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Report

On

Sales Management System

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We like to extend our heartfelt appreciation to all individuals who have made valuable contributions to the successful completion of the Sales Management System project.

Above all, we express our sincere gratitude to Er. Saroj Shakya, whose supervision, assistance, and invaluable perspectives throughout the project were greatly appreciated. His proficiency and support greatly improved the caliber and extent of our job.

We would like to express our gratitude to our friends for their support and aid over the duration of this endeavor. Their constructive criticism and moral encouragement gave us the drive to persist and flourish. We would also like to extend our appreciation to our families for their steadfast support and comprehension during this undertaking. Their support and perseverance bolstered us amidst difficult circumstances, enabling the realization of our initiative. In addition to all, the resources available on the internet such as programming libraries,documentations, tutorials, and open-source communities were a great guide through the completion of the project.

The team anticipates that our “Sales Management System” project will significantly contribute to domains and provide advantages to local-level organizations to run their business in an efficient manner.

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ABSTRACT

Data management systems serve as a backbone for any business, since it provides secured and organized compilation of information. With its presence, the efficiency, accuracy and management of an organization is set to boost.

The goal of this project is to develop a Departmental Store Management System "Byapar". It is a comprehensive software solution designed to streamline and optimize the sales processes within an organization. It acts as a platform for managing inventory, transactions and managing inventory and transaction system. In this project, we aim to design an application providing features such as Inventory Modification, Purchase/Sale and Transaction History. A digital management system "Byapar" provides a far more practical and well-compiled alternative to a traditional hand-written record system.

The main idea is to provide secured data records to gain valuable insights into the sales performance, ultimately leading to improved overall productivity of the organization.

Keywords: DBMS, GUI

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List of Abbreviations

DBMS	DataBase Management System
SQL	Structured Query Language
GUI	Graphical User Interface
POS	Point Of Sale
ERP	Enterprise Resource Planning
CRM	Customer Relationship Management
SMS	Sales Management System/Software
SAP	Systems Applications and Products

1. INTRODUCTION

1.1 Background Introduction

The application “Byapar” is based on a Data Management System which acts as a platform for managing inventory and transactions system. Here, Byapar is aimed to be designed as an application including features such as Inventory Modification and Purchase/Sale Transaction History that ultimately provides a secure and structured compilation of information boosting organization’s efficiency, accuracy and management.

C++, MySQL and wxWidgets are used in the creation of the “Byapar” application. Here, the libraries needed to construct the project’s GUI are provided by wxWidgets and the libraries needed to connect SQL databases to the C++ compiler enabling data access, executing SQL query and many other functions are provided by MySQL. "Byapar" is a general-purpose program that will primarily serve local businesses by offering digital management. "Byapar" has an easy-to-understand design because it doesn't demand a lot of technical expertise.

“Byapar” mainly focuses on offering safe data records so that insightful information about sales performance can be obtained. This will eventually increase the organization's overall productivity and ensure that it is well-managed.

1.2 Motivation

The world is moving towards digitalization. During a casual visit to a cricket equipment business, the traditional method of storing inventory, billing, and transactions was witnessed in this digital age. Motivated by the necessity for real-world implementation following this experience, the team was set out to create a desktop program that will substitute the traditional approach to sales management with a contemporary digital method. The team was given handwritten bills while making cricket purchases, and the shopkeeper was keeping meticulous track of all of our transactions in old-fashioned record books. This seemingly insignificant incident started a discussion in the team on how important it is to use contemporary technologies to streamline similar procedures. Inspired by this insight and sales management system of large departmental stores like Big Mart, Sales Berry, and Bhat Bhateni, among others, the team decided as a group to

create a comparable application for small local businesses that would assist these kinds of local store owners in continuing their transactions in a contemporary digital manner.

1.3 Problem Definition

Even in the digital age, handwritten records are still used in traditional sales management methods. Keeping track of records in such an old manner is a headache. Data can be lost for a variety of reasons, and managing that data by hand is challenging and can result in significant losses for a business. However, digital record monitoring will undoubtedly make records easy to handle, safe, and secure. With a digital approach, finding the record only takes a few clicks, but with a traditional method, searching through all the handwritten documents is too onerous. Hence, the project mainly focuses on ways to eliminate the old-fashioned ways of the sales management system aiming to build an application that helps to manage the inventory and transactions of a business. Management of the products/inventory also come under the goals of the project.

1.4 Project Objectives

The specific objectives of the program are listed below:

- To study and understand the concept of DBMS and GUI development and C++.
- To make user-friendly and easy to use application for sales management.

1.5 Scope of the Project

The proposed project “Byapar” is designed to efficiently address the fundamental needs of small to medium-sized businesses. The scope of this project encompasses the development of a user-friendly desktop application with capabilities limited to recording transactions and maintaining inventory details. However, it is essential to note that this project does not extend its scope to complex financial analytics, extensive reporting, or integration with external systems.

