Sri Lanka Institute of Information Technology

Pharmaceutical Management System

Project Proposal
Information Systems Project 2024

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Submitted by:

1.IT22319142– (WIJESINGHE A.G.T.)
2.IT22310996– (THENNAKOON T.A.C.S.)
3.IT22884138– (RATHNAYAKA R.M.T.D.)
4.IT22364692– (KANDAGE K.T.S.)

Submitted to:
(Supervisor's signature)

Name of the supervisor:
Ms. Narmada Gamage

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Abstract

A well-known pharmaceutical company, "Medicare Pharmaceuticals" is looking for an innovative solution to improve its overall business process, since it is currently using an ineffective and error-prone manual system. As the initiative for that revolution, this project presents a "Desktop Pharmaceutical Management Application" that automates the key business functions within the company. It will manage all the manual issues in Medicine Inventory & Stock Management, Supplier & Employee Management, Customer & Order Management, and Sales & Billing Management to minimize errors, improve data-driven decision-making and maximize productivity. Improved inventory & stock control, customer satisfaction, supplier chain management, and employee productivity are also promised by the suggested approach. At the same time, by automating & streamlining ordering & billing processes, this software seeks to promote financial accuracy and provide thorough reports. In the end, it is anticipated that the shift from manual to automated methods will culminate in substantial advantages for the inclusive business process of “Medicare Pharmaceuticals.” [1][2][3]

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1. Introduction

1.1 Problem Specification

At present, “Medicare Pharmaceuticals” relies on a manual system to conduct all the primary business functions, including medicine inventory and stock management, supplier and employee management, customer, and order management and, sales and billing management within their company.

This reliance on manual procedures has serious disadvantages and inefficiencies that make it more difficult for the business to run pharmaceutical activities efficiently. There are several drawbacks to the existing system, the main one being that it is manual. The accuracy of inventory records and order fulfillment are impacted by the system's frequent errors caused by the manual data entry and processing used in it. Furthermore, the lack of up-to-date information on medication expiration dates leads to ineffective stock management, which causes unnecessary losses.

The inefficiencies are further compounded by supplier and employee management, where information is manually overseen, which takes time and is prone to error. Customer satisfaction is negatively impacted by customer service's difficulties with loyalty point computations and customer registration. Manual order processing complicates business procedures by introducing errors like insufficient stock for required orders.

The shortcomings of the existing system also include delayed data-driven decision-making since the lack of automated reporting systems limits the capacity to make decisions based on precise and current data. Human error in the computation of net amounts and discounts might result in financial error and invoicing inconsistencies.

In conclusion, "Medicare Pharmaceuticals"' current manual system has several issues, such as poor stock monitoring, inefficient supplier & customer relationships, ineffective inventory management, inefficient employee management, order inaccuracies, a lack of data-driven decision-making capabilities, and possible financial inaccuracies. These difficulties highlight the crucial requirement for the creation of a desktop pharmaceutical management application to optimize operations, lower mistake rates, increase productivity, and provide the pharmaceutical business with the ability to make well-informed decisions.

1.2 Solution Outline

The proposed solution to all the challenges faced by “Medicare Pharmaceuticals", because of the current manual system, is, the creation of a comprehensive "Desktop Pharmaceutical Management Application". It replaces the current manual approach, which is error prone and inefficient. Using the Java programming language, this application will automate and streamline critical business processes, revolutionizing several of the corporation's operations.

There are four main functional modules in the solution:

1. Medicine Inventory Management and Stock Details Management:
    - Allows users to change, add, and remove medicines.
    - Makes real-time data easier to obtain for precise stock management & generate automated emails to place new orders.
    - Determines expiration dates to reduce losses and stockouts.
2. Supplier and Employee Management:
    - Improves supplier relationships by allowing users to do supplier registration, update details, search & delete the added details.
    - Simplifies personnel administration, including keeping track of attendance and paying salaries.
    - Introduces the ability to use automated comprehensive reports to analyze monthly salaries according to the monthly attendance.
3. Customer Details Management and Order Details Management:
    - Efficiently manages customer registration, updates, and loyalty point computations to improve customer service.
    - Increases the accuracy of order processing by producing error alerts for low stock.
    - Maintains comprehensive order records to manage & control orders effectively.
4. Sales and Billing Management:
    - Automates the creation of discounts and net amount computations for efficient billing management.
    - Generates & prints detailed payment receipts for completed orders in PDF format.
    - Analyze monthly sales data & enable the ability to have a holistic view of revenue.

