INSIGHT: RECAMADAS OPTICAL CLINIC OPERATIONAL MANAGEMENT SYSTEM

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by

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THE RESEARCH DESCRIPTION

Introduction

Recamadas Optical Clinic has been known as an eye care service since 1990 for a small family-run business. It came under the client's ownership in 2018. They offer optical services like check eye examinations for patients handled by a Doctor and products which include framed glasses and contact lenses. This clinic is located at Port Road, Ozamiz City, 7200, Misamis Occidental, beside Gaisano Capital Ozamiz, at the Fubu and Crissa outdoor store.

For day-to-day operations within the clinic, they use manual processes. Firstly, in the manual process, the admin gives an index card to new customers, and then the customers go for the checkup. The admin or the Doctor will tell them to return after two hours. After the checkup, the lens technician is manually informed about customer details and grading. These manual methods cause mistakes and are time-consuming for customers and the optical clinic’s employees, leading to ineffective and inefficient day-to-day operations. Now, the client wants to upgrade their way of operation from manual to digital processes since the clinic lacks an automated system, which will lead to miscommunication with customers and slow retrieval of data, resulting in duplication of efforts.

Various gaps in the manual processes cause pain for the clinic. Manual record-keeping of patient and inventory data has resulted in slow access speed and considerable time wastage, and patients would prefer a less painful way of managing data. Lastly, all the day-to-day lens grading sold will be written manually in Facebook Messenger and sent to the supplier as an order. This daily process is error-prone and extremely time-consuming; therefore, they would like to automate it.

Modern Clinics all over the Philippines such as optical clinics have not benefited fully from modern information technology. Many still use traditional methods and outdated technology in their business. Existing and new systems can be utilized to provide better outcomes for business owners and customers.

Other countries have proven the benefit of adapting information technology for business management and operation (LaBerge, 2020). Ignoring the benefits of new technology may risk financial vulnerabilities. Businesses should consider the risks and continual costs that may occur in the future if they are using an old tradition of processes such as manual customer messaging. Manually writing product information is time-consuming, and staff must remember to notify the customer on busy days. This will result in poor customer experiences and high costs for fixing the issue in the future. Customers may be less motivated to do business, and if a competitor provides a better customer experience, the competitive parity is at risk (Eye Cloud Pro, 2022).

Additionally, ignoring the modern experience that customers may expect or causing frustration because of the old system may lead to losing customer loyalty (Diaz, 2023). Thus, the researchers have argued that the contribution of technology would help the clinic's operation by building an Operational Management System that integrates all the manual processes inside the clinic into one.

Moreover, the researchers wish to explore methods and techniques that can be used by the Recamadas Optical Clinic, the client.

Research Objectives

This project objective aims to help Recamadas Optical Clinic in achieving increased organisation, effectiveness, and efficiency of operations.

Specifically, this project aims to;

1. Cut down on time spent locating paper documents;
2. Track inventory levels and sales of frames from specific suppliers;
3. Automate supplier order generator from the order form;
4. Streamline patient order tracking in the order form;
5. Have remote access and management of the clinic;
6. Design, develop, and implement a web-based Operational Management System for Recamadas Optical Clinic.

Scope and Limitations

This study will focus on identifying Recamadas Optical Clinic's key operations processes, particularly inventory stocks, processing patient data and transactions, and monitoring ordered stocks from the supplier. The researchers will seek to improve these processes by designing efficient steps. Other processes not stated will not be part of or covered in the research.

Significance of the Study

The study of the Recamadas Optical Clinic Operational Management System will help the optometrist solve problems quickly with information technology. The system aims to aid the optometrist, administrator, and patient with day-to-day operations in various ways.

Specifically, the following parties will benefit from the study.

The owner. The doctor who owns the clinic will benefit from this study, as it can provide technology for simple, organized, and effective patient records, supplier data, and notification systems.

Admin. This study will be a significant relief to the clinic's workspace. This information technology can provide easy access to inventory and patient transaction records , helping them process patient data and inquiries much faster.

Recamadas Optical Clinic. This study is significant for Recamadas because it will enhance operational efficiency and effectiveness.

Customers. They will benefit from increased efficiency and customer service, with shorter wait times and quick access to their data.

Future Researchers. This study will also benefit them as well since they may use it as a model for a comparable system they want to create. This research can potentially be considered advanced for some clinics with manual workflow.

Definition of Terms

The definitions provided below are specific to their use in this study.

Automated. It is a machine or computer program without requiring human intervention.

HTML. It stands for the hypertext markup language, a formatting system for displaying material retrieved over the Internet.

InSight. It is a concise term for the Recamadas Optical Clinic and Operational System.

Interface. It is an interaction between humans and different components, systems, or applications that communicate.

JavaScript. It is a programming language that allows for dynamic content updates, control multimedia, animation images, and much more.

MongoDB. It is a database used to store data. It is particularly useful for its flexible data model, which handles unstructured data, also known as a NoSQL database.

Patient Data. It is the patient's personal information, including medical and health records.

SMS. It stands for Short Message Service. It is used to notify or send messages to users through text messages on their phones.

Supply Chain. It is a process of tracking inventory, where the client records which supplier each box of frames is sourced from, specifically for managing Recamadas Frame Stocks.

TypeScript. It is a programming language that will be used is to the website-based application for Recamadas Optical Clinic.

UI. It stands for User Interface (UI) is the user-friendly part of a device or software that you can see and interact with. It includes buttons, menus, and screens that make it easy for you to do things or find information.

Web Application. It’s a software application where the user interface runs in a web browser and connects to a server.

Web-based. It is a website based on Recamadas Optical that can be accessed by the client outside the clinic through a web browser over the internet.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

In this chapter, the researchers have made a concerted effort to learn about and examine the research relating to the issue under study.

Technical Background

Model-Driven Optical Clinic Management Systems: Systematic Software Engineering Approach

In 2022, eHealth systems in a modern hospital and clinics will require stringent measures to coordinate the operations of doctors, nurses, and pharmacies for improved healthcare delivery. They said the lack of an electronic records management system in certain health facilities affected efficient health care delivery in terms of proper, up-to-date record-keeping of patients to keep pace with previous medical records before diagnosis and medication is prescribed(Adams et al., 2022).

The researchers have recognized the key features aimed at completing the gap between the old system and modern technology, specifically focusing on the New Patient Interface and the Patient Information Interface. New Patient Interface is designed to streamline the process of registering new patients, providing a user-friendly form that captures essential details such as personal information, contact information, medical history, and insurance information. The Patient Information Interface is a comprehensive hub for accessing detailed patient information. It provides healthcare professionals with a complete overview of a patient's medical history, including past diagnoses and treatments.

Patient Record Management System Using Laravue

The study of Aran and Cabañero (2023) introduced a Patient Record Management System (PRMS) developed using Laravue, which is a framework that seamlessly integrates Laravel PHP and Vue.js. The system's primary aim is to streamline the handling of patient records, enhance the accessibility of healthcare data, and improve overall efficiency in the healthcare sector. By leveraging Laravel's robust backend capabilities and Vue.js's dynamic, responsive frontend, the PRMS offers a detailed solution to the problems faced by healthcare providers in managing patient information. In Addition, the study thoroughly analyzed existing patient record management systems, highlighting their limitations and the pressing need for a more efficient and user-friendly solution like Laravue.

The researchers have pinpointed the key features to serve as closing the gap for developing their desired output. Their focus is specifically on a patient record management system equipped with a search bar, which will serve as a primary source of inspiration for the operational management system at Recamadas Optical Clinic.

HealthBlock: A secure blockchain-based healthcare data management system

According to Zaabar et al.(2021), the security and privacy of electronic healthcare records (EHRs) remains a critical issue for healthcare service consumers and providers. Breaching a healthcare system can lead to the unauthorized disclosure of sensitive health data, which individuals and the healthcare system may suffer greatly as a result. Traditionally, this data is stored in centralized databases, creating vulnerabilities and exposing the system to potential cyber-attacks. Centralized storage solutions are often single points of failure, making them attractive targets for malicious entities seeking to exploit weaknesses.

The researchers have distinguished the key features to serve as bridging the gap in the research to ensure the desired project's success, specifically focusing on the security and privacy of Electronic Health Records (EHRs) by using blockchain technology. Blockchain's decentralized and immutable ledger provides a robust framework for secure data storage and transmission, significantly reducing the risk of data breaches and unauthorized access. Privacy is another critical aspect that the researchers are working on with the inspiration of blockchain, which can greatly enhance the data security of the Recamadas Optical Clinic operational management system.

File Security Design in Electronic Health Record (EHR) System with Triple DES Algorithm (3DES)

According to Yunus et al. (2023), there has been a notable increase inThe use of IT in the healthcare industry in Indonesia. The emergence of electronic health records (EHRs) as a means of utilizing IT in healthcare is an indication. The use of an EHR can enhance patient care and treatment as well as the delivery of healthcare. An electronic representation of a patient's medical history that is periodically kept up to date by a health care provider is called an Electronic Health Record (EHR).

The researchers have features to serve as references and guides for their desired output, specifically focusing on the style and architectural design of their dashboard. The goal is to create an eye-pleasing and user-friendly interface that will greatly enhance the operational management system of Recamadas Optical Clinic. By prioritizing aesthetics and usability, the dashboard will facilitate smooth navigation and efficient data access for clinic staff. Key design elements will include a clean layout, intuitive navigation, and visually appealing graphics, ensuring that users can easily locate and interpret critical information.

Understanding the impacts of health information systems on patient flow management

According to Nguyen et al. (2022), patient flow is the term used to describe how a patient moves through a care route, such as from admission to discharge from a hospital. Patient happiness, hospital income, and health outcomes are all negatively impacted by poor patient flow. Health information systems (HISs) are being used more often in different healthcare settings to address patient flow difficulties, although there still needs to be more data regarding their overall effects.

In this article, the researchers are gathering information on the importance of implementing a health information system, specifically an electronic one, for Recamadas Optical Clinic. They emphasize that such a system is crucial for streamlining the clinic's operations, improving patient care, and enhancing overall efficiency. An electronic information system can significantly reduce administrative burdens by automating routine patient record management and billing tasks. This not only saves time for healthcare providers but also minimizes the risk of errors associated with manual data entry.

Importance of Complying with Electronic Health Information Expansion

According to Adams (2024), the definition of electronic health information (EHI) expanded from the information elements contained in the United States Core Data for Interoperability (USCDI) version 1 to all electronic data as defined in the designated record set (DRS). The EHI expansion has created challenges for health information (HI) professionals to comply with the requirements.

In his interview with AHIMA Senior Director of Regulatory and International Affairs Andrew Tomlinson, he discussed the importance of understanding the change and

how organizations can remain compliant. He answered, "What have been some of the challenges created since October 2022, when the definition of electronic health information expanded?" Challenges related to expanding the EHI definition were not as widespread as some feared. Proper preparation from clinician organizations ensured they nnnnnwere ready to understand what parts of their designated record set were maintained electronically. If they did encounter challenges, it most likely fell into understanding how to operationalize the expansion.

In this article, the researchers of Recamadas Optical Clinic have identified the importance of complying with electronic health information expansion. This article emphasizes the need for clinics like Recamadas Optical Clinic to adopt digital and efficient information exchange from clinic to patient and vice versa. As this article has stated, the challenges of electronic health information expansion to clinic professionals are not as big as the problem of manual paper management.

Chapter 3

RESEARCH METHODOLOGY

This chapter presents and discusses the research environment, research method, research respondents, sampling method, and conceptual framework.

Research Environment

The research will be conducted at Recamadas Optical Clinic, Port Road, Ozamiz City, 7200, Misamis Occidental. This clinic is beside Gaisano Capital Ozamiz at the Fubu and Crissa outdoor store. Recamadas Optical Clinic has been an eye care service since 1990. The client took ownership of it in 2018.

Research Method

This research will utilize qualitative research. To obtain and acquire the necessary information to build the project, the researchers will conduct interviews to receive data. The interviewers will use the Interview Guide to elucidate the customer's demands, which will help the researchers create the project.

Furthermore, the project development teams/researchers will also use online document resources related to the study to further the needed information for the development.

Research Respondents

The researchers will have the owner of Recamadas Optical Clinic, the client, and her trusted admin as the interviewees for this project. This project will only allow the client and her trusted admin to answer the interview questionnaire.

Conceptual framework

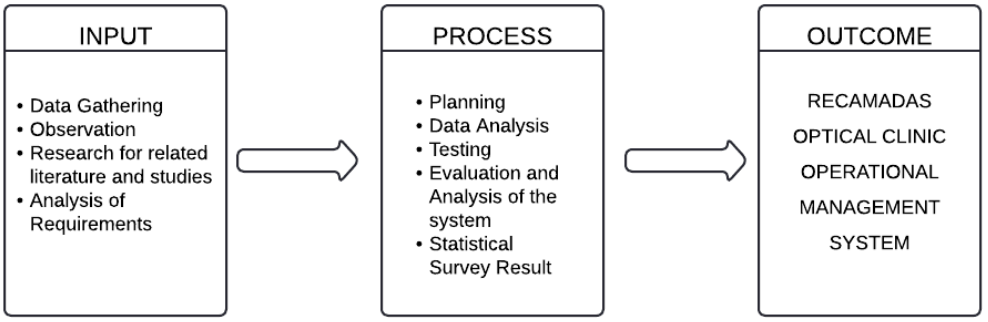

Figure 1. Conceptual Framework

Figure 1 is the conceptual framework of the project entitled Recamadas Optical Clinic Operational Management System.

Input - This part of the conceptual framework is also known as the System Requirements Determination.

Process - In this section, the researchers will determine which software development life cycle model matches the project.

Outcome - A software called the Recamadas Optical Clinic Operational Management System ensures that new projects are implemented and maintained successfully for long-term survival.

Chapter 4

REQUIREMENTS ANALYSIS

This chapter summarizes the current priorities and needs of the client.

Evaluation Stakeholders

The researchers forwarded a transmittal letter to obtain data for the study. After it was signed, they proceeded with the specified deadline. Accordingly, the client and the admin participated in the interview. The interview took place at the clinic, which is located near Gaisano, Port Road, Ozamiz City, 7200 Misamis Occidental.

Core Evaluation Questions

In fulfilling the purposes of the evaluation, the following core questions were addressed:

1. What's your clinic's name, and can you give a quick history?
2. What processes would you like to automate?
3. How do you manage your inventory stocks?
4. Do you encounter problems in obtaining frames from the supplier?
5. How do you address customer complaints about frames or lenses, especially if they do not fit properly?
6. How do you manage faulty orders from suppliers?
7. How do you track lost frames?
8. Have you experienced any data loss before?

9. Do you make mistakes writing wrong information from an index card or recording book?
10. Have you encountered customer complaints that it took too long to wait or that you forgot to inform them about the frames and lenses they ordered being delivered to your clinic?
11. What are your processes for sending it to the supplier if you want to order frames from them?

Descriptions

From the initial conversation with the client, the primary focuses identified are as follows:

1. According to the client, the clinic has been named Recamadas Optical Clinic since it was named by the client's Mother in 1990. The admin has been with the clinic since the start. The small family-run business has been known as an eye care service. The client took over ownership in 2018.

2. what they want to automate:

    a. To add/remove/delete for all modules.

    b. Track and record transactions, inventory, patient information, supplier information, and orders.

    c. To generate a PDF of the order form for the supplier through Messenger.

3. The client and the admin manually write down the information on frame stocks from a notebook—model number, frame brand, frame type, and price—from every box from the different suppliers. Then, they would have to strikethrough for

every sold item to track the sold frames. So, the supplier would give them a box full of frames, but there would be a due date for them to pay.

4. Since they have to personally contact each supplier and risk forgetting because they have a lot of paperwork to sift at once, the Recamadas Optical Clinic has been having trouble replenishing and getting frames from the supplier.
5. The Recamadas Optical Clinic addresses this kind of problem by calling the patient to the clinic to adjust if they do not fit correctly or if the patient needs a visit to the eye doctor in the clinic.
6. When they encounter the wrong items, they return them to the supplier. Sometimes, this happens when they accidentally switch names from the customer's orders.
7. The admin said she would know if they were lost or misplaced frames because she tracks them in her recording book.
8. The admin said they might have lost data from old customers since they have been using paper-based and index cards for over 34 years.
9. They need help with their current system of gathering and storing patient information. They currently write down all the information on paper, which makes it difficult to retrieve it later.
    - The admin and client need time to help track orders and deadlines for different patients.
    - They state that it can lead to delays in delivering glasses to patients or forgetting to inform them that their glasses are ready/arrived at the clinic. Additionally, they have difficulty keeping track of their inventory of lenses because there are many different types of lenses with other grades.

10. Yes, the admin indicated that they've encountered customer complaints because they forgot to inform the patient that the item ordered had arrived at the clinic. It happens on busy days.
11. According to the client and the admin they manually write down daily sold frames. After compiling sales for that day, they use Facebook to communicate with the supplier and send the information to order items. They constantly send information about frames to the supplier for everyday sales.

Product Features

According to the initial interview with the client, the current priorities are the following:

Feature #1: User Management

This feature allows Recamadas Optical Clinic's owner and admin to access the dashboard as administrative users by providing the correct credentials for the login feature, and this contains the system user's first name, last name, email, password, and role for the user's information.

Feature #2: Dashboard

This feature provides a comprehensive overview of orders' arrival dates and sales during the day. It also provides sales figures for the last month and has a navigation bar for all the modules.

Feature #3: Patients Record

This feature contains a comprehensive overview of patient information and their clinic history with Recamadas Optical Clinic, including their name, date of birth, contact information, medical history, eye examination results, and other relevant information. The form also has fields for the patient's prescription information, such as the type of lenses they need, the sphere power, cylinder power, and axis.

Feature #4: Supplies

This feature contains Recamadas Optical Clinic's orders. It is a list of all the customers' orders, and they will use this order form to order an item from the supplier.

Feature #5: Order detail with Download PDF Mode

The admin can also download PDF versions of the order module.

Feature #6:Inventory

This contains frame items to monitor and track the stock sold from a specific supplier and the order lens.

Feature #7: Transactions

The admin inputs the payment details of patient payments and allows the admin to sort by payment status to identify unpaid debts.

Feature #8: The owner and admin

The admin is an admin management system where they can add, edit, and delete information for Patient Records, Prescriptions, Transactions, Orders, Supply Chains, and User Management. The admin is also responsible for security and access management. The other users will not be able to access the user management.

Feature #9: Search Bar

The admin can search the patient's information by Name and number through a search bar on many screens to aid in the search for all modules.

Feature #10: Admin - Update Password

The admin can update their passwords.

Constraints

Listed below are the software technical constraints that limit designs.

- Laptop Device
    - Operating System: Windows 10
    - Processor: AMD A12-9720P RADEON R7, 12 COMPUTE CORES 4C+8G 2.70 GHz
    - Installed RAM: 8.00 GB
    - System Type: 64-bit operating system, x64-based processor
- Laptop Device
    - Operating System: Windows 10
    - Processor: Intel(R) Core(TM) i3-6006U CPU @ 2.00GHz

    - Installed RAM: 4.00 GB
    - System Type: 64-bit operating system, x64-based processor
- Personal Computer Device
    - Operating System: Windows 10 Pro
    - Processor: Intel(R) Core(TM) i5-10400 CPU @ 2.90GHz
    - Installed RAM: 16.0 GB
    - System Type: 64-bit operating system, x64-based processor
- Laptop Device
    - Operating System: Windows 10
    - Processor: 11th Gen Intel(R) Core(TM) i3-1115G4 @ 3.00GHz
    - Installed RAM: 8.00 GB (7.80 GB usable)
    - System Type: 64-bit operating system, x64-based processor

Developer environment tools

- Visual Studio Code
- Git will be used as the code versioning control system (VCS) and hosted on GitHub.
- minifier
- Prettier
- ESLint

Programming languages

- Html/CSS
- Javascript/TypeScript

Browser tools

Google Chrome, Brave, Mozilla Firefox, Safari, Microsoft Edge, Opera, MacOS

browser Safari, Internet Explorer

Process model

Prototype Model

Operating systems

Windows 7 and higher, macOS X and higher, at least have MacOS 8 GB RAM or higher for fast loading.

Assumptions

- It is assumed that users using this software use a browser with the full standard functionality for a modern browser.
- It is assumed that the administrator will utilize the system from a desktop or laptop platform.
- It is assumed that most user devices can handle moderate performance drops.
- It is assumed that the database software needs to handle long periods of operations and large amounts of accrued historical data.
- It is assumed that users must have an active internet connection to load the web
- It is assumed that users have a sufficiently robust device to run the database.

It is assumed that users have at least one operating system version, Windows 10, for safety from the errors and hacks from the past versions

- It is assumed that all members have the software installed, Visual Studio Code, and in case of technical difficulties, members can attempt to debug to replace any lost roles.
- It is assumed that the lead programmer will be using the programming language JavaScript/TypeScript with the help of the hired consultant or assistance in the making of the project

- It is assumed that the website's frontend tools for developing the User-Interface will use React 18, Redux, Ant Design, Vite, Axios, ESLint, and Prettier.
- The backend tools for the frontend to function are Node.js, Lodash, Multer, Express.js
- It is assumed that end users possess some sort of device capable of running a browser.
- It is assumed that the lead programmer is using full-stack JavaScript.
- It is assumed that the business is unlikely to scale significantly in the future, and therefore, the product will not require complete scalability

Chapter 5

SYSTEM DESCRIPTION

This chapter explains how the researchers developed the project and tested the project outcomes.

System Overview

Insight: Recamadas Optical Clinic Operational Management System is a project designed to enhance the clinic's processes by enabling efficient location and tracking patient information, payments, debt basis, and inventory. This system aims to address the client's challenges by providing an automated solution for storing important data, thereby reducing the slow and error-prone manual processes associated with data storage, retrieval, manipulation, and supplier order creation and submission. The system is developed using PHP for server-side functionalities and JavaScript for client-side interactivity. The website features a user-friendly interface designed for administrators, though it may benefit from modern updates. It is accessible online, allowing the owner to monitor and manage the system conveniently from any location.

System Objectives

The specific aims of the system consisted of:

1. Home Page
    1.1. Dashboard
        1.1.1. Displays key metrics, such as monthly sales, daily sales, patient paid, patient unpaid, patient with balance
    1.2. It contains a sidebar navigation menu that includes a dashboard, patient, order form, inventory-category, inventory-supplies, supplier, sales, sold, transaction, user management, and user logs.

2. Admins can search for and track specific information.
3. Admins can add new information.
4. Admins can delete information.
5. Admins can edit existing information.
6. Admins can view information.
7. Admins can generate downloadable PDF files for order forms.
8. Admins can track inventory stock levels from specific suppliers
9. Admin can track user log activities
10. Admins can add users and assign roles.
11. Admins can log into the system.
12. Admins can log out of the system.

Implementation Plans

Software Development Model

Development of the project for Recamadas optical clinic will be using the prior explained prototype iterative process model by iteratively constructing prototypes and seeking feedback to further iterate on prototypes to build the features found in quick plans and designs and then deploys for feedback. The process relies on consistent communication with clients, customers and developers, to align modifications and expand features in ways which benefit the end users.

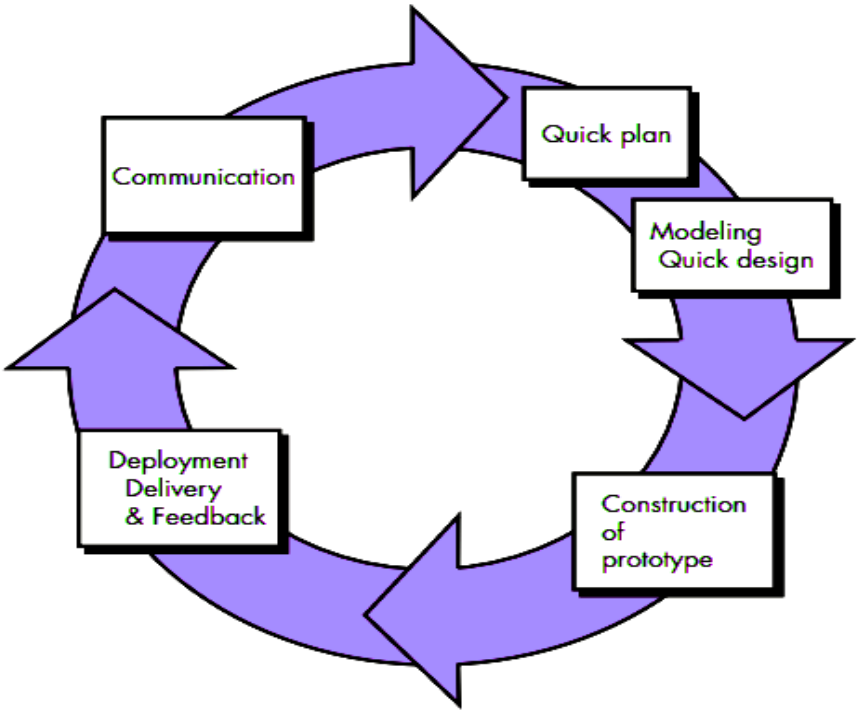

Figure 2. Agile Software Development

1. **Communication**

The team began accumulating feedback from August 31, 2023 to September 13. During the communication stage of software development, meetings are held with stakeholders to formulate and make clear what requirements are needed for the system. These meetings are facilitated by the project leader, Aloha Shaeris Onguda, actualized by the client liaison, and attended by the team. In addition, organizational goals are visualized. This stage centers on collecting project requirements to define its scope and details. This is done through a series of interviews, where planning and specifications take shape through a collaborative process.Communication is integral to this process as it commences the relationship between the proponents and their client, stakeholders, and other respondents. It is here that important discussions are

made to ensure full support and prevent miscommunications.

2. **Quick Plan**

This phase involves translating the data gathered during the communication phase into a comprehensive set of project plans. The “Quick plan” details a step-by-step sequence of actions that adhere to the project schedule and acts as the central component of the Software Project Management Plan (SPMP). Aloha Shaeris Onguda and Wena Mae Mabasa, the planning manager, are responsible for laying a solid foundation for the project plan. Janet Roxan Yabo, the team programmer, will start setting up and coding the project on September 15, 2023.