Our proposed project put forward for the following applications:

- To streamline the recording of sales and managing inventory in local retail stores

- Ideal for small businesses who cannot afford the complex expensive software.
- Startups with limited inventory and sales operations can benefit from this system
- Tool for teaching the concepts of DBMS and user interface design for students and beginners.

2. LITERATURE REVIEW

Sales management is one of the most crucial aspects of any business. Billing, relationships with consumers, transaction records, inventory management, and many other tasks are all included in sales management. The most important thing is to manage these records and data. Sales management is divided into several phases, from digital techniques to conventional handwritten records. In the twenty-first century, also referred to as a "world of technology," keeping digital records is straightforward and manageable. Even if an enormous amount of data and information is kept digitally, traditional methods are still used.

2.1 Literature Survey

The history of sales management software, including inventory management, sales transactions, and billing systems, is intertwined with the evolution of technology and the changing needs of businesses.

Here is a brief history of the development of sales management systems:

Manual Systems: Before the computer era, sales management relied heavily on manual methods. Paper-based records, balance sheet, and rudimentary systems were used to track sales, inventory, transactions and billing systems.

Early Computer Systems: The emergence of computers in the late 20th century led to the evolution of early sales management software. These systems had begun to automate basic sales processes such as inventory modification/management, order management, and customer database. [1]

In the 1970s, initially, computerized sales and inventory management was limited to manual processes. However, some early attempts were still achievable. Businesses started using mainframes to manage their inventory and handle their orders. [2]

In the 1980s, programs such as Lotus 1-2-3 and Microsoft Excel became popular for organizing and analyzing basic sales data. However, these were separate tools and lacked comprehensive sales management capabilities. Enterprise Resource Planning (ERP) systems also became popular in the 1980s. These systems merged various business functions, such as sales, inventory, transaction, and billing, into a single software. [3]

In the 1990s, the emergence of the Point-Of-Sale (POS) system revolutionized the retail industry. Not only do these systems keep track of sales, but they also facilitate real-time inventory management. The use of Advanced POS terminals not only simplifies sales but also collects relevant information on purchases, customer preferences and overall satisfaction levels. [4]

After the 1990s, cloud-based solutions were witnessed, allowing businesses to access their sales and inventory data from everywhere. Customer Relationship Management (CRM) software also came into light in this period. Along with this, the rise of mobile technology modified the sales management systems, and became mainstream, providing flexibility and enhancing productivity. [5]

2.2 Related Softwares

2.2.1 SAP

A software company that was founded in 1972 and offers various software solutions for business processes, including sales management, inventory management, transactions, and billing systems. Enterprise resource planning (ERP) software that is extensively used is called Systems Applications and Products (SAP). Some of the largest organizations in the world are managed and controlled by SAP software. [6]

2.2.2 Oracle

A software company that was founded in 1977 and offers various software solutions for business processes, including sales management, inventory management, transactions, and billing systems. [7]

2.2.3 QuickBooks

A software that was launched in 1983 and is designed for small and medium-sized businesses to manage their accounting, sales, inventory, transactions, and billing systems. [8]

2.2.4 NetSuite

NetSuite is an integrated cloud-based ERP (Enterprise Resource Planning) system that includes comprehensive modules for sales, inventory management, and financial transactions. It allows businesses to manage sales processes, track inventory levels, handle orders, and streamline financial transactions within a unified platform. [9]

2.3 Importance

By integrating both inventory management and transaction processing capabilities, these sales management system solutions enable businesses to optimize their sales activities while keeping track of inventory levels, transactions, and order fulfillment. Historically, sales management systems show a transition from manual methods to more integrated and data-driven systems. Today's systems are characterized by flexibility, real-time capabilities, and the ability to leverage technology for smarter sales strategies and customer engagement.

2.4 Limitation

Although possessing several benefits and significance, there exist limitations.

- **Complexity:** It is complicated for a user unfamiliar with accounting software to use, and users may need training and technical expertise while implementing and setting up these programs.
- **Cost:** Cost for software licenses, installation, and continuing maintenance, support, and extra features or modules is expensive. The entire cost of ownership could be too expensive for users' needs and size of company.
- **Scalability:** For growing business**,** users might run into problems with functionality or performance as the business grows, which might hinder the progress.
- **Dependence on Internet Connectivity:** Internet access is necessary for

cloud-based software to access the system and data. Especially for remote or field-based businesses, inconsistent internet connectivity can cause access issues to the system, making it more difficult to execute transactions and maintain inventories.