1.2.1 High-Level Architecture Diagram of the Proposed System

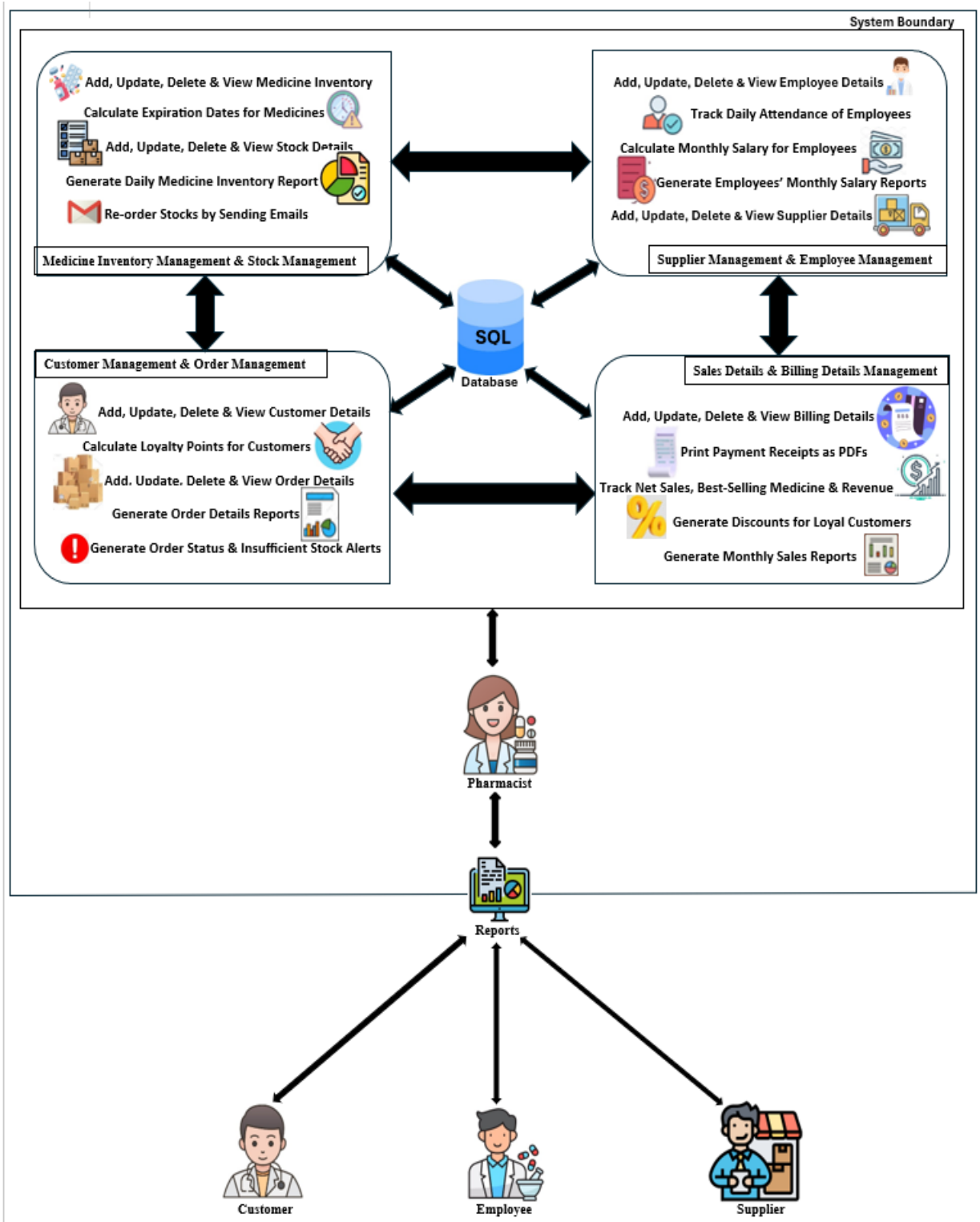

Figure 1.1 : High Level Architecture Diagram

1.3 Key Benefits

- Effective Inventory Management: By automating the process of adding, updating, and removing medicines from the inventory, errors are minimized, and real-time data accuracy is guaranteed.
- Better Stock Management: By monitoring the expired stock and lowering losses, real-time data on medicine expiration dates facilitates improved stock management.
- Improvement of Supplier Relationships: Effective management of supplier information guarantees better supplier relationships.
- Improved Customer Service: More efficient customer registration, updates, and loyalty point calculations lead to customer satisfaction and service.
- Employee Productivity: Streamlined HR procedures and enhanced productivity are the results of effective employee management, attendance monitoring, and salary calculation.
- Order accuracy: By ensuring correctness and minimizing errors in order processing, real-time order details management helps to avoid problems like requested orders with a small quantity.
- Data-Driven Decision Making: By offering information on product demand, order reports facilitate data-driven decision-making and the optimization of sales and inventory plans.
- Customer Loyalty: Recurring sales and client retention are enhanced by offering discounts and loyalty points to devoted patrons.
- Financial Accuracy: Discounts and automated net amount calculations guarantee proper billing, minimizing mistakes and disputes.
- Business Analysis: By revealing information about product performance, monthly sales Analysis helps identify top-selling medicines and optimize marketing and inventory tactics.
- Financial Reporting: The business may plan for growth and profitability with the assistance of monthly profit and sales reports, which aid with educated financial decision-making.

2. Objectives

2.1 Main Objective

The main objective of the proposed Desktop Pharmaceutical Management Application, which is built for “Medicare Pharmaceuticals” by the end of this semester, is to transform the current pharmaceutical management in response to the ever-changing business environment. The project aims to eliminate manual errors, improve operational efficiency, and usher in a new era of seamless pharmaceutical operations by embracing the transformational power of automation. This SMART objective aims to enhance customer satisfaction, maintain inventory management, optimize operations, and guarantee financial accuracy by employing sophisticated Java programming. Prioritizing user-friendliness, responsiveness, and visual appeal helps to guarantee a satisfying user experience, which includes quick product removal at the user's choice.