3. **Modeling Quick Design**

In this stage, the website’s user interface layout is demonstrated using modeling quick design. Janet Roxan Yabo, as the requirements specifiers, are in charge of this step. In this stage, the website’s basic structure is created, along with a mock-up of its initial features. Since the prototype is the foundation for the early versions of the product, the researchers will be able to build it through the design. This stage includes creating design diagrams, improving prototype UI design, evaluating design with the client, and revising the Software Requirements Specification (SRS). It is necessary for the approval of the SRS, and this job runs concurrently with the SPMP Revision task of Quick Plan (Section 1.1.4 Schedule and Budget Summary).

4. **Construction of Prototype**

In this stage, a functioning prototype is built using the Software Requirements Specification (SRS) and then utilized in writing the Software Design Documentation

(SDD). Completion is not required as the process model works on interactive increments. The proponents, headed by the lead programmer, Janet Roxan Yabo, will construct the website using the gathered feedback and with the quick design as the basis. TypeScript alongside JavaScript is to be used with Node.js, Lodash, Multer, Express.js for the back-end and front-end are React 18, Redux, Ant Design, Vite, Axios for, ESLint, Prettier, and other tools uses in making this project through software tools such as Visual Studio Code with the help with the hired experience programmer consultant or assisting in guiding other features that the lead programmer of the team, Janet Roxan Yabo cannot get it alone as it needed long span of studying some features. This shall be utilized to realize the illustrations and diagrams. The estimated time frame to complete in creation of the project website prototype, from September 15, 2023 to December 1, 2023.

5. **Deployment Delivery and Feedback**

In this stage, we will carefully write down the steps we take to test our system, following the guidelines in Section 6.3 the Verification and Validation Plan. This documentation is important for future reference. It will help us look back at any problems we faced during testing and figure out practical solutions. The website is assessed with input from stakeholders, and the System Design Document (SDD) is revised. Testing is conducted, and revisions are accumulated. Once the prototype is built, the research team will present it to the client for feedback. The client's feedback will guide the adjustments made in the next phase. This phase is important as it offers the initial opportunity for clients to interact with system features and provide immediate feedback.

UI Design Plan

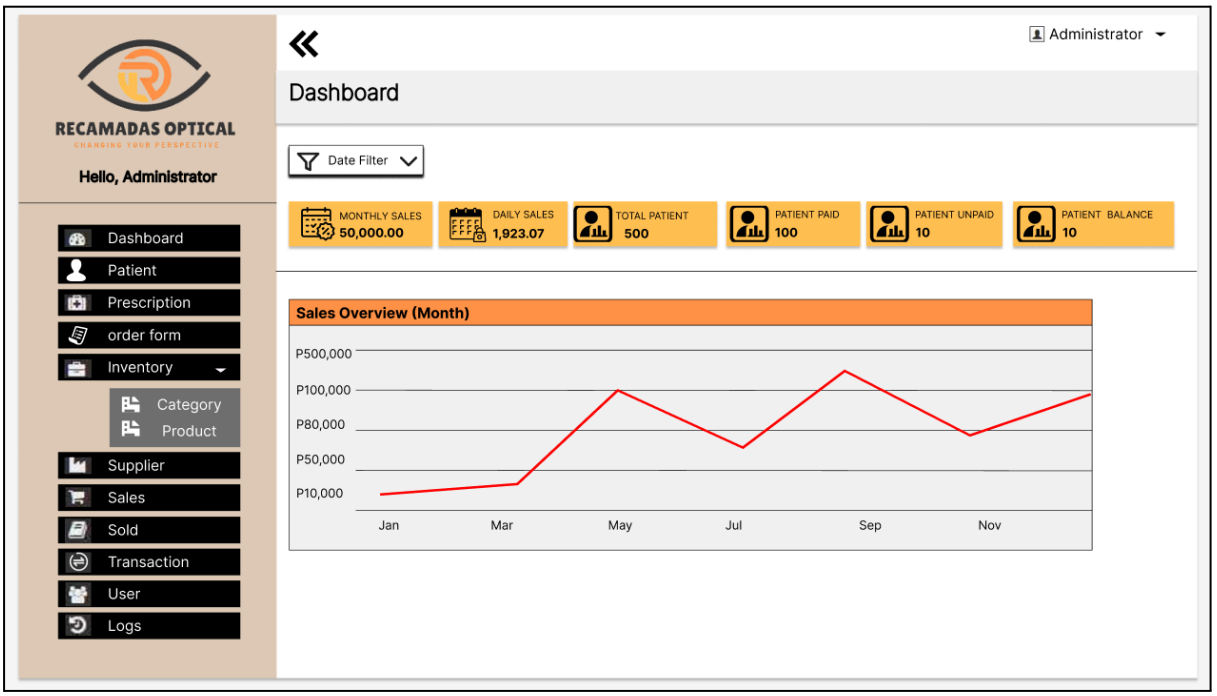

Figure 3. Landing Page - Dashboard

The website displays the dashboard as a landing page with the logo. The navigation on the left sidebar contains patient, prescription, order form, inventory dropdown with category and supplies, Supplier, Sales, Sold, Transaction, User, and Logs; these are all the module processes. The system lets users log in using their username and password, and when you are on the website, you can log out and change accounts by clicking the administrator profile. Additionally, the admin dashboard can view reports of monthly sales, daily sales, total patients, patients paid, patients unpaid, and patient balances.

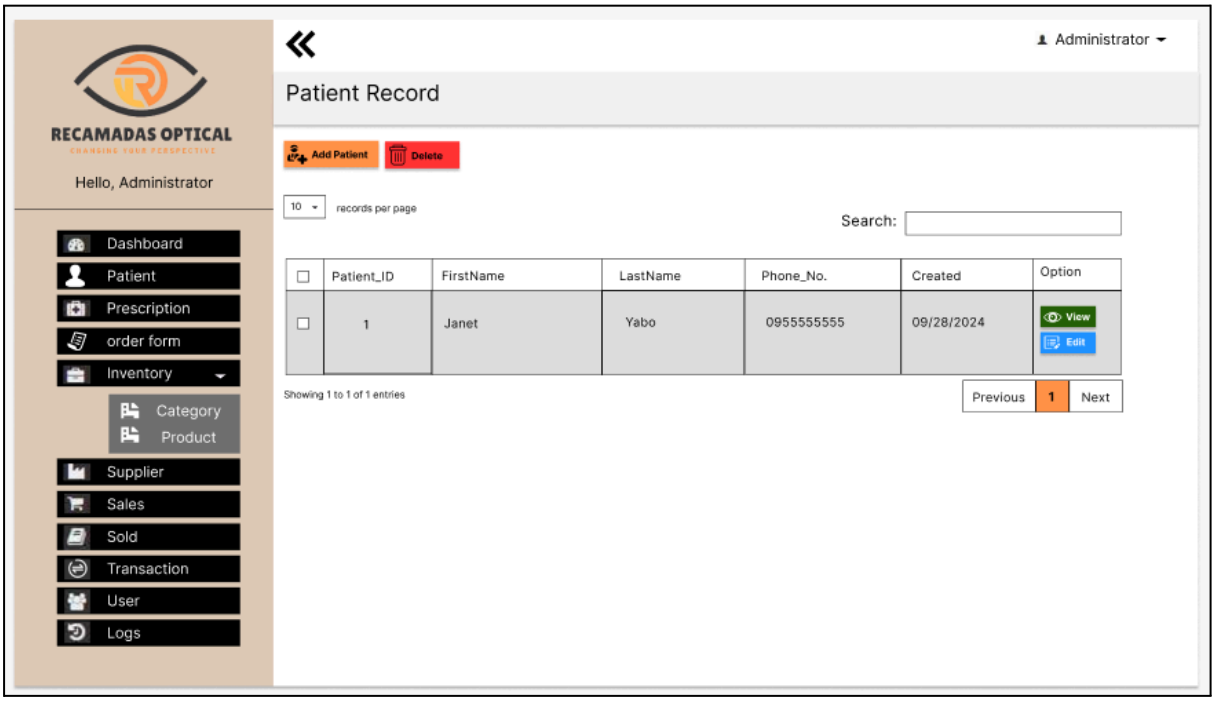

Figure 4. Patient List

The website shows the list of patients in this view when you click the patient module's navigation button. The user can (1) add a patient, (2) delete information, (3) search for specific information, (4) view the complete record of the patient, and (5) edit the information.

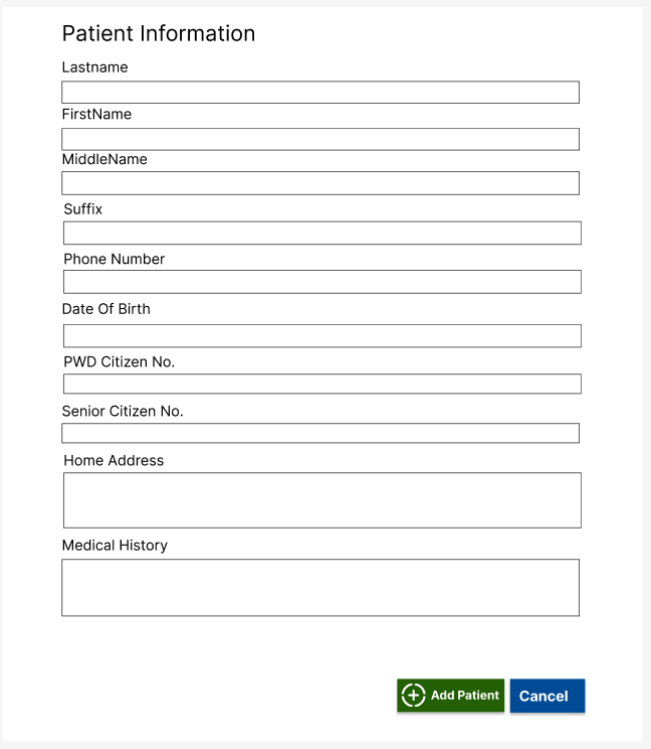

Figure 5. Add Patient Information

The system enables the user to add and fill in patient information and has a cancel and x button to exit the form.

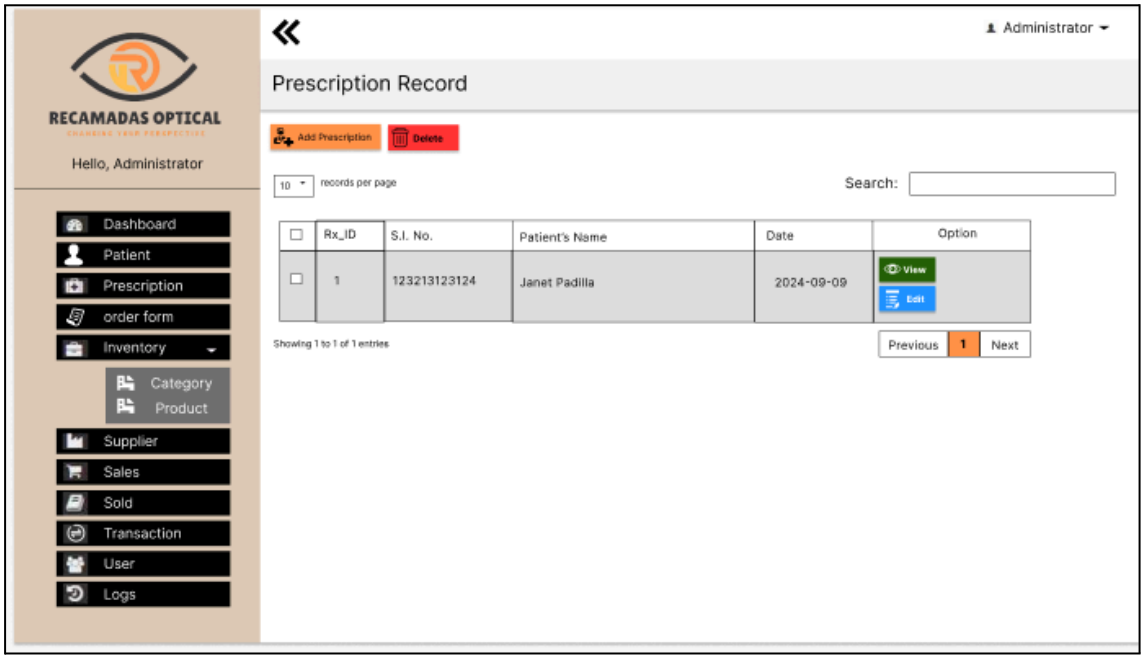

Figure 6. Prescription List

The website shows the list of prescriptions in this view when you click the precipitation module's navigation button. The user can (1) add a prescription, (2) delete information, (3) search for specific information, (4) view the complete record of the patient's prescription, and (5) edit the information.

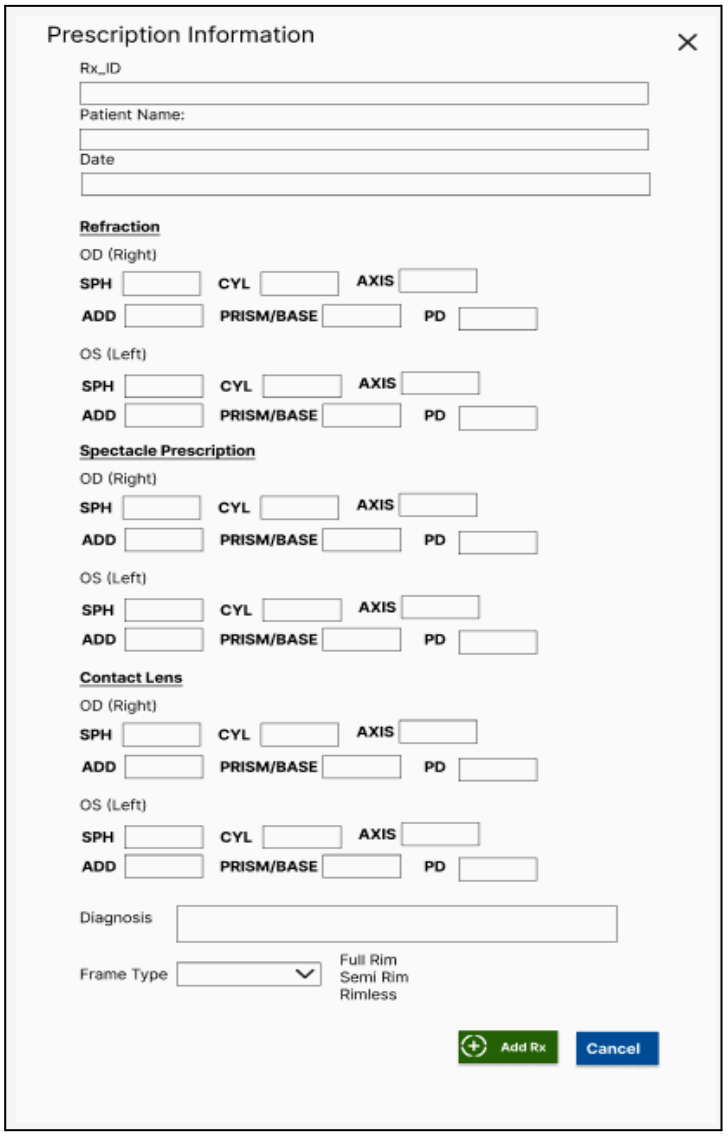

Figure 7. Add Prescription Information

The system enables the user to add and fill in prescription information and has a cancel and x button to exit the form.

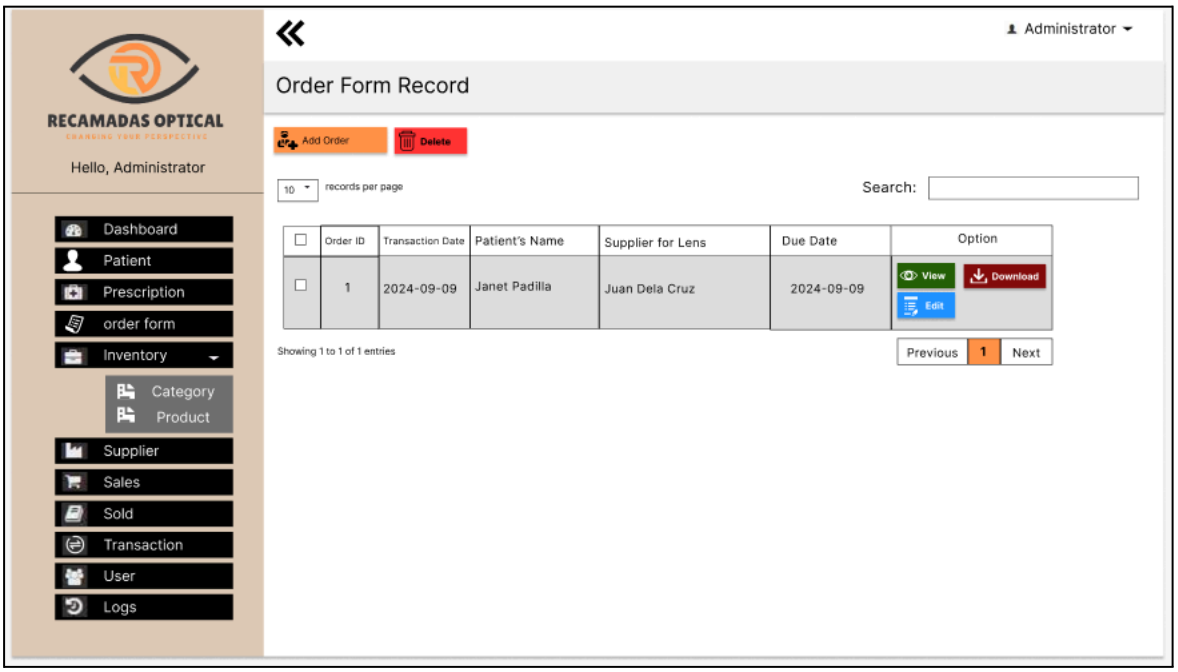

Figure 8. Order List for lenses

The website shows the list of lens orders in this view when you click the precipitation module's navigation button. The user can (1) add new order information, (2) delete information, (3) search for specific information, (4) view the complete record of the order information, (5) edit the information, (6) an option to download a pdf file to manage order to send it to the supplier.

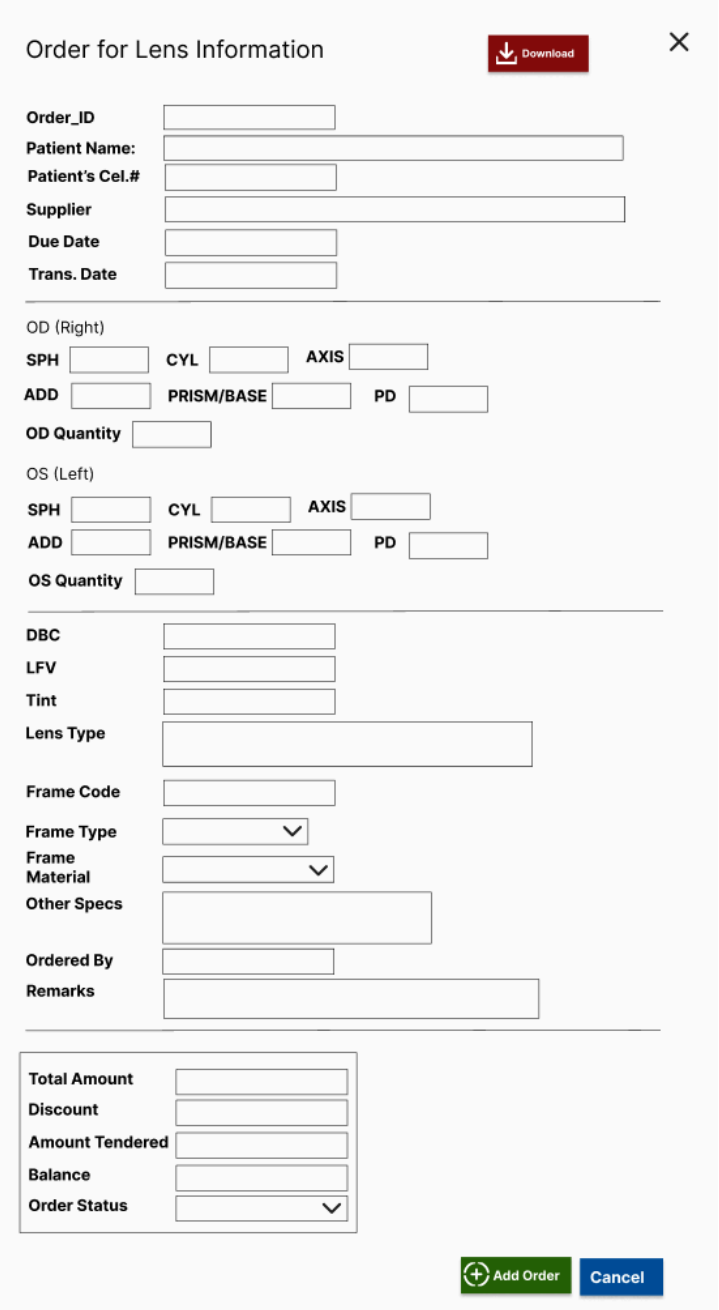

Figure 9. Add Order Information

The system enables users to add and fill in orders for lens information. It has a cancel button and an x button to exit the form. The client can also download the form and send it to the supplier. The website backend will automatically update the order status once the payment is made from the transaction module to track the lens debts because some patients want to pay partially until the item arrives in the clinic.

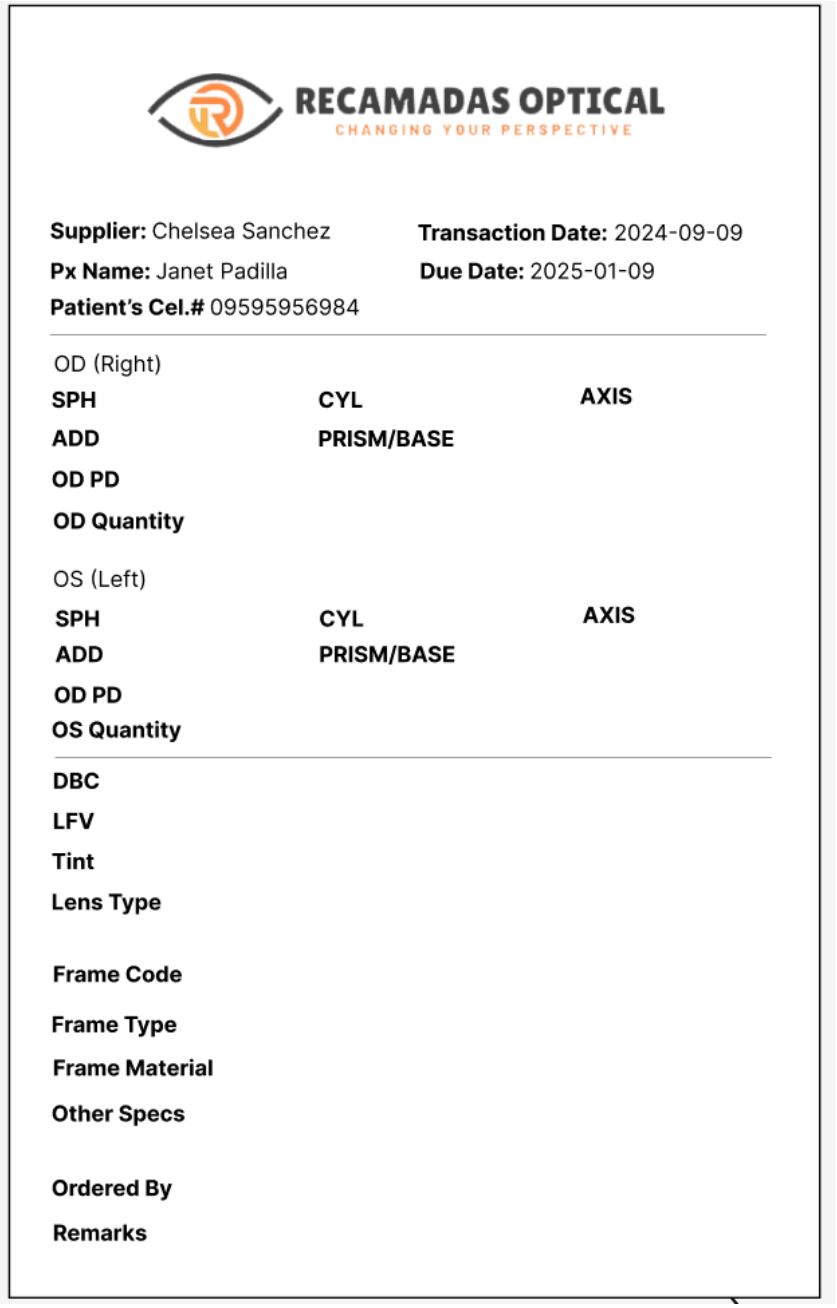

Figure 10. Order Information - Download File

The order form will generate a downloaded PDF file summarizing the lens information. Moreover, the total amount, discount, balance, and order status are not included in the PDF file information because the supplier is forbidden from seeing it.

