clicks "Submit" button.										
4.	System validates and saves expense details.										
5.	Notify: "Expense Details Saved Successfully!"										
Alternative Flows	<table border="1"> <tr> <td>3.1</td> <td>System error while saving details.</td> </tr> <tr> <td></td> <td>3.1.a Notify: "Failed to Save Expense Details."</td> </tr> </table>	3.1	System error while saving details.		3.1.a Notify: "Failed to Save Expense Details."						
3.1	System error while saving details.										
	3.1.a Notify: "Failed to Save Expense Details."										
Quality Requirements	Expense management data must be saved within 10 seconds.										

Table2.4.13: Case Description-13: Vendor Management

Use Case	Vendor Management
Goal	Shop Owner, Admins or Managers can manage vendor information.
Precondition	Shop Owner, Admins or Managers must be logged in.
Success End Condition	Notification: "Vendor Details Updated Successfully!"
Failed End Condition	Notification: "Failed to Update Vendor Details."
Primary Actors: Secondary Actors:	Shop Owner, Manager, Admin
Trigger	Shop Owner /Admin/Manager elects "Manage Vendors" option.

Description / Main Success Scenario	1.	Select "Manage Vendors" option.
	2.	Admin updates vendor details or adds a new vendor.
	3.	Clicks "Save" button.
	4.	System validates and saves the changes.
	5.	Notify: "Vendor Details Updated Successfully!"
Alternative Flows	3.1	System error while saving details.
		3.1.a Notify: "Failed to Update Vendor Details."
Quality Requirements	Vendor data must be saved within 10 seconds.	

Table2.4.14: Case Description-14: Customer Management

Use Case	Customer Management	
Goal	Shop Owner, Admins or Managers can manage customer profiles.	
Precondition	Customer data must exist in the system.	
Success End Condition	Notification: "Customer Details Updated Successfully!"	
Failed End Condition	Notification: "Operation Failed."	
Primary Actors:	Shop Owner, Manager, Admin, Employee	
Secondary Actors:		
Trigger	Shop Owner /Admin/Manager selects a customer management option.	
Description / Main Success Scenario	1.	Select "Manage Customers" option.
	2.	Shop Owner, Admins or Managers updates or modifies customer details.
	3.	Clicks "Save" button.
	4.	System saves the changes.
	5.	Notify: "Customer Details Updated Successfully!"
Alternative Flows	3.1	System error while saving details.
		3.1.a Notify: "Operation Failed! Please retry."
Quality Requirements	Updates to customer data must reflect immediately.	

Table2.4.15: Case Description-14: Employee Management

Use Case	Employee Management										
Goal	Managers can manage employee details with shop owner's permission.										
Precondition	Employee details must exist in the system.										
Success End Condition	Notification: "Employee Details Updated Successfully!"										
Failed End Condition	Notification: "Operation Failed."										
Primary Actors:	Manager										
Secondary Actors:	Shop Owner										
Trigger	Manager selects "Manage Employees" option.										
Description / Main Success Scenario	<table border="1"> <tr> <td>1.</td> <td>Select "Manage Employees" option.</td> </tr> <tr> <td>2.</td> <td>Manager updates or adds employee details.</td> </tr> <tr> <td>3.</td> <td>Clicks "Save Changes" button.</td> </tr> <tr> <td>4.</td> <td>System validates and saves the changes.</td> </tr> <tr> <td>5.</td> <td>Notify: "Employee Details Updated Successfully!"</td> </tr> </table>	1.	Select "Manage Employees" option.	2.	Manager updates or adds employee details.	3.	Clicks "Save Changes" button.	4.	System validates and saves the changes.	5.	Notify: "Employee Details Updated Successfully!"
1.	Select "Manage Employees" option.										
2.	Manager updates or adds employee details.										
3.	Clicks "Save Changes" button.										
4.	System validates and saves the changes.										
5.	Notify: "Employee Details Updated Successfully!"										
Alternative Flows	<table border="1"> <tr> <td>3.1</td> <td>System error while saving details.</td> </tr> <tr> <td></td> <td>3.1.a Notify: "Operation Failed! Please retry."</td> </tr> </table>	3.1	System error while saving details.		3.1.a Notify: "Operation Failed! Please retry."						
3.1	System error while saving details.										
	3.1.a Notify: "Operation Failed! Please retry."										
Quality Requirements	Employee data updates must be completed within 1 minute.										

Table2.4.16: Case Description-15: Real-Time Stock Monitoring

Use Case	Real-Time Stock Monitoring
Goal	Shop Owner, Admins or Managers can monitor stock in real time.
Precondition	System must track stock levels.
Success End Condition	Notification: "Stock Updated!"
Failed End Condition	Notification: "Unable to Fetch Stock Data."
Primary Actors:	Shop Owner, Manager, Admin, Employee
Secondary Actors:	
Trigger	User selects "View Stock" option.

Description / Main Success Scenario	1.	Select "View Stock" option.
	2.	System retrieves and displays real-time stock levels.
	3.	Notify: "Stock Updated!"
Alternative Flows	2.1	System error fetching stock data.
		2.1.a Notify: "Unable to Fetch Stock Data."
Quality Requirements	Stock data updates must be displayed within 5 seconds.	

Table2.4.17: Case Description-16: Analytics and Reporting

Use Case	Analytics and Reporting	
Goal	Admins or Shop Owners can analyze business performance.	
Precondition	System must collect sales and performance data.	
Success End Condition	Notification: "Analytics Generated Successfully!"	
Failed End Condition	Notification: "Failed to Generate Analytics."	
Primary Actors: Secondary Actors:	Admin, Shop Owner	
Trigger	User selects "View Analytics" option.	
Description / Main Success Scenario	1.	Select "View Analytics" option.
	2.	System processes data to generate analytics.
	3.	Displays visualized performance metrics.
	4.	Notify: "Analytics Generated Successfully!"
Alternative Flows	2.1	System error while generating analytics.
		2.1.a Notify: "Failed to Generate Analytics."
Quality Requirements	Analytics must be generated within 2 minutes.	

2.4.3 Activity Diagram

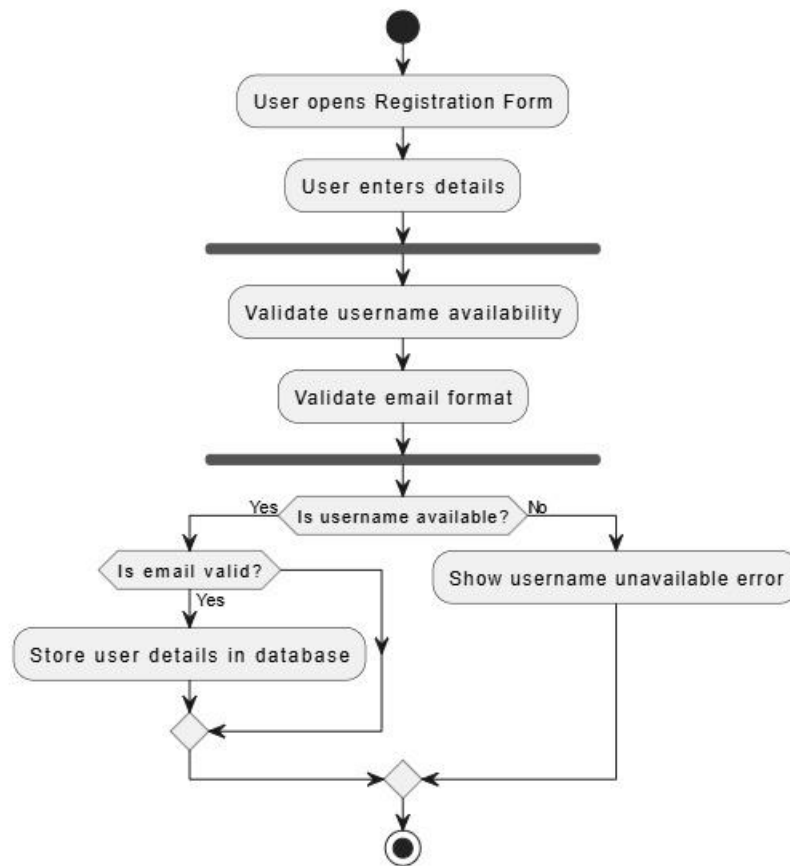


Figure 2.4.1: Activity Diagram for User Registration.

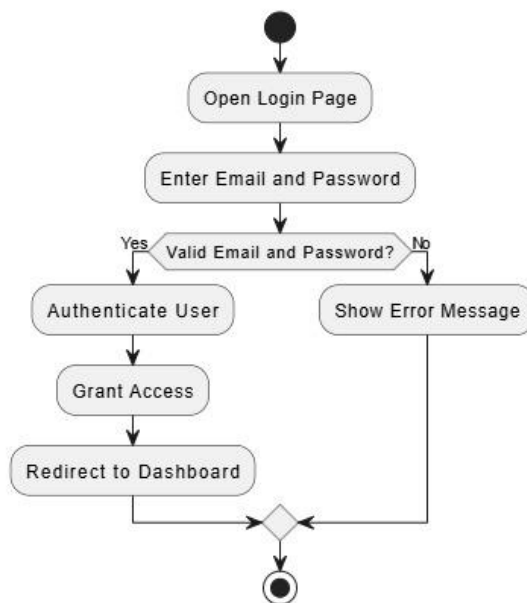


Figure 2.4.2: Activity Diagram for User Login.

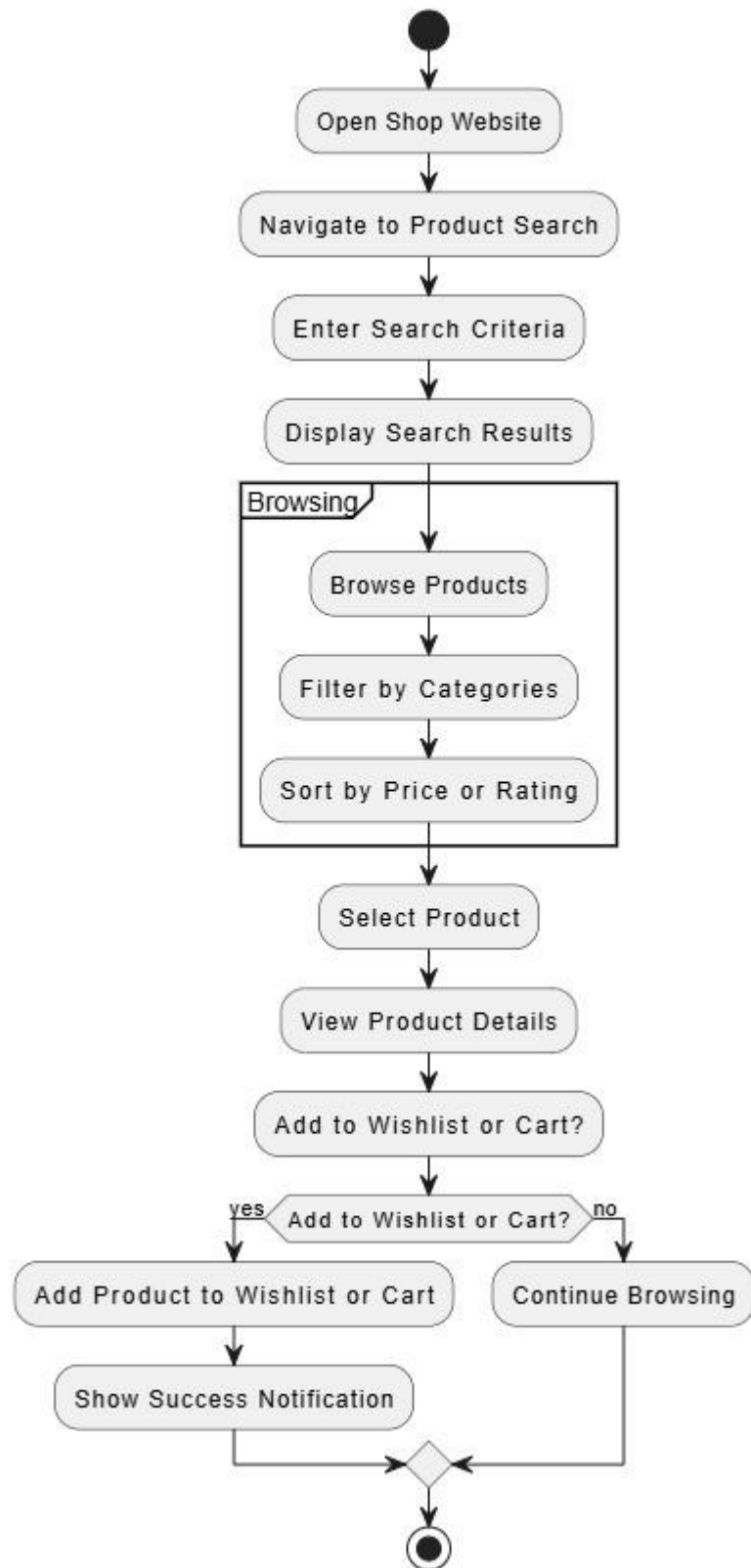


Figure 2.4.3: Activity Diagram for Product Browsing and add to cart to Wishlist.

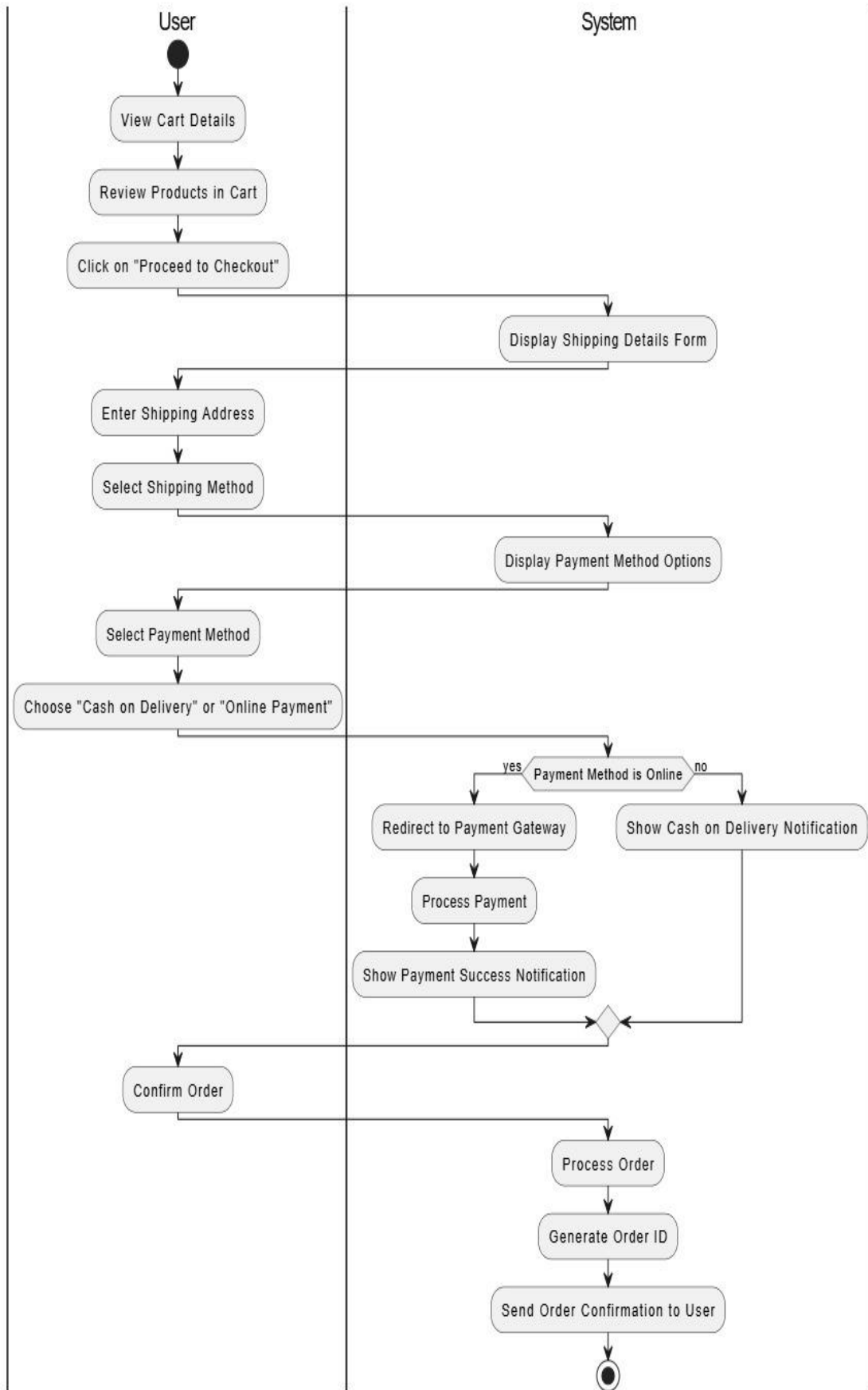


Figure 2.4.4: Activity Diagram for User Checkout.