The Medicine Inventory & Stock Management function aims to enable systematic management of medicine inventory by providing real-time tracking of stock levels, efficient reordering operations, and accurate reporting. The Supplier & Employee Management feature aims to simplify supplier and employee management procedures by allowing for quick registration and tracking of supplier and employee information, optimizing resource allocation and operational oversight. Similarly, the Customer & Order Management function attempts to improve customer interaction and satisfaction by streamlining order management operations, managing customer data efficiently, and tracking orders precisely. Finally, the Sales & Billing Management role aims to streamline the invoicing process, optimize sales data analysis, and increase customer satisfaction through precise billing, discounts, and extensive reporting. By integrating these processes into a coherent system, Medicare Pharmaceuticals aims to provide a comprehensive solution that improves operational efficiency, accuracy, and customer happiness across all aspects of its pharmaceutical operations.

2.2 Sub Objectives

2.2.1 Medicine Inventory and Stock Management - Function 01

The sub-objectives of Medicine inventory and stock management function aim to improve drug inventory management by addressing multiple key factors. Firstly, a great focus is placed on managing medicine inventories effectively, with the goal of creating streamlined processes for adding, modifying, and deleting medicines. The total efficiency of pharmaceutical item management is the focus of this strategy. To reduce inconsistencies and improve the accuracy of stock information, the second shift in emphasis is to real-time data management. The project's goal is to put in place a flexible system that guarantees the availability of current data, enhancing decision-making procedures. Developing methods for reducing expenses and implementing waste-reduction, carrying-cost-cutting, and eventually profit-boosting policies in the drug inventory management system are important additional components. Finally, the sub-objectives focus on optimizing stock levels via effective management strategies to avoid overstocking and stockouts.