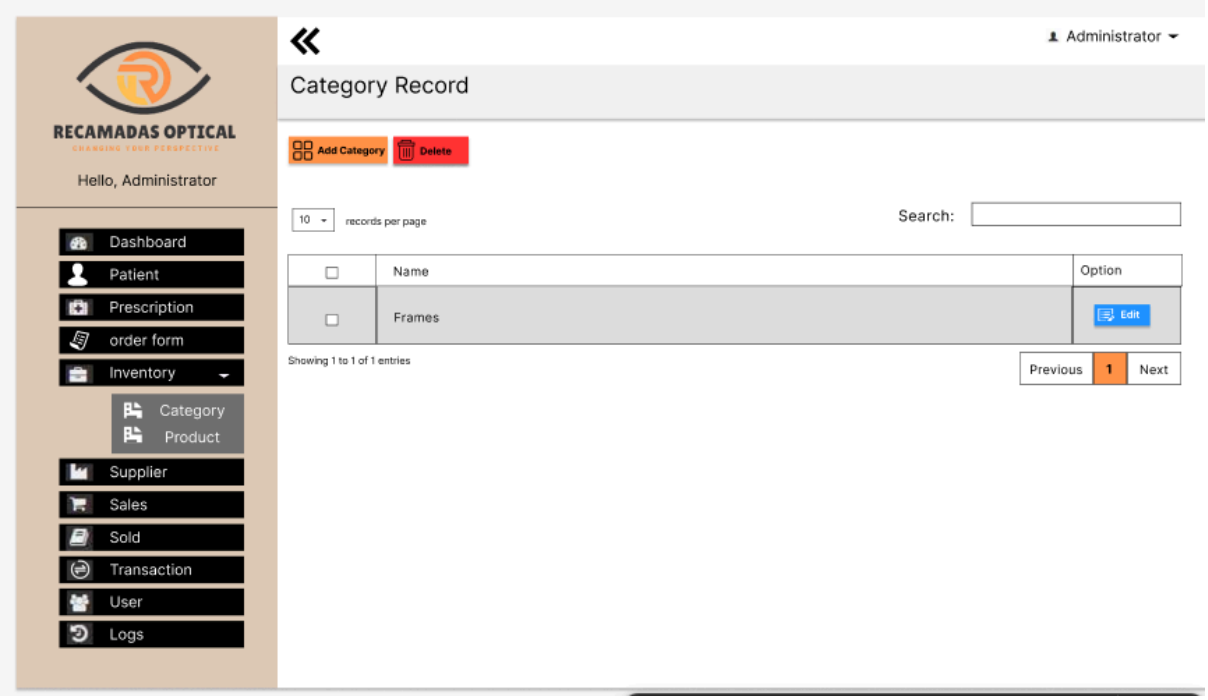

Figure 11. Inventory-Category List

The website shows the list of inventory-categories in this view when you click the inventory module's navigation button. The user can (1) add new supply, (2) delete information, (3) search for specific information, and (4) edit the information. This section, the client can add categories like Frames and Accessories etc. depending on what product they have in the clinic.

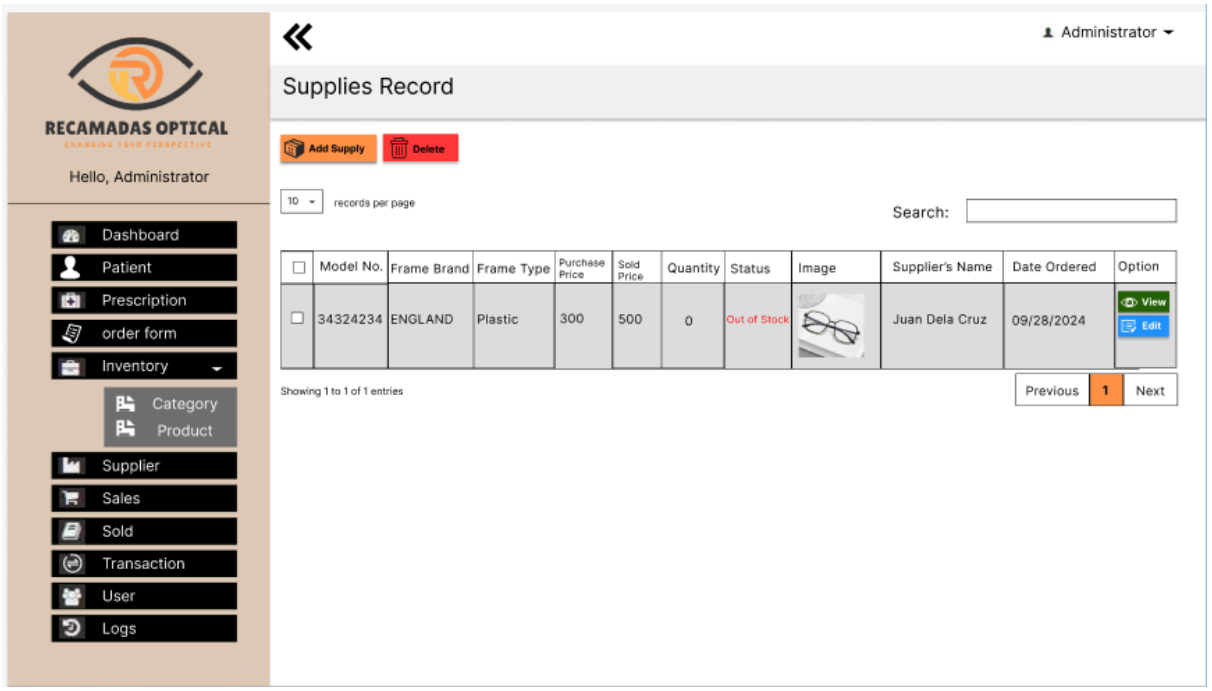

Figure 12. Inventory-Supplies list

The website shows the list of supplies in this view when you click the inventory module's navigation button. The user can (1) add new supplies information, (2) delete information, (3) search for specific information, (4) view the complete record of the supply information, (5) edit the information, This section will help the client to track the supplies from the specific supplier and the inventory stock, mostly for frames.

\

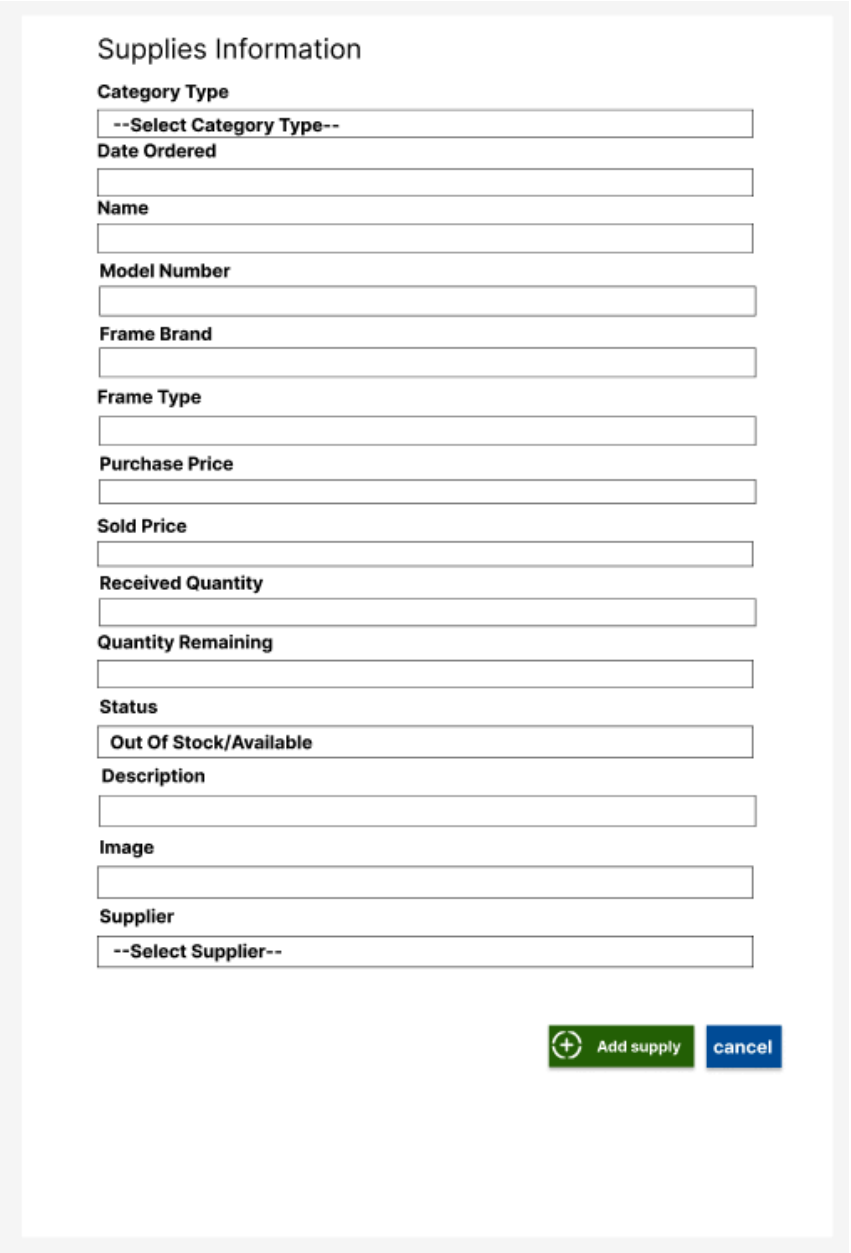

Figure 13. Inventory - AddSupplies Information

The system enables users to add and fill in supply information. It has a cancel button and an x button to exit the form.

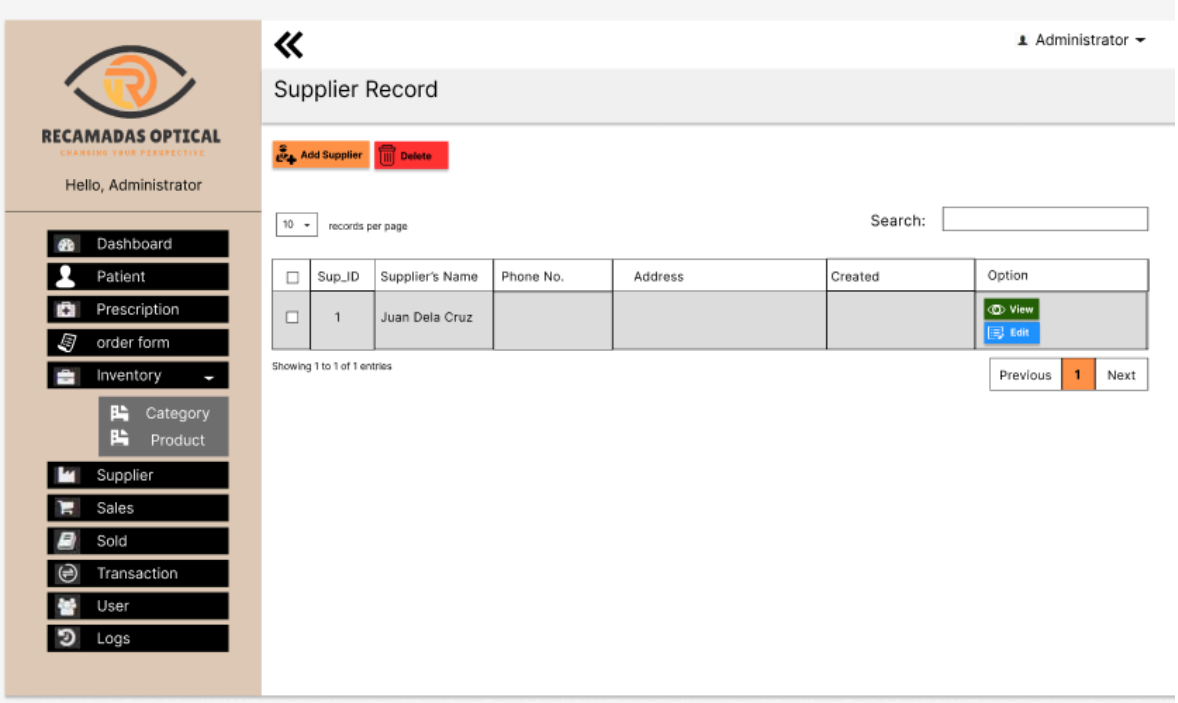

Figure 14. Supplier List

The website shows the list of suppliers in this view when you click the supplier module's navigation button. The user can (1) add new supplier information, (2) delete information, (3) search for specific information, (4) view the complete record of the supplier information, (5) edit the information. This section, the user will add all the supplier to track where they items are coming from.

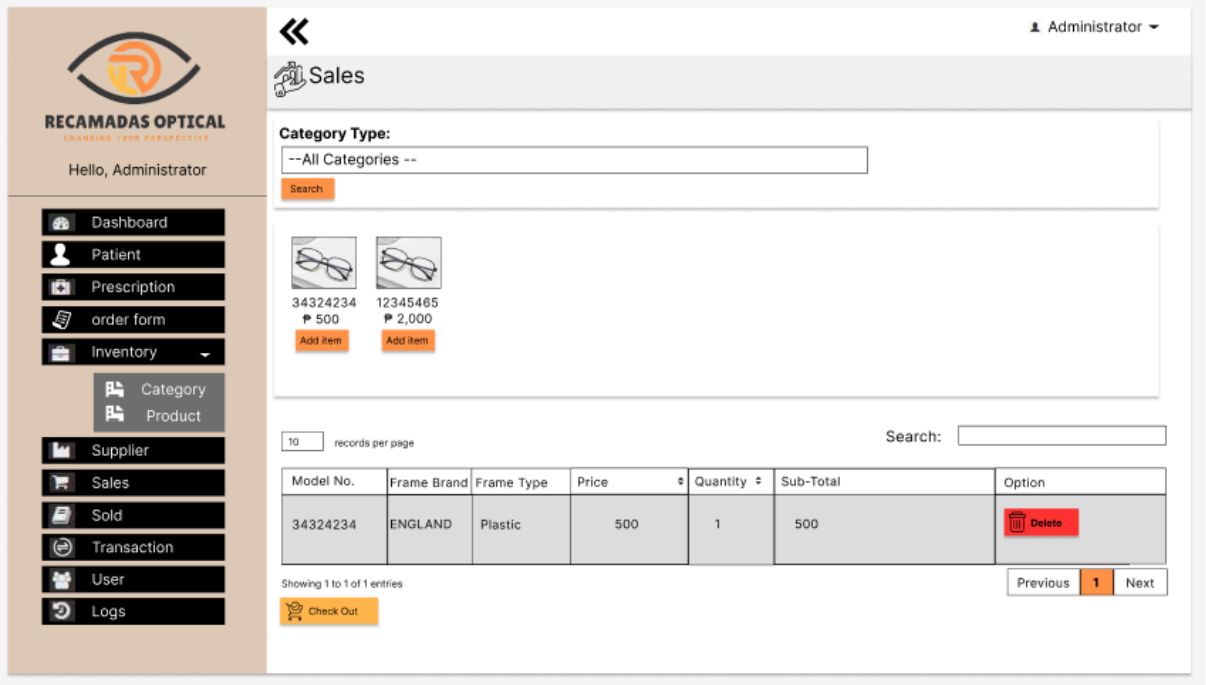

Figure 15. Sales

The website displays the category, supplies, and sales for all customer purchases, but only items from the stock supplies module are deducted from inventory when sold. The order form and any additional charges are recorded as part of the transaction.

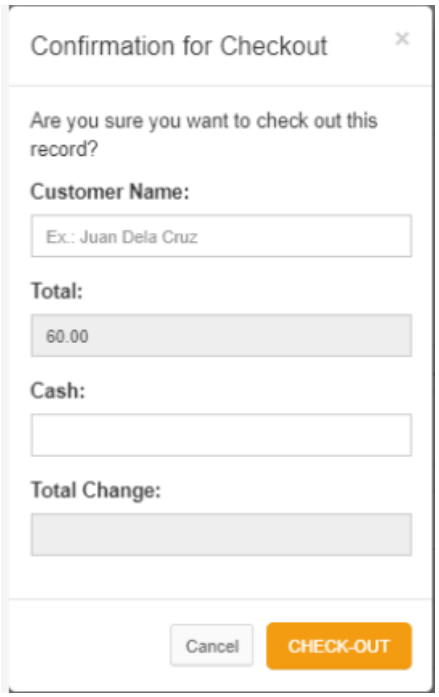

Figure 16. Sales-Check Out

This will be in the form of a check out button when clicked.

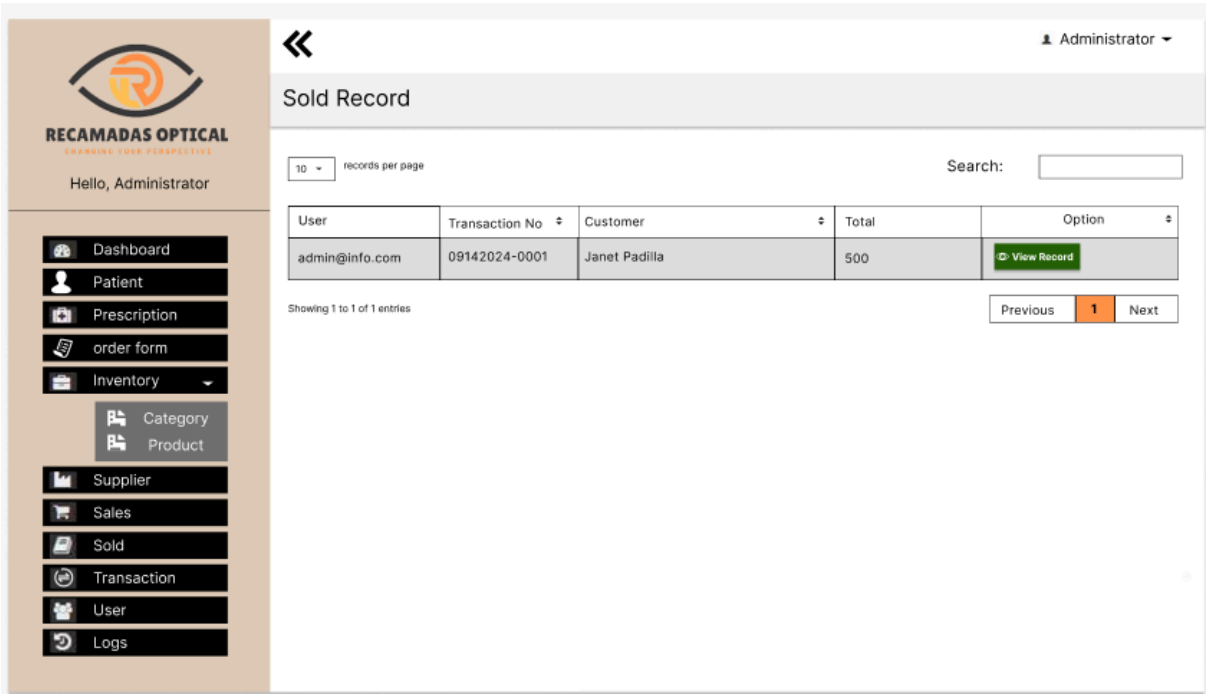

Figure 17. Sold

The website shows a list of all successful sales records, and users can view each record for more detailed information.

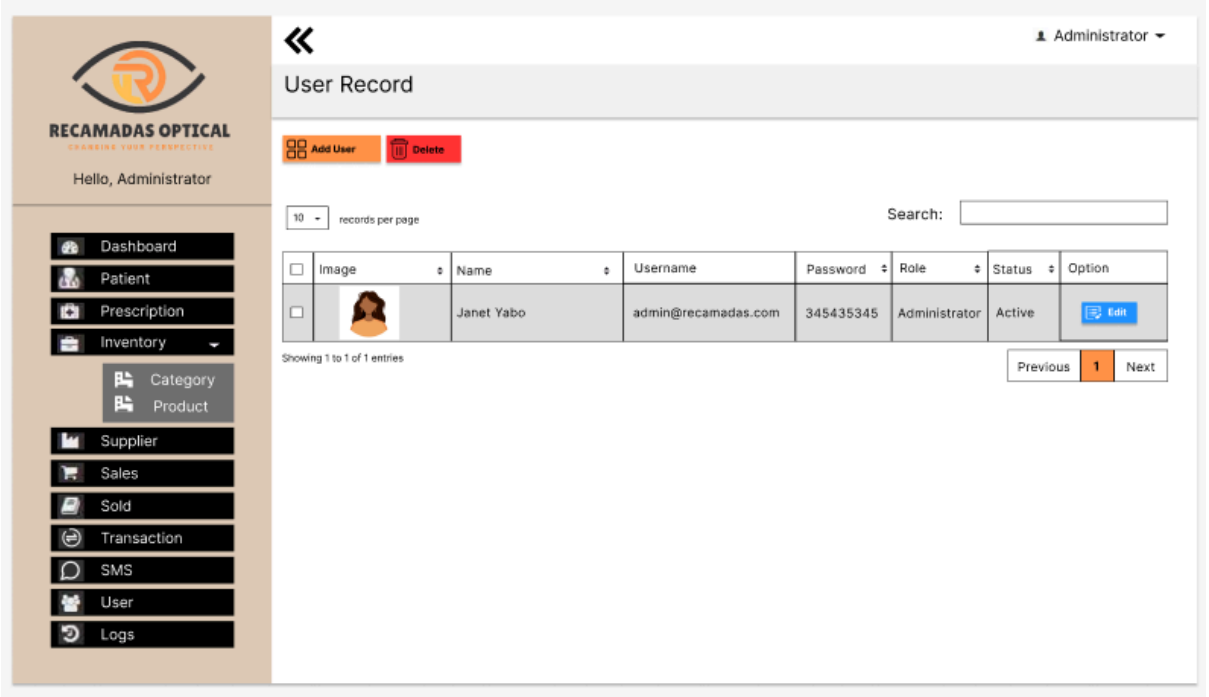

Figure 18. User Management

The website shows the list of user records in this view when you click the user module's navigation button. The user can (1) add new user information, (2) delete information, (3) search for specific information, and (4) edit the information. Only the admin can access this module.

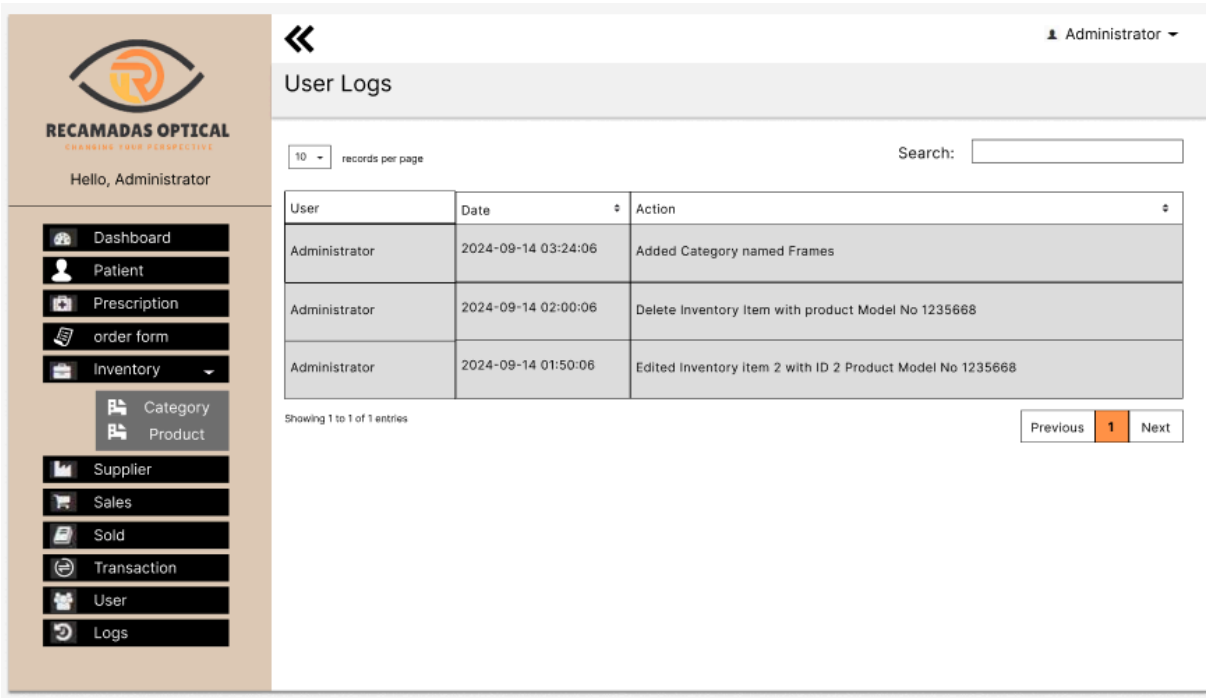

Figure 19. User Logs

This website shows user logs for each major activity, such as adding, editing, and deleting. This section helps the administrator to locate activities of each user.

Structure Diagrams

Architectural Diagram

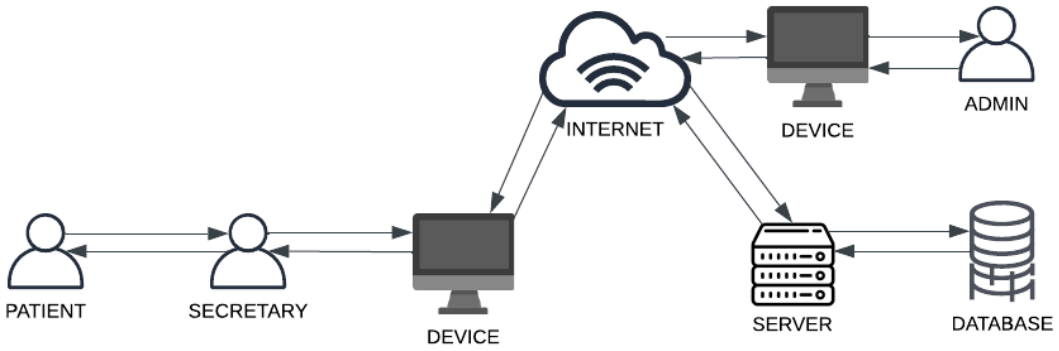

Figure 20. Architectural Diagram - User

Figure 1 outlines how the researchers will solve the problem on manual processes of Recamadas Optical Clinic. As shown, patients can directly visit the optical clinic for their check-ups and orders. Moreover, the clinic owner and administrator manage these requests based on the availability of the clinic's resources. The website will be hosted on the optical clinic's server, making it accessible online, and all requests and their details will be securely stored in a database.