Figure 2.4.5: Activity Diagram for Order Tracking.

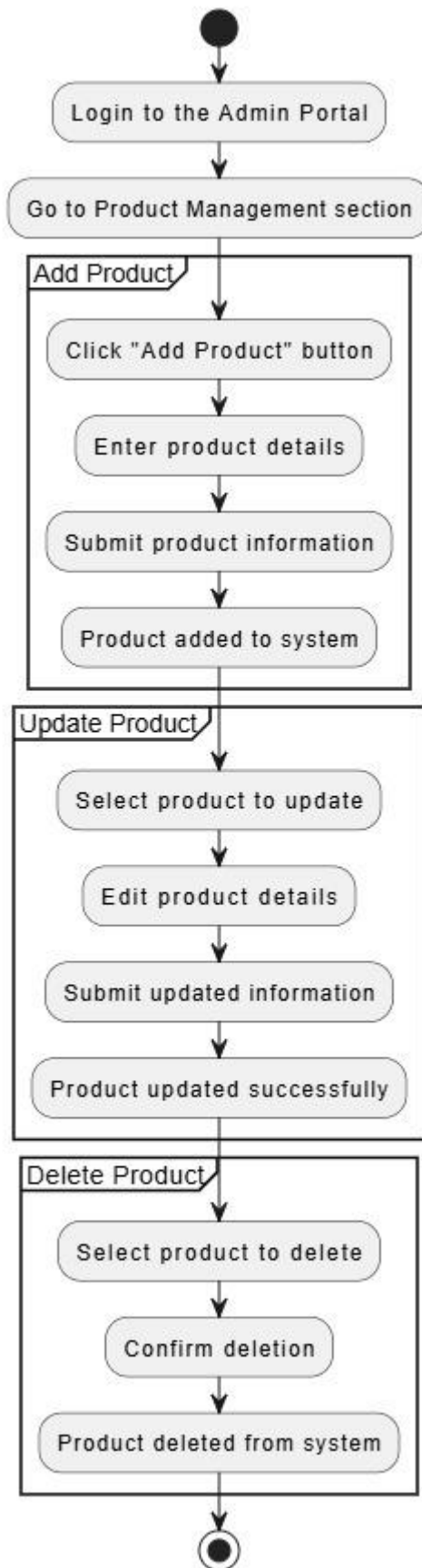


Figure 2.4.6: Activity Diagram for Add, Modify or Delete Products.

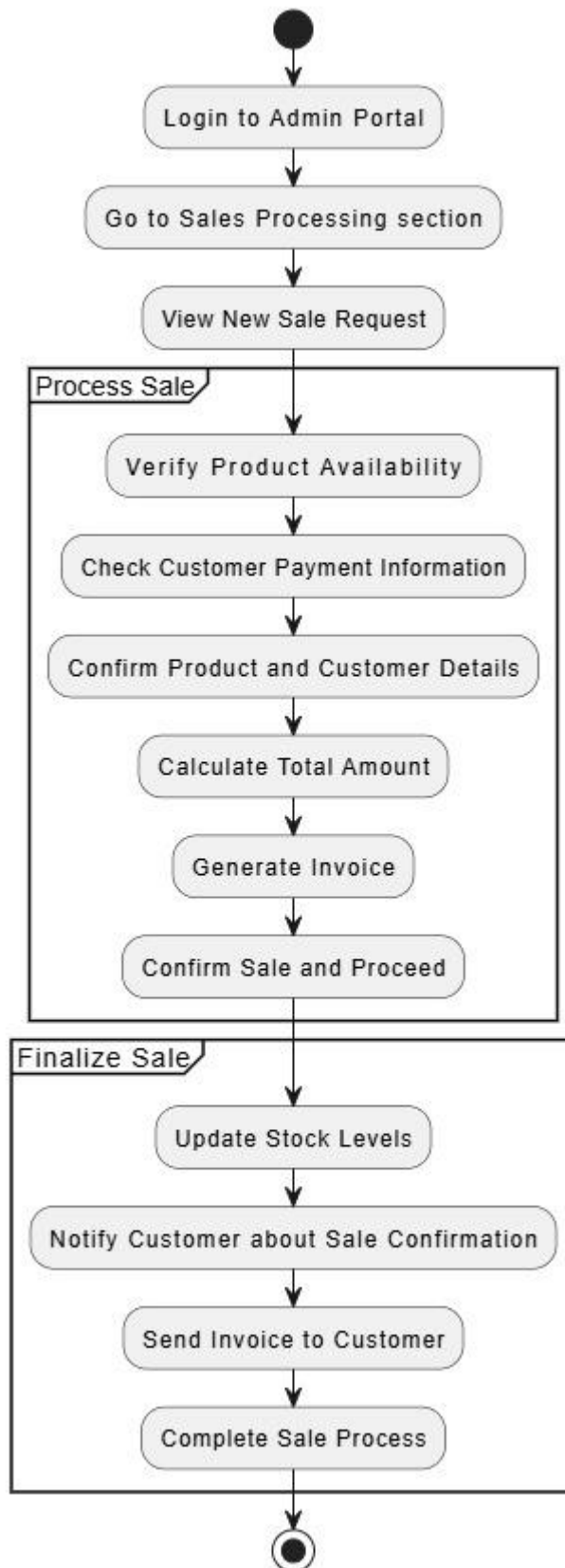


Figure 2.4.7: Activity Diagram for Sales Processing.



Figure 2.4.8: Activity Diagram for Manage Orders

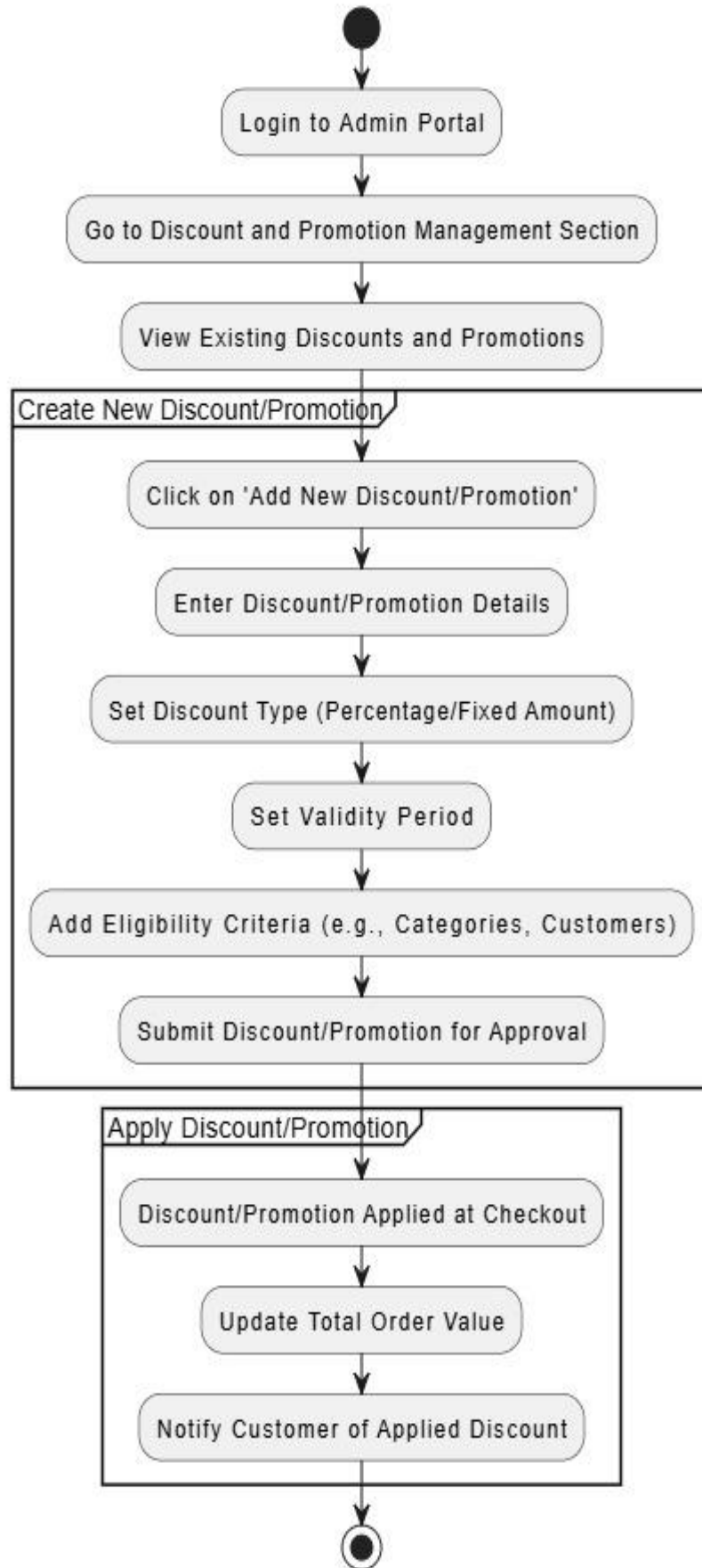


Figure 2.4.9: Activity Diagram for Discount and Promotion Management.

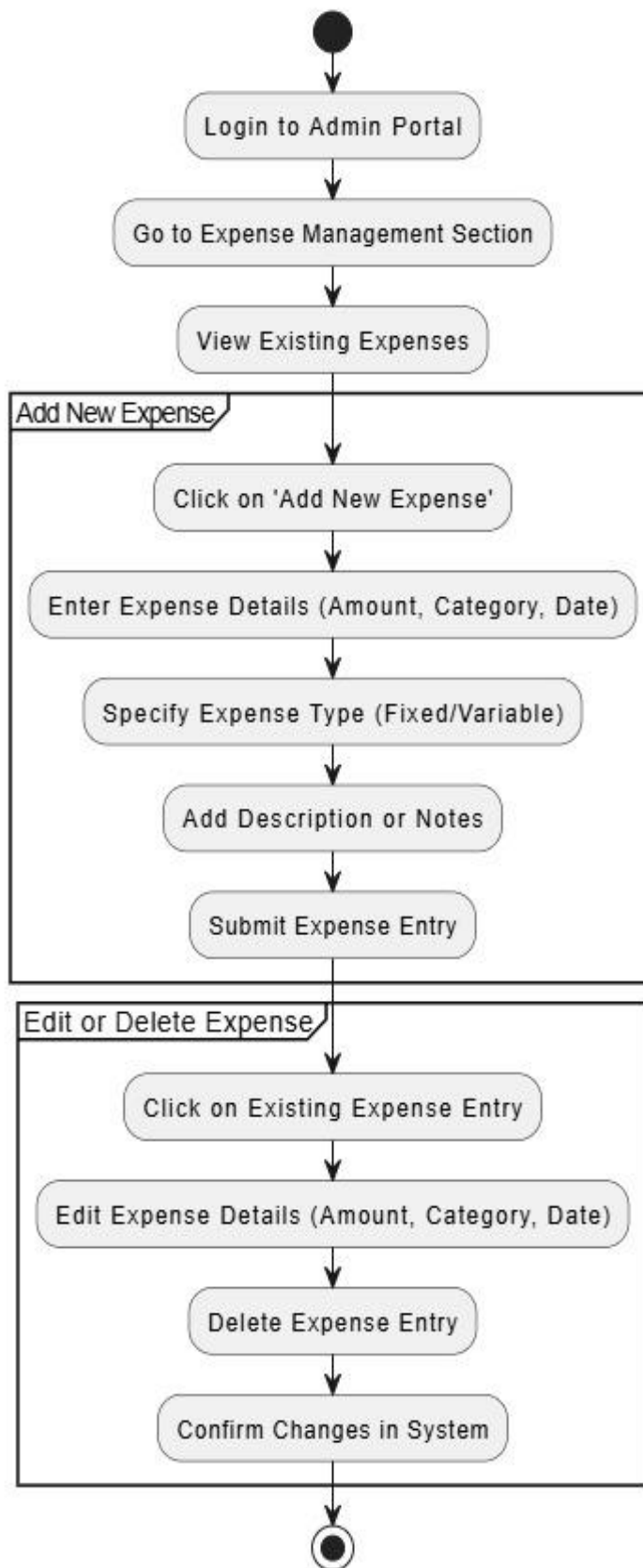


Figure 2.4.10: Activity Diagram for Expense Management.

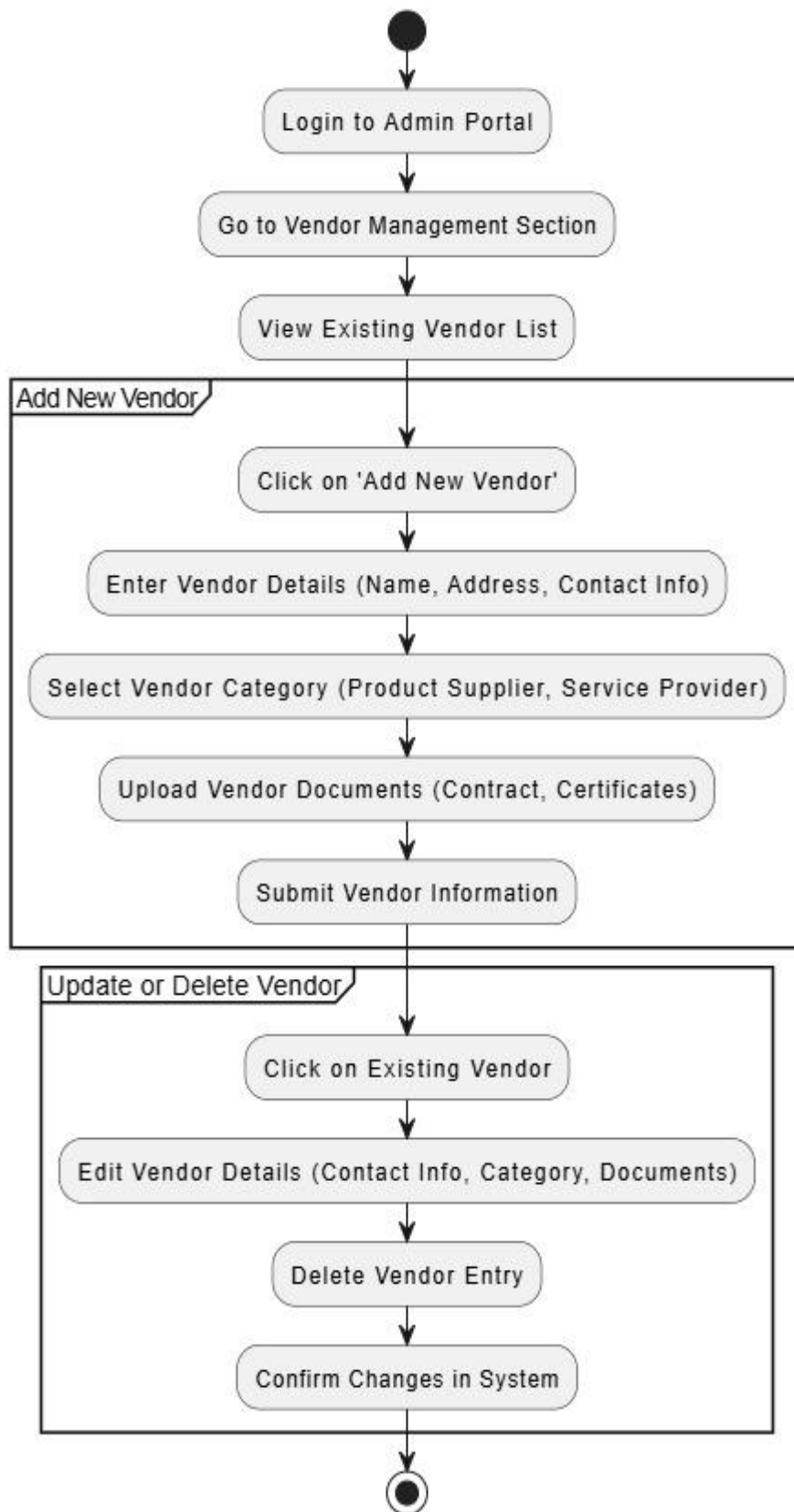


Figure 2.4.11: Activity Diagram for Vendor Management.