2.2.2 Supplier and Employee Management - Function 02

The domains of Supplier Management and Employee Management contain numerous sub-objectives that are all aimed at improving organizational effectiveness. A crucial component is setting forth a system that works well for monitoring employee attendance, with an emphasis on achieving the 15% efficiency goal. Meanwhile, efforts will be focused on automating salary computations using modern techniques to guarantee accuracy and timeliness in financial transactions. Human resource management procedures are prioritized in addition to goals that are focused on the necessities of the employee. To reinforce an accurate and efficient human resources framework, this involves establishing error-free procedures through regular inspections and extensive employee development programs.

Additionally, Effective Supplier Collaboration and Communication is included in the set of objectives. Several strategic initiatives will be put into place to support supply chain management in general, with a focus on cutting lead times and stockout incidents. It is expected that a more effective and well-managed organizational structure will be fostered by the comprehensive integration of these sub-objectives in the areas of supplier and employee management.

2.2.3 Customer and Order Management - Function 03

Some of the important sub-objectives for the pharmacist-focused capabilities in the desktop pharmaceutical application are efficient customer management, improved customer contact, seamless order administration, error prevention, complete order tracking, and customer satisfaction and loyalty. Efforts are focused on creating a user-friendly interface to streamline customer information management, with the goal of reducing manual data entry and retrieval time by 20% within the first three months. Encouraging effective customer engagement by enabling only registered customers to place orders and rewarding new registrations with loyalty points seeks to increase customer relations and satisfaction by at least 15% in the first six months. Seamless order management and the integration of features to avoid incomplete transactions provide precise and consistent transactions, resulting in a 30% reduction in transaction mistakes over the first six months. Providing accurate order listings and vital facts allows for more effective order tracking, which results in a 20% increase in order processing efficiency within the first six months.

2.2.4 Sales & Billing Management - Function 04

The sales and billing management function's aims include several aspects of operational improvement and customer satisfaction. To begin, the goal is to improve efficiency by streamlining the invoicing process, with a 20% reduction in human calculations and data entry expected within the first quarter. Second, efforts are focused on increasing customer happiness by providing accurate and complete transaction receipts, with the goal of achieving a 15% increase in positive customer feedback within six months. Revenue optimization is pursued by applying targeted discount techniques with the goal of increasing average order value by 10% within the first year. Data accuracy is prioritized through quick updates to clients' information, aiming for a 90% reduction in data entry errors within six months. Operational flexibility is sought by allowing for quick updates to billing information, with the goal of minimizing transaction errors by 25% in the first quarter. Sales analysis seeks to discover trends and patterns, allowing for data-driven decision-making on product offerings and marketing methods. Reporting accuracy is prioritized to give stakeholders with trustworthy insights, with the goal of reducing reporting inconsistencies by 95% within the first year. Finally, continual process optimization strives to improve overall effectiveness and efficiency by implementing at least two enhancements each quarter.

3. Procedure

3.1 Flow of the Project

The process of developing the "Medicare Pharmaceutical Desktop Application" begins with an extensive analysis through a proper requirements elicitation of the company's current manual system. The following all-inclusive project flow represents a series of sequential & successive phases that helps the pharmacist to manage & control a robust pharmaceutical management system at the end of the project.

3.1.1 Medicine Inventory & Stock Management

The suggested desktop pharmaceutical application for Medicare Pharmaceuticals has a systematic and efficient workflow for its Medicine Inventory and Stock Management function. Upon logging in, the pharmacist will be navigated to the Dashboard, where all the key business functions are accessible. After directing to the Medicine Inventory Management page, a comprehensive CRUD system will be displayed. Initiating with the addition of a new medicine, those details will be automatically incorporated into the "Available Medicines Table." The pharmacist will be able to view, modify, or remove medicine listings here, ensuring that the inventory is kept up to date. Using a medicine ID, the search function enables rapid access to specific medicine details. There is also a user input field that captures the initial stock quantity of all the newly added medicine.

"Re-ordering page" will navigate the user to the page with a table, which tracks the real time medicine quantities of the current available medicines.

The pharmacist will be able to update medicine quantities in the inventory, as stock arrives, and real-time stock movements are reflected in deductions made in response to customer orders. When necessary, an automated email feature speeds up supplier re-ordering process. Using the reports generating feature, a thorough daily medicine inventory report is generated to wrap up the day.