Component Diagrams

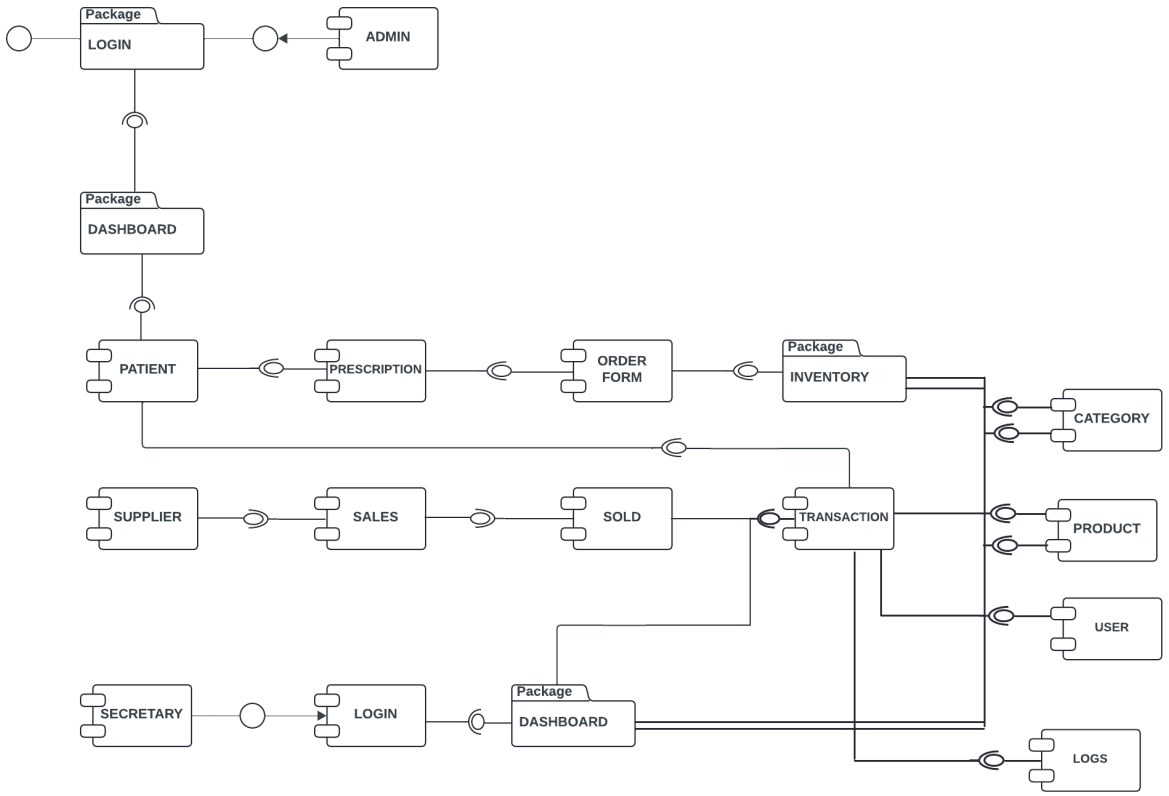

Figure 21. Component diagram

The component diagram of the Recamadas Optical Clinic software system depicts the important modules that trigger an action. Relationships are illustrated through dependencies to visualize the interaction of software elements. All component flows of the system end up in the database.

Class Diagrams

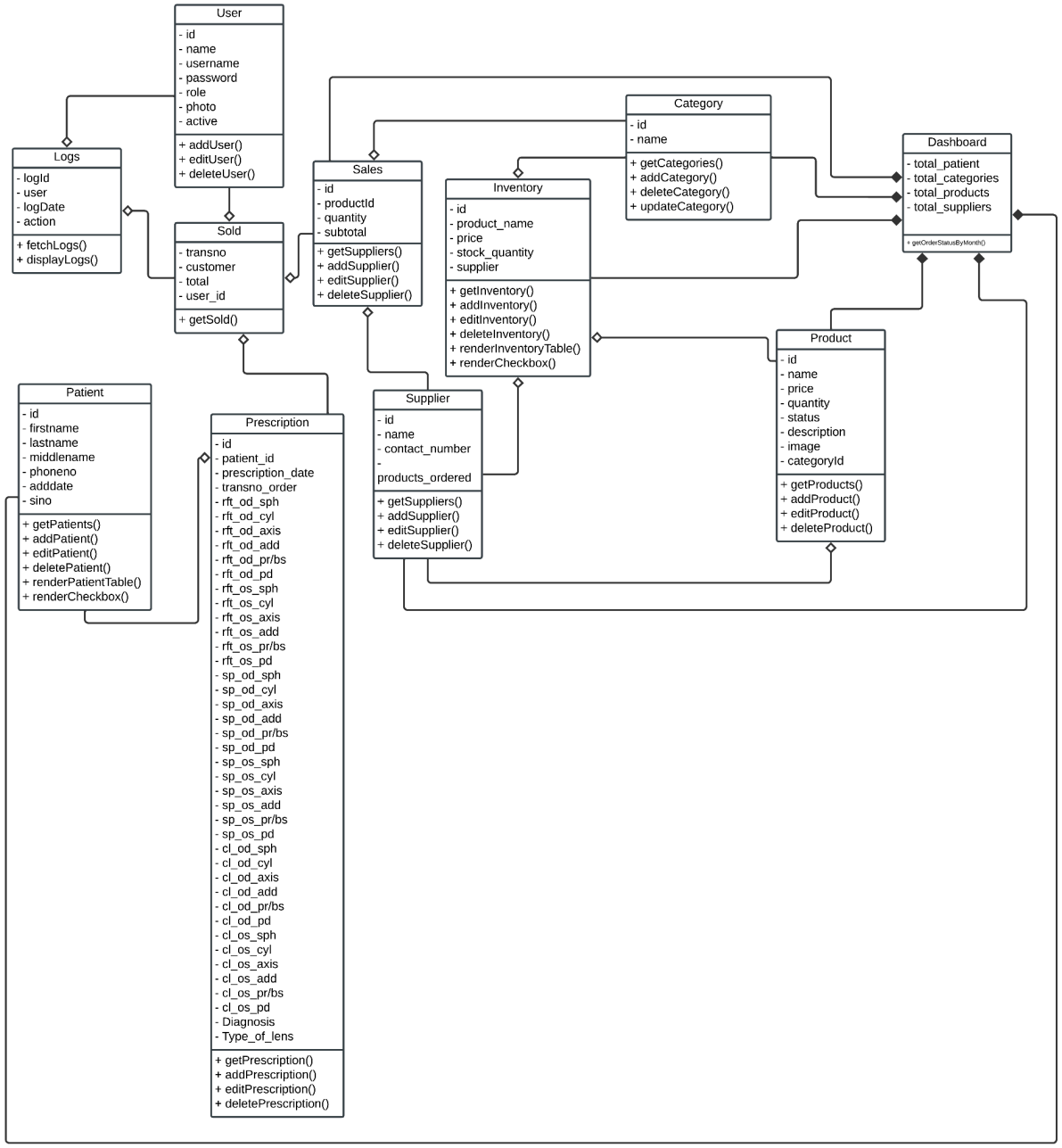

Figure 22. Class Diagrams

The CD (class diagram illustrates) interactions and relationships from inside the website system for modifying, adding, and deleting records in the various tables. The diagram graphically shows the construction of the components and key entities and how they relate.it serves to give

contextual insight into the structure and information flow of the inner workings of the system.

Deployment Diagram

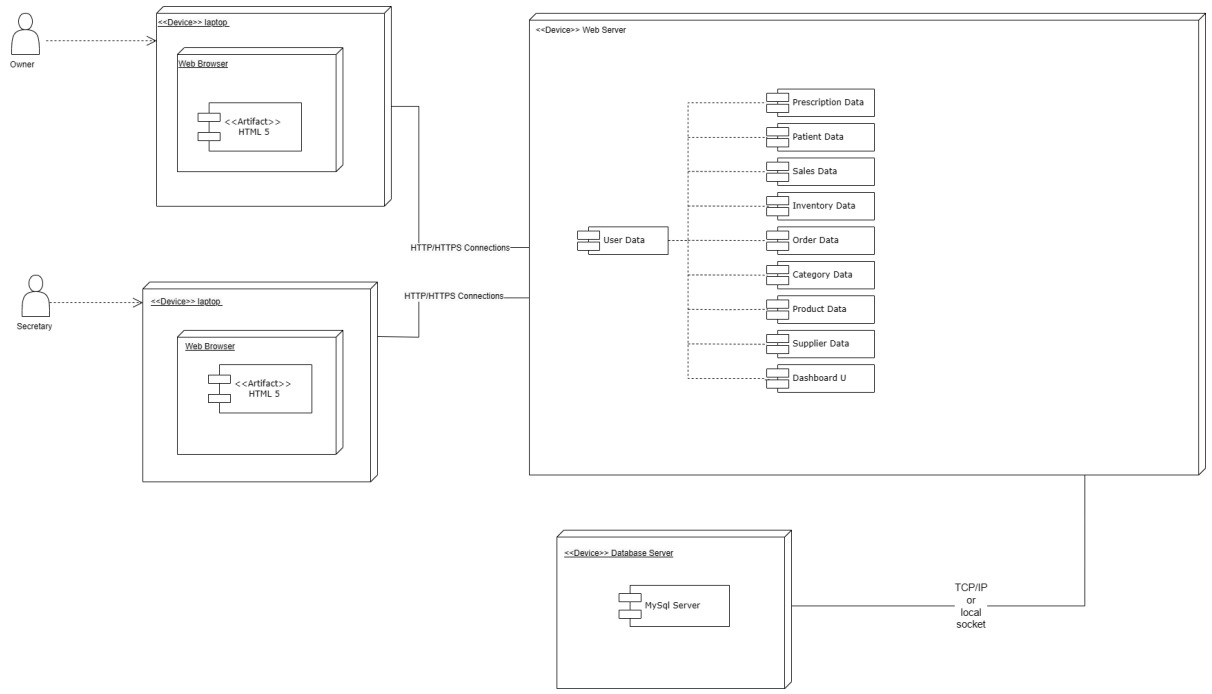

Figure 23. Deployment diagram

A hardware topology and software development environment for an officially-released system. The Recamadas admins are recommended to utilize their laptops to make use of the check-up and order tracking. Due to major internet connectivity concerns, the team envisions

Entity-Relationship Diagram

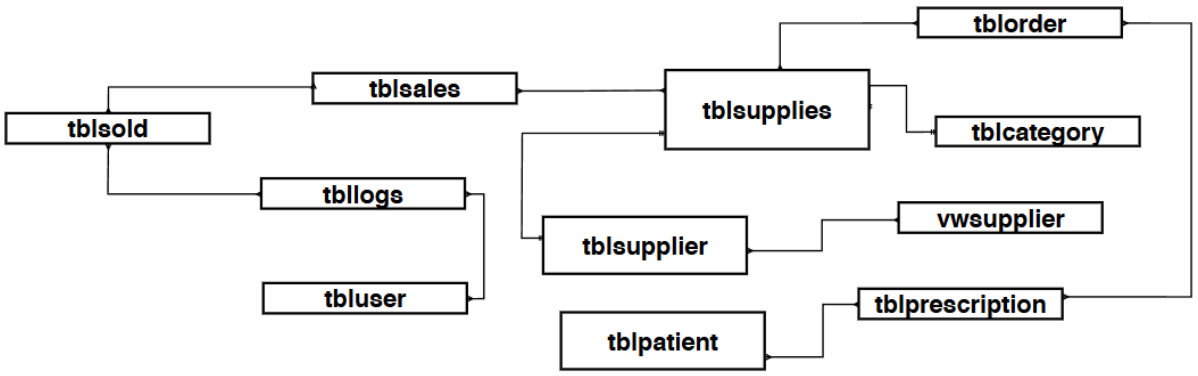

Figure 24. Entity-Relationship Diagram

tblcategory		
PK	id	INT
PK	id	INT
	category	VARCHAR(100)
	status	VARCHAR(20)

Table 1. Category

tbluser		
PK	id	INT
	name	VARCHAR(100)
	username	VARCHAR(100)
	password	VARCHAR(100)
	role	VARCHAR(100)
	active	VARCHAR(10)
	photo	VARCHAR(100)

Table 2. User

tblsupplier		
PK	id	INT
	name	VARCHAR(100)
	contact_number	VARCHAR(20)
	products_ordered	TEXT

Table 3. Supplier

tblsupplies		
PK	id	INT
	name	VARCHAR(100)
	price	FLOAT
	qty	INT
	status	VARCHAR(100)
	description	TEXT
	image	TEXT
	date_created	DATETIME
	date_updated	DATETIME
FK	cat_id	INT
FK	supplier_id	INT

Table 4. Supplies

vwsupplier		
PK	id	INT
	product_name	VARCHAR(100)
	price	DECIMAL(10,2)
	price	DECIMAL(10,2)
	stock_quantity	INT
FK	supplier_id	INT
	supplier	VARCHAR(123)

Table 5. Supplier

tblorder		
PK	id	INT
FK	product_id	INT
	quantity	INT
	date_updated	TIMESTAMP
FK	user_id	INT
	transno	VARCHAR(100)
	customer	VARCHAR(100)
	total	INT
	date_created	TIMESTAMP
	cash	INT
	change	INT

Table 6. Order

tblpatient		
PK	id	INT
	firstname	VARCHAR(50)
	lastname	VARCHAR(50)
	middlename	VARCHAR(50)
	phoneno	VARCHAR(20)
	adddate	DATE
	sino	VARCHAR(20)

Table 7. Patient

tblsales		
PK	id	INT
	customer_name	VARCHAR(100)
FK	product_id	INT
	sale_price	DECIMAL(10,2)
	down_payment	DECIMAL(10,2)
	total_amount	DECIMAL(10,2)
	remaining_balance	DECIMAL(10,2)
	status	ENUM('paid','partial')
	sale_date	TIMESTAMP

Table 8. Sales

tbllogs		
PK	id	INT
FK	user	VARCHAR(50)
	logdate	DATETIME
	action	TEXT

Table 9. Logs

Behavior Diagrams

Activity Diagrams

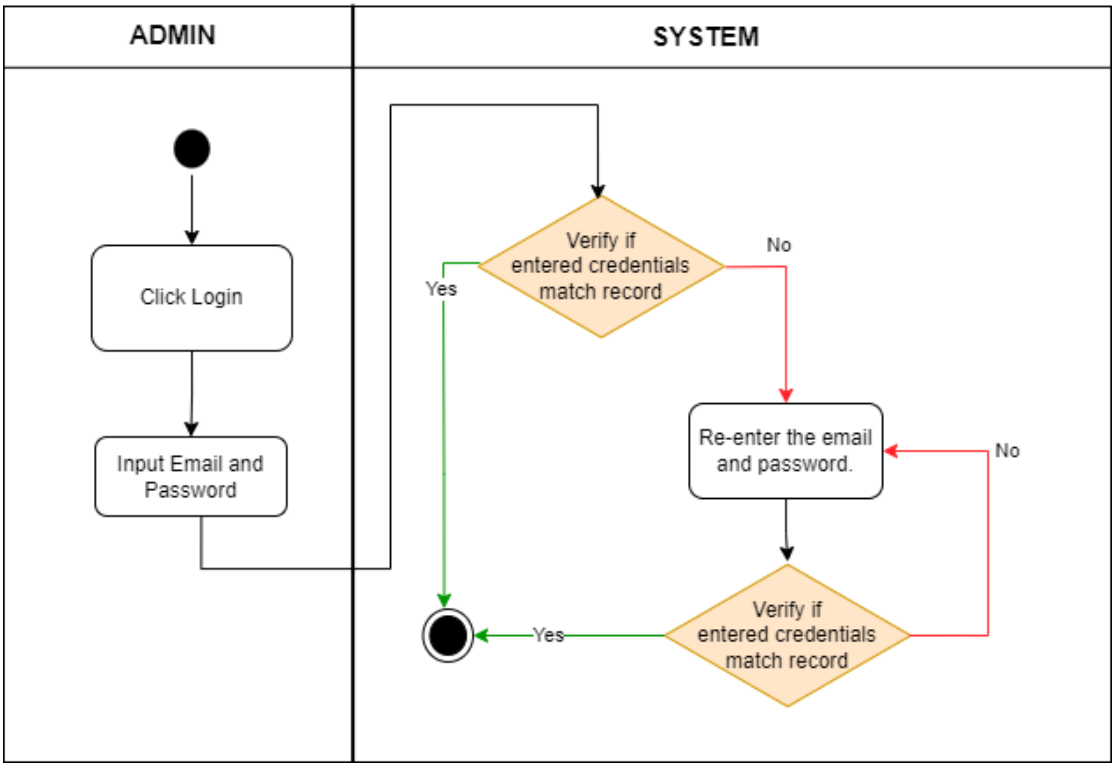

Figure 25 . Login (Activity Diagram-Admin)