3. SYSTEM ARCHITECTURE

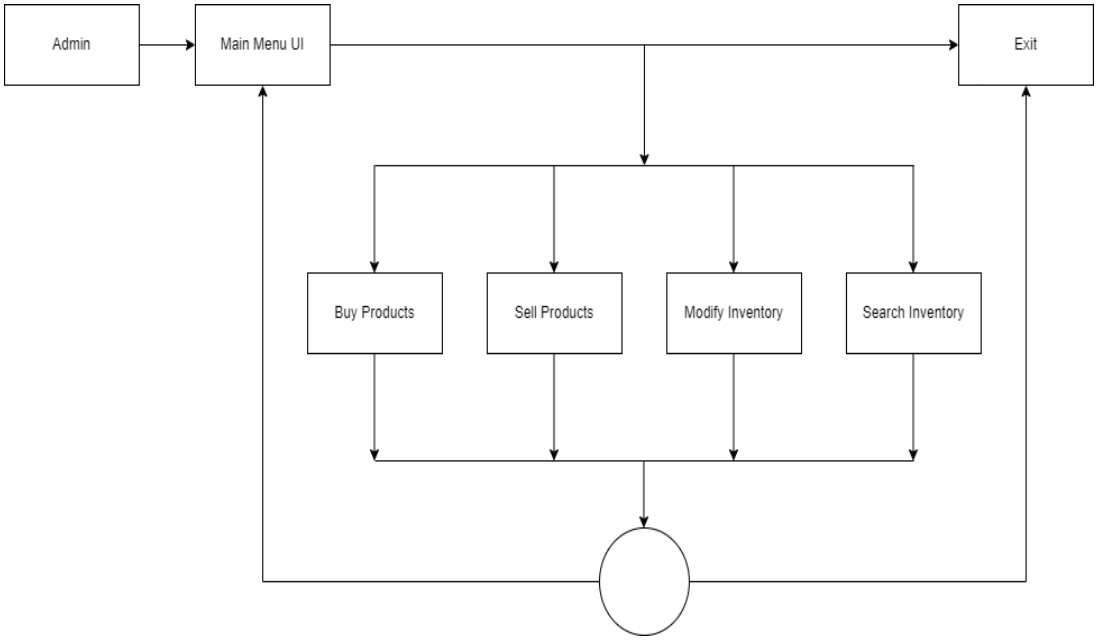


Fig 3-1: Top Level Flowchart

3.1 Parts of the applications

3.1.1 Main Menu UI

This is the front menu which appears after opening the application “Byapar”. It displays the details of the organization and has four options to choose from. They are: Buy items, Sell items, Modify Inventory, and Search items. The option to exit the application is provided in every window of the program.

3.1.2 Buy Items

At the time of purchase of products, the “Buy Items” option is used. The user inputs the details i.e. the ID, name, rate, and quantity of the product to be purchased. There is a check of availability of the product in the inventory. If the product is already in the

inventory, the quantity is added and if the product is new to the inventory, then the details of the new product are added.