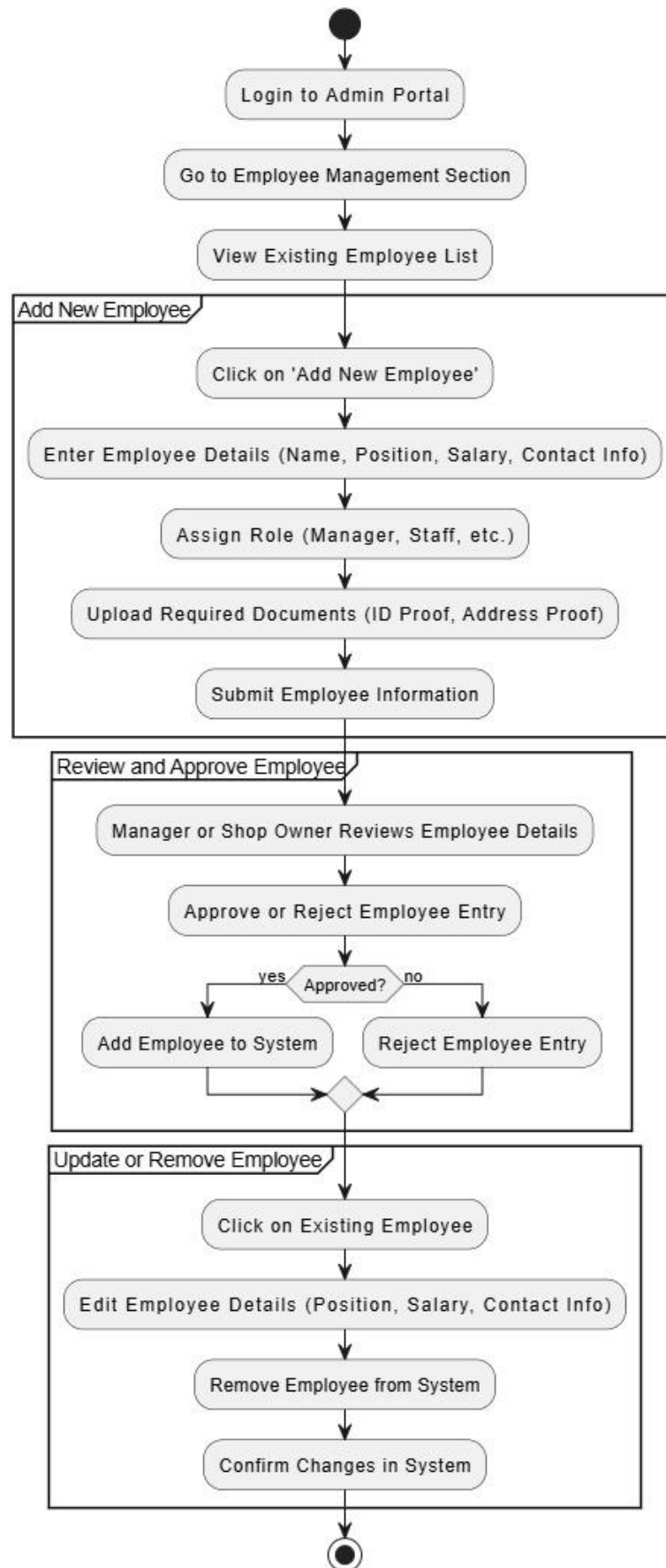


Figure 2.4.12: Activity Diagram for Employee Management.

2.4.4 Sequence Diagram

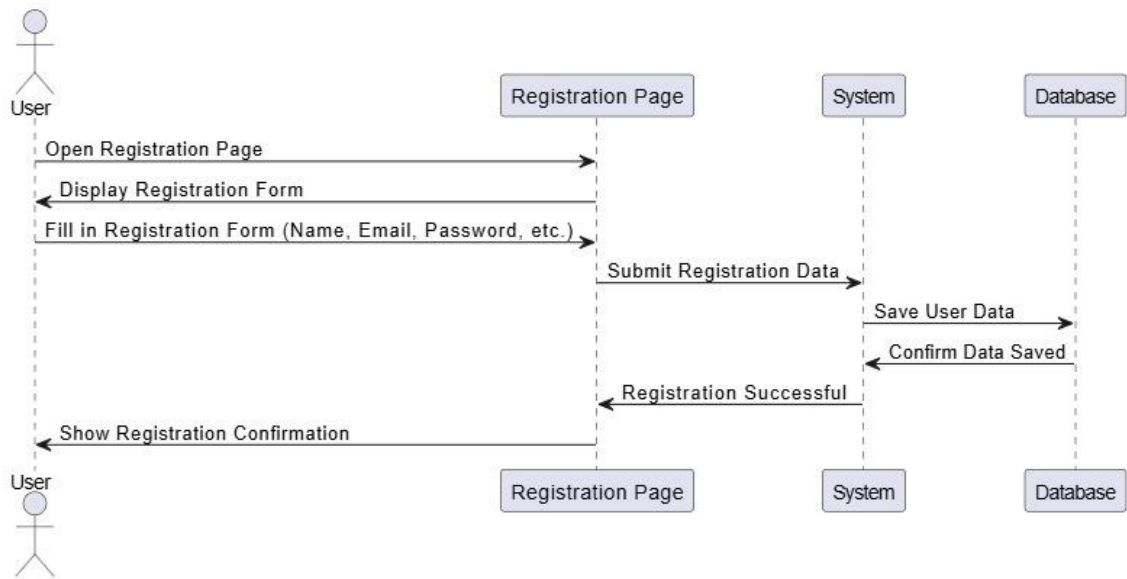


Figure 2.4.13: Sequence Diagram for User Registration.

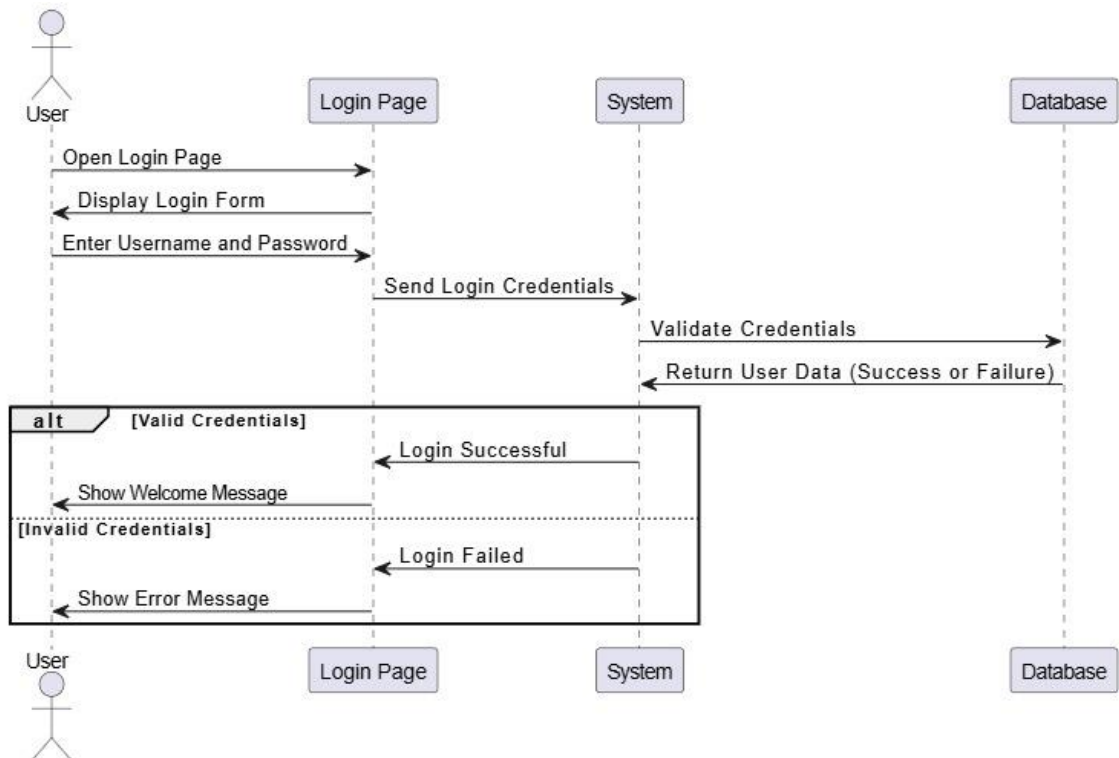


Figure 2.4.14: Sequence Diagram for User Login.

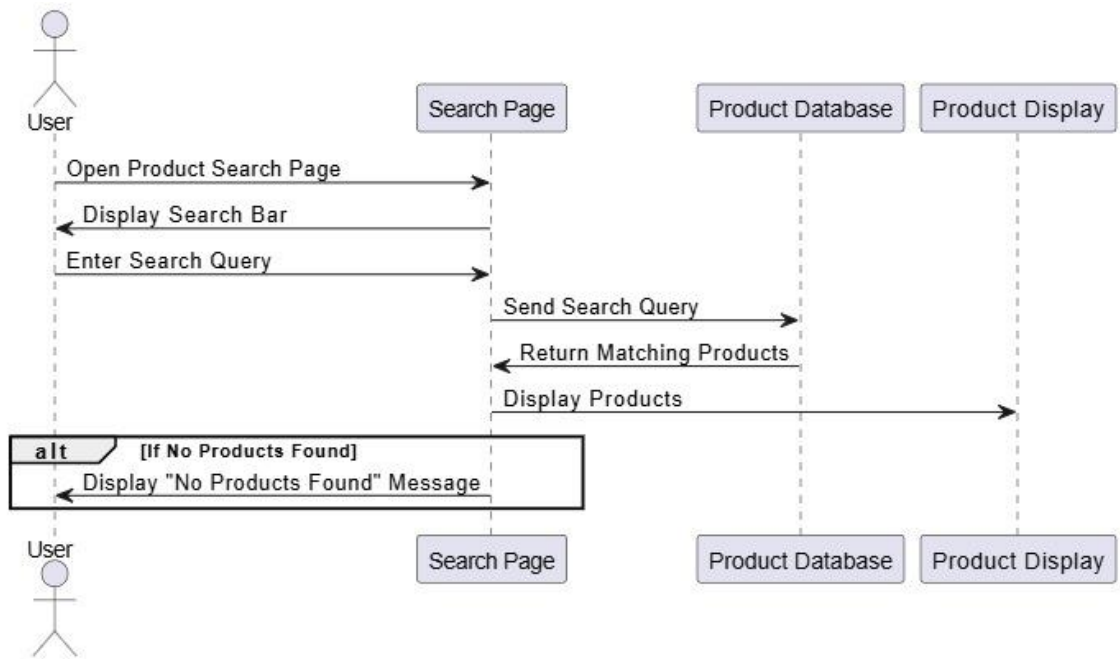


Figure 2.4.15: Sequence Diagram for Product Searching or Browsing.

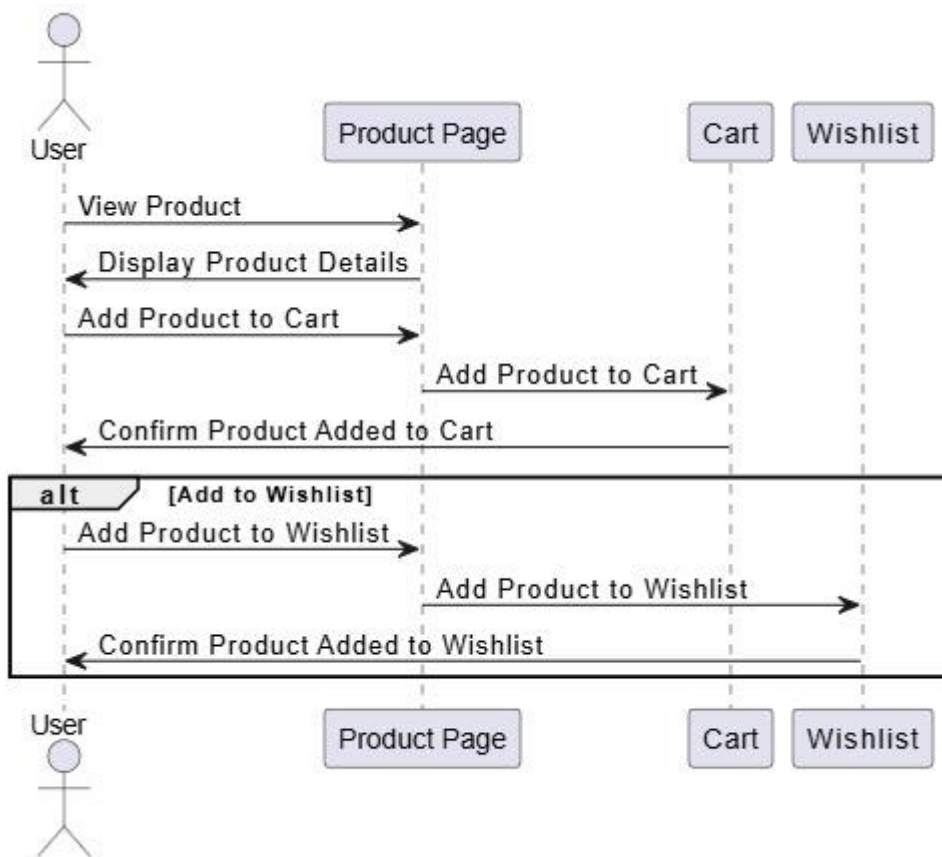


Figure 2.4.16: Sequence Diagram for Add to Cart or Add to Wishlist.