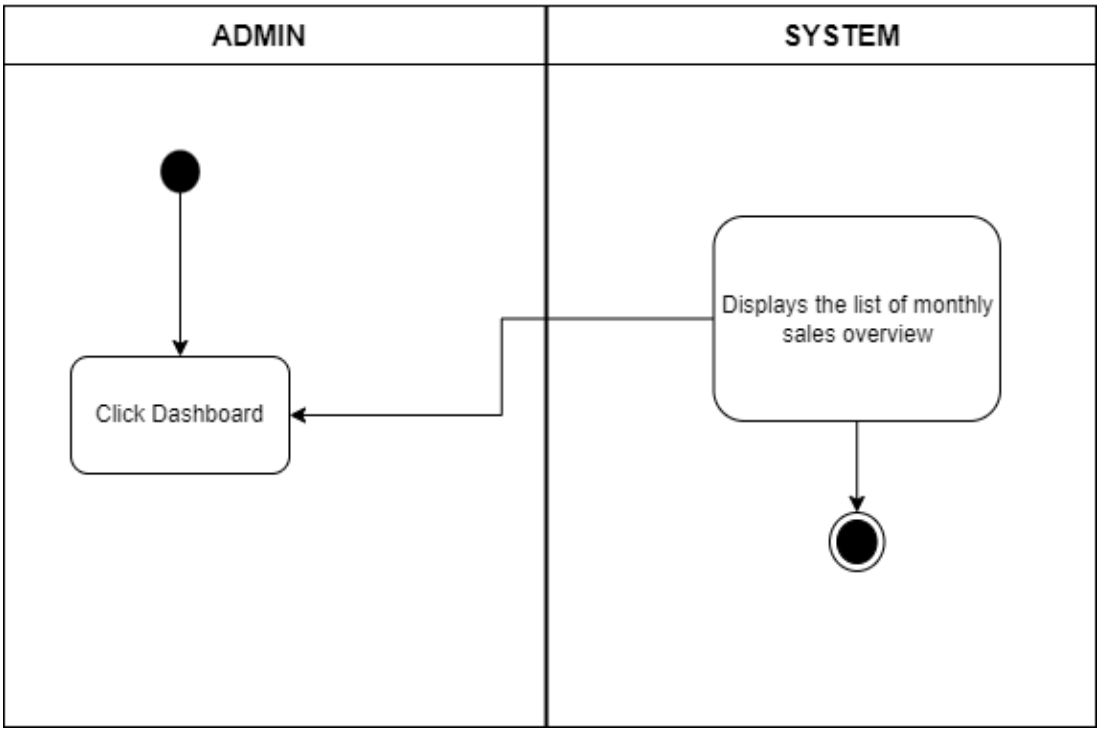

Figure 26 **.**Dashboard

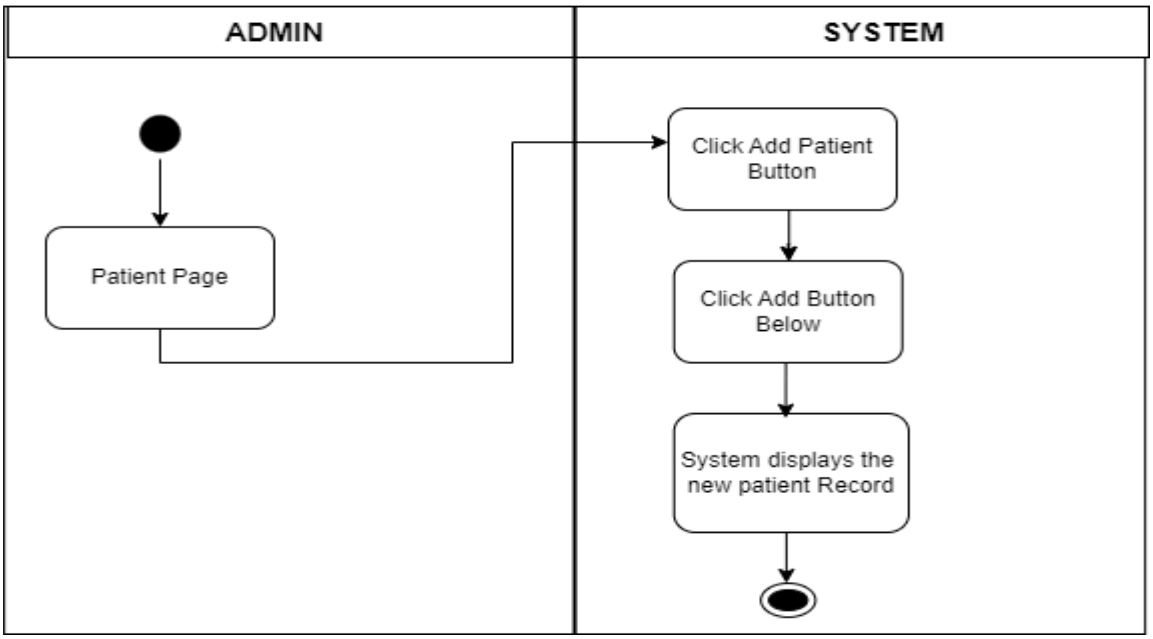

Figure 27. Add patient Page

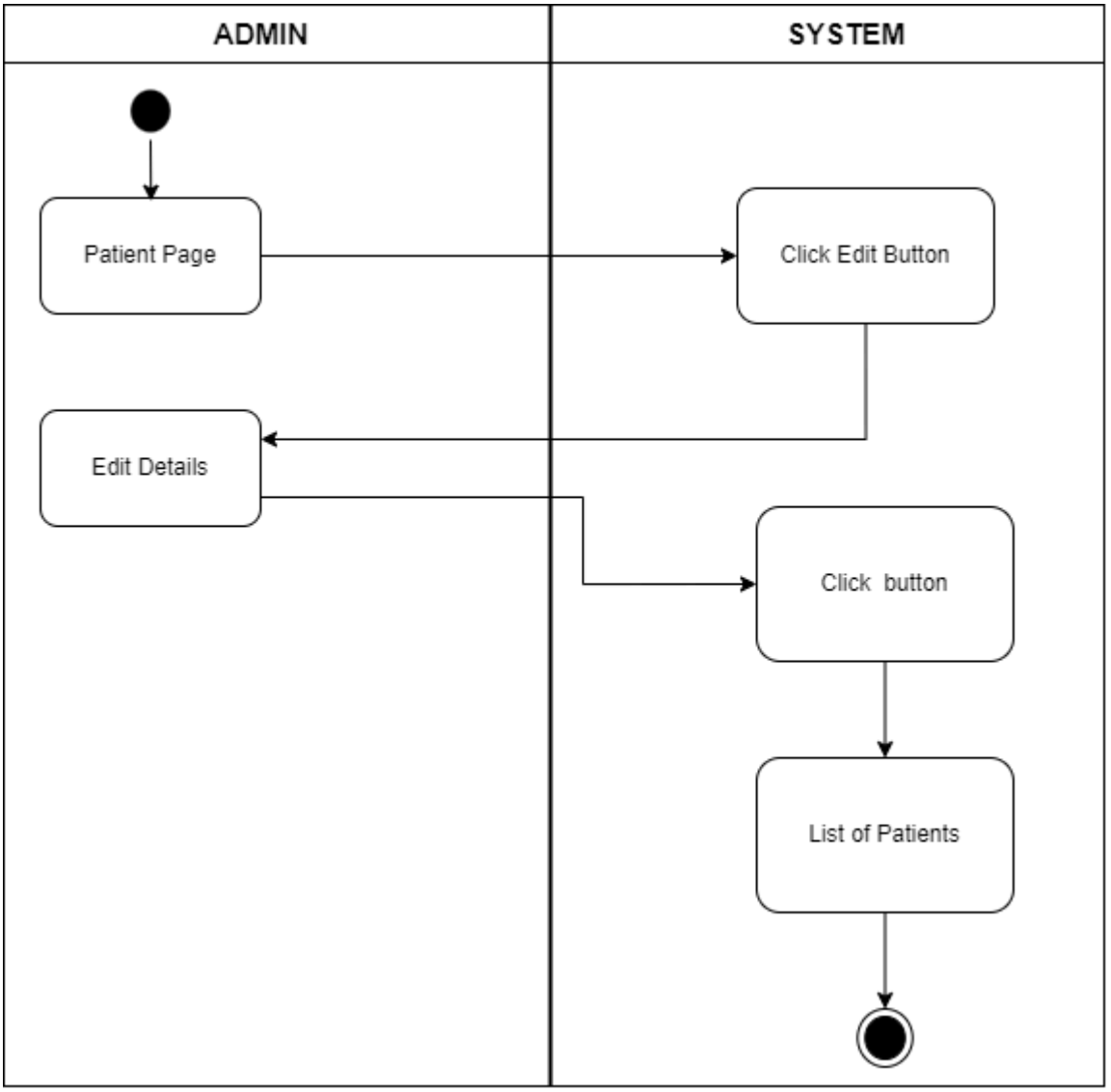

Figure 28. Edit Patient Page

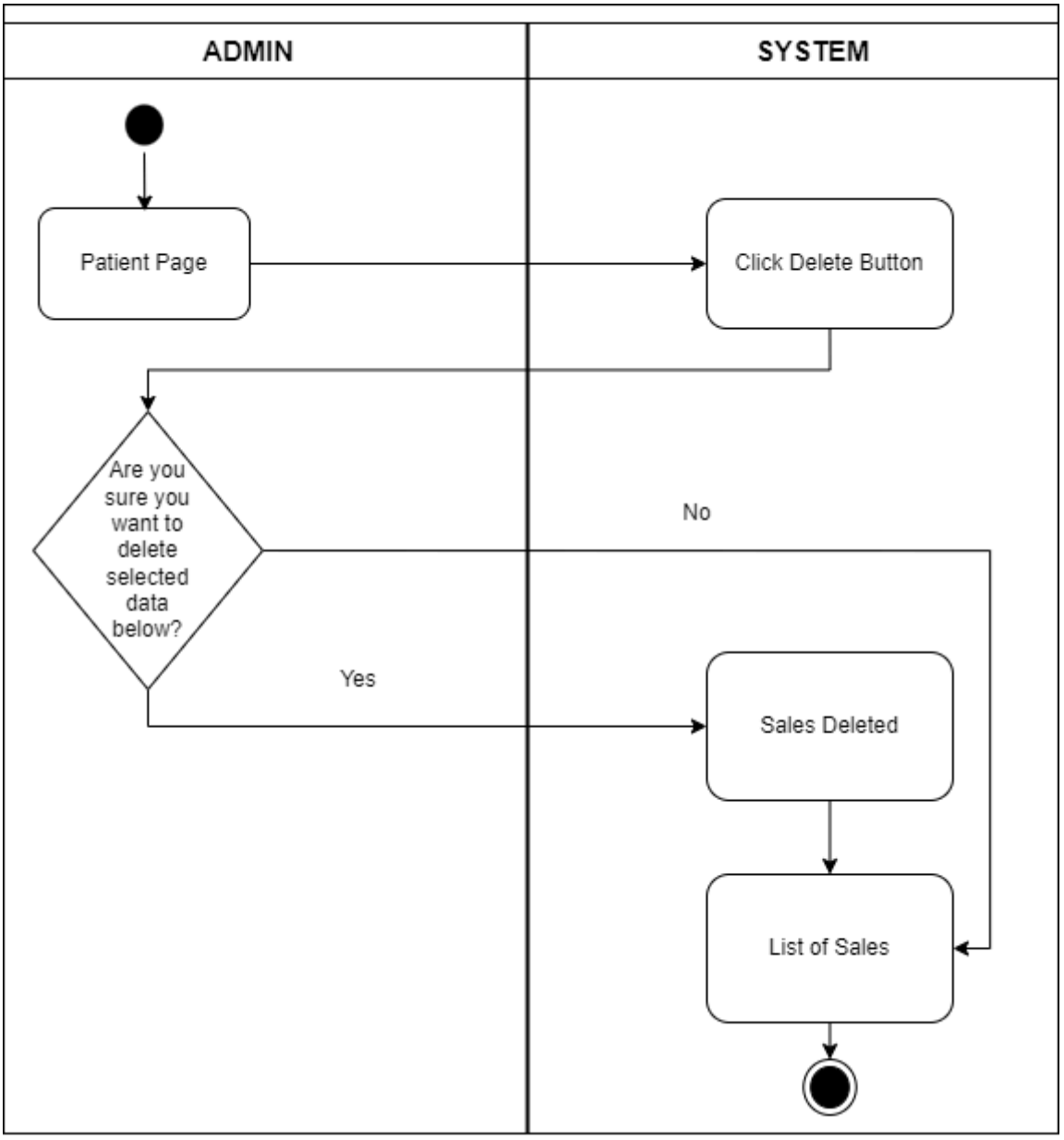

Figure 29. Delete patient Page

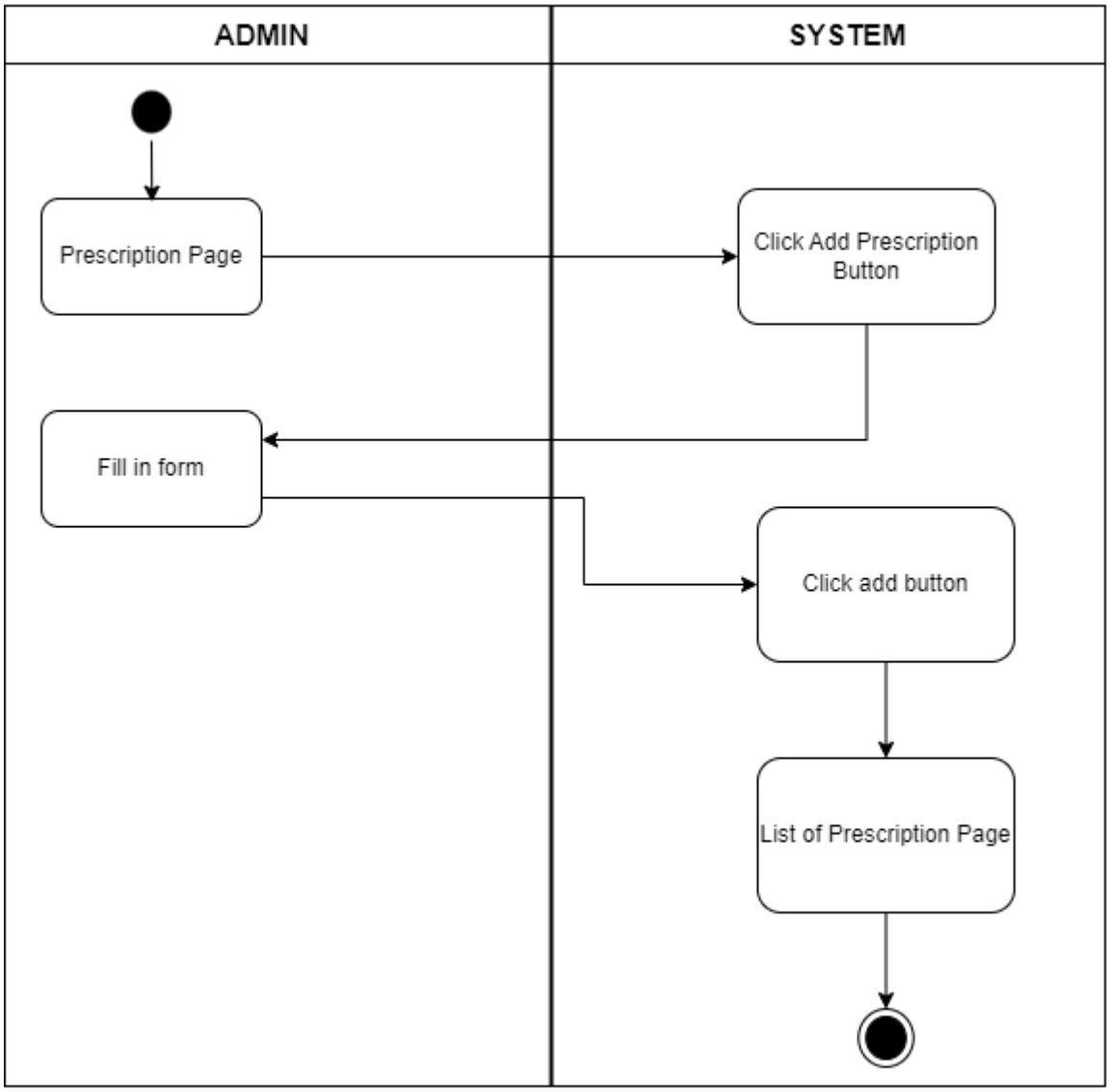

Figure 30. Add Prescription

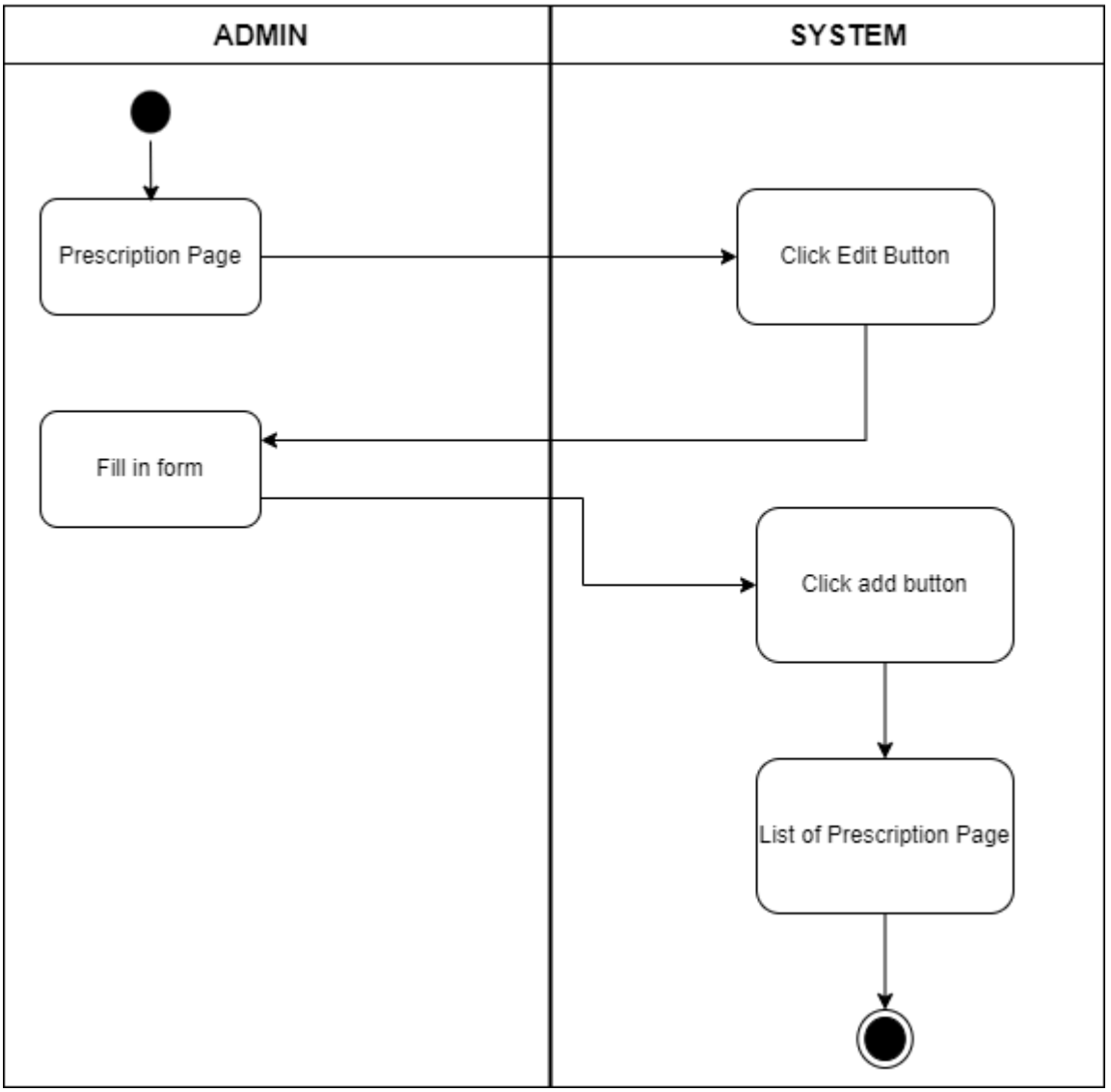

Figure 31. Edit Prescription

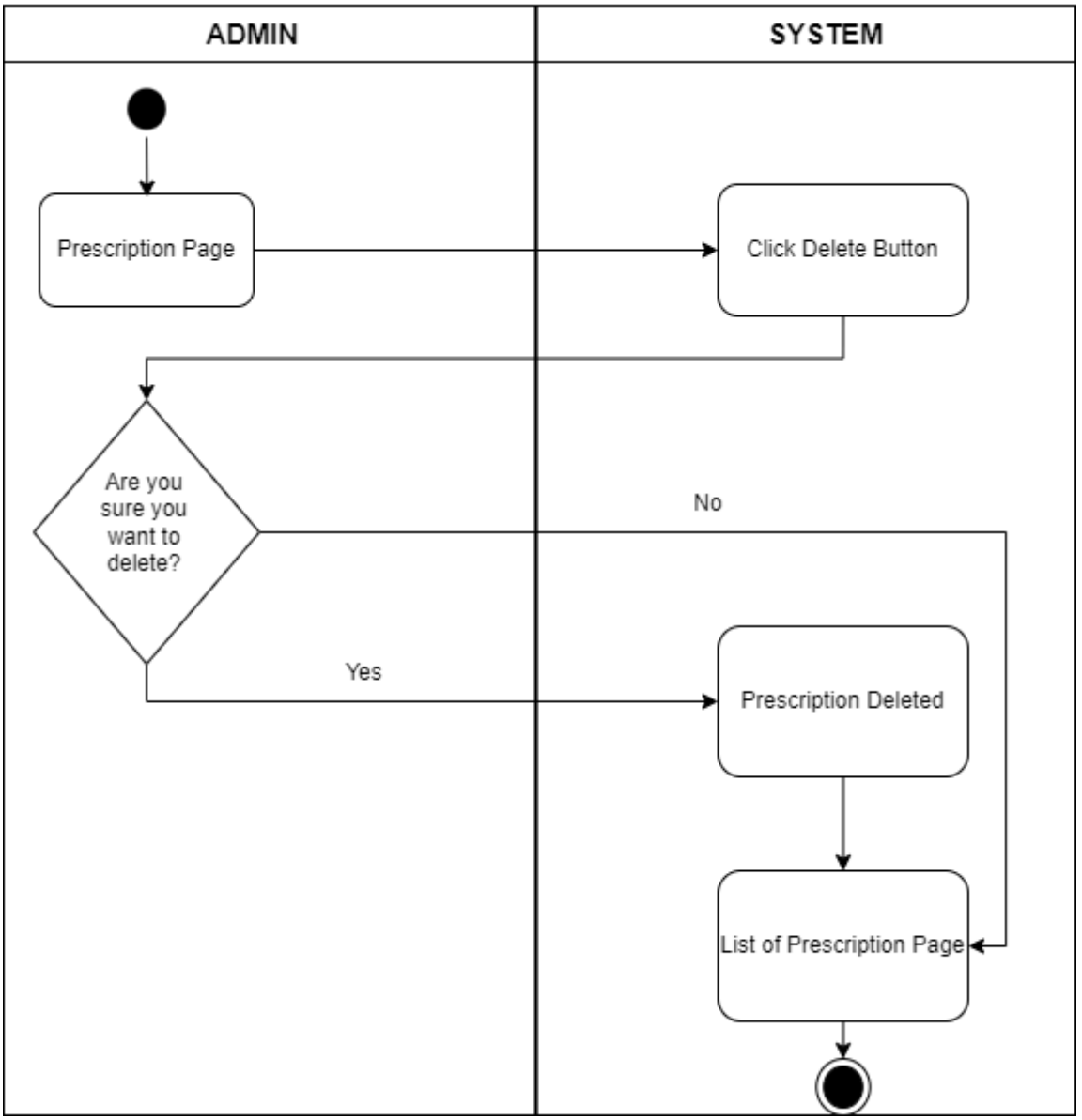

Figure 32.Delete Prescription

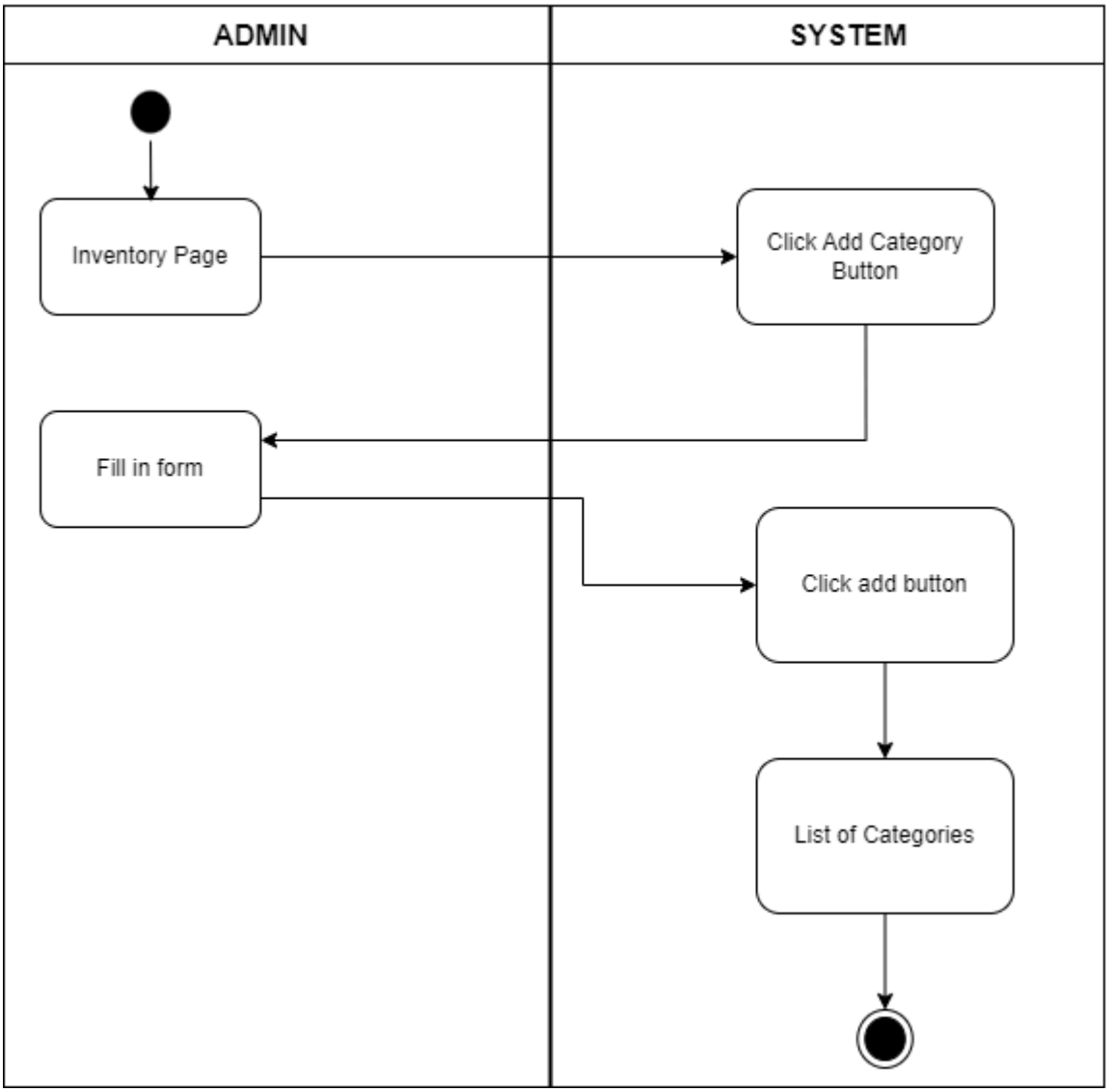

Figure 33.Inventory - Add Category

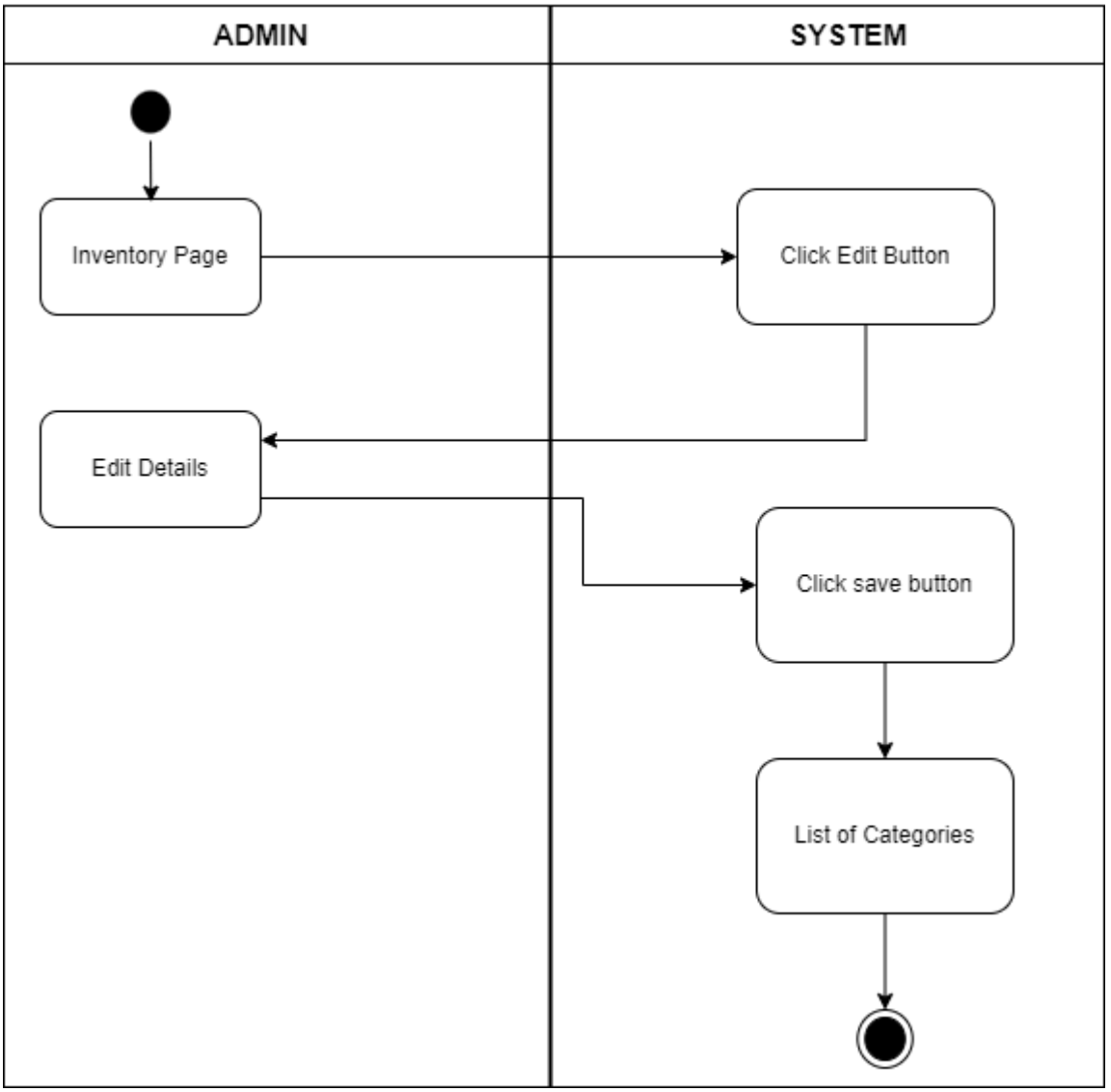

Figure 34.Inventory - Edit Category

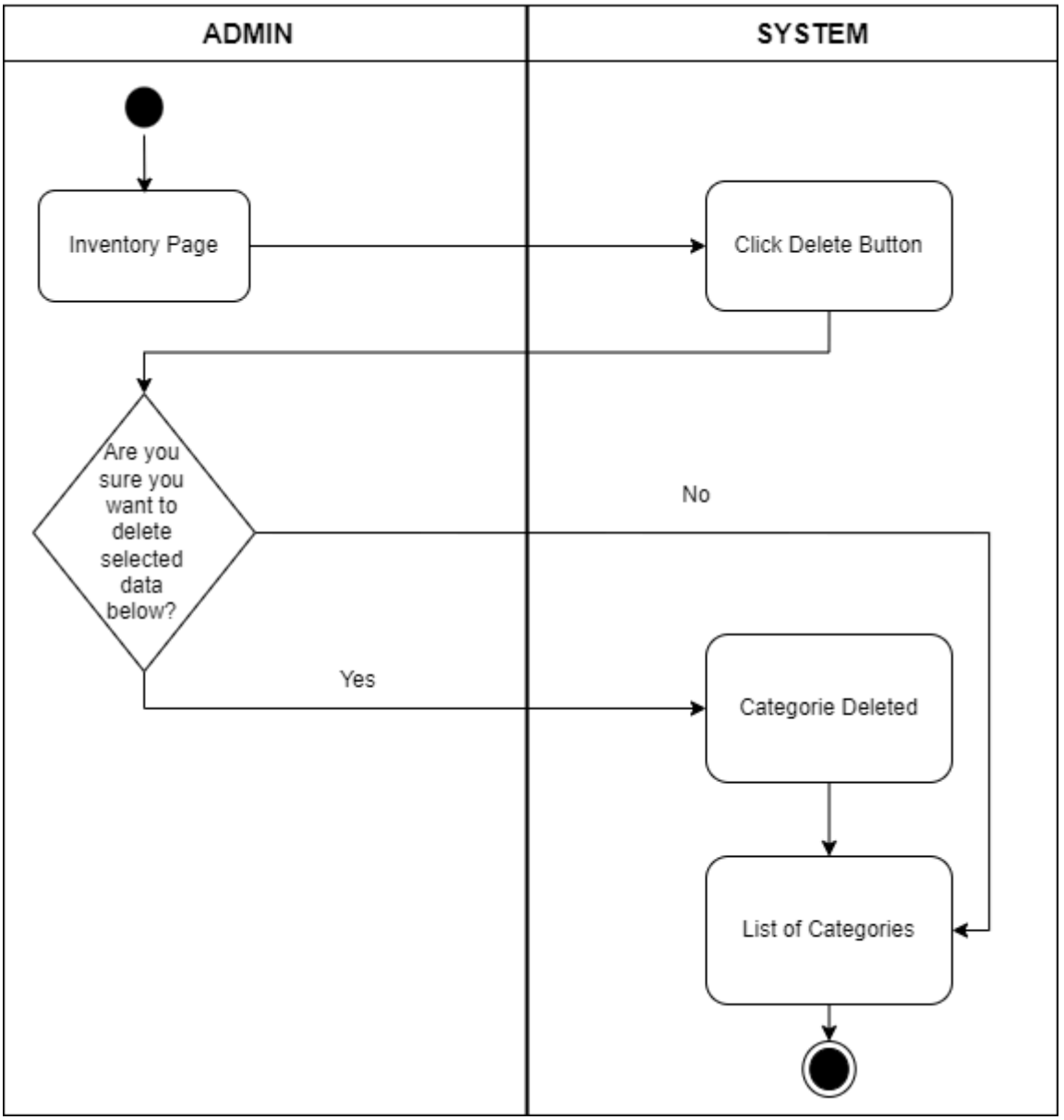

Figure 35. Inventory -Delete Category

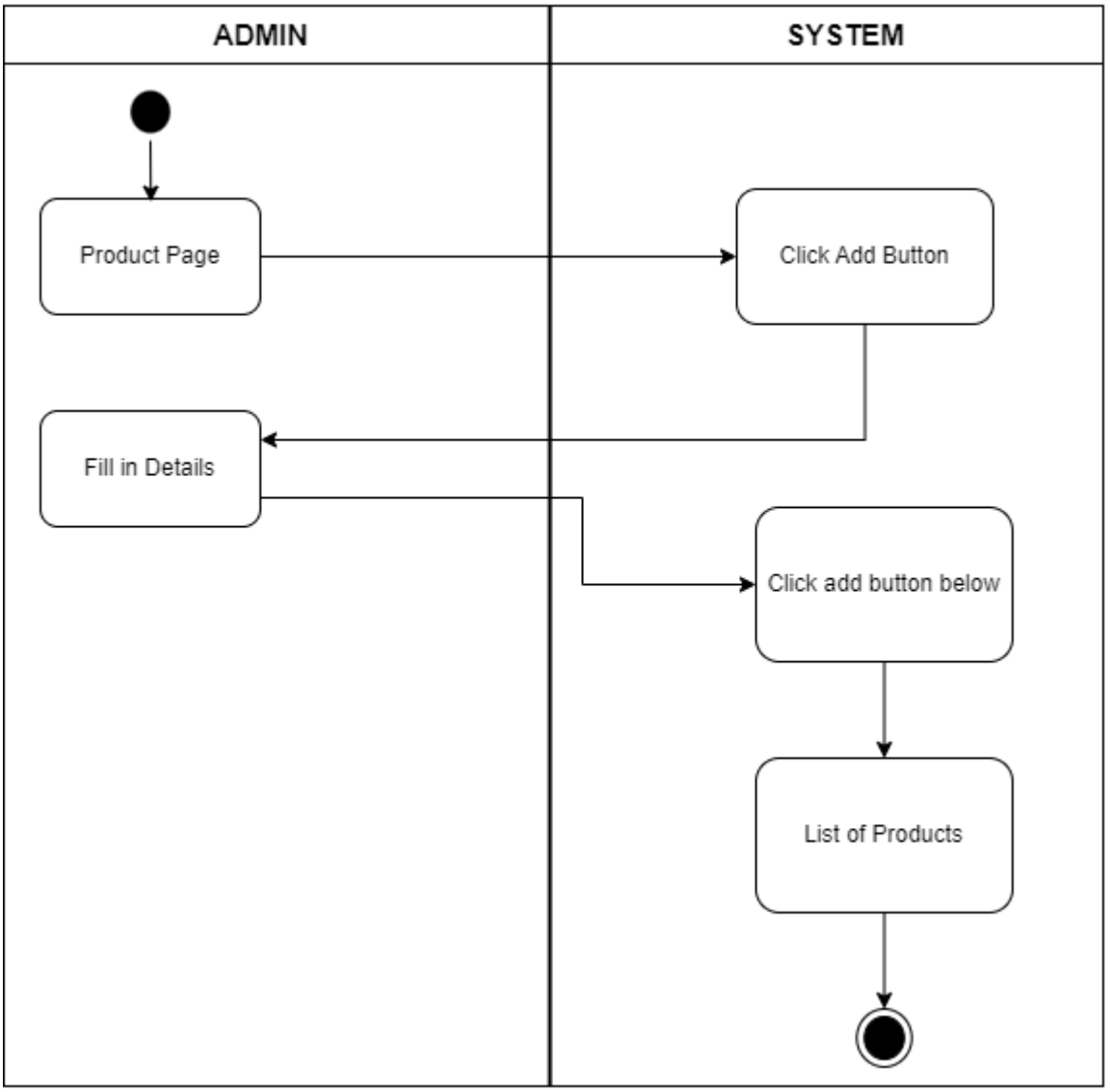

Figure 36. Product -Add Product

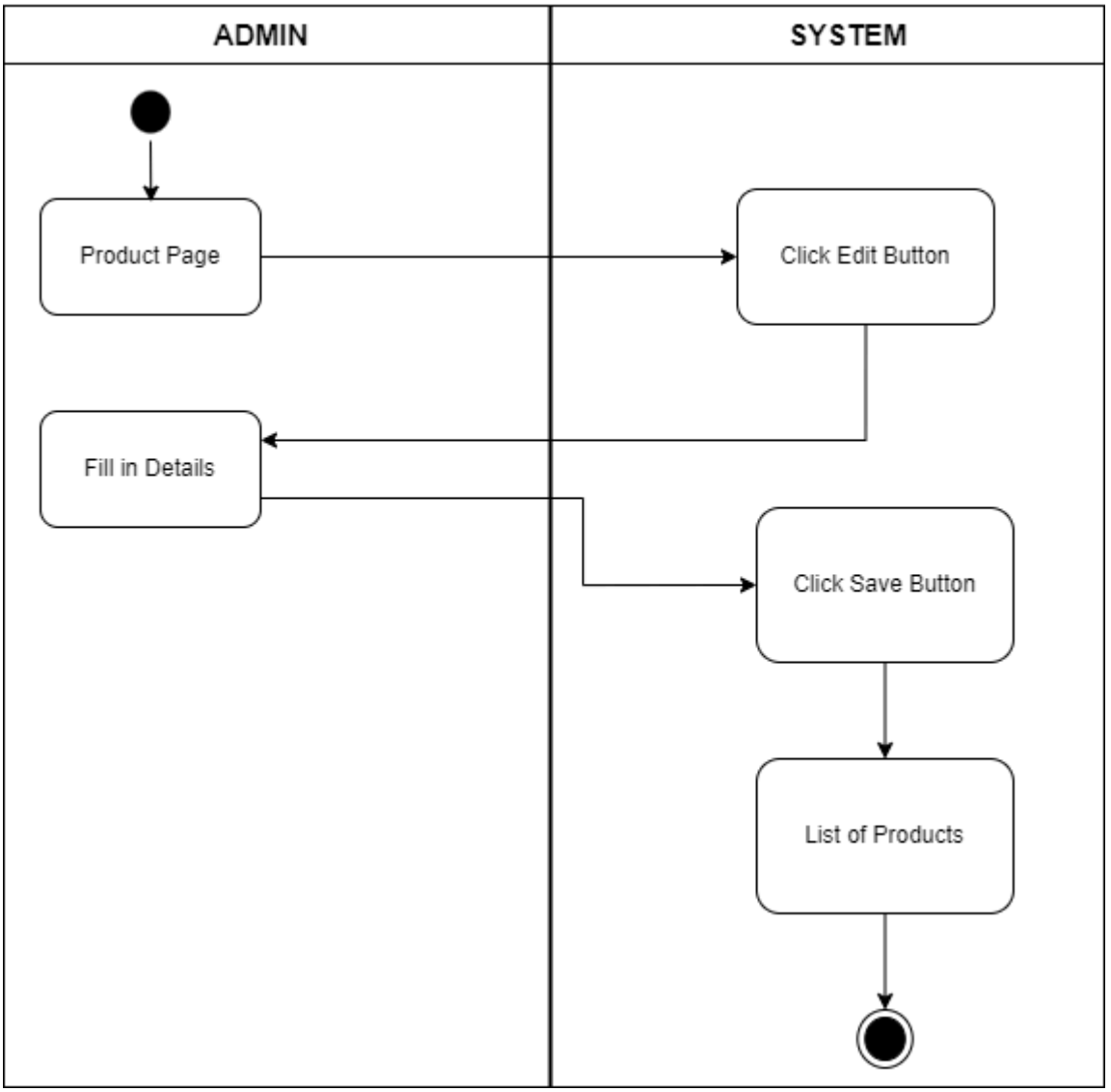

Figure 37. Product -Edit Product

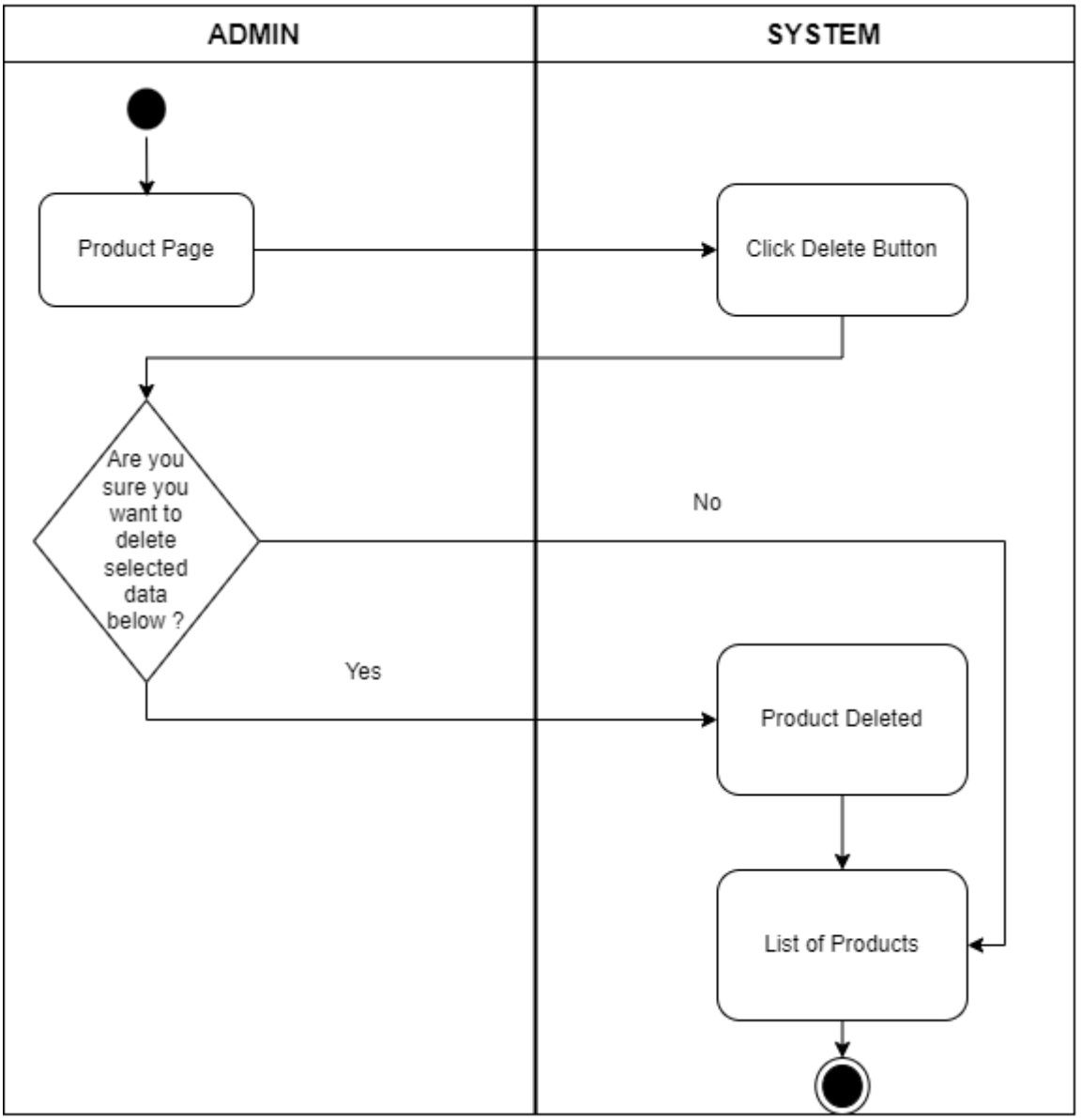

Figure 38. Product -Delete Product

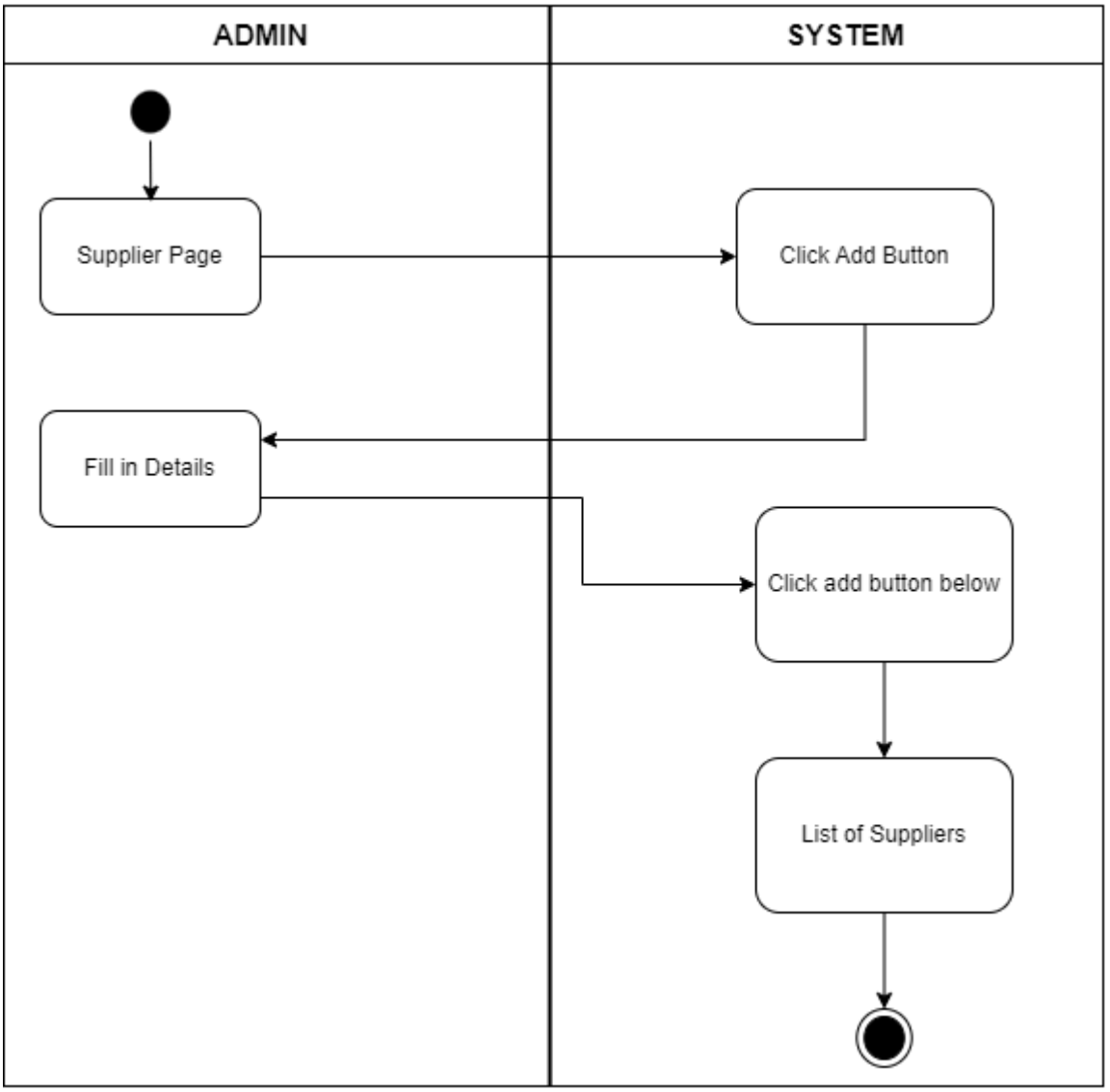

Figure 39. Add Supplier

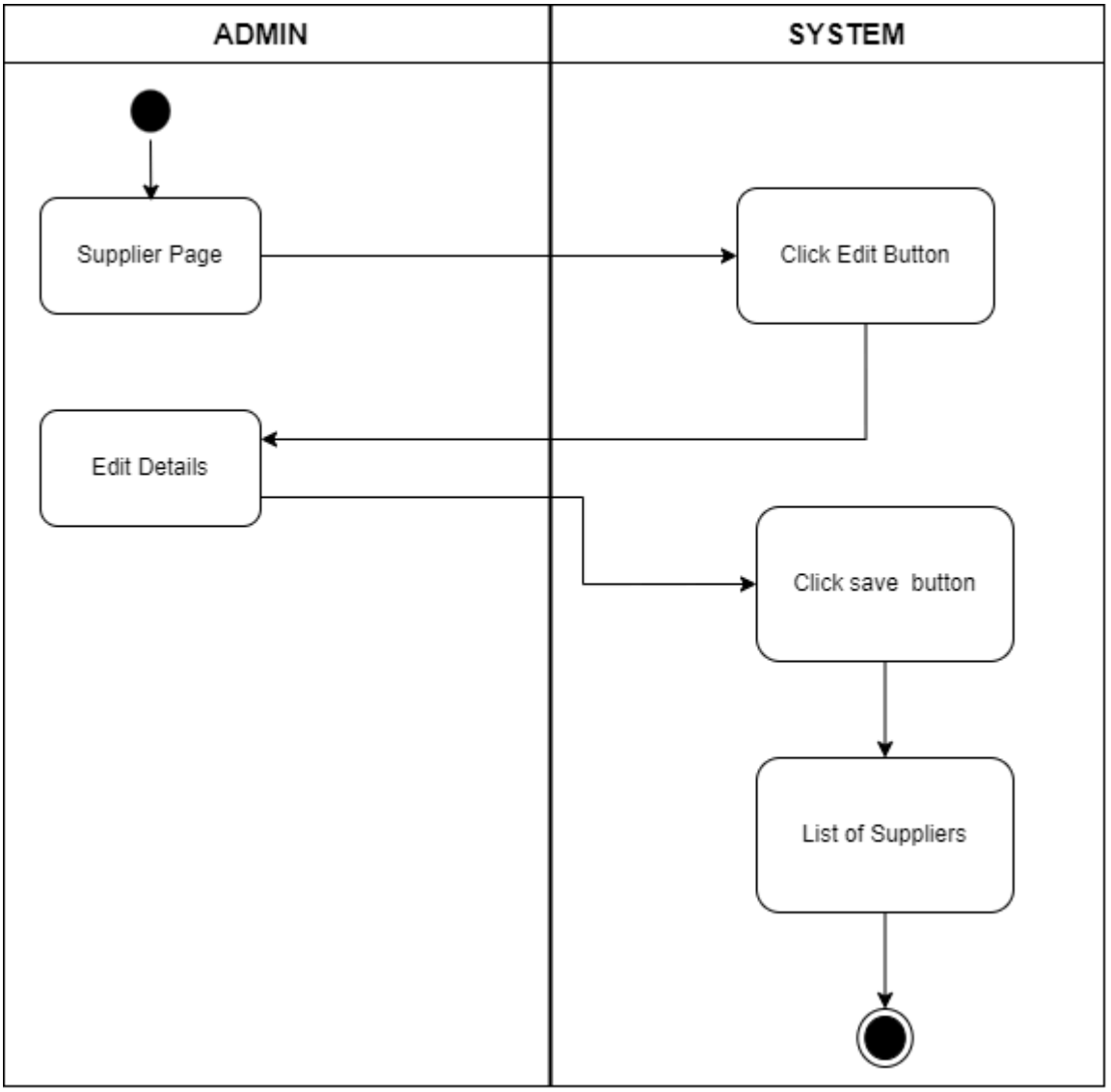

Figure 40. Edit Supplier

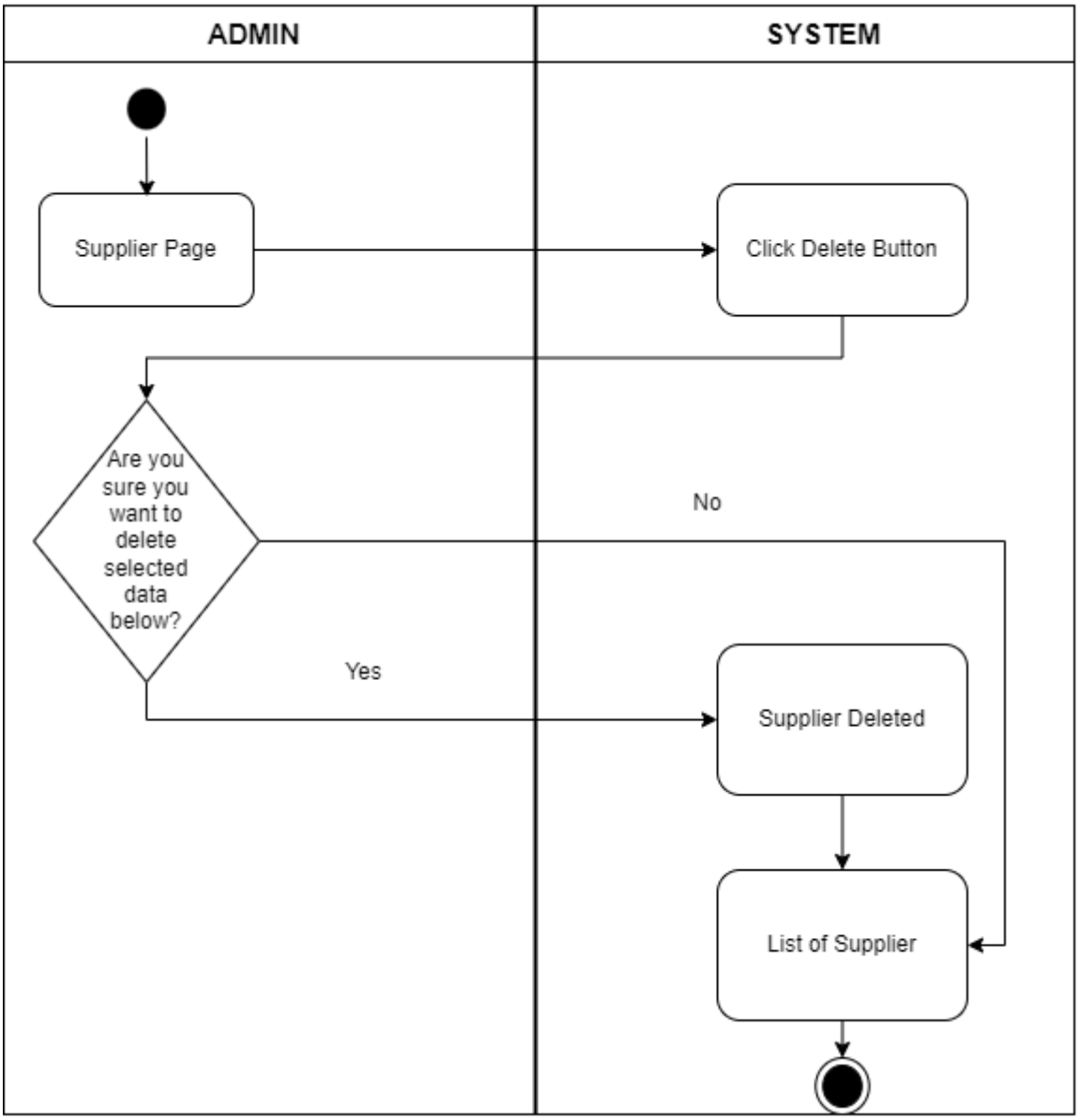

Figure 41. Delete Supplier

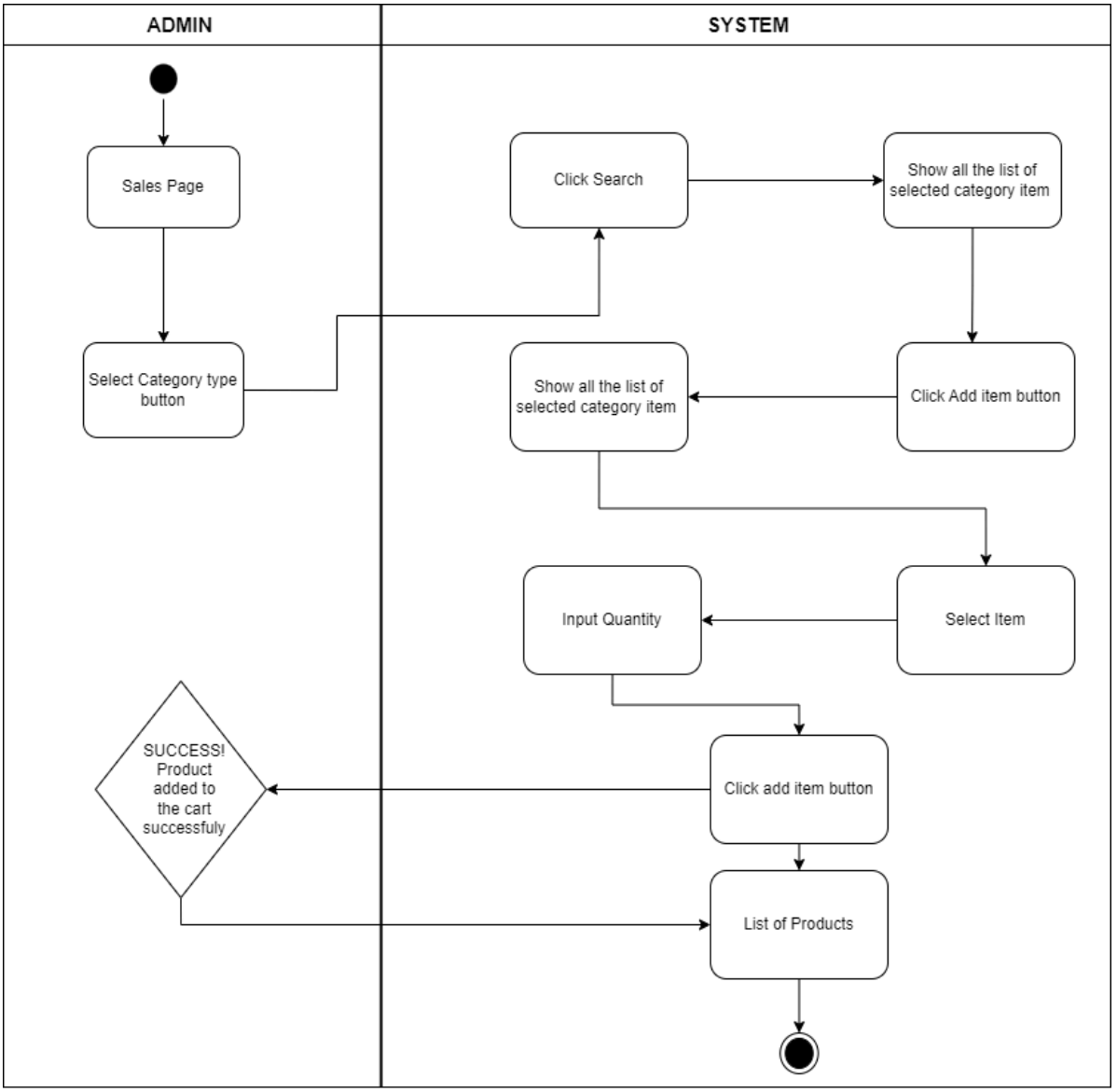

Figure 42. List of Products

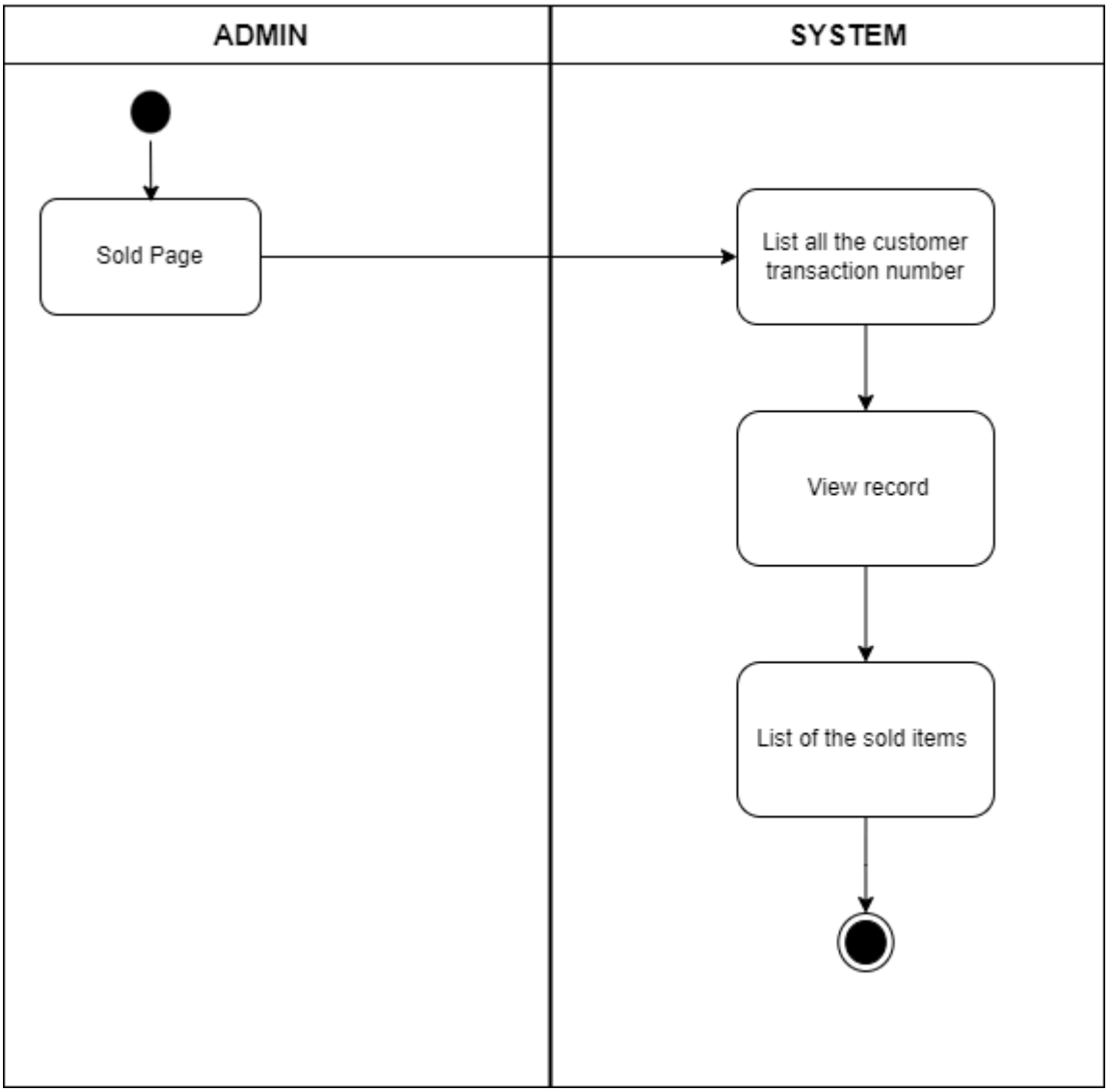

Figure 43. List of Sold Items

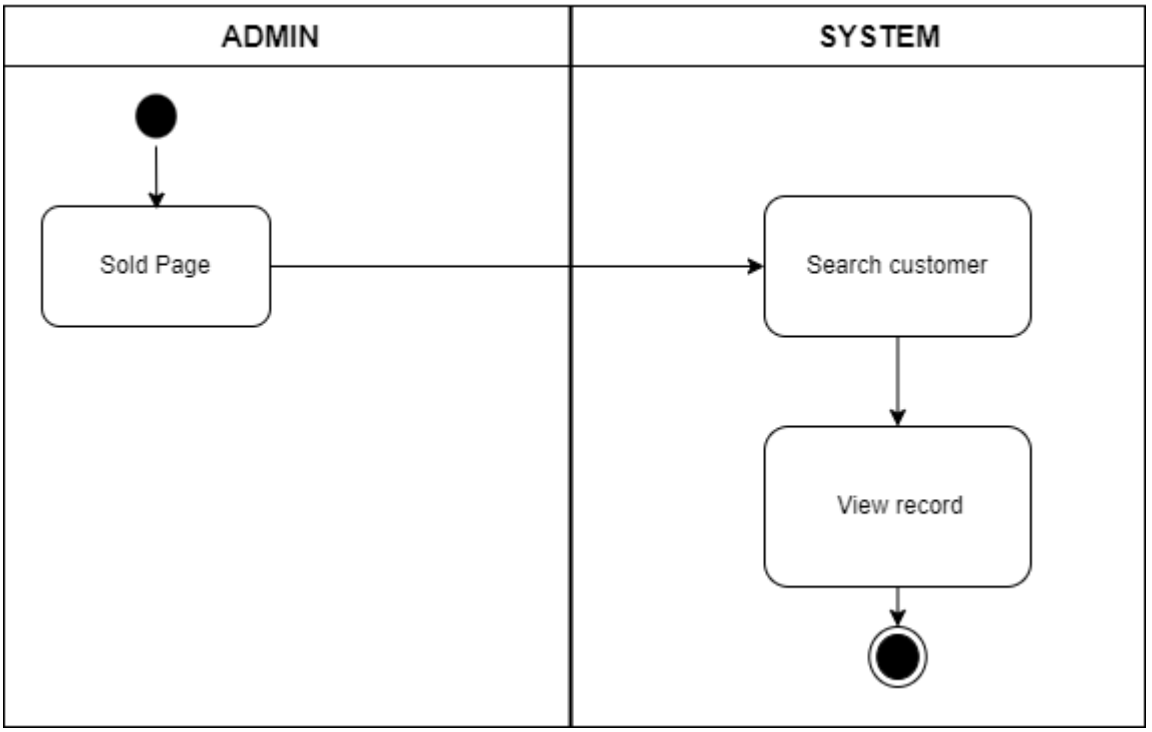

Figure 44. Sold Page

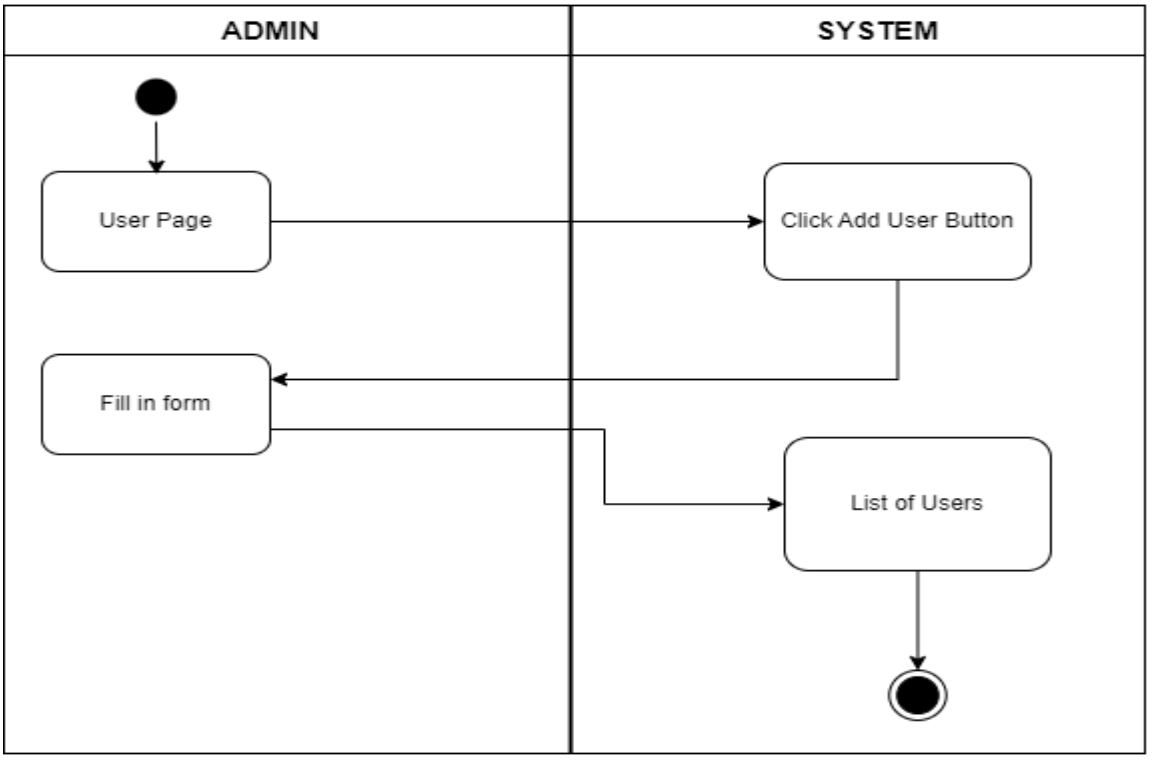