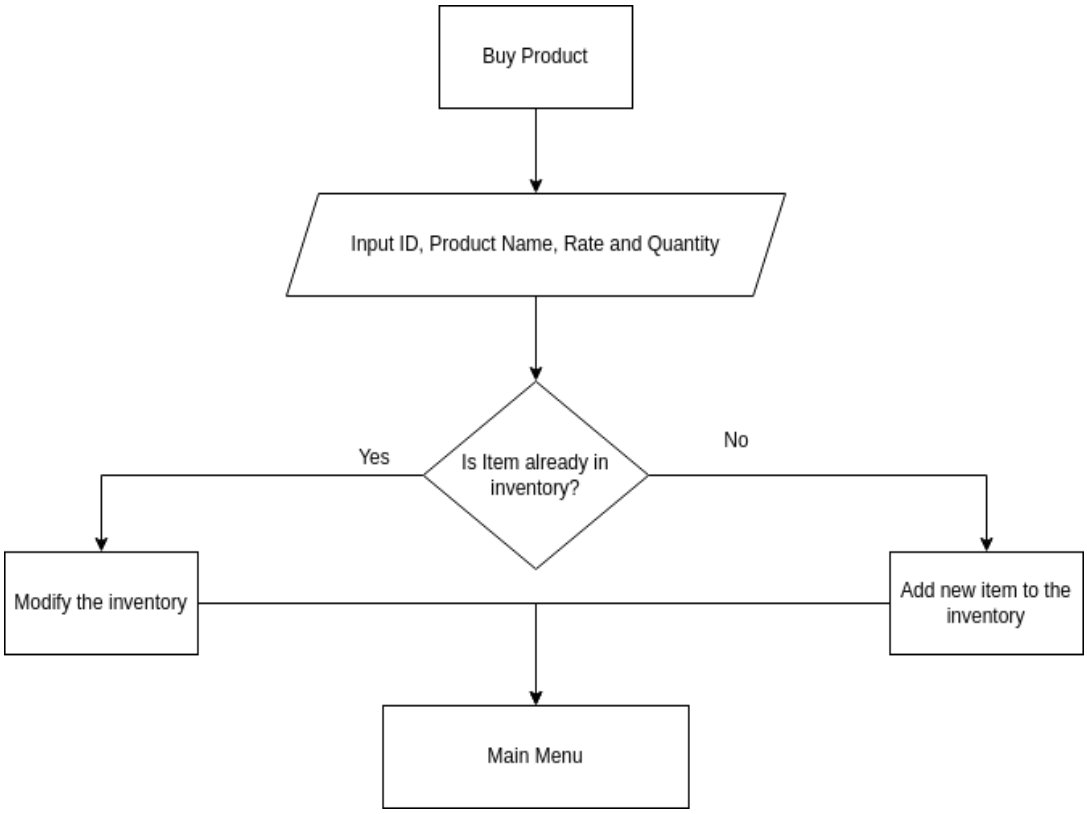


Fig 3-2: Buy Product Section

3.1.3 Sell Items

At the time of sale of products, the “Sell Items” option is used. The user inputs the details i.e. the ID, name, rate, and quantity of the product to be purchased. There is a check of availability of the product in the inventory. If the product is already in the inventory, the item details are added to the basket and if the product is not available in the inventory, a message “Product Not Available” is displayed. After the transaction is done, an invoice is saved in digital form.

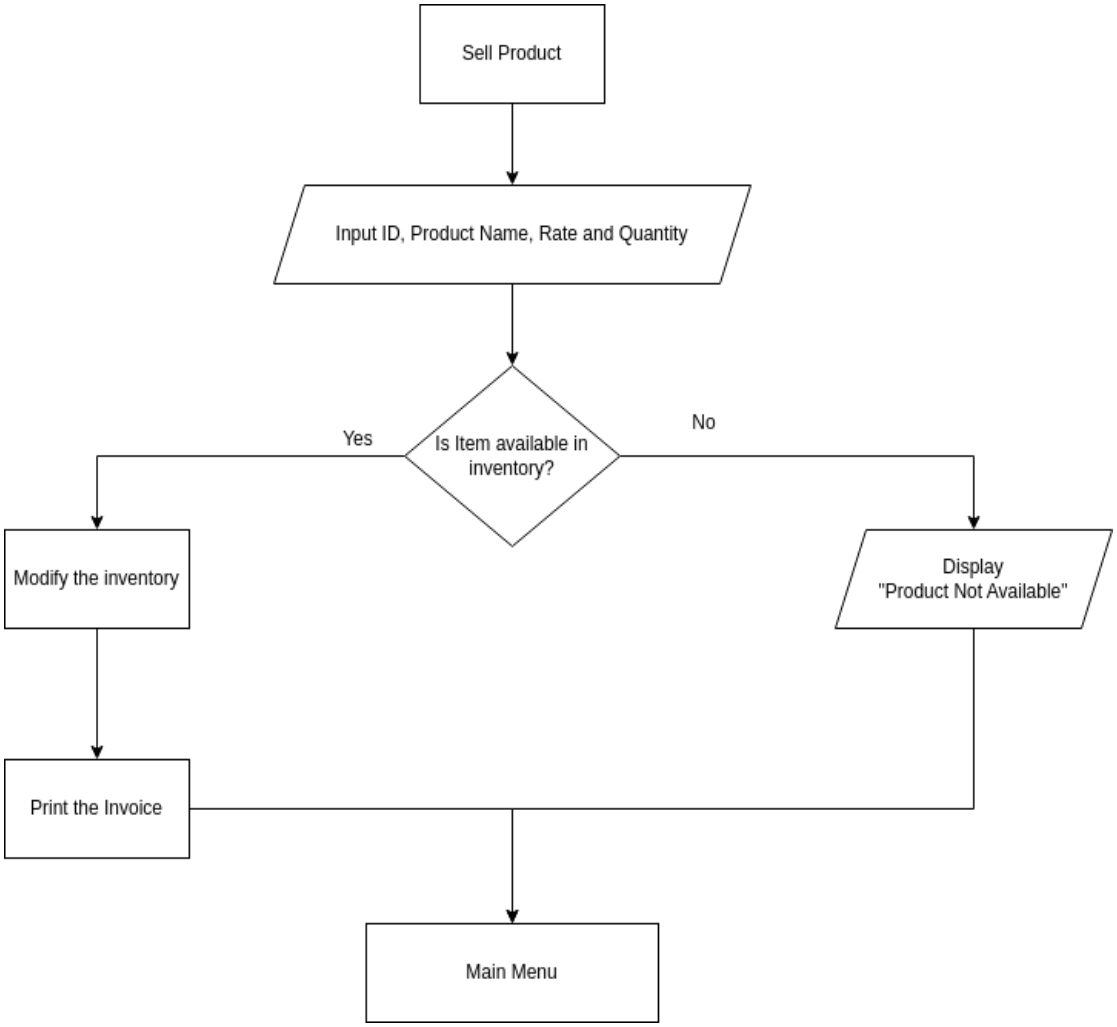


Fig 3-3: Sell Product Section

3.1.4 Modify Inventory

The feature of managing inventory can be accessed through this option. If the inventory is in need of a modification without the purchase or sales of products, due to damage of products or change in rates or other causes, users can modify the quantity or rates of the products available in the inventory.