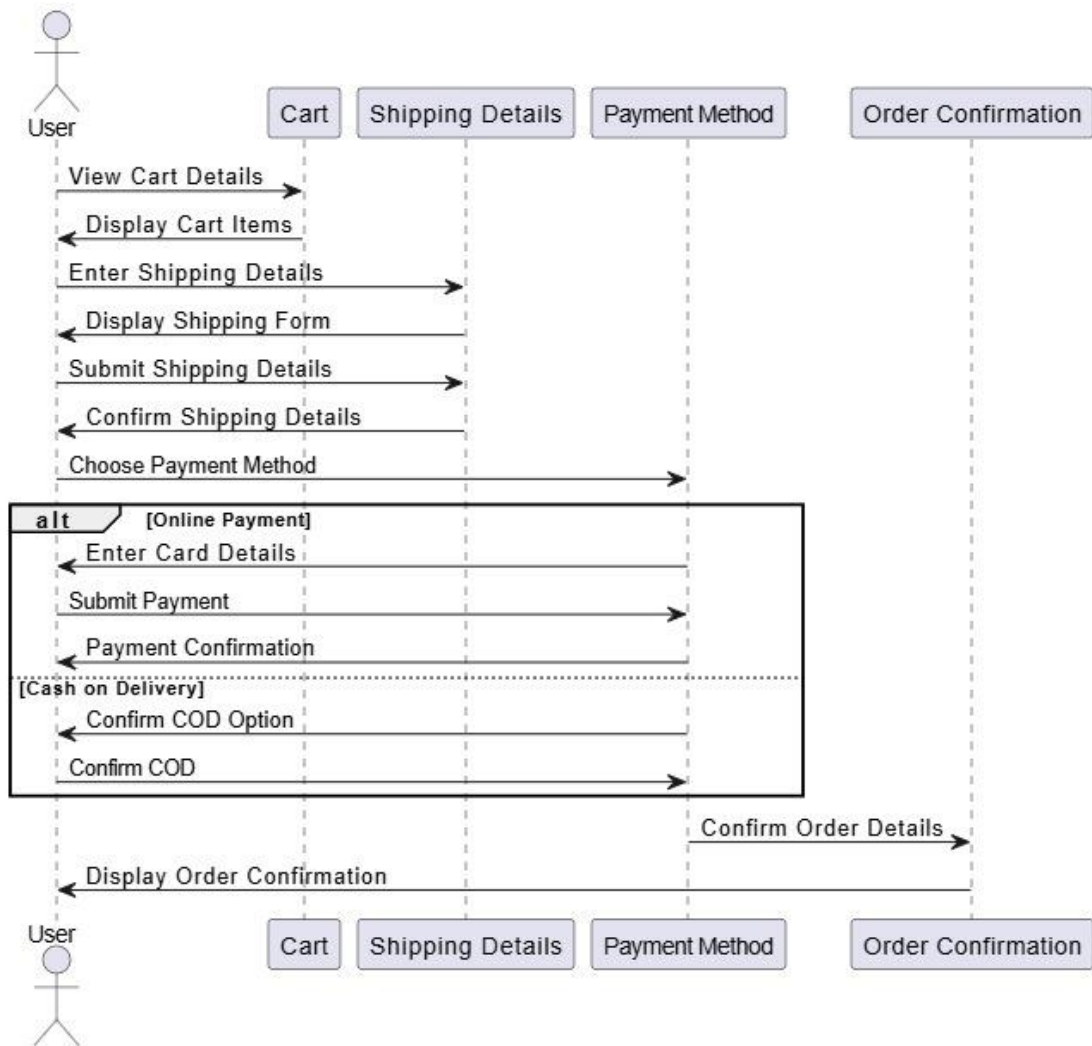


Figure 2.4.17: Sequence Diagram for Checkout.

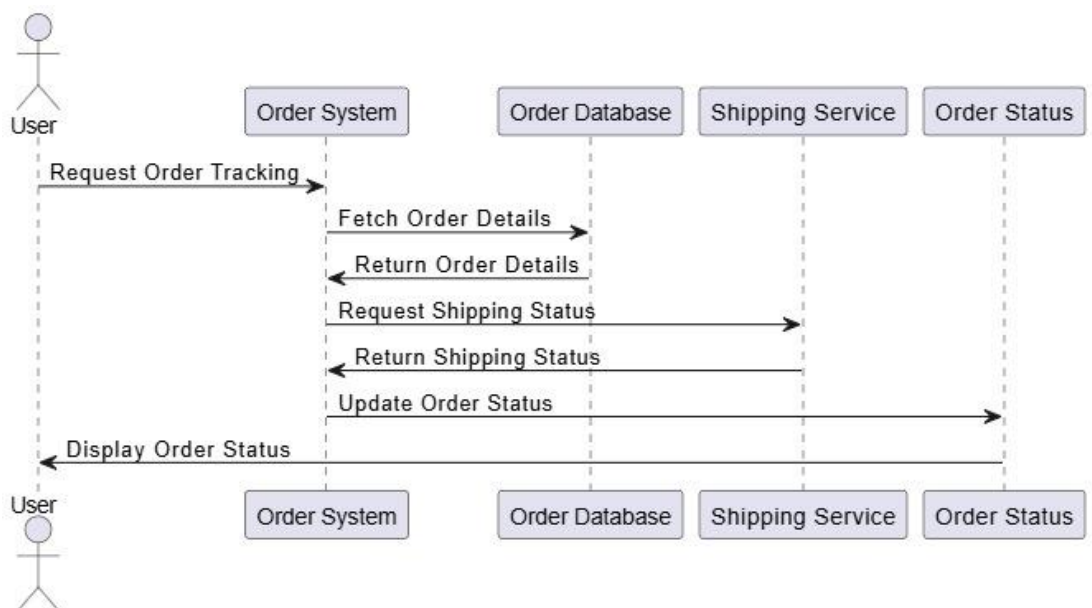


Figure 2.4.18: Sequence Diagram for Order Tracking.

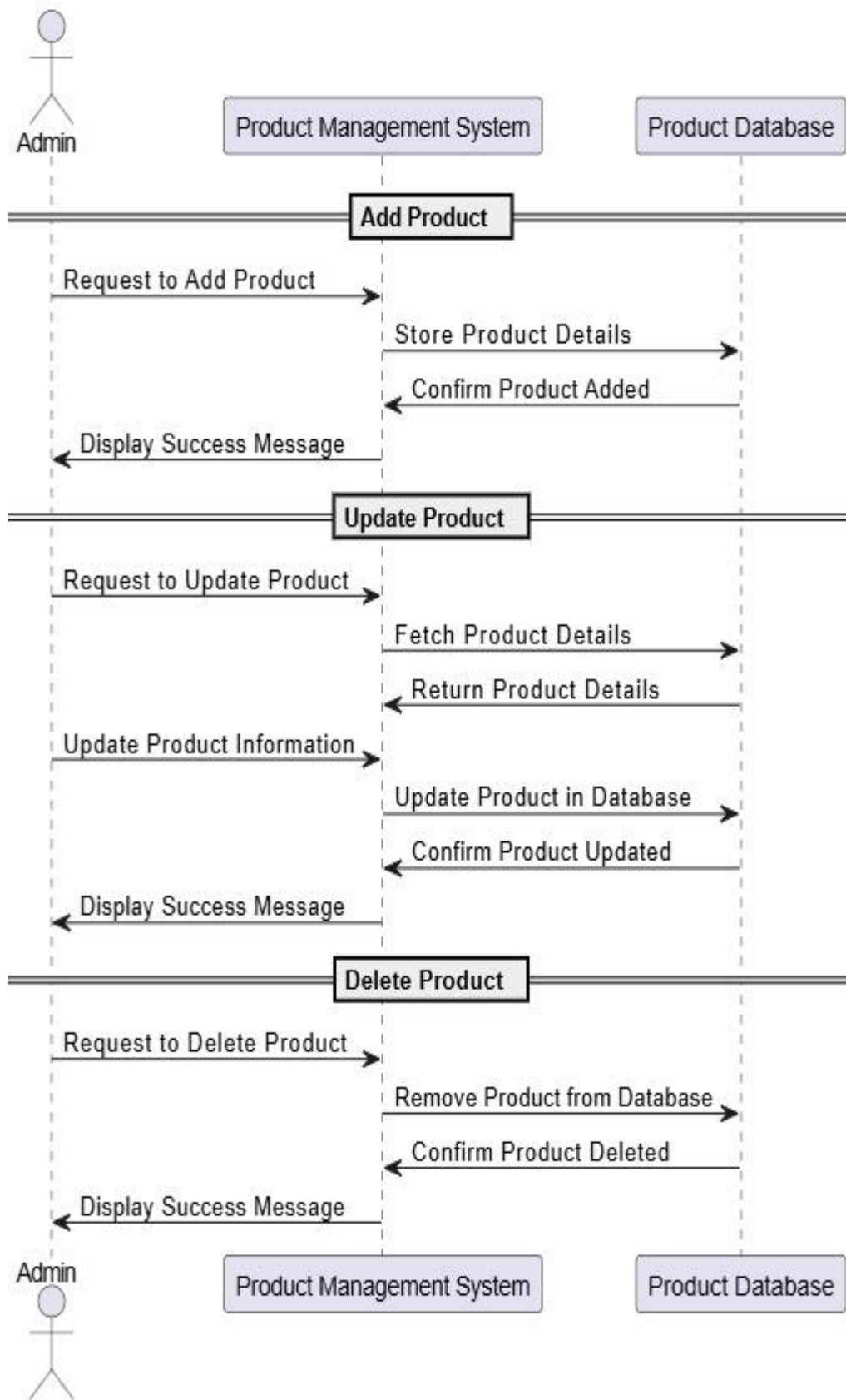


Figure 2.4.19: Sequence Diagram for Products Management.

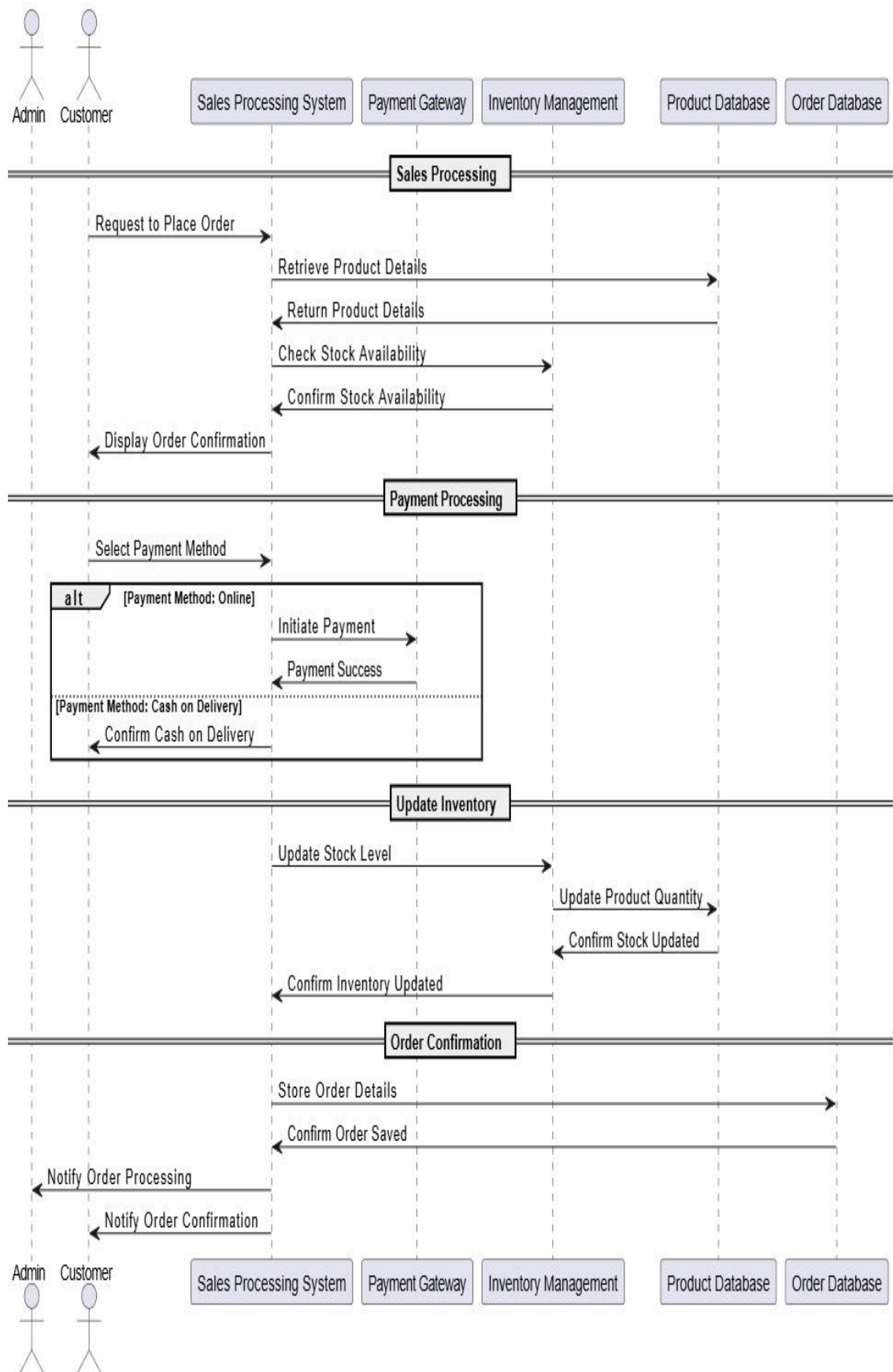


Figure 2.4.20: Sequence Diagram for Sales Processing.

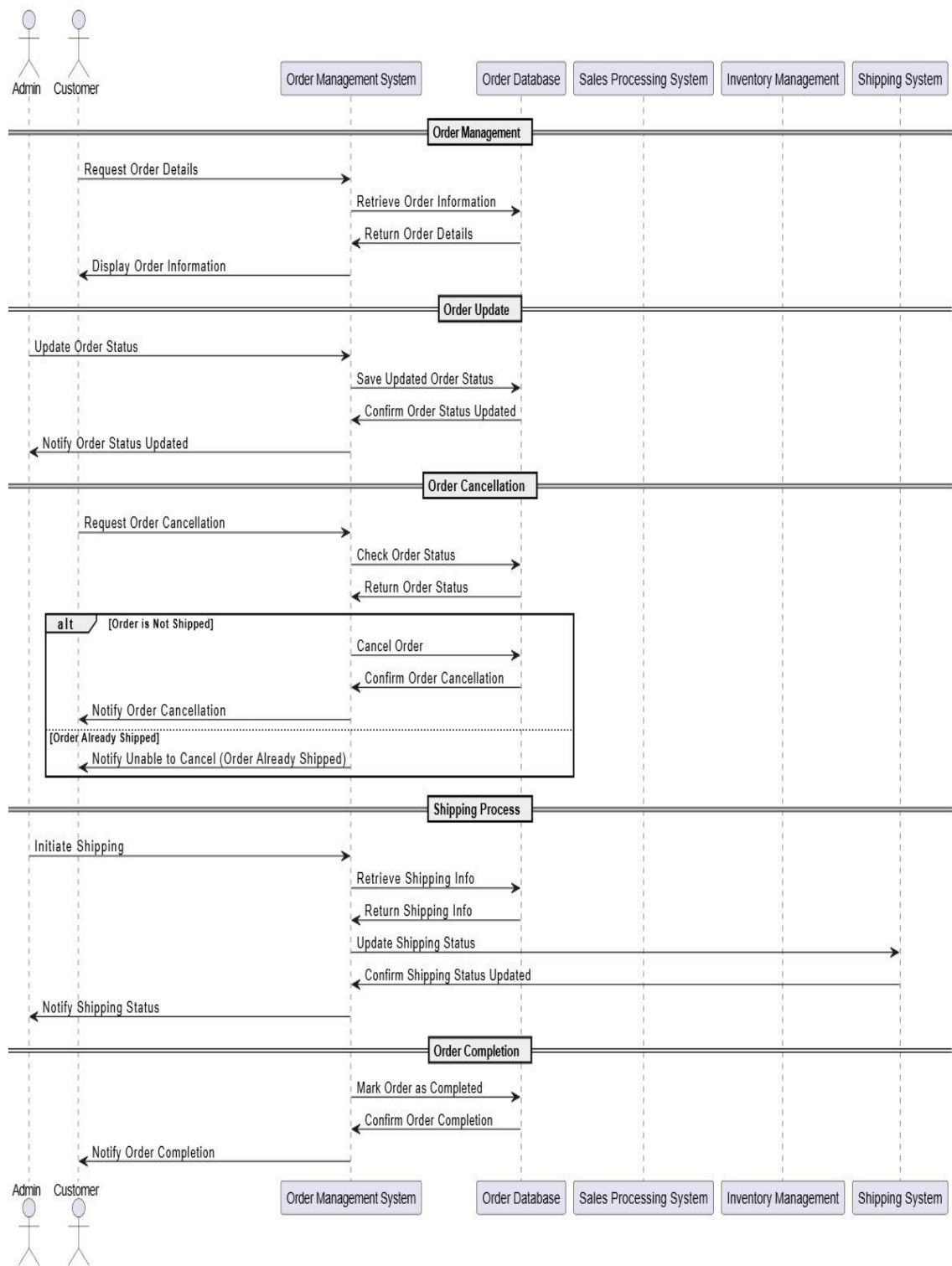


Figure 2.4.21: Sequence Diagram for Order Processing.