The Stock management function provides a concurrent CRUD to manage the stocks effectively. In addition to offering facilities for adding, editing, removing, viewing, and searching available stock, the Stock Details page also highlights the number of days left before expiration. Through this meticulous procedure, Medicare Pharmaceuticals is guaranteed to manage its drug stock and inventory as efficiently as possible, improving overall accuracy and efficiency in day-to-day operations.

3.1.2 Supplier & Employee Management

The objective of the second key business function, Supplier and Employee Management function, is to improve operational efficiency. Starting with the Supplier Management feature, the pharmacists can easily register new suppliers and link them to certain medicine IDs that they are supplying, because in this company a specific supplier only supplies every medicine.

The system provides an easy-to-use capability for updating supplier details and allows inactive suppliers to be permanently deleted from the system database. Pharmacists can type the supplier ID into a search field to filter and display specific supplier details.

Moving onto the employee management feature, the procedure starts registering new employees, whose information is added to a centralized "Employee Details" table. By erasing entries from the database permanently, the pharmacist is still able to make changes to employee data and start the resignation procedure.

Prominently, the feature allows the pharmacist to keep track of each employee's attendance with its special "Daily Attendance Tracking" feature. Based on daily attendance and the daily rate, monthly salary calculations are automatically generated.

It is possible to generate detailed salary reports at the end of each month. Medicare Pharmaceuticals' business operations are optimized overall because of this integrated approach to supplier and employee management, which guarantees a methodical and efficient workflow.

3.1.3 Customer & Order Management

This third primary business function is also reserved for the pharmacist, who can use it to manage orders and customers efficiently. The pharmacist can add new customers, update their information, and remove entries as needed. Effective and well-organized management is made possible by the pharmacist's capacity to search the registered customer database quickly and easily.

Only registered customers are allowed for order placing, which encourages effective customer interaction because every first-time registration earns a loyalty point. This improves customer relations and enhances customer satisfaction.

Because of the seamless connection between the order management system, the pharmacist may easily add, edit, remove, and search through orders. When there is not enough inventory to complete an order, an integrated feature prevents incomplete transactions by displaying an error notification. This guarantees precise and consistent transactions in addition to improving the customer experience.

Accurate order listings give an in-depth review and include crucial details about order statuses, like completed or due orders. The pharmacist is more capable of tracking and overseeing each order's progress with efficiency because of this detailed overview.

In summary, the system that only the pharmacist has access to creates a solid basis for managing orders and customers. It offers an effortless and streamlined range of features that encourage accuracy, efficiency, and customer loyalty.

3.1.4 Sales & Billing Management

The sales and billing management feature is precisely designed to efficient the invoicing process and effectively evaluate sales data. After completing a customer's order, the system methodically calculates the entire price due, taking into consideration the drugs purchased.

Loyalty points collected from prior transactions are considered, as well as discounts granted based on the customer's loyalty point status. After discounts are applied, the system accurately calculates the total amount to be paid by the customer, logging the payment, and computing the remaining balance.

Detailed receipts with detailed information on purchased drugs, applied discounts, reward points used, and the total amount paid are provided for client reference, with the option of printing if asked.

The system continually updates clients' loyalty points and changes sales data to reflect the most recent transactions. In the event of any problems or changes to the purchase before the transaction is completed, billing information can be quickly deleted and cleared to assure correctness. Monthly sales data is thoroughly analyzed to establish overall sales revenue and the quantity of medications sold, allowing for the accurate identification of the month's best-selling medicine. This comprehensive sales analysis results in the creation of a full report summarizing monthly sales data for strategic insights and decision-making.

3.2 Project Plan

The proposed project is to be completed within 14 weeks. The following table represents the key milestones and the time durations to achieve those milestones. And the Gantt chart illustrates how the project milestones listed in the preceding section will be achieved within the allocated time.[6]

Table 3.1 : Project Plan

Week	Date	Task
1	5th February – 11th February	Project Team Decided
2	12th February – 18th February	Project Charter Submission
3 - 4	19th February – 27th February	Project Proposal Presentation
4	28th February – 1st March	Project Proposal Submission
4 - 5	2nd March –7th March	ER Diagram Submission
5	8th March –10th March	SRS Document Submission
6 - 7	11th March – 19th March	Progress Presentation 1
7 - 13	20th March – 30th April	Progress Presentation 2
13 - 15	1st May – 18th May	Final Presentation
15	(One week after final exam)	Final Report Submission