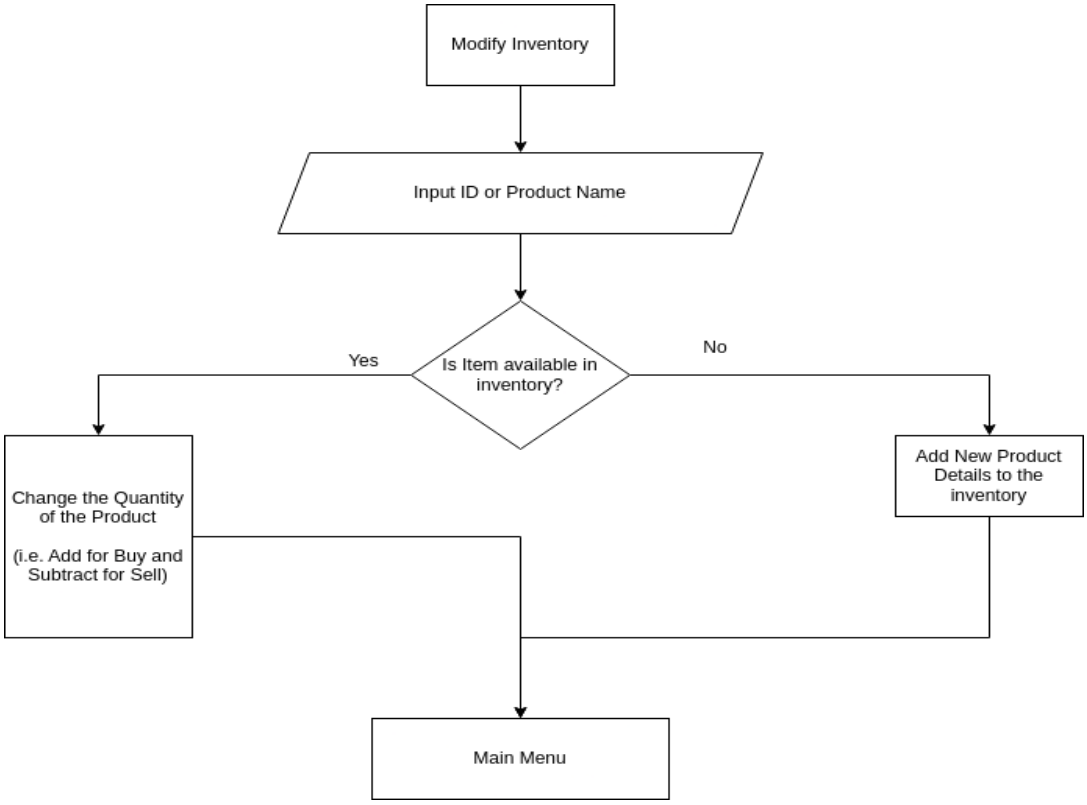


Fig 3-3: Modify Inventory Section

3.1.5 Search Inventory

Users can use the “File>Search ” option or press “CTRL + F” for checking the details of required products. It can also be used for checking the availability of the product.