2.4.5 Class Diagram

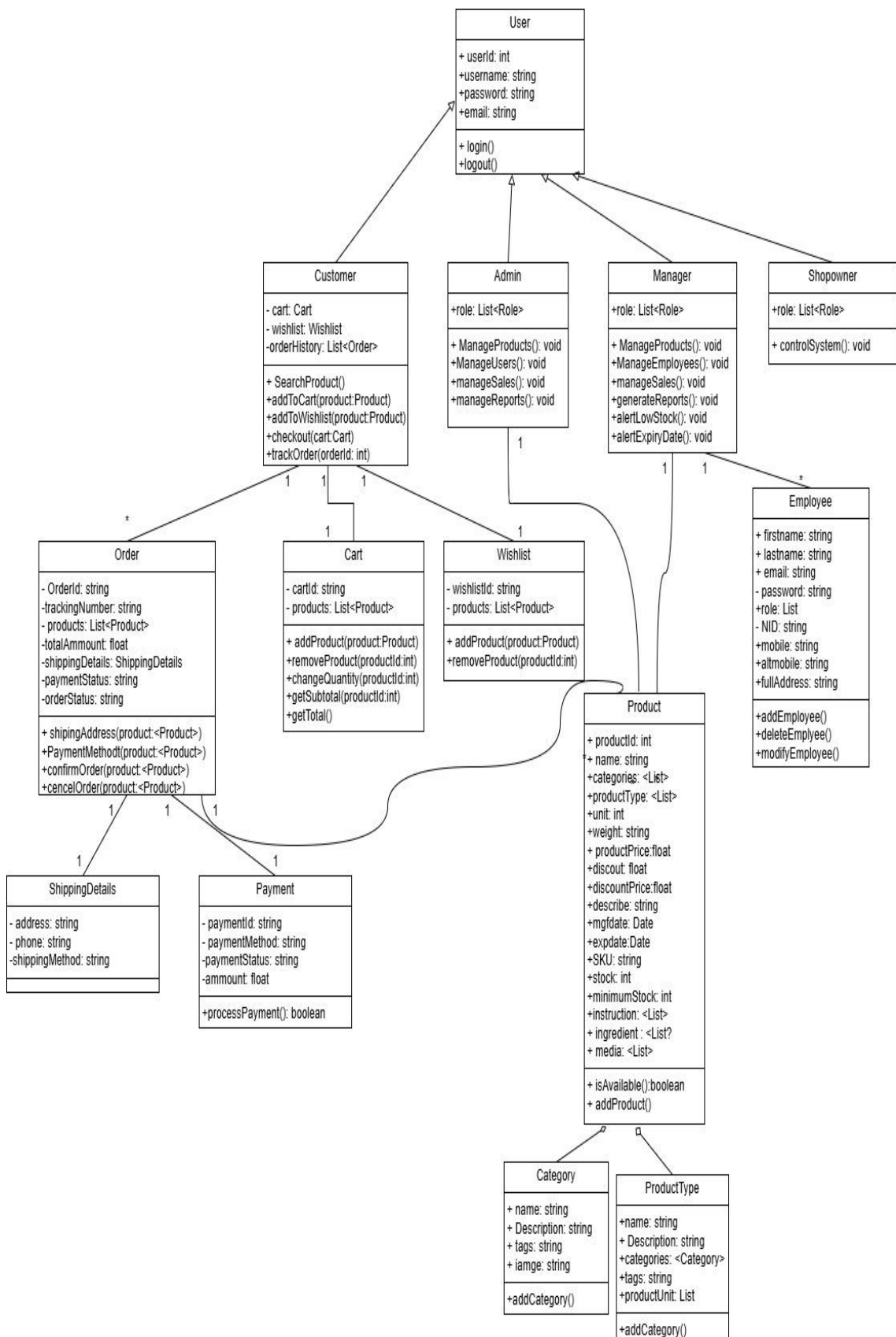


Figure 2.4.22: Class Diagram for Sales and Inventory Management System.

2.4.6 ER Diagram

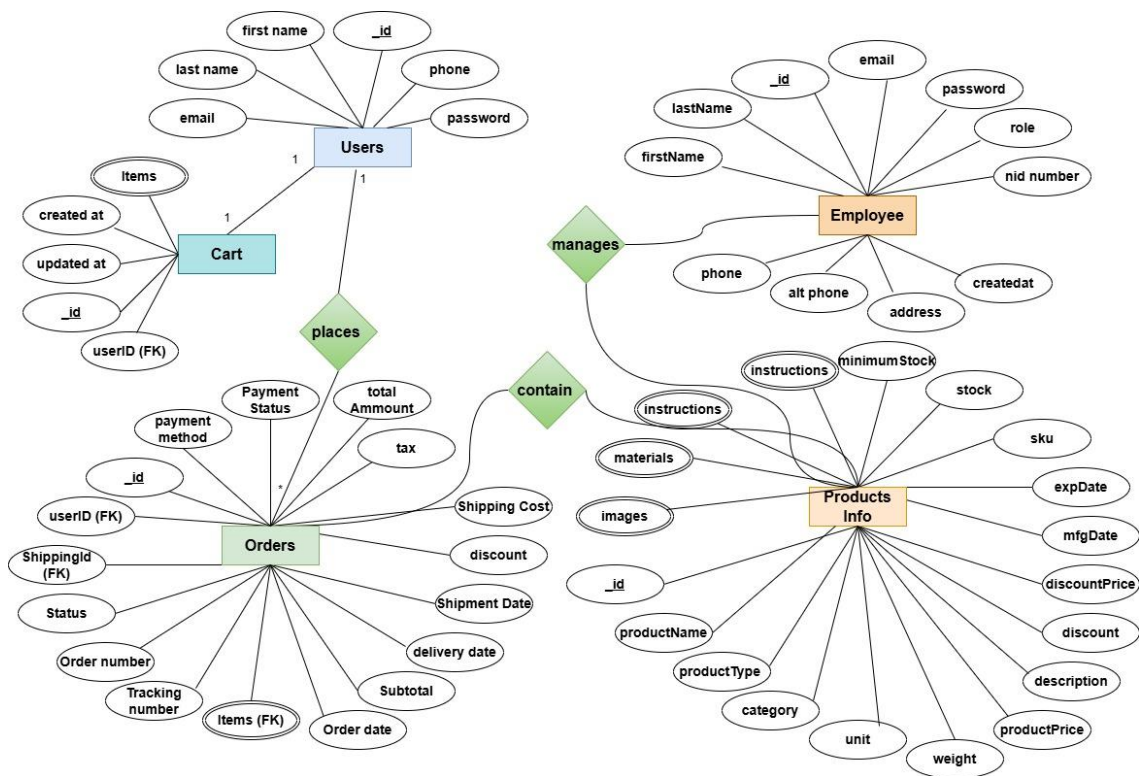


Figure 2.4.23: Entity Relationship Diagram for Sales and Inventory Management System.

2.5 Coding: Appendix A

Software testing is an important phase in developing a “sales and inventory system” which ensures that the final product meets its functional and non-functional requirements; and provides a reliable and efficient system usage by the end-users. Testing is the method of identifying as well as diagnosing problems, effectiveness issues, or variability in the system before it is implemented. Through the use of standard comprehensive testing methodology, the project attempts to find out whether the system can support as many different types of and configurations of hardware and software; how well it performs in real life; and how well it handles various situations. This will include inventory control test, Point of Sale (POS test), and functional test to prove that the e-commerce modules meet their intended design. The non-functional test is aimed at the assessment of the effectiveness, safety, accessibility and characteristics of the system. The compatibility test will help integrate it perfectly with frequently used equipment’s including bar code scanners, receipt printers and mobile financial solutions including bKash and Nagad. The method will also look at how other parts of the system are functioning disconnect from

the internet to ensure Continued functionality in areas with poor internet connection. Tube Individual test cases will be created, mimicking different realistic scenarios and peculiarities of users. Here, one will be using both, the manual testing technique and the automated testing tools to increase efficiency as well as the level of accuracy. In a manner that covers all of the objectives comprehensively, the “Sales and Inventory System” aims at being a reliable, easy to use and superior performing system for the departmental stores in Bangladesh.

2.6 Summary

Software testing is a critical phase to establishing the “sales and inventory system” for a certain level of functional and non-functional necessities as well as to deliver a dependable and effective solution for users. By accomplishing this goal, it is achieved the identification and correction of faults, problem in performances, and other form of variability in the system before it is used. Through systematic testing procedures the project seeks to verify that it is effective with different hardware and software platforms, competent to deal with real life events and conditions, and robust enough to cope with different situations during its operations. The areas of testing will include inventory control, POS and functional tests that will ensure that the e-commerce was implemented as intended. He non-functional test will inquire on the efficiency, security, friendliness and characteristics of the system. The compatibility test will help in integration with devices used frequently like printer, bar code scanner, receipt printer and mobile money solutions like bKash and Nagad. The method will also focus on the offline working of the system, ensuring continued operation in regions where there is no access to the Internet. Just like the development methodology, the testing process is also going to play several test cycles that are in coordination with the development process of the system. This means that other test cases will have to be created to mimic real life situations thus, capturing all those emerging scenarios, and users’ behaviors. Also, the result of both manual and automated testing tools will be used to increase efficiency and effectiveness in software development. In a systematic test, the “Sales and Inventory System” aims to offer an optimized, efficient and easy to use solution customized to meet the requirements of the departmental stores in Bangladesh.

Chapter 3 Software Testing

3.1 Introduction

Verification is a critical process for the development of a “sales and inventory system,” that checks the functionalities and non-functional aspects that enable a sound and robust component for a user during his working on the developed system. Testing is thus aimed at having an accurate system free from faults or areas of poor performance or inconsistency before going on the market. In an effort to ensure that the project is able to demonstrate compatibility with existing hardware and software, the ability of the system to handle real world events and its robustness to various scenarios, strict testing procedures will be followed. The testing shall cover areas such as inventory management, point of sale (POS) and functional testing to verify that the e-commerce modules are as designed. The non-functional test will check how well the system performs, the safety of the system, its usability and its parameters. Compatibility test will enhance the ability to work perfectly with frequent adopted tools like barcode, printers, receipt, etc, and digital payment systems such as bKash, Nagad, etc. The method will also look into the offline functionality of the system and ensure constant running especially in areas with poor internet connection. The project will therefore employ an agile testing cycle where testing will be done in parallel to the development process with constant feedback on the defects. To ensure that all possible use cases are considered, practical use cases will be replicated with the creation of test cases. Both software testing performed manually and by using test tools will be used for better performance and results. In this way, using an extensive testing methodology, the “Sales and Inventory System” aims at offering a functionally and qualitatively sound and concurrently, an easy-to-use system fit for department stores in Bangladesh.

3.2 Testing Features

3.2.1 Feature to Be Tested

- a. User Registration
- b. User Login
- c. Product Browsing
- d. Add to Cart
- e. Checkout

- f. Admin Login
- g. Add, Modify, Delete Products
- h. Sales Processing
- i. Order Processing
- j. Discount and Coupons Processing

3.3 Testing Strategies

3.3.1 Test Approach

The measures in the testing Strategies involve the following: Testing on the “Sales and Inventory System” is conducted with the aim of ensuring that the system would meet intended performance, reliability, and user-friendliness before it is made functional. A well-coordinated approach using several layers of testing and methods to solve potential issues will be implemented. The procedure will start with the unit level testing, where every part of the-total-environment like the inventory management, POS, and e-commerce modules will be tested for accuracy in isolation. Once again, the testing technique which embraces continuous improvement via iterations yields feedback assures the “Sales and Inventory System” is robust, customer-centric and ready for deployment to the departmental shops in Bangladesh.

3.3.2 Pass/Fail Criteria

The testing methodologies for “Sales and Inventory System” are developed to such a manner that the proposed system satisfies the functional and non-functional specifications. The primary focus of functional testing is customer, operational, and application usability, speed, security and reliability of various components of the system, such as inventory control, points of sale, and E-commerce facilities. Primarily, the testing will be done on whether or not the particular component of a system is performing to its capacity. For example, the updates on the inventory records should be made to correlate with the changes in the stock, the POS system must be able to handle transactions and generate VAT compliant invoice. If the feature is implemented without difficulties and if the test is aligned to some criteria, a test case will pass. Errors such as inconsistent inventory feed or, failed payment transaction will cause failure. Performance testing will determine congestion and real time update rates on the system. Here we impose only one condition for passing – the system should remain fairly responsive and be able to execute tasks without significant slowdown during the highest load. Failure states comprise of

system crashes, slow response to commands or queries, or delayed feedback on the system. Security testing will assess information security operating procedures such as user login, and encryption. The system will be considered as successful if it guards against unauthorized access, effectively stores and handles incentives and securely integrates payments. When a flaw like a data leakage or an avoidable access control is identified it means that a failure exists.

3.4 System Testing (Test Cases with Report)

Table 3.4.1: Test Case Report for User Registration.

Test Case: 3.4.1		Test Case Name: User Registration					
System: Sales and Inventory System		Subsystem: User Authentication					
Designed by: Sarat Saha		Design Date: 25/12/2024					
Executed by: Sarat Saha		Execution Date: 24/12/2024					
		Description: The user registers for the Sales and Inventory System by providing valid registration information.					
		Pre-condition: The user accesses the registration page.					
Step	Name	Email	Password	Retype password	Response	Pass / Fail	Comment
1	Sarat Saha	SaratSaha.edu@gmail.com	1234	1234	Registration Successful	Pass	Registration is successful with valid input.
2	Sarat Saha	SaratSaha.edu@gmail.com	123456	123546	Password mismatch	Fail	Password and retype password must match.
3	Sarat Saha		123456	123456	Email field empty	Fail	User must input an email.
4		SaratSaha.edu@gmail.com	123456	123456	Name field empty	Fail	User must input a name.
		Post-condition: The user is successfully registered with valid information, and the process is complete.					