3.2.1 Gantt chart

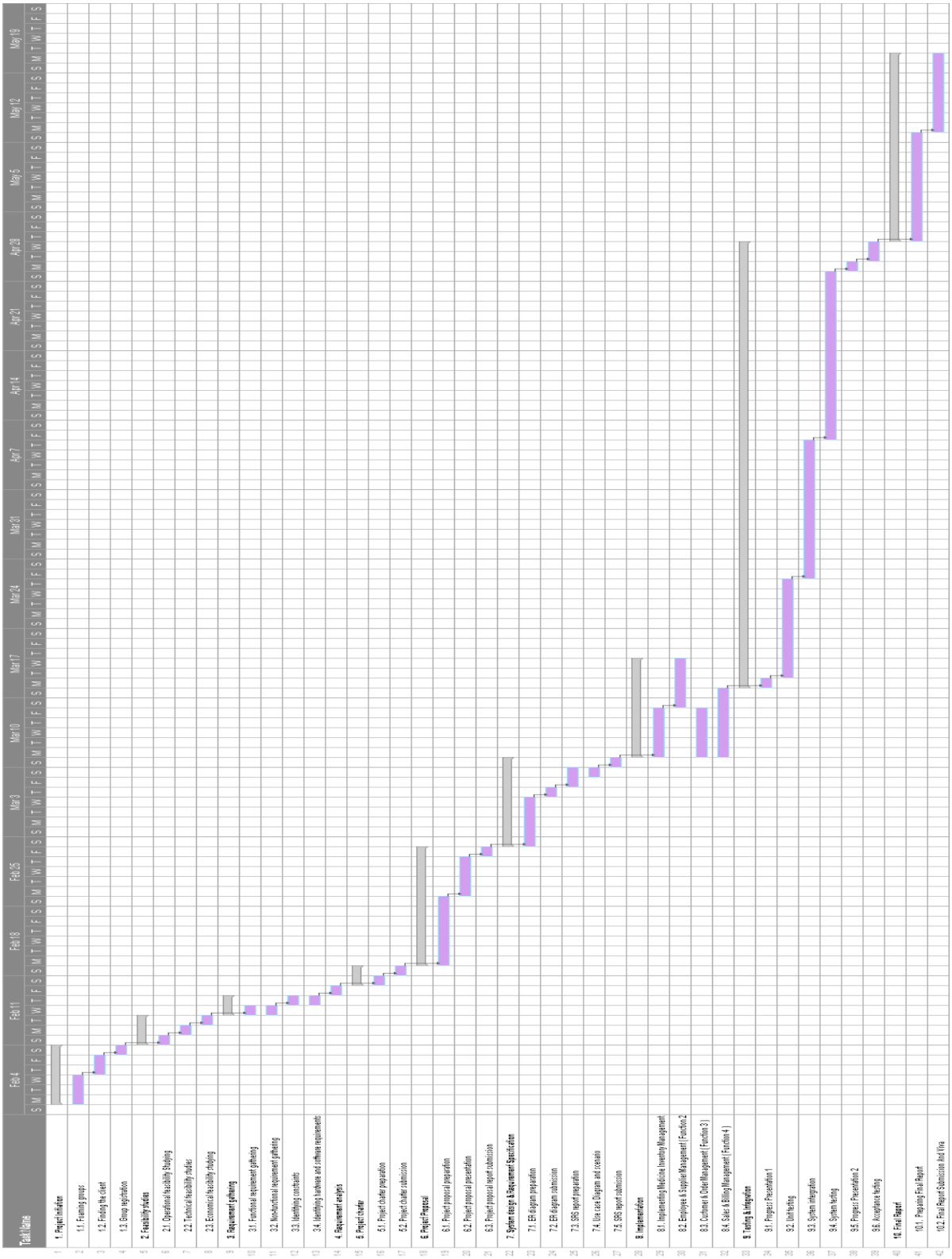

Figure 3.1 : Gantt Chart

4. Personnel and Facilities

This table outlines the main individuals that are responsible for the development of the proposed "Desktop Pharmaceutical Management Application." These people play essential roles in several aspects of the project, from planning and analysis to creating, evaluating, and overseeing a specific functionality. Each person's facilities list contains the equipment and resources needed for their specific tasks in the development process.