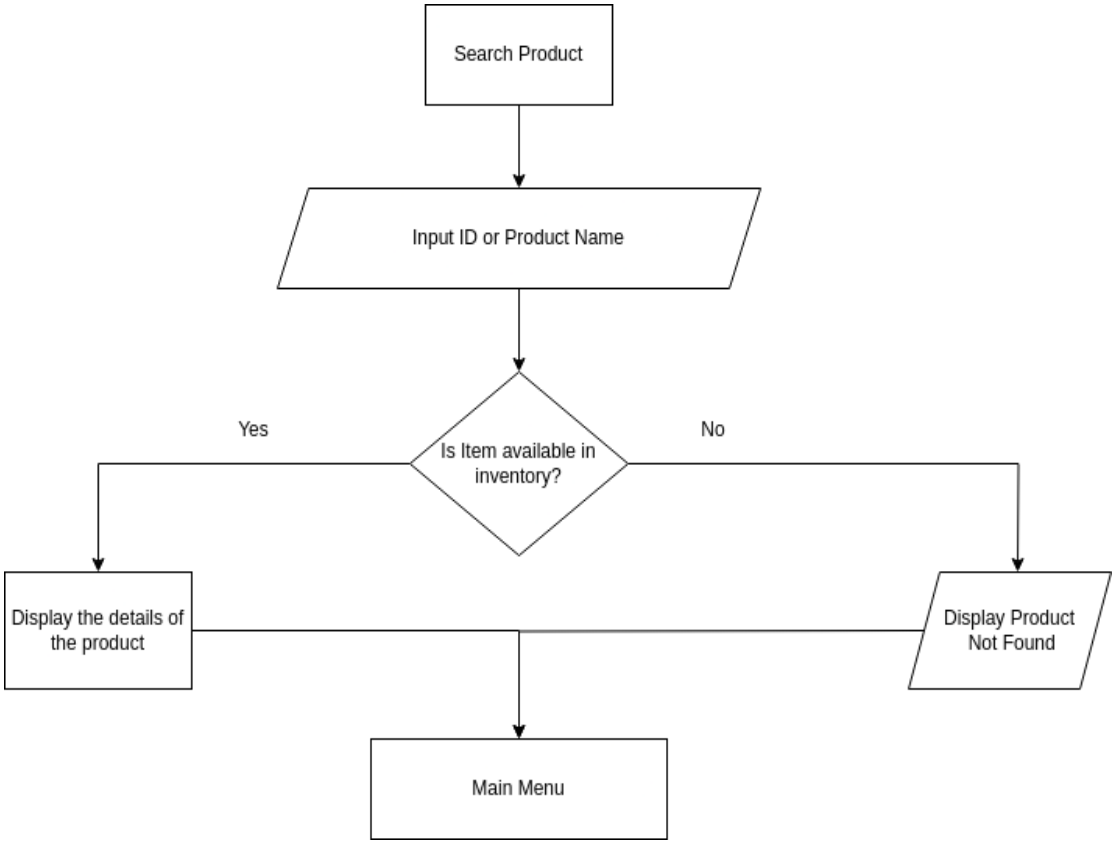


Fig 3-5: Search Inventory Section

4. METHODOLOGY

A collection of methodologies was applied in the designing as well as execution of the project. There was implementation of different header files, Database Management System, Graphical User Interface and file handling.

4.1 Header Files

Header files are files which store predefined functions. In C++, it offers the features like library functions, data types, macros, etc. by importing them into the program with the help of a preprocessor directive “#include”. Although including a header file is equivalent to copying its information, we don't do so as it increases the possibility of errors when there are numerous source files in a program. During the development of the project, various header files were used which are as follows:

- iostream
- wx.h

- tuple.h
- array.h
- vector.h
- mysql_connection.h
- string.h
- iomanip.h
- fstream.h

4.2 GUI

A GUI is a system of interactive visual components for computer software. A GUI displays objects that convey information and represent actions that the user can take. The objects change color, size, or visibility when the user interacts with them. The GUI was created at Xerox PARC (Palo Alto Research Center) by Alan Kay, Douglas Engelbart, and other researchers in 1981. Later, Apple introduced the Lisa computer with a GUI on January 19, 1983. [10] The GUI process lets you click or point to a small picture, known as an icon or widget, and open a command or function on your devices, such as tabs, buttons, scroll bars, menus, icons, pointers and windows. It is now the standard for user-centered design in software application programming.

GUI acts as the front page of this project because it serves as the interface through which the user interacts. It improves usability and understanding of the application with the help of objects such as buttons, input boxes, and dynamic windows, ultimately making it easier on the user. As the work is done through actions, mostly clicking buttons and inputting numbers the efficiency and overall productivity also takes a drastic upgrade as compared to a console. Keeping all the ease of use and benefits in mind, GUI was implemented in this project.

4.3 DBMS

DBMS are software systems used to store, retrieve, and run queries on data. A DBMS serves as an interface between an end-user and a database, allowing users to create, read, update, and delete data in the database.

DBMS manages the data, the database engine, and the database schema, allowing for data to be manipulated or extracted by users and other programs. This helps provide data security, data integrity, concurrency, and uniform data administration procedures. DBMS optimizes the organization of data by following a database schema design technique called normalization, which splits a large table into smaller tables when any of its attributes have redundancy in values. DBMS offer many benefits over traditional file systems, including flexibility and a more complex backup system. [11]

As GUI acts as the face of the application, DBMS is the backbone as every product detail, as well as inventory information are stored in the database. DBMS is a must for well-optimized and secured data management. As this project revolves around the idea of efficiently creating and altering records of products and transactions, connection to a database is considered the most ideal method of fulfilling all the above-mentioned criteria.

4.4 Tools and Environment

- **Visual Studio Code:** Visual Studio Code is a development environment that is used for writing and debugging C++ code. It offers a lightweight yet comprehensive set of tools for software development.