Figure 45. Add User

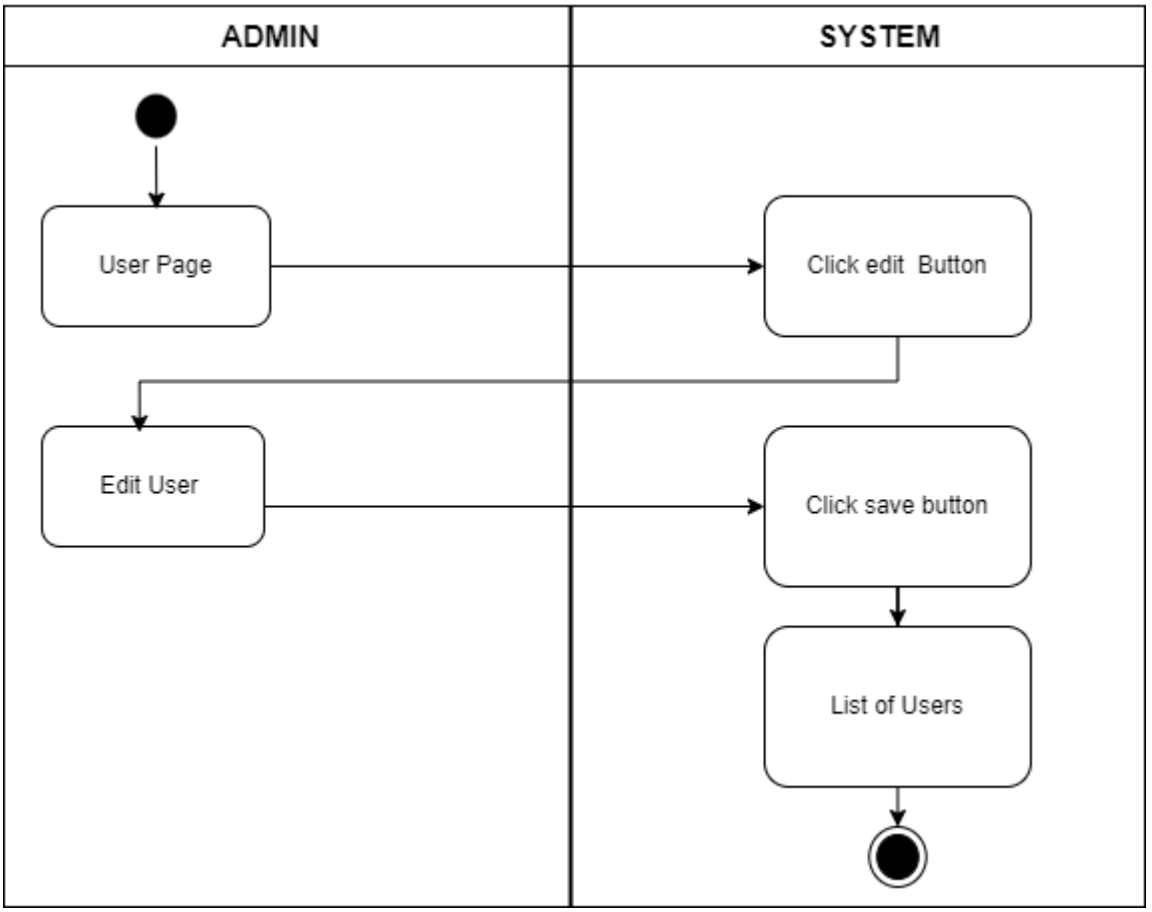

Figure 46. Edit User

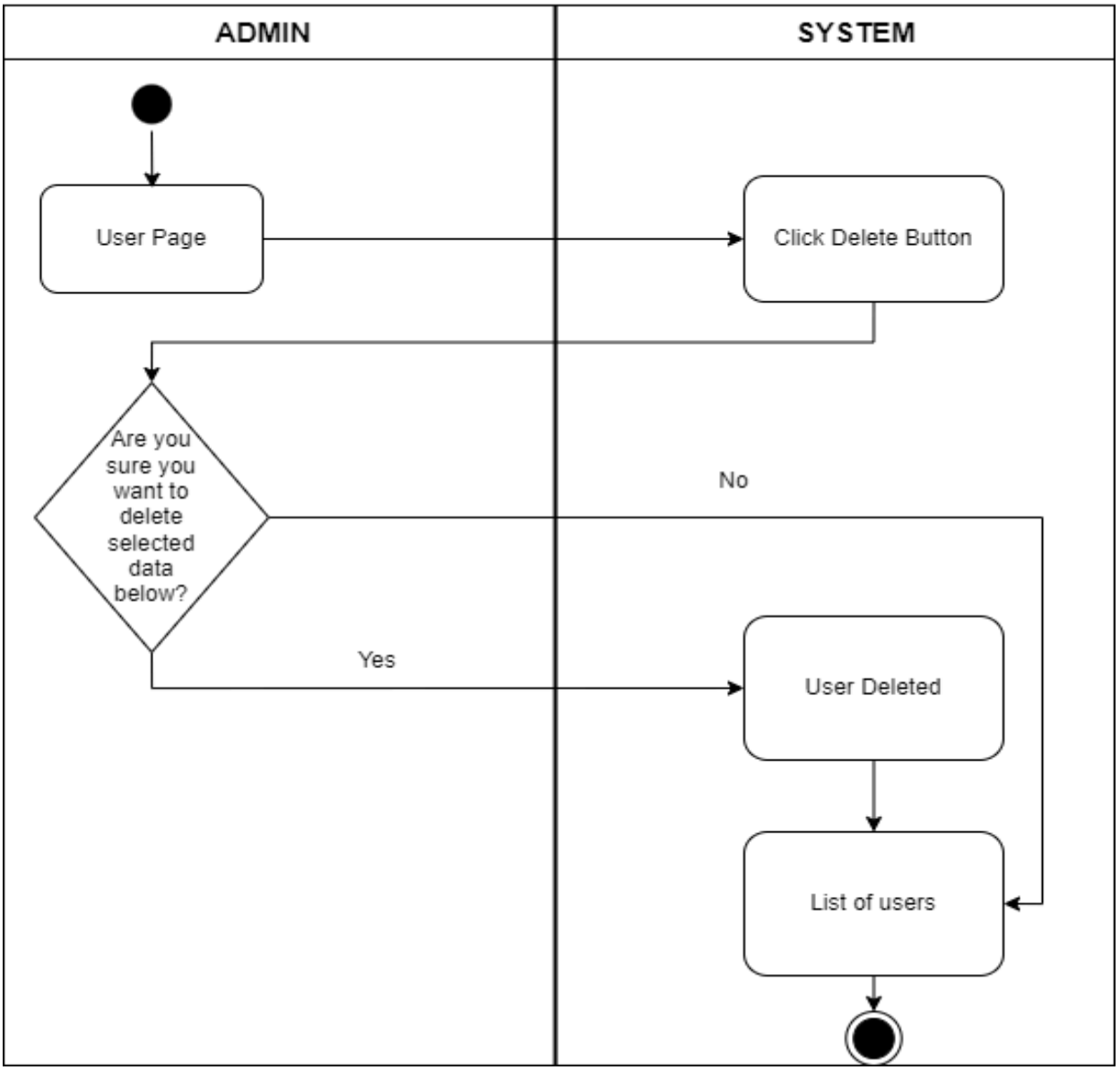

Figure 47. Delete User

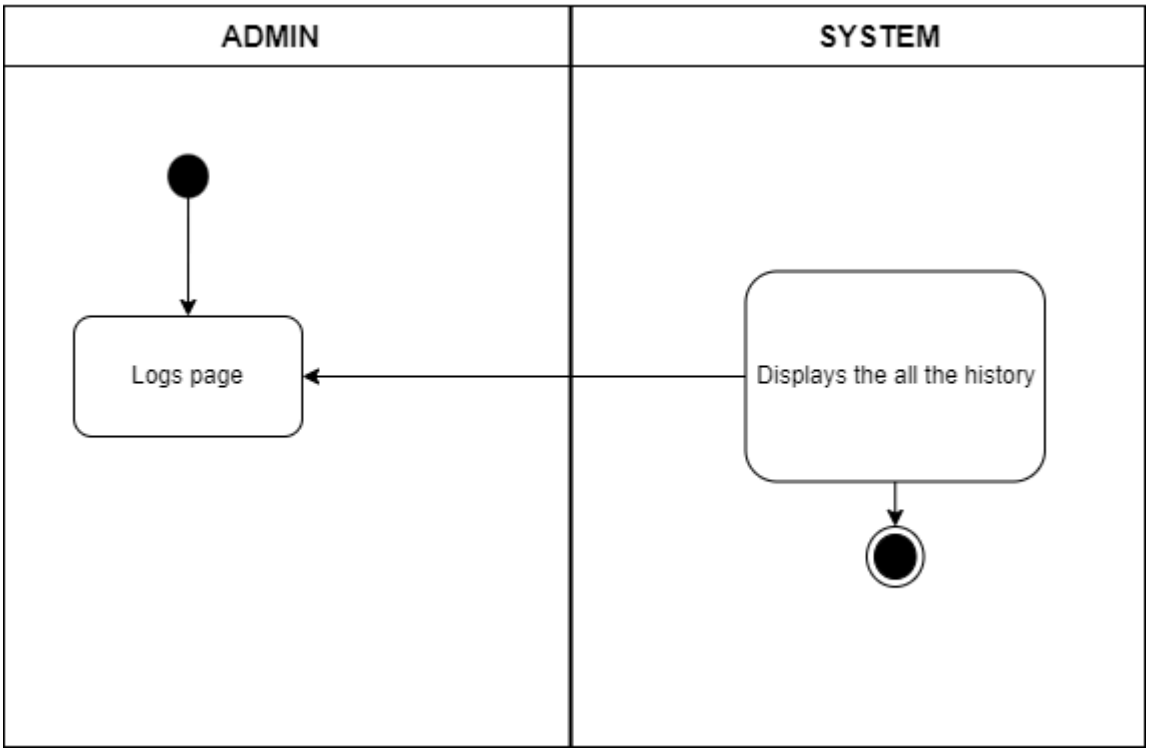

Figure 48. Logs Page

Use Case Diagrams

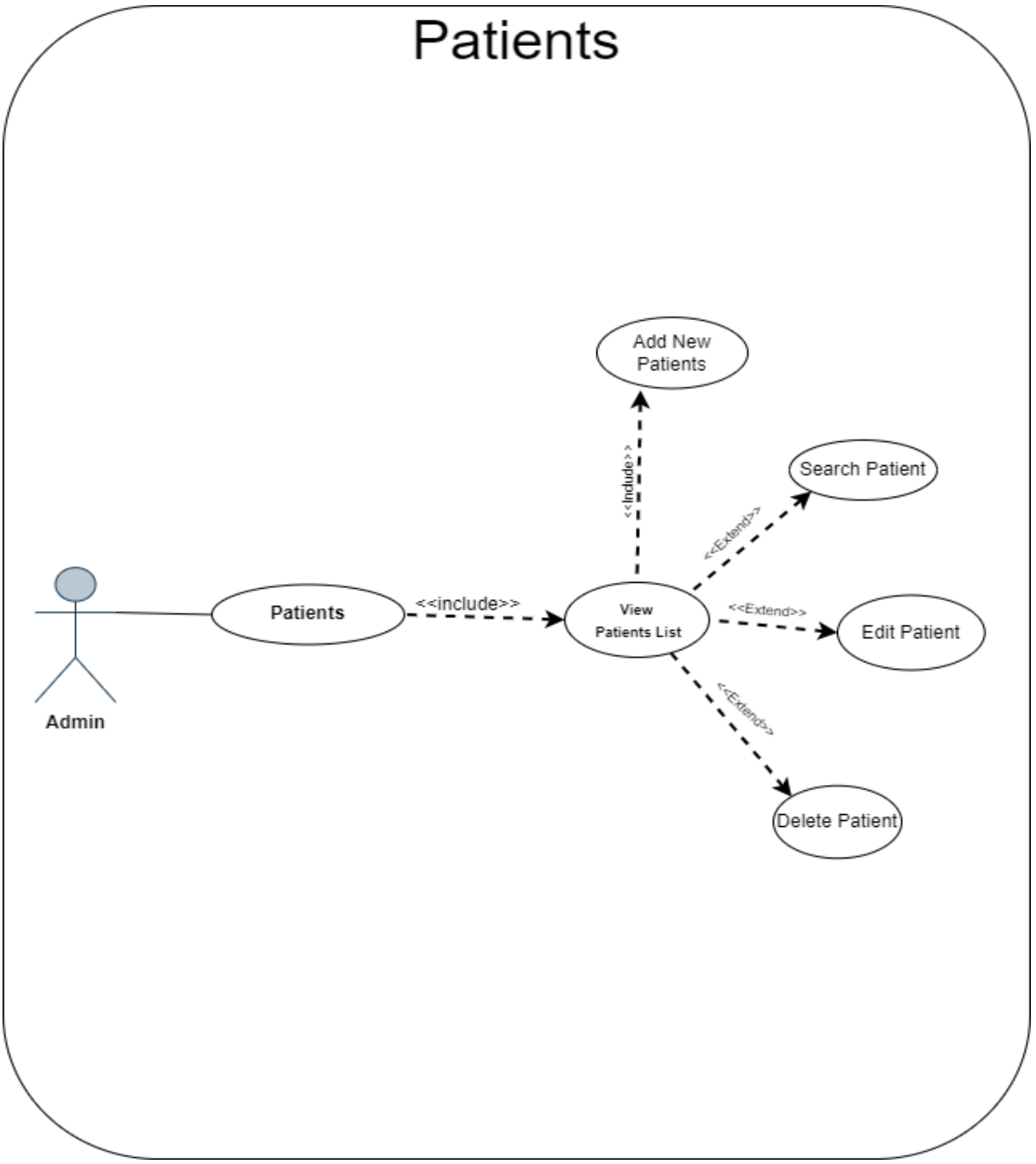

***Figure* 49.** Admin Patient Use Case Diagram

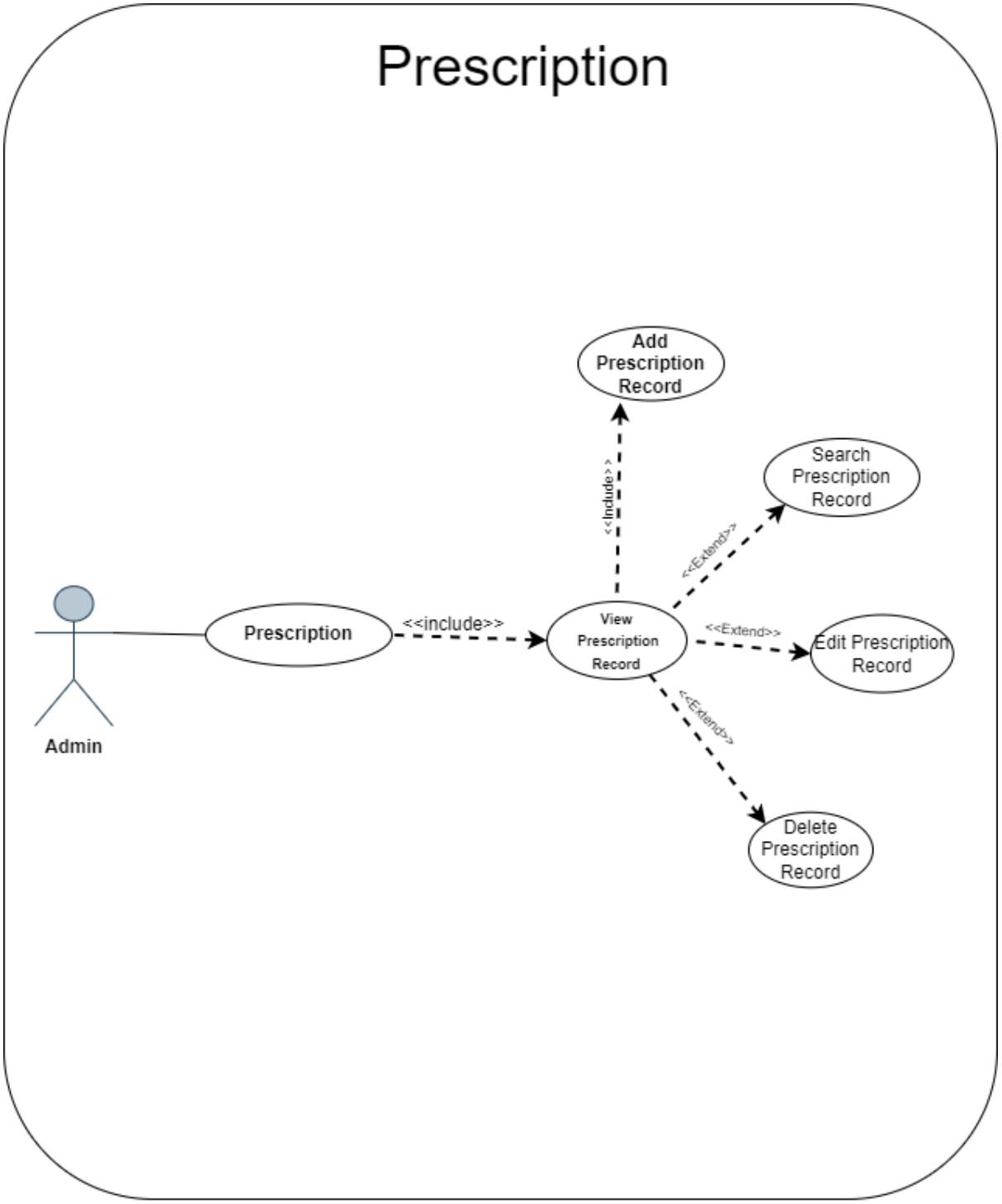

***Figure* 50.** Admin Prescription Use Case Diagram

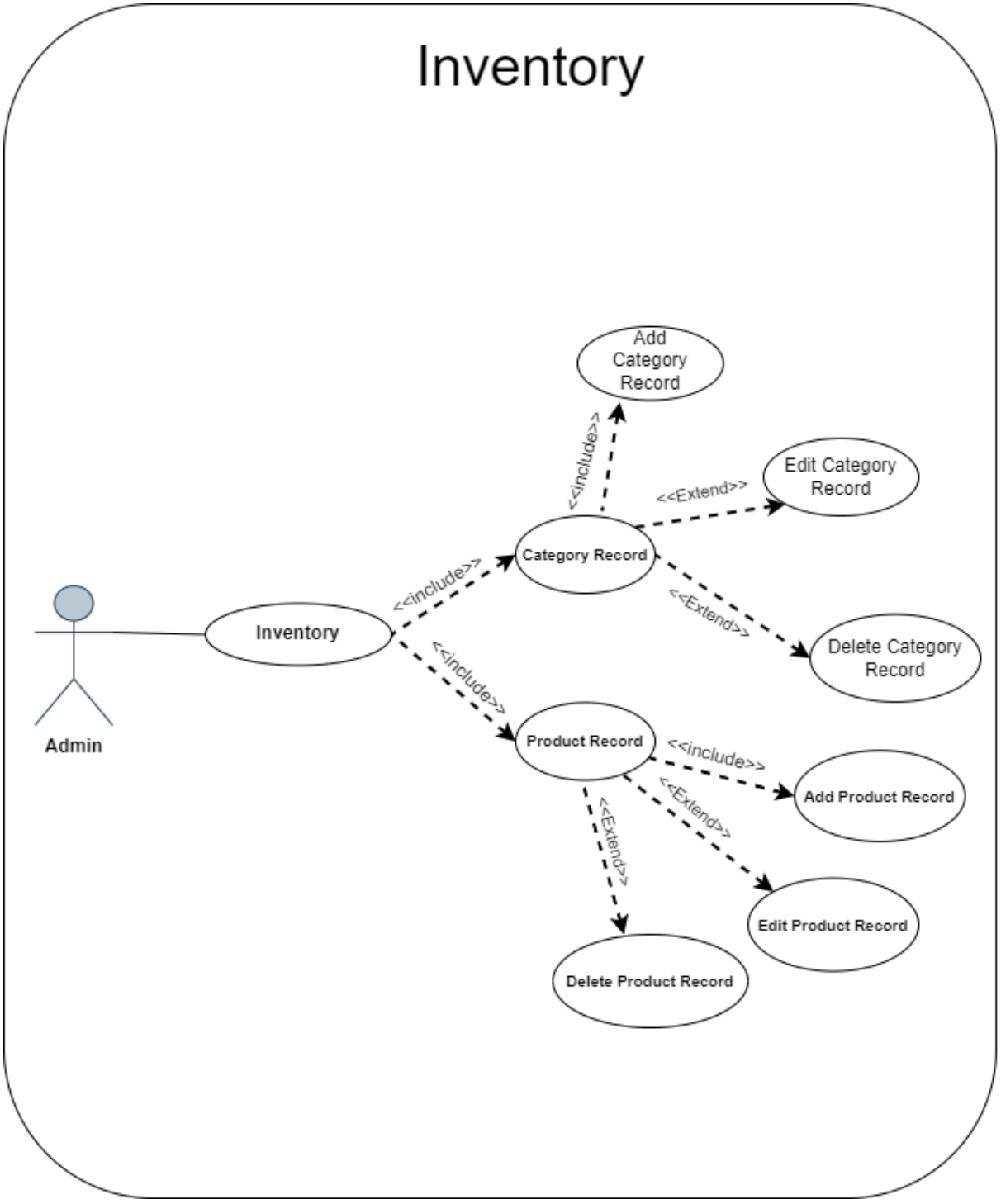

***Figure* 51.** Admin Inventory Use Case Diagram

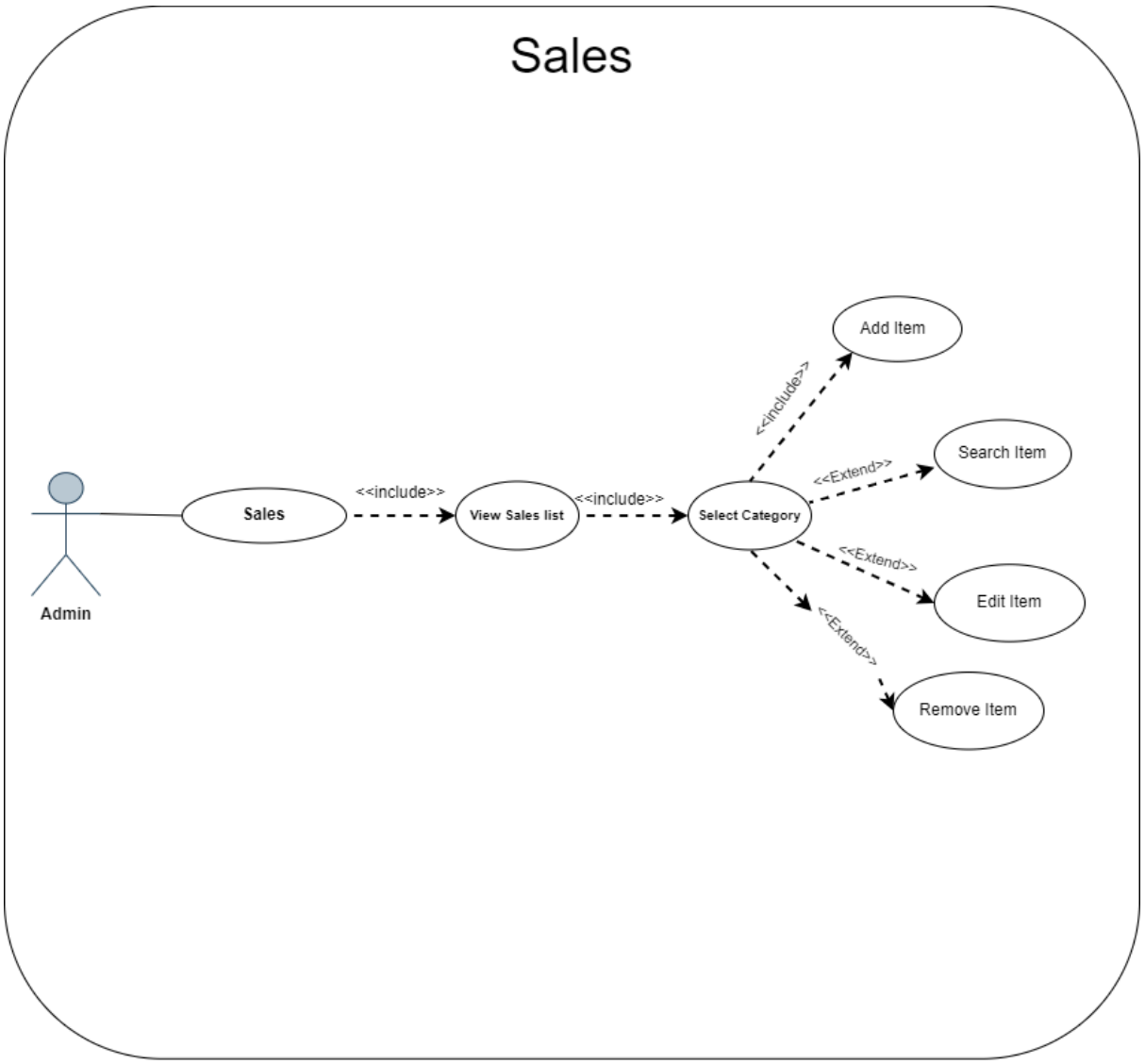

***Figure* 52.** Admin Sales Use Case Diagram

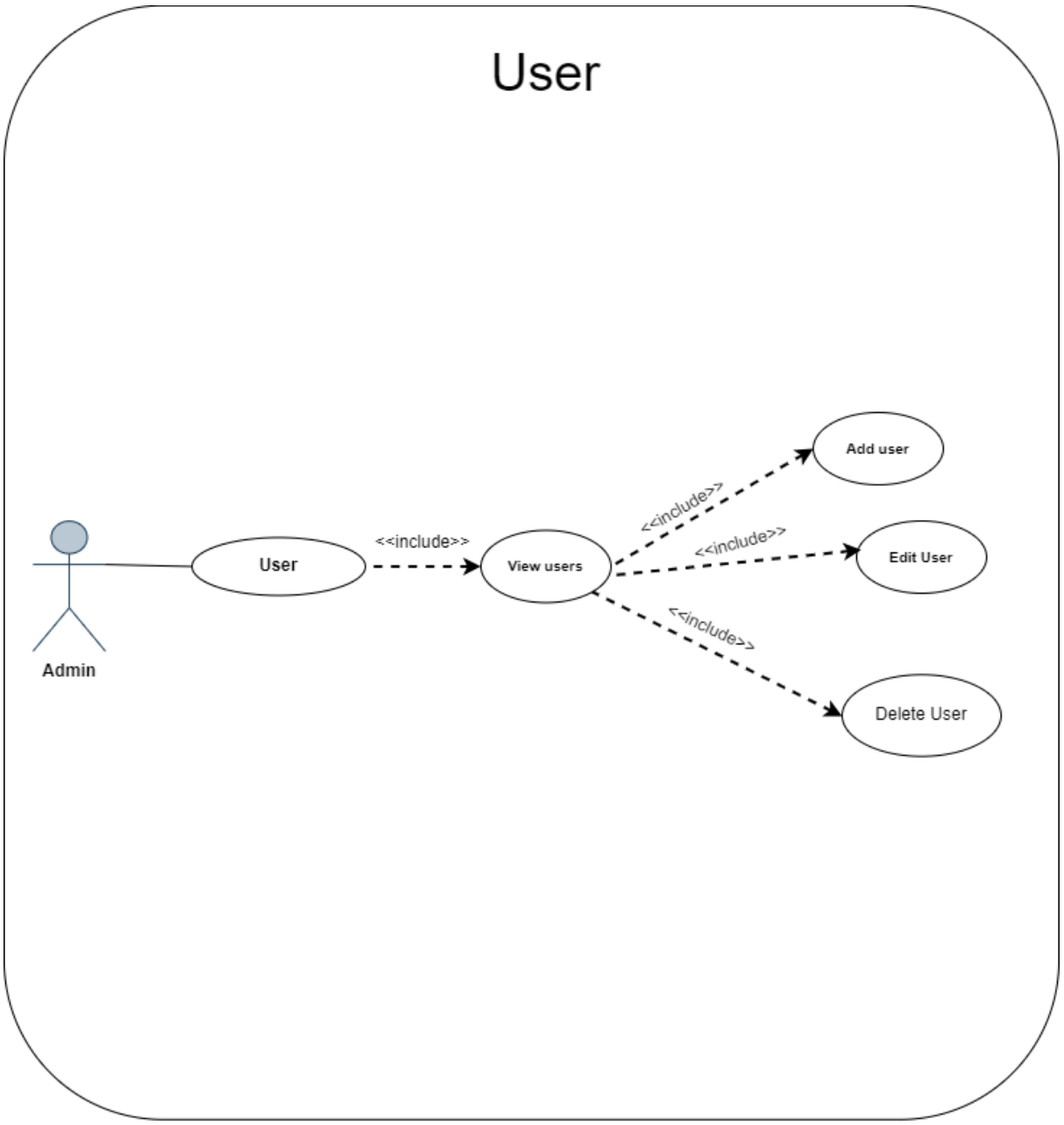

***Figure* 53.** Admin User Use Case Diagram

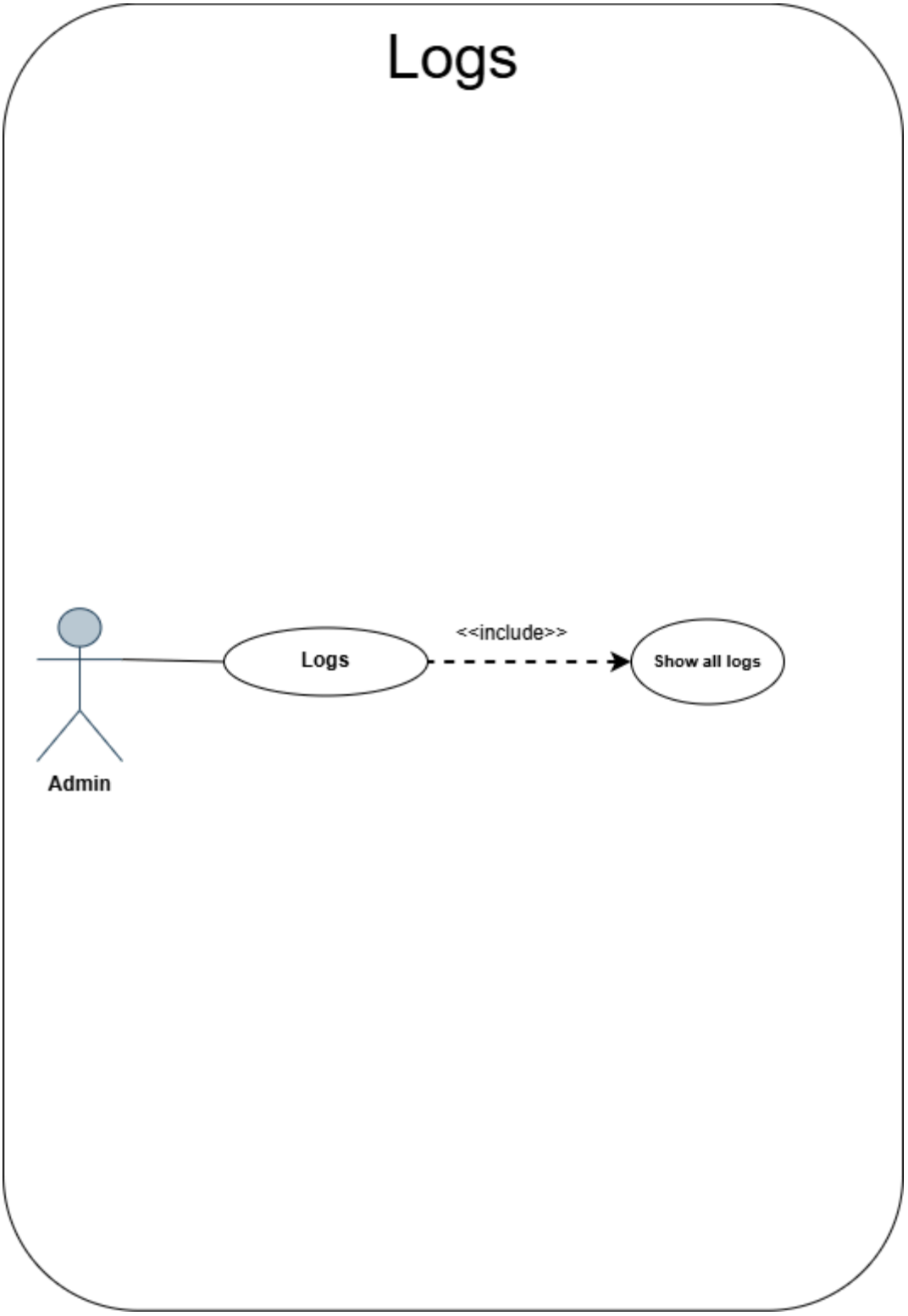

***Figure* 54.** Admin Logs Use Case Diagram

Interaction Diagrams

Data Flow Diagrams

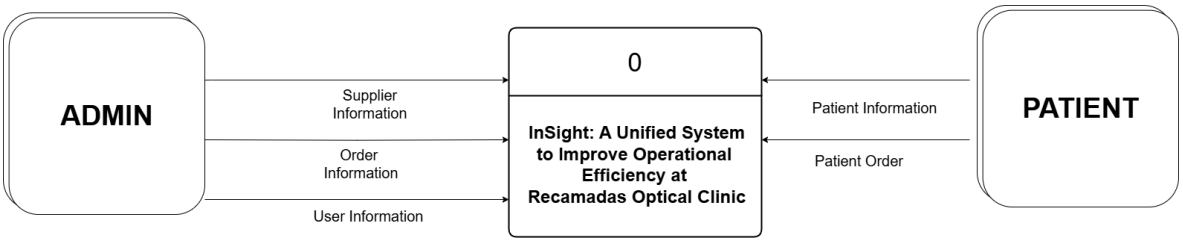

Figure 55. Data Flow Context Diagram- Level 0

The Context Diagram identifies the administrative and Patient as external entities. Admin only interacts with the system while Patient will just give information and receive payment slip from generated download from the system. The admin will input employee information.to the system for the data flow.

Sequence Diagrams

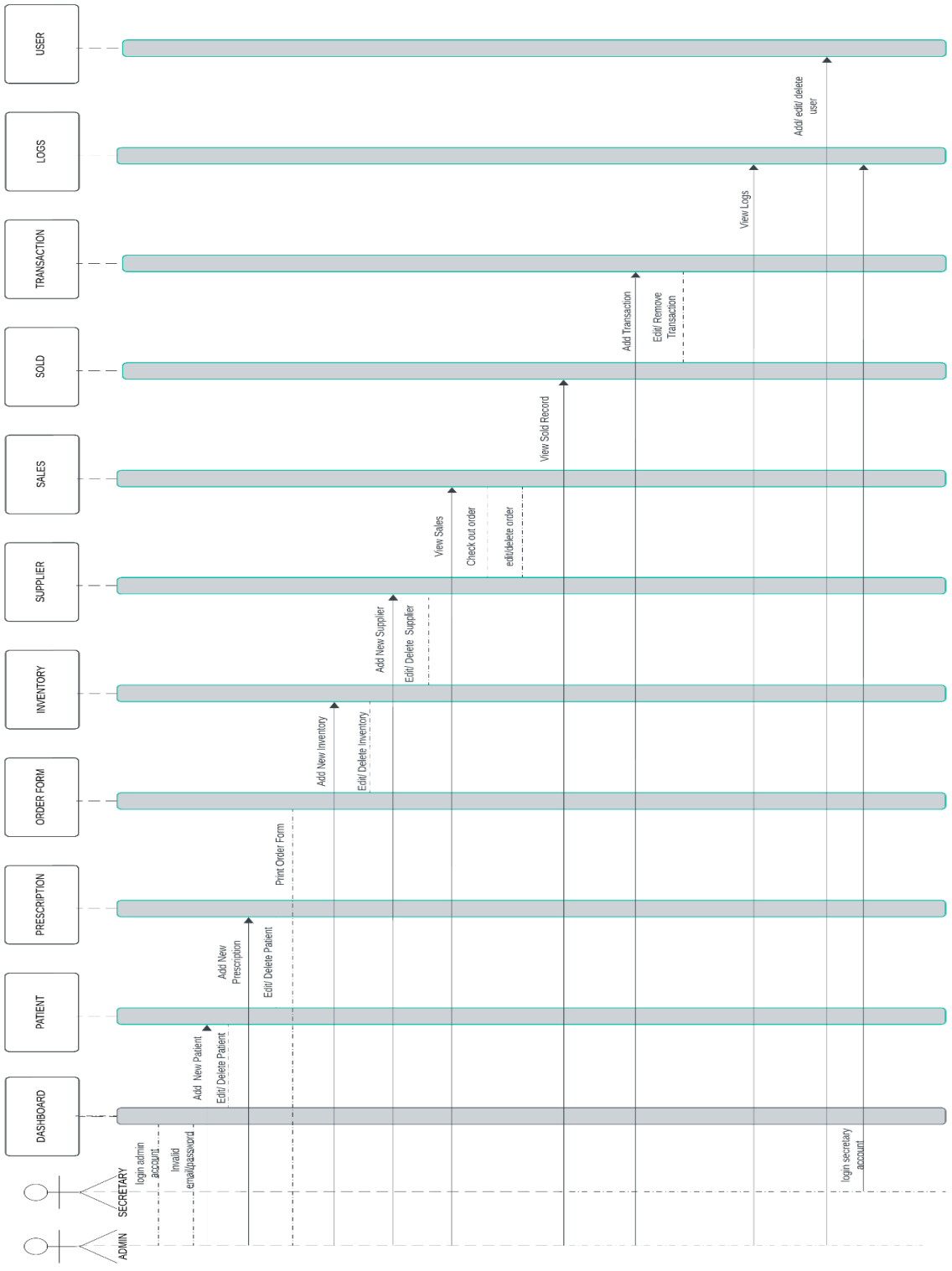

Figure 56. Sequence diagrams

Communication Diagram

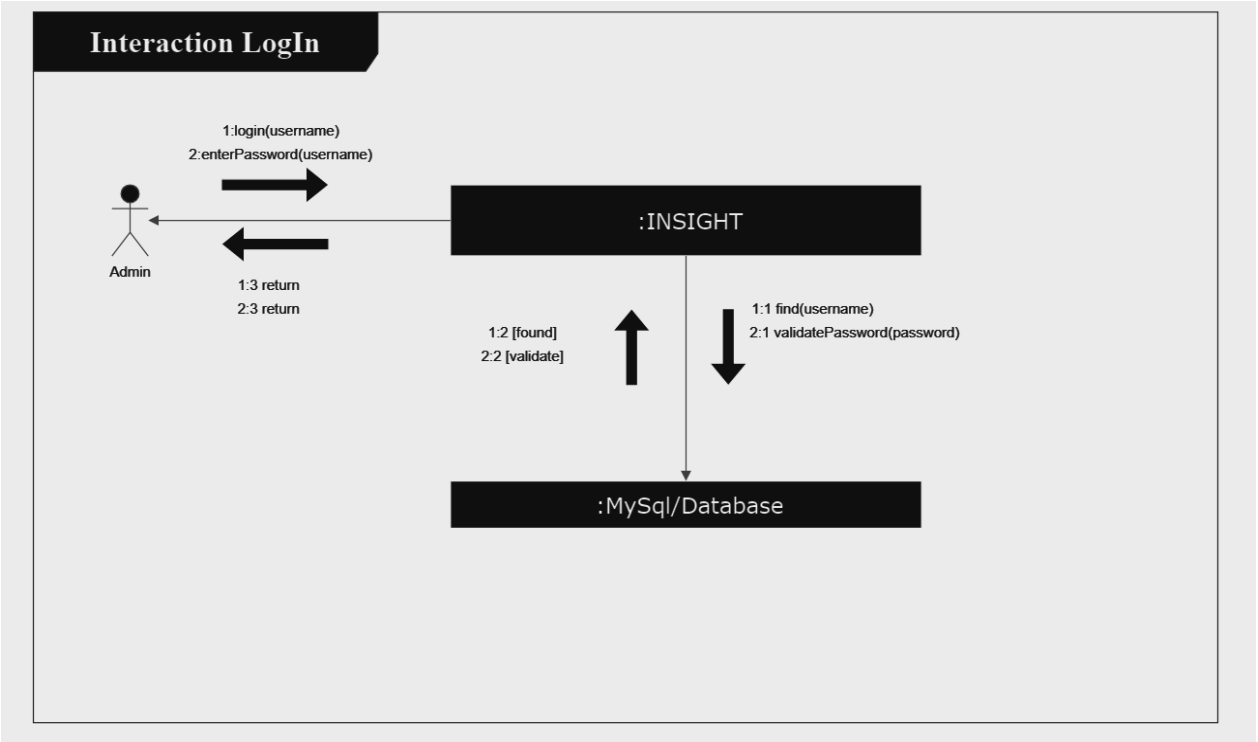

Figure 57. Communication Diagram- login interaction