Table 4.1 : Personnel and Facilities

Name and ID	Function Name	Roles	Facilities
WIJESINGHE A.G.T. IT22319142	Supplier & Employee Management	Analyst Database Administrator UI / UX Designer Developer Tester	• Development environment with Java IDEs • Database management system • Workstation for developers
THENNAKOON T.A.C.S. IT22310996	Sales & Billing Management		• Development environment with Java IDEs • Printers for generating payment receipts
KANDAGE K.T.S. IT22364692	Inventory & Stock Management		• Development environment with Java IDEs • Access to email services
RATHNAYAKA R.M.T.D. IT22884138	Customer & Order Management		• Development environment with Java IDEs • Customer support facilities

5. Software and Hardware Requirements

The following table lists the essential components required for Medicare Pharmaceuticals planned "Pharmaceutical Management Application" to be implemented and function successfully.
Tools for database management and development like NetBeans and MySQL, backup software, security software including security system and antivirus programs, and ChatGPT integration for additional features are among the software requirements. A printer, a monitor, a Windows Server for reliable network management, and high-performance specifications like 32GB RAM and a 2GHz i7 CORE processor are required for the system's hardware.

Table 5.1 : Software & Hardware Requirements

Software	Hardware
NetBeans	Windows Server
MySQL	Monitor
Backup Software	Printer
Security Software (Antivirus Software & Firewall)	32GB RAM
ChatGPT	2GHz Processor (i7 CORE)

6. Budget

This table depicts a comprehensive analysis of the expected expenditures for the development of the "Desktop Pharmaceutical Management Application" for "Medicare Pharmaceuticals." These allocations accurately represent the overall cost of the project, which includes the salaries of developers, contractual services, software, utilities, printing, internet access, and costs associated with training and deployment for the 13-week project.

Table 6.1 : Planned Budget of the Project

Budget Item	Amount (LKR)
1. Personnel	**LKR 300,000.00**
• WIJESINGHE A.G.T. • THENNAKOON T.A.C.S. • KANDAGE K.T.S. • RATHNAYAKA R.M.T.D.	LKR 75,000.00 LKR 75,000.00 LKR 75,000.00 LKR 75,000.00
2. Contractual Services	**LKR 60,000.00**
• Quality Assurance and Testing • Legal and Compliance Services	LKR 35,000.00 LKR 25,000.00
3. Software	**LKR 100,000.00**
4. Utilities	**LKR 30,000.00**
5. Printing Cost	**LKR 15,000.00**
6. Internet Facility	**LKR 10,000.00**
7. Training & Deployment Cost	**LKR 50,000.00**
Total Amount	**LKR 565,000.00**

7. References

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Appendix

These are the questions that were asked by the client, during the requirement elicitation phase of the project.

- Could you please explain the current manual pharmaceutical management workflow, including how orders are processed, medicine inventory is controlled, and customer and employee data is managed?
- What are the key issues or challenges with the current manual system, and which aspects of the pharmaceutical management process are especially prone to errors or inefficiencies?
- What crucial business processes need to be automated via the aid of the Pharmaceutical Management System, and how can these processes improve "Medicare Pharmaceuticals'" total productivity and profitability?
- Does the new pharmaceutical management program need to interact with any internal databases or accounting software, or with any other systems or tools already operating at the company?
- Who are the main system users, and what responsibilities and authorizations should be assigned to those users within the company to guarantee proper access control?
- Which kinds of information and reporting are essential for making effective company decisions? Do you require, for example, insights on employee productivity, inventory performance reports, or monthly sales details?
- Is there any industry standard or regulatory compliance that the pharmaceutical management system needs to follow?
- What is your prediction on the company's future growth, and how should the pharmaceutical management system be established to support potential growth of operations and scalability?
- Do you think any specific support systems or training programs will be necessary for a smooth transition from manual system to automated system?
- Regarding the project, what are the budgetary constraints and is there a deadline that must be first met? Furthermore, which deliverables or major milestones are particularly important to the project's success?