- **wxWidgets:** wxWidgets is a widget toolkit and tools library for creating graphical user interfaces for cross-platform applications. wxWidgets enables a program's GUI code to compile and run on several computer platforms with minimal or no code changes. [12]

- **XAMPP:** XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.

5. SYSTEM DESCRIPTION

The Sales Management System (SMS) is a sophisticated software solution that aims to optimize and mechanize several facets of the sales process for enterprises. The system employs a Graphical User Interface (GUI) to facilitate user interaction, a relational

Database Management System (DBMS) for the storing and management of data, and incorporates several libraries and tools for development and functionality.

Key Components:

5.1. Graphical User Interface (GUI)

The GUI is created using wxWidgets, a C++ framework designed for building cross-platform programms with native user interfaces. It offers an aesthetically pleasing and intuitive interface for engaging with the sales management system.

5.2. Database Management System (DBMS)

The system employs MariaDB, a widely-used open-source relational database management system, to store and handle sales-related data. MariaDB is seamlessly included into XAMPP, a comprehensive development environment encompassing Apache, MySQL and PHP hence streamlining the process of configuring and administering databases.

5.3. Header Files and Libraries

The iostream header file is used for managing input and output operations on the console.

The file wx.h is a header file that belongs to the wxWidgets library and is used for graphical user interface (GUI) operation as it contains functionality and components for the GUI.

The mysql_connectionl.h file is a header file that provides the MySQL C API, enabling communication with a MariaDB database using C++ programms.

5.4. Features:

Product Management: Facilitates users in overseeing product inventory, encompassing tasks such as introducing new items and modifying stock levels.

Transactions: Facilitates users to keep transaction records and view transaction history.

6. RESULT AND ANALYSIS

6.1. The outcome

6.1.1. Graphical User Interface (GUI) Development

The Sales Management System features a C++-developed graphical user interface (GUI) that provides a user-friendly environment for system interaction.

GUI elements are specifically crafted to enhance user navigation and optimize the handling of inventory and product data.

6.1.2. Management of inventory

The system incorporates powerful inventory management features, enabling users to efficiently monitor and control inventory levels. Stock tracking, and inventory replenishment features are incorporated to guarantee efficient inventory management. The system smoothly integrates product management functions, allowing users to effortlessly add and modify product information. The database effectively handles details such as the product name, description, price, and quantity, guaranteeing correctness and consistency.

6.1.3. Management of databases

The management of the database is accomplished through the utilization of C++ and pertinent database libraries like MySQL or MariaDB, which offer a dependable infrastructure for the storage and retrieval of inventory and product information.

The database architecture is specifically designed to facilitate effective storing and retrieval of data, hence enhancing performance and scalability.

6.2. Evaluation

6.2.1. Effective Inventory Control and Product Management

The incorporation of inventory management features enables organizations to maintain ideal stock levels, minimizing the likelihood of stock shortages or excessive stockpiling. Implementing real-time inventory tracking allows for prompt decision-making and guarantees product availability to match client demand.

The smooth incorporation of product management features streamlines the tasks of adding and modifying product data. Users may efficiently oversee product details within the system, hence improving productivity and precision in inventory management.

6.2.2. Intuitive Interface

The graphical user interface provides a user-friendly platform for people to engage with the system. GUI elements are intentionally created to prioritize user experience, offering convenient access to tools for managing inventory and products.

Ensuring data integrity and security is achieved through the utilization of a dependable database management system. Data encryption and access control measures are implemented to safeguard sensitive inventory and product information, preventing unauthorized access or tampering. The system architecture enables scalability and flexibility, facilitating the expansion and changing requirements of the business. The system's capabilities can be enhanced over time by seamlessly integrating additional functionality and modules.

The Sales Management System, created using C++ and incorporating a graphical user interface, inventory management, and product management capabilities, offers firms a full solution for effective control of inventories and administration of products. The tool's user-friendly interface, strong database administration, and flexibility to scale make it a useful asset for optimizing sales operations and promoting corporate expansion.

7. CONCLUSION AND FUTURE ENHANCEMENT

7.1. Conclusion

Developing a Sales Management System (SMS) in C++ has several pros and cons. Leveraging the language's performance, efficiency, and vast libraries throughout development helps create a strong, scalable solution for unique business demands. Graphical user interface (GUI) frameworks like wxWidgets provide for intuitive and user-friendly interfaces, improving the user experience.

However, implementing SMS in C++ requires careful memory management, complexity in concurrency and threading, and slower prototyping than higher-level languages. Database connectivity libraries and error handling must also be considered when working with MariaDB.

Despite these limitations, a well-designed SMS implemented in C++ can provide great performance, platform independence, and easy integration with current systems. A C++-based SMS can help firms streamline sales operations by tackling these difficulties and exploiting the language's strengths.