Table 3.4.2: Test Case Report for User Login.

Test Case: 3.4.2		Test Case Name: User Login					
System: Sales and Inventory System		Subsystem: User Authentication					
Designed by: Sarat Saha		Design Date: 25/12/2024					
Executed by: Sarat Saha		Execution Date: 25/12/2024					
		Description: The user logs into the system by providing valid credentials.					
		Pre-condition: The user accesses the login page.					
Step	Email	Password	Response	Pass/ Fail	Comment		

1	SaratSaha.edu@gmail.com	123456	Login successful	Pass	User logs in successfully with valid credentials
2	invalid.email@gmail.com	123456	Login failed	Fail	Email not registered.
4	SaratSaha.edu@gmail.com	100000	Login failed	Fail	Incorrect password.
Post-condition: The user successfully logs into the system with valid credentials.					

Table 3.4.3: Test Case Report for Product Browsing.

Test Case: 3.4.3		Test Case Name: Product Browsing			
System: Sales and Inventory System		Subsystem: E-Commerce			
Designed by: Sarat Saha		Design Date: 25/12/2024			
Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: The user browses the product catalog and views product details.			
		Pre-condition: The user accesses the product browsing page.			
Step	Name	Action	Response	Pass/Fail	Comment
1	View Categories	Click on "Groceries"	Products displayed	Pass	Products under the category are displayed.
2	Search Product	Search for "Rice"	Results displayed	Pass	Relevant results are shown.
3	Invalid Search	Search for "xyz123"	No products found	Pass	Proper message displayed for no results.
Post-condition: The user successfully browses products and views details.					

Table 3.4.4: Test Case Report for Add to Cart.

Test Case: 3.4.4		Test Case Name: Add to Cart			
System: Sales and Inventory System		Subsystem: E-Commerce			
Designed by: Sarat Saha		Design Date: 25/12/2024			
Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: The user adds products to the shopping cart.			
		Pre-condition: The user selects a product to add to the cart.			
Step	Name	Product	Response	Pass/ Fail	Comment
1	Add Valid Product	Rice	Added to cart	Pass	Product successfully added to the cart.
2	Invalid Quantity	Rice	Error: Invalid quantity	Fail	Quantity must be greater than zero.
Post-condition: The user successfully adds valid products to the cart.					

Table 3.4.5: Test Case Report for Checkout.

Test Case: 3.4.5		Test Case Name: Checkout			
System: Sales and Inventory System		Subsystem: E-Commerce			
Designed by: Sarat Saha		Design Date: 25/12/2024			

Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: The user completes the purchase process by checking out.			
		Pre-condition: The user has items in the cart.			
Step	Name	Action	Response	Pass/ Fail	Comment
1	Valid Checkout	Enter payment details	Order confirmed	Pass	Checkout process successful.
2	Invalid Payment	Enter invalid details	Payment failed	Fail	User needs to enter valid payment info.
3	Empty Cart Checkout	Proceed with empty cart	Error: Cart is empty	Fail	User cannot checkout with an empty cart.
Post-condition: The user completes the purchase successfully with valid payment details.					

Table 3.4.6: Test Case Report for Admin Login.

Test Case: 3.4.6		Test Case Name: Admin Login				
System: Sales and Inventory System		Subsystem: User Authentication				
Designed by: Sarat Saha		Design Date: 25/12/2024				
Executed by: Sarat Saha		Execution Date: 25/12/2024				
		Description: The admin logs into the system with valid credentials.				
		Pre-condition: Admin accesses the login page.				
Step	Name	Email	Password	Response	Pass/ Fail	Comment
1	Valid Admin Login	admin@example.com	admin123	Login successful	Pass	Admin logs in successfully.
2	Invalid Email	invalid.admin@example.com	admin123	Login failed	Fail	Email not registered.
3	Invalid Password	admin@example.com	wrongpwd	Login failed	Fail	Incorrect password.
Post-condition: Admin successfully logs into the system with valid credentials.						

Table 3.4.7: Test Case Report for Add, Modify, Delete Products

Test Case: 3.4.7		Test Case Name: Add, Modify, Delete Products				
System: Sales and Inventory System		Subsystem: Inventory Management				
Designed by: Sarat Saha		Design Date: 25/12/2024				
Executed by: Sarat Saha		Execution Date: 25/12/2024				
		Description: Admin manages the product inventory.				
		Pre-condition: Admin is logged into the system.				
Step	Name	Action	Response	Pass/ Fail	Comment	
1	Add Product	Enter valid product details	Product added successfully	Pass	Product successfully added to inventory.	
2	Modify Product	Edit product details	Product updated successfully	Pass	Product details updated correctly.	

3	Delete Product	Remove product	Product removed successfully	Pass	Product deleted from inventory.
Post-condition: Admin manages the product inventory successfully					

Table 3.4.8: Test Case Report for Sales Processing.

Test Case: 3.4.8		Test Case Name: Sales Processing.			
System: Sales and Inventory System		Subsystem: Sales Management			
Designed by: Sarat Saha		Design Date: 25/12/2024			
Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: Process customer purchases and generate sales receipts.			
		Pre-condition: Admin and cashier are logged into the system.			
Step	Name	Action	Response	Pass/Fail	Comment
1	Valid Sale	Enter product details and total	Receipt generated	Pass	Sales processed successfully.
2	Invalid Product	Enter non-existent product ID	Error: Product not available	Fail	Only valid product IDs are accepted.
3	Empty Cart	Proceed without adding products	Error: No items in cart	Fail	Sale cannot be processed without products.
Post-condition: Sale is completed, and a receipt is generated for the customer					

Table 3.4.9: Test Case Report for Order Processing.

Test Case: 3.4.9		Test Case Name: Order Processing			
System: Sales and Inventory System		Subsystem: Order Management			
Designed by: Sarat Saha		Design Date: 25/12/2024			
Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: Admin processes orders placed by customers.			
		Pre-condition: Orders are available in the system.			
Step	Name	Action	Response	Pass/Fail	Comment
1	Valid Order	Mark order as shipped	Status updated successfully	Pass	Order processed and marked as shipped.
2	Cancel Order	Cancel a valid order	Order canceled successfully	Pass	Order removed from pending orders.
3	Invalid Order ID	Attempt to process invalid ID	Error: Order not found	Fail	Only valid orders can be processed.
Post-condition: Orders are successfully processed, shipped, or canceled as needed.					

Table 3.4.10: Test Case Report for Discount and Coupons Processing

Test Case: 3.4.10		Test Case Name: Discount and Coupons Processing			
System: Sales and Inventory System		Subsystem: Promotions Management			
Designed by: Sarat Saha		Design Date: 25/12/2024			
Executed by: Sarat Saha		Execution Date: 25/12/2024			
		Description: Apply discounts and coupons during checkout.			
		Pre-condition: Valid discounts and coupons are available.			

Step	Name	Coupon Code	Discount Amount	Response	Pass/Fail	Comment
1	Valid Coupon	SAVE20	20%	Discount applied successfully	Pass	Total amount updated with discount.
2	Expired Coupon	EXPIRED50	50%	Error: Coupon expired	Fail	Cannot apply expired coupons.
3	Invalid Coupon	INVALID10	10%	Error: Invalid coupon	Fail	Only valid coupons are accepted.
Post-condition: Discounts and coupons are applied correctly during checkout.						

3.5 Summary

Software testing is a critical phase in the development of a ‘sales and inventory system,’ to ensure that the product developed delivers based on the functional and non-functional requirements, is reliable and consistently efficient based on those it was developed for. Testing is the evaluation done at different phases of the system development to identify and respond to any defect, performance problem or variation in the system before implementation. As a result, the project attempts to validate that the system suits many forms of hardware and software configurations, and that the system can operate underneath different situations and events native to most environments. The testing fields include inventory control, POS, and functional testing to ensure that the e-commerce modules run as predicted. Non-functional test will focus on the efficiency, reliability, accessibility and characteristics of the system. The compatibility test will mean seamless compatibility with common operating devices like barcode scanners, receipt printers, and will also be compatible with e-publishing devices and the popular mobile money services like bKash and Nagad. The method will also consult and observe the offline efficiency of the developed system, ensuring continued usability by communities with limited or no internet connection thus addressing Benson P’s concern. The approach of use of iteration testing where testing incidents with the development cycle thus providing regular feedback forming part of the overall continuous improvement of the system. This way test cases will be developed to mimic such realistic conditions as different scenarios and user actions. Both human and automated testing tools will also be used to optimize the element of efficiency as well as accuracy. As a result, the “Sales and Inventory System” – through the testing method – aims at developing an effective, ease to use and efficient system that will serve the departmental stores in Bangladesh effectively.

Chapter 4 Deployment and Maintenance

4.1 Introduction

Making and sustaining some elementary structures like the “Sales and Inventory System” for the smooth running of the system from development to practicing phase and maintenance of the system for the longevity of the model is the final step of developing this system. Implementation entails the deployment of the system in departmental stores involving the integration of the current hardware like the bar code scanners, receipt printers, and cash drawers. This phase includes erecting e-commerce platforms and integrating them into payment channels bKash and Nagad for secure transactions. Certification and tutorial lessons for the system shall be provided to orient shop owners and other workers to the program’s capabilities. Full support for the upkeep of the program and constant updates will be implemented during the maintenance phase. Updates on the software will be done frequently to fix problems, and enhance the security and the new features will depend on the users. Technologically facilitated support services will be available to facilitate and address operation challenges promptly. Furthermore, the effectiveness of the system will be assessed; the performance analysis especially at a busy time will be made. The deployment and maintenance techniques put into perspective are aimed at providing a solid foundation, as well as growing capability to accommodate the additional roles that sector shops require in order to effectively operate physical and digital stores.

4.2 Try to follow the SRLC (software release life cycle)

The deployment of the Sales and Inventory System shall go through an organized Software Release Life Cycle (SRLC) since this structure offers a solid and easy to use product to the users. The cycle starts with the pre-alpha that primarily involves requirements gathering and establishing feasibility of the system and the design phase of the system. Stakeholder feedback is then taken at this stage while the major functionalities of the project, which include the inventory management, POS, and e-commerce are defined by creation of simple models for assessment. From the alpha creation stage, the basic modules are developed and tested intranet. Actual inventory tracking and sales processing capabilities, as well as order-taking over the internet, are incorporated and compared to the requirements of a business. This stage involves small

cycle debugging and purification to make sure the basic components of the system provide what is expected of them. The beta phase is the stage where a prototype of the commercially available system is taken to real users which include the department store owners and personnel. In this stage, feedback from the usability test is received, and real-life scenarios such as handling of large volume of transactions, synchronizing with offline mode, payment gateway integration etc., are implemented. In the release candidate phase, all crucial features are established and tested to release a nearly bug-free final version of the system to the users. The faults if any are corrected and the system is fine tuned to increase software reliability. Other tests are performed for sustaining operability and for conformance to legal and regulatory requirements which include VAT invoicing. The system is ready for roll out and documentation including user's guide and handbooks are completed. Lastly during the general availability stage, the system is launched publicly and available for use by anyone. Customer care for emergencies is avails once the system has been launched and regular updates to implement new functionality and optimize the system is proposed. Therefore, by the strict adherence to SRLC, the project guarantees efficient and friendly development of the system and provides a solid solution for the departmental stores

Chapter 5 User Manual

5.1 Introduction

The development of the “Sales and Inventory System” is carried out in accordance with the Software Release Life Cycle (SRLC) to devise an orderly and effective way of presenting a sound and effective application. Pre-Alpha Initiation: it involves the system requirements gathering, analysis of viability, system specification phase. exact business requirements are gathered during this stage, and the major capabilities of the project such as inventory control, point of sale, and electronic commerce are defined by creating working models and templates for reviewing. Inventory control, sales, and online order management tools are implemented and tested with respect to organizational requirements. Technical checkout: This is the last stage of software testing which involves multi cycle debug and purging in order to ascertain that the simple sub-modules of the system work as expected. Beta implemented involves providing the system to a few users in the intended environment, department stores and their owners, and their peers. Here again, feedbacks regarding usability issues are gathered, and realistic features like handling of large number of transactions, modality for handling offline sync of data, Online Payment Gateway Integration etc. are introduced. Slight problems are fixed and the system is improved to make the dependability and efficiency higher. The release candidate stage refers to the point near to the completely polished and developed system, where all major characteristics are developed and checked. Other tests are performed for sustaining and for the purpose of meeting legal requirements and or billing such as; VAT billing among others. Documentation is complete and ready which includes user manuals and training handouts At the general availability phase, the system is ready for wider use in the public domain. First of all, after system launch, the dedicated support team will be able to solve the problems that occur unexpectedly; Secondly, system updates that will contain new options and features as well as the improvements of its function are expected to be released periodically. Thus, compliance with the SRLC helps the project become organized and focused on the user and increases its reliability and scalability to meet the needs of departmental stores.

5.2 Project Functionalities

User Login

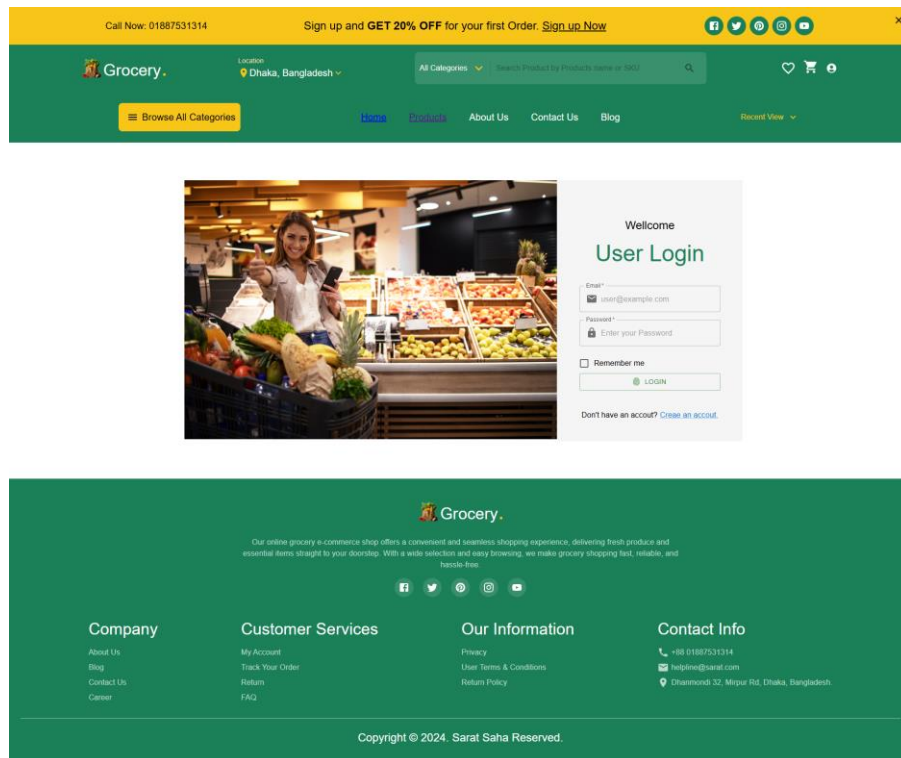


Figure 5.2.1: User Log in page

User Registration

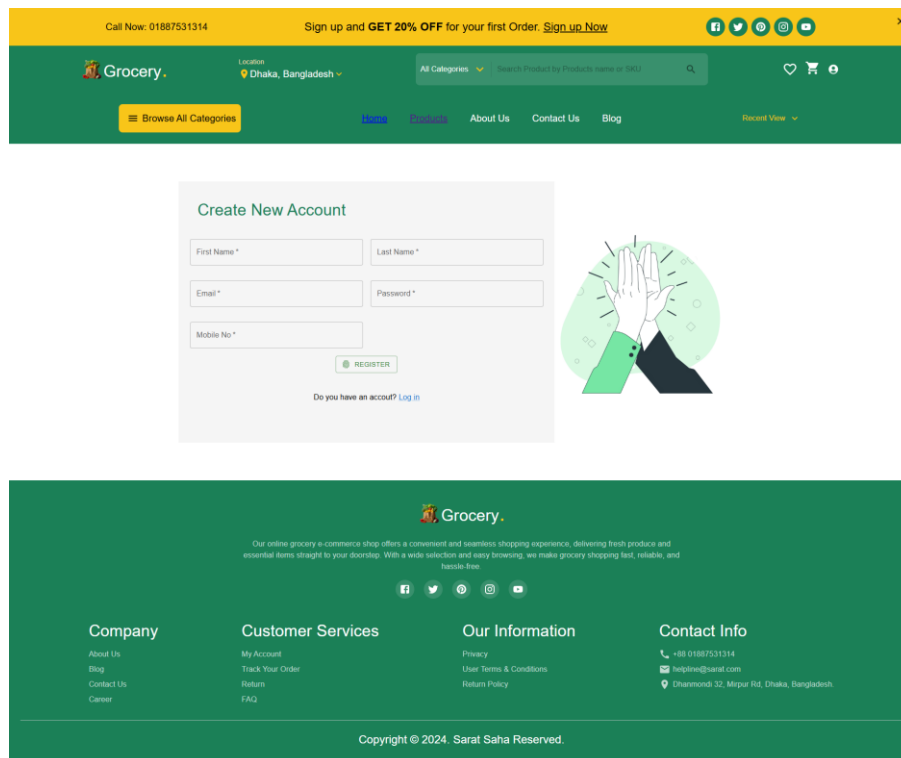


Figure 5.2.2: User Registration page

Home Page:

Call Now: 01887531314 Sign up and GET 20% OFF for your first Order. [Sign up Now](#)

Grocery Location: Dhaka, Bangladesh All Categories Search Product by Products name or SKU

[Browse All Categories](#) [Home](#) [Products](#) [About Us](#) [Contact Us](#) [Blog](#) [Recent View](#)

The Best Online Grocery Shop

Your One-Stop Shop for Quality Groceries

Our online grocery e-commerce shop offers a convenient and seamless shopping experience, delivering fresh produce and essential items straight to your doorstep. With a wide selection and easy browsing, we make grocery shopping fast, reliable, and hassle-free.

[SHOP NOW](#) → [View All Products](#)

4.8 Rating+
Trusted by 40k+ customers

Secure Payment

Fast Delivery

Featured Categories

Flat 15% Discount

Summer Sale!

Enjoy great deals on all our products. Don't miss out on the limited-time offer.

[SHOP NOW](#) →

Flat 20% Discount

Summer Sale!

Enjoy great deals on all our products. Don't miss out on the limited-time offer.

[SHOP NOW](#) →



Winter Discount

Get 50% Off - Limited Time Offer!

1d : 0h : 59m : 34s

[SHOP NOW](#) →



Today Deals

Deals of the Day

25% Off

Laundry Supplies
Eco-Friendly Laundry Detergent
₹ 12.99 ~~₹ 16.99~~
★ 4.5 Out of 5.0

This eco-friendly laundry detergent is tough on stains but gentle on the environment. Perfect for everyday use, it leaves your clothes smelling fresh and clean.

[Add](#)

15% Off

Personal Cares
Refreshing Citrus Body Wash
₹ 9.99 ~~₹ 11.99~~
★ 4.7 Out of 5.0

This invigorating citrus-scented body wash provides a refreshing cleanse, leaving your skin soft, hydrated, and delicately fragranced.


[Add](#)

Weekly Deals

Unbeatable Offer: Your Weekly Grocery Specials

Unlock unbeatable weekly deals on your favorite groceries – shop now for exclusive savings every week!

[Shop Now →](#)



Testimonials

Testimonials from Our Loyal Customers



I've tried several grocery delivery services, and this one is by far the best. The website is user-friendly, the selection is vast, and the customer service is outstanding. Highly recommend!



Bessie Cooper
Housewife

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Frequently Ask Questions

Customer Frequently Ask Questions

- What areas do you deliver to? +
- What is the maximum order amount for delivery? +
- Can I schedule a delivery time? +
- How do I return an item if I'm not satisfied? +
- What payment methods are accepted? +
- How can I track my order? +
- Do you offer discounts or promotions? +
- What should I do if an item is out of stock? +
- Is there a loyalty program for regular customers? +
- Can I modify my order after placing it? +

 **Grocery.**

Our online grocery e-commerce shop offers a convenient and seamless shopping experience, delivering fresh produce and essential items straight to your doorstep. With a wide selection and easy browsing, we make grocery shopping fast, reliable, and hassle-free.

<p>Company</p> <ul style="list-style-type: none"> About Us Blog Contact Us Career 	<p>Customer Services</p> <ul style="list-style-type: none"> My Account Track Your Order Return FAQ 	<p>Our Information</p> <ul style="list-style-type: none"> Privacy User Terms & Conditions Return Policy 	<p>Contact Info</p> <ul style="list-style-type: none"> +88 01887531314 helpline@sarat.com Dhanmondi-32, Mirpur Rd, Dhaka, Bangladesh.
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Activate Windows
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Figure 5.2.3: E-commerce Home page

Display products page:

Call Now: 01887531314 Sign up and **GET 20% OFF** for your first Order. [Sign up Now](#)

Grocery. Location: Dhaka, Bangladesh

Home Products About Us Contact Us Blog Recent View

Showing 1-6 of 6 results Sort by: Default Sorting

Active Filters: Clear All

Filter Options

Category

- Fresh Vegetables
- Dairy & Eggs

Product Type

- Vegetables
- Fresh Fruits
- Dairy Products

Product	Discount	Price	Action
Carrots	5% off	\$57 / \$60	Add
Broccoli	10% off	\$108 / \$120	Add
Spinach		\$50	Add
Apples		\$150	Add
Bananas	10% off	\$18 / \$20	Add
Whole Milk		\$80	Add

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Figure 5.2.4: Display products page

Product Details:

The screenshot displays the 'Product Details' page for Broccoli on the 'Grocery' website. The page features a yellow header with contact information and a promotional offer, a green navigation bar with the site logo and location, and a main content area with a product image, description, and purchase options. The footer contains company information, customer services, and contact details.

Header: Call Now: 01887531314 | Sign up and GET 20% OFF for your first Order. [Sign up Now](#)

Navigation: Grocery | Dhaka, Bangladesh | All Categories | Search Product by Product name or SKU | Home | Products | About Us | Contact Us | Blog | Recent View

Product Details:

- Product Name:** Broccoli (Out of stock)
- Discount:** 10% OFF
- Price:** ₳ 108 (Original Price: ₳ 120)
- Description:** Fresh organic broccoli, rich in nutrients.
- Product Unit:** Pieces (pc)
- Product Quantity:** - 1 +
- Buttons:** ADD TO CART, ADD TO FAVORITES
- SKU:** BRO-m546a60-e0365
- Product Type:** Vegetables
- Available Stock:** 45
- Manufacturing Date:** 2024-12-24
- Expiry Date:** 2024-12-28
- Instructions for this product:**
 - Store in a cool place
 - Wash before use
 - Broccoli
- Ingredients for this product:**
 - Broccoli

Footer:

- Company:** About Us, Blog, Contact Us, Career
- Customer Services:** My Account, Track Your Order, Return, FAQ
- Our Information:** Privacy, User Terms & Conditions, Return Policy
- Contact Info:** +88 01887531314, helpine@sarat.com, Dhanmondi 32, Mirpur Rd, Dhaka, Bangladesh

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Figure 5.2.5: Product Details page.

View Cart:

Call Now: 01887531314 Sign up and **GET 20% OFF** for your first Order. [Sign up Now](#)

Location: Dhaka, Bangladesh

Search Product by Products name or SKU

Shopping Cart

Home / Products / Shopping-cart

Products	Price	Quantity	Subtotal
Spinach	₳50.00	2	₳100.00
Apples	₳150.00	1	₳150.00
Carrots	₳60.00	1	₳60.00
Bananas	₳20.00	3	₳60.00
Whole Milk (liters)	₳80.00	3	₳240.00

Order Summary

Items: 13

Sub Total: ₳970.00

Taxes: ₳60.00

Coupon Discount: -₳60.00

Total: ₳970.00

[PROCEED TO CHECKOUT](#)

Coupon Code: [APPLY COUPON](#) [CLEAR SHOPPING CART](#)

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Figure 5.2.6: View Cart page.

Checkout:

Call Now: 01887531314 Sign up and GET 20% OFF for your first Order. [Sign up Now](#)

Location: Dhaka, Bangladesh
All Categories ▼
Search Product by Products name or SKU

Browse All Categories
Home
Products
About Us
Contact Us
Blog
Recent View ▼

Checkout

[Home](#) / [Products](#) / [Shopping-cart](#) / [Checkout](#)

Billing Details

Delivery Address *

Same as shipping address
 Use a different billing address

Country * ▼

Order Summary

Items:	13
Sub Total:	₳970.00
Taxes:	₳0.00
Shipping Cost:	₳0.00
Coupon Discount:	-₳0.00
Total:	₳970.00

PROCEED TO PAYMENT

Order's Item

Products	Price	Quantity	Subtotal
Broccoli 0	₳120.00	3	₳360.00
Spinach 0	₳50.00	2	₳100.00
Apples 0	₳150.00	1	₳150.00
Carrots 0	₳60.00	1	₳60.00
Bananas 0	₳20.00	3	₳60.00
Whole Milk 1liters	₳80.00	3	₳240.00

Order Summary

Total Item:	13
Sub Total:	₳970.00
Taxes:	₳0.00
Shipping Cost:	₳0.00
Coupon Discount:	-₳0.00
Payable Ammount:	₳970.00

Select Payment Method

Cash On Delivery
 Online Payment

CONFIRM ORDER

Our online grocery e-commerce shop offers a convenient and seamless shopping experience, delivering fresh produce and essential items straight to your doorstep. With a wide selection and easy browsing, we make grocery shopping fast, reliable, and hassle-free.

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Figure 5.2.7: Checkout page.

Confirm Order:

Call Now: 01887531314 Sign up and GET 20% OFF for your first Order. [Sign up Now](#)

Grocery Location Dhaka, Bangladesh

All Categories Search Product by Product name or SKU

[Browse All Categories](#) [Home](#) [Products](#) [About Us](#) [Contact Us](#) [Blog](#) [Recent View](#)

Your order is completed!

Thank you. Your order has been received.

Order ID: **ORD-1735559183091-AOEND7** Order Tracking Number: **TRK-K2GJU53J** [DOWNLOAD INVOICE](#)

Order Date: 12/30/2024

Payment Method: **Cash On Delivery** Payment Status: **pending** Order Status: **pending**

Order Details

Products	Price	Quantity	SubTotal
Carrots	₳60	1	₳60
Broccoli	₳120	1	₳120
Spinach	₳50	1	₳50
Apples	₳150	1	₳150
Bananas	₳20	1	₳20
Whole Milk	₳80	1	₳80
Total			₳480.00
Shipping Cost			₳20.00
Tax			₳0.00
Discount			- ₳0
Total			₳480

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Figure 5.2.8: Confirm Order page.

Admin Login:

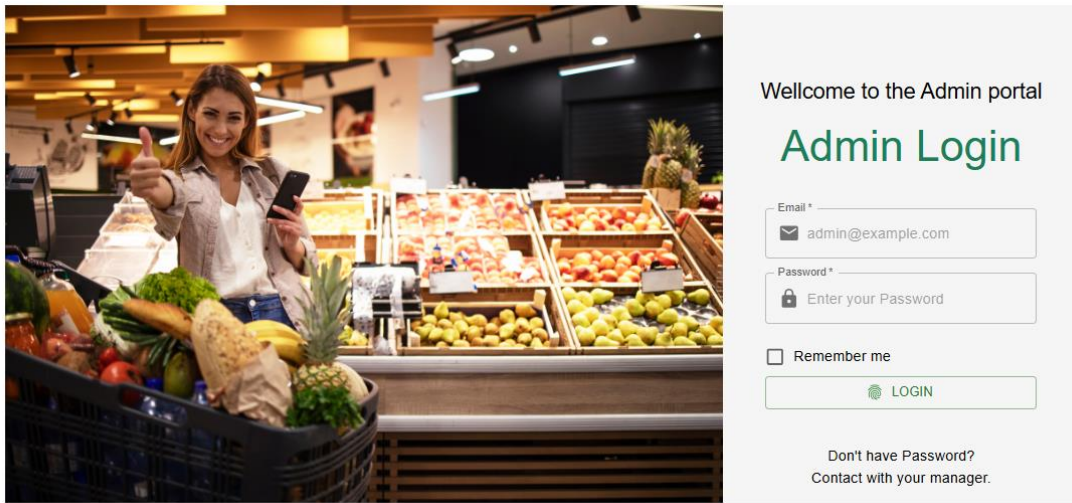


Figure 5.2.9: Admin Login page.

New Employee Register.:

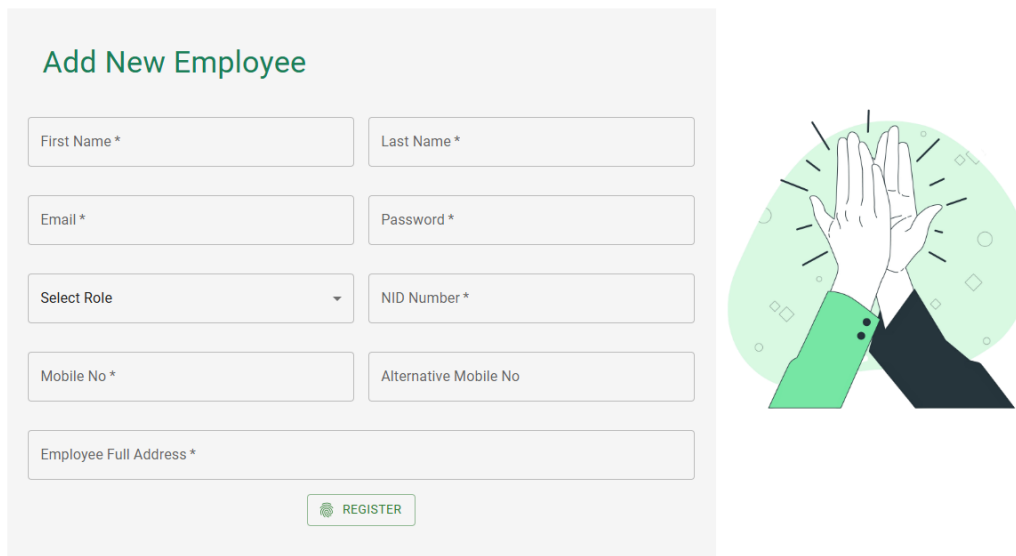
The image displays an 'Add New Employee' registration form on the left and an illustration of two hands clapping on the right. The form has a light green header with the title 'Add New Employee'. It contains several input fields: 'First Name *', 'Last Name *', 'Email *', 'Password *', 'Select Role' (a dropdown menu), 'NID Number *', 'Mobile No *', 'Alternative Mobile No', and 'Employee Full Address *'. A green 'REGISTER' button is located at the bottom of the form. The illustration shows two hands, one in a green sleeve and one in a dark blue sleeve, clapping against a light green circular background with radiating lines and small squares.

Figure 5.2.10: Employee Registration page.