It is a communication diagram that shows how information is exchanged between the admin and patient.

External Interfaces and Dependencies

This website uses the following third-party plugins to provide some features and functionalities:

- **Elementor**: This plugin enables the website to design and customize its pages using a visual drag and drop editor. It offers a wide range of widgets, templates, and styles to create any type of layout and design.
    - Version: 3.10.2
    - Publisher: Elementor.com | https://elementor.com/?utm_source=wp-plugins&utm_campaign=author-uri&utm_medium=wp-dash

- **WooCommerce**: This plugin enables the website to create and manage an online store, including products, orders, payments, shipping, and inventory. It also integrates with other services such as PayPal, Stripe, Google Analytics, and Mailchimp.
    - Version: 7.9.0
    - Publisher: Automattic | https://woo.com/
- *Some text omitted…*

All of those plugins with their specific versions are tested and assured to work with PHP 8.1 and WordPress 6.4.2 by their respective publishers. Moreover, these plugins can be installed via the WordPress dashboard or manually through an FTP service.

These plugins are also reviewed to ensure they follow the WordPress coding standards and best practices to maximize the security and compatibility of the plugins. All plugins mentioned above also included a setup wizard to guide the administrators through the basic configuration of the plugin, such as store details, payment methods, shipping options, and miscellaneous settings. The administrators can also access the plugin's settings page to customize or tweak further plugin behavior, such as adding products, managing orders, setting up coupons, and configuring integrations.

Functional Testing Plan

This section outlines the functional testing plan and defines the test objectives, scope, strategy, environment, and deliverables for each functional test case. The functional testing plan is intended to ensure that the website meets the business requirements and user expectations.

Test Environment

The test environment for the functional testing consists of the following components:

- Hardware:
    - A laptop or desktop computer with a minimum of 4 GB RAM, 500 GB HDD, and a high-speed internet connection.

    - A phone with the latest OS version, a minimum of 2 GB RAM, and a stable internet connection.
- Software: A web browser such as Chrome, Firefox, Safari, or Edge that supports the latest web standards and technologies.

Test Scope

The functional testing will cover the following features and functionalities of the website:

1. Dashboard
2. Patients Records
3. Prescription Record
4. Order Form
5. Inventory (Category, Supplies)
6. Supplier Record
7. Sales
8. Sold
9. Transaction
10. User
11. Logs

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