Sales Processing:

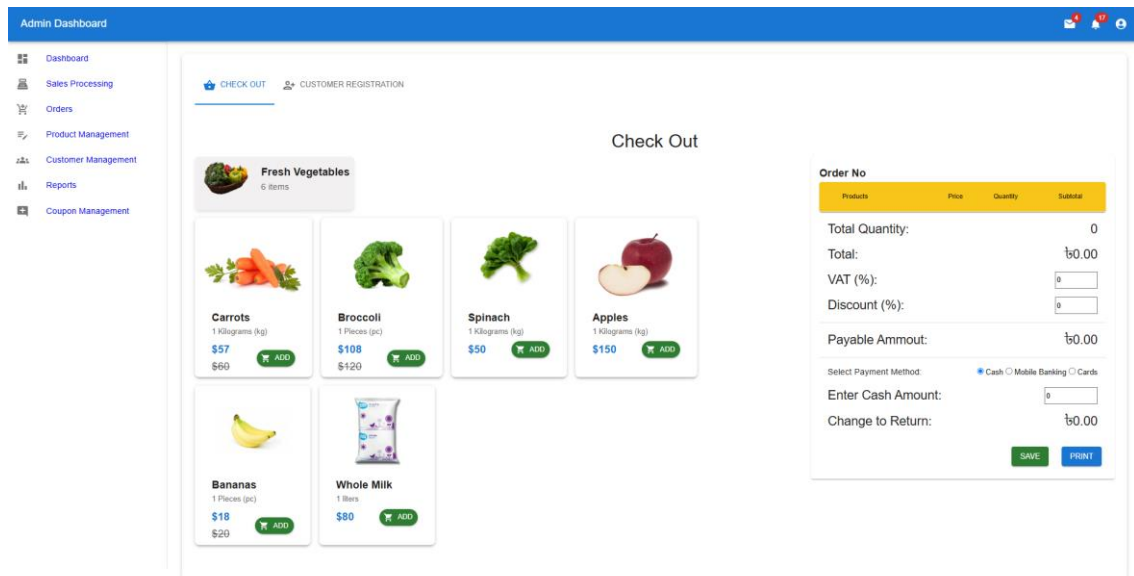


Figure 5.2.11: Seles Processing page.

View Stocks:

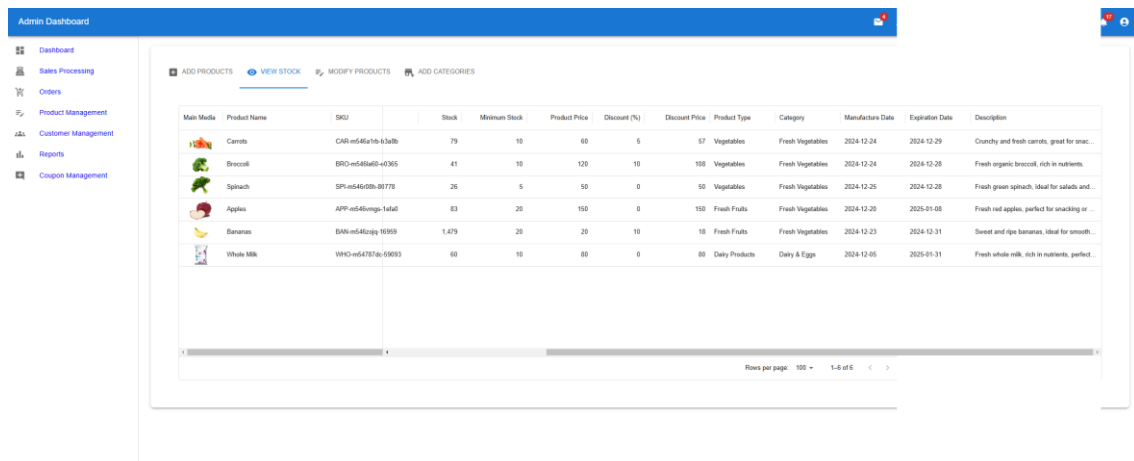


Figure 5.2.12: View Stocks page.

Cupun Management:

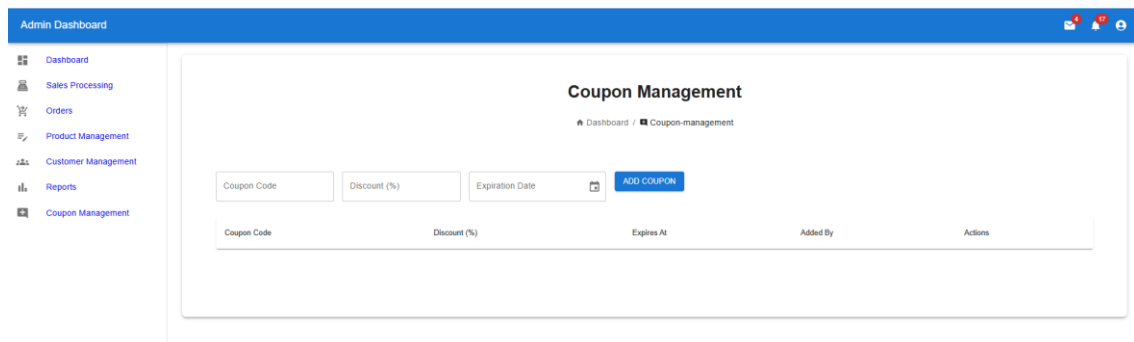


Figure 5.2.13: Cupun Management page.

Admin Dashboard

Dashboard | Sales Processing | Orders | Product Management | Customer Management | Reports | Coupon Management

ADD PRODUCTS | VIEW STOCK | MODIFY PRODUCTS | ADD CATEGORIES

ADD PRODUCT

General Information ----- 08

Product Name
\$ Enter Product Name

Select Categories | Select Product Type | Select Unit

Product Price \$ 1000.20 | Discount % | Discount Price \$

Product Description 0/100 characters

Manufacture Date 12/30/2024 | Expiry Date 12/30/2024

Manage Stock --- 13

Stock Keeping Unit (SKU)
XXX-m5azafsh-435d9

Stock | Minimum Stock

Instruction and Ingredients -- 02

Instructions

Enter Instruction +

Used Ingredients

Enter Ingredients +

Media Upload

Upload an image or video

Figure 5.2.14: Add New Product page.

Add New Product Types:

Admin Dashboard

Dashboard | Sales Processing | Orders | Product Management | Customer Management | Reports | Coupon Management

ADD PRODUCTS | VIEW STOCK | MODIFY PRODUCTS | ADD CATEGORIES

ADD PRODUCT TYPE + | ADD PRODUCT CATEGORY +

Add New Product Type X

Product Type Name *

Product Type Description

Select Categories

Product Unit *

Product Type Tags (comma separated)

CANCEL SAVE

This is text

Activate Windows
Go to Settings to activate Windows.

Figure 5.2.15: Add New Product Types page.

Modify Products:

The screenshot displays the 'Modify Products' interface. At the top, there's a search bar with the SKU 'SPI-m54608h-80778'. The main heading is 'Product Details' with an 'EDIT' button. The 'General Information' section contains several input fields: SKU, Product Name (Spinach), Product Price (50), Discount (0%), Discount Price (50), Stock (26), Minimum Stock (5), Product Type, and Category. Below these are fields for Manufacture Date (12/25/2024) and Expiry Date (12/28/2024). A description field contains the text 'Fresh green spinach, ideal for salads and cooking.' The 'Instruction' section has a list of two items: '1. Keep refrigerated' and '2. Wash Before Wash'. The 'Ingredients' section has one item: '1. Spinach'. The 'Media' section features a large image of a spinach bunch and three smaller thumbnail images, each with a 'Delete' button and a 'Select' radio button.

Figure 5.2.16: Modify Products page.

Add New Category:

The screenshot shows the 'Add New Category' page with a modal window for 'Add New Product Type'. The modal contains the following fields: 'Product Type Name *', 'Product Type Description', 'Select Categories' (a dropdown menu), 'Product Unit *', and 'Product Type Tags (comma separated)'. At the bottom of the modal are 'CANCEL' and 'SAVE' buttons. The background page is dimmed and shows a large heading 'This is to' and a 'Select Product Details' section with fields for 'Select Categories', 'Select Product Type', and 'Select Unit'. There are also buttons for 'ADD PRODUCT TYPE +' and 'ADD PRODUCT CATEGORY +'.

Figure 5.2.17: Add New Category page.

5.3 Summary

The user manual for this project also provides explicit instructions for using and navigating the tool. Packed with the modern departmental shop owner in mind, the system comes with integrated inventory control, Point of Sale (POS) and even e-commerce. Web developed admin or manager can handle the inventory easily for add/update/delete products, setting product categories, online tracking of products and automatic alerts for fewer products stock and products expired. POS module include smooth in store transactions with bar code scanner, VAT enabled receipt and also integration with payment gateways like bKash, Nagad etc ensures flexibility of payments. Also, the integrated e-Commerce solution helps the store owners to diversify the variety of customers since the customers can make the products' search, order, and payment online with the help of secure web-interface. Available on numerous devices and produced in English and thus easy and comprehensible, the system is highly effective in organizing shop operations and enhancing the clients' experiences.

Chapter 6 Project Summary

6.1 Introduction

This project is an integrated solution software to cater to the operational and business requirements of the departmental stores in Bangladesh. This system enhances multiple activities of a shop such as inventory management, POS, and e-commerce, so as to create a centralized platform to manage their shop operations and reach out to many customers via the Internet. As for the practical functionalities of the proposed solution, the stock tracking, the spending, and the safe payment system have been arranged to be real-time and efficient with Bangladeshi payment gateways like bKash and Nagad. The features like barcode scanning, low stock alert, and offline working make it business continuity and improved effectiveness. Further, the e-commerce platform allows stores to attain a web interface to sell their products so that customers can shop online and pay too. Designed with a focus on ease of use, expandability, and relevance to individual locations, the “Sales and Inventory System” assists departmental retailers to improve value delivery to consumers while responding to the current e-commerce environment.

6.2 Project Limitation

This project is developed to undertake the fundamental operational demands of departmental stores although it does have its constraints. The first limitation that they mentioned was time, which sheller impacted on the depth of some of the functions. For instance, the basic control of inventory and POS is available under the system, but features such as daily intelligent stock control using artificial intelligence and machine learning were not in a position to be rolled out within the system due to the project duration. Likewise, the e-commerce platform incorporates tools for purchasing online and other payment methods while not including more complex tools like support for multiple vendors or other set price-making algorithms. Another factor affecting the incorporation of solutions is costs, and high-quality technology solutions are expensive. Integrations of high-end hardware like installing IoT to monitor stocks on their own that consumers are able to automatically order products they need, which are fancy were pushed to future schedules because of the costs of imprinting them on products. However, the attaining of these is fairly inexpensive, as deployment depends on the available open-source technologies Rather than business level, enterprise level systems Coded access

and customization may only be achievable with enterprise level systems rather than the freely available open-source systems. From a technical perspective the system is fine tune for S/M departmental stores and has a weak link when it comes to chain operation. Also, smooth integration with multiple international payment gateways and multiple currency processing was not an enhancement feature although competitive local payment methods like bKash and Nagad were incorporated. Another problem is how user who has no previous experience with digital systems may take time to learn, more so since the project focuses more on functionality rather than provisions of intensive user training on how to use the identified systems. VAT and taxes regulations are handled but constant update than may need implementing to cater for changes in the local laws. Last but not least, while the core concept of the system permits the employment of offline capacities, the offline manner of the e-commerce component contingent extends however a little. These limitations will be addressed in future iterations of the system making them more robust, scalable and more accessible for sustaining general stakeholder satisfaction in the long term.

6.3 Scope

The "Sales and Inventory System" is a comprehensive system developed to ease operations for departmental stores in Bangladesh by merging three essential functionalities: such functions as inventory control, POS and e-commerce. The features include tracking of stocks in real-time, low-stock alerts and expiration date alerts ensure that stocks are well managed. The POS module includes the options like barcode scanning, VAT compliant invoice, multiple payment option (such as cash, bKash, cash) and offline mode to fit with the requirements of merchants for easy transaction processing. The e-commerce module helps business owners build an online store, which helps customers browse products, order products and even make safe payments online. Delivery management for online orders, implementation of role-based access control for security concern and multilingual user interface in Bengali and English to satisfy the local clients are the part of the system architecture. Reporting and analytics tools are provided to assist store owners monitor the sales effectiveness and make right decisions. It can be accessed through many devices such as computers, tablets, and phones and integrable with commonplace peripherals such as scanners and printers. Some of the options defined beyond the project scope are: Predictive analytical service maiming using artificial neural

networks, adaptable pricing models, functioning with more than one vendor, operating with a currency other than the base one. It also does not incorporate IoT devices, for example, smart shelves or automated stock counter devices. This system also incorporates payment gateways for local utilization, but it lacks international payment options as well as other efficient supply chain management for a large-scale supply chain. New user training aids in the form of detailed instruction for integrating the system into the organization's framework are not incorporated into the training system but may be developed in the future. The following are the exclusion that highlighted the projects aim to develop a feasible and incremental system which could be enhanced in future for small-middle scaled departmental store division.

6.4 Future Work

The "Sales and Inventory System" is a comprehensive system developed to ease operations for departmental stores in Bangladesh by merging three essential functionalities: supply chain applications, as well as point of sale (POS), and e-business functions. The identified important features include real time tracking of stock, low stock alert and expiry alerts to help in the management of stocks. Barcoding, PV & VAT compliant receipts, support multiple payment methods such as cash, bKash, cash etc. and operates in offline mode in POS module. The e-commerce module assists business owners build a website whereby clients can view, purchase items, and make secure payments online. The system also has delivery management of online orders, role-base access control for better security, and fully in Bengali and English to meet the demand of local users. There are solutions for the reporting and analytics of Results for the store owner for tracking the sales success and decision making. It is web based and can be accessed on computers, tablets and smart phones, and supports regular hardware ticks such as bar code scanners and receipt printers. Lack of related features to the project, for instance, predictive insight, enabled by AI, possibility of integration with multiple vendors, and the integration of multiple currencies are excluded from the project. This also does not incorporate IoT devices including smart shelves or automated stock counters. While small payment gateways are supported, no other international payment options are available along with complex supply chain logistics for massive distributions. On the other hand, there are no specific set of training for new users and there is likelihood that these will be developed in the future. The following exclusions define the project

objective to develop a solution that is as feasible and easy to scale as possible while leaving room for adding advanced features for small to medium-sized departmental stores.

6.5 Conclusion

The “Sales and Inventory System” project effectively integrates inventory solutions and POS and e-business facilities in to a single, user-friendly application designed for departmental stores across Bangladesh. Some of these challenges include; Real time stock tracking, sale, implementation of business beyond store, equipping store owners of tools that would owners to the digital platform. By including black lines, bar code coding, no online mode, value-added tax compliant invoicing, secure payment processing etc the project fulfills basic main objectives which are efficient working, less errors and happy customers. Some of the important lessons realized during the development process include optimization between utility and density of application, management of resources and appropriateness of local infrastructure. Effective partnerships and constant reiteration were critical for designing a system that would respond to as-built needs. However, due to the time and monetary constraints, the project possesses limited smart features for the current model; however, it creates a sound groundwork for future enhancements that include predictive analysis, integration with IoT services, and the diversification of e-Commerce services. Lastly, that the “Sales and Inventory System” makes the objective to bring department stores a comprehensive and strong yet extensible solution that integrated business conventional methods and advanced digital technology. It illustrates a vivid testimony of the pragmatic excellence or following core values such as innovation, flexibility and customer focus to meet entailing needs of modern small businesses.

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