7.2. Limitations

Customer Relationship Management: The concept of CRM is complex. As a result of the lack of CRM capabilities in the sales management system, users are unable to efficiently manage interactions with customers across the entirety of the customer lifecycle.

Error Handling Complexity: The sales management system does not have adequate error handling and does not have a complicated implementation using C++.This might result in a variety of problems that may have an effect on the system’s dependability and usability.

Profit and Loss Analysis: It only shows transaction records in the application. Even having transaction records, this application is unable to calculate profit and loss due to this fact the users may experience various issues.

7.3. Future Enhancement

In spite of the fact that the existing system currently offers powerful capabilities for product management, there is room for improvement in the future. In order to develop a sales management solution that is more comprehensive, it is possible to incorporate additional capabilities such as issuing bills, calculating profit and loss (monthly), adding different modes of payment such as card payment and QR payment as well as customer relationship management and order processing.

8. APPENDICES

8.1. UI Snippets

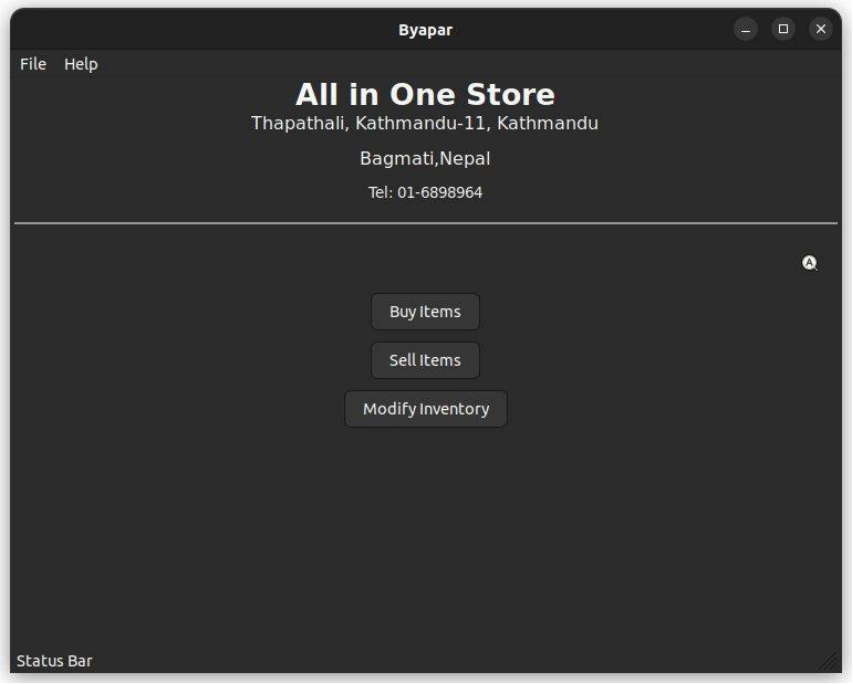


Fig 8-1: Main Menu Window

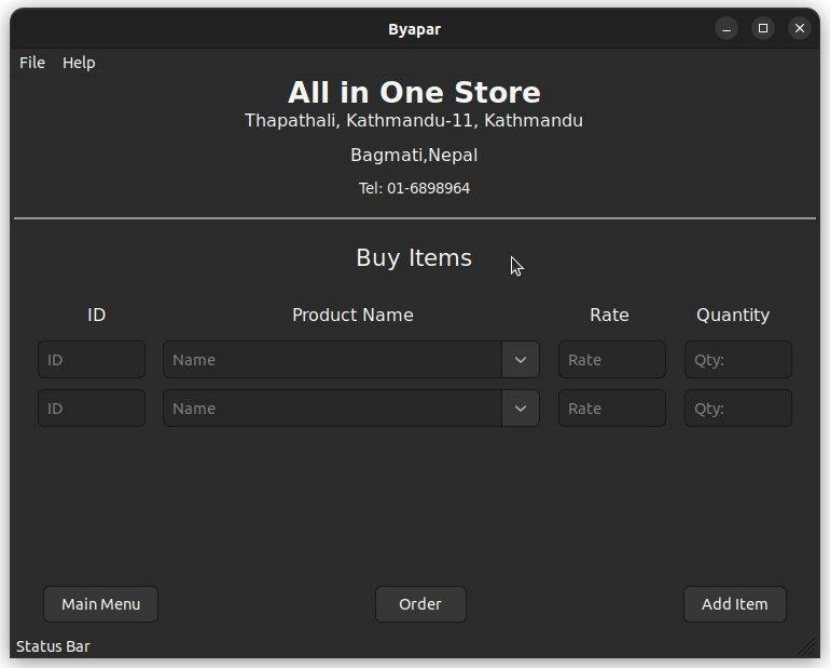


Fig 8-2: Buy Items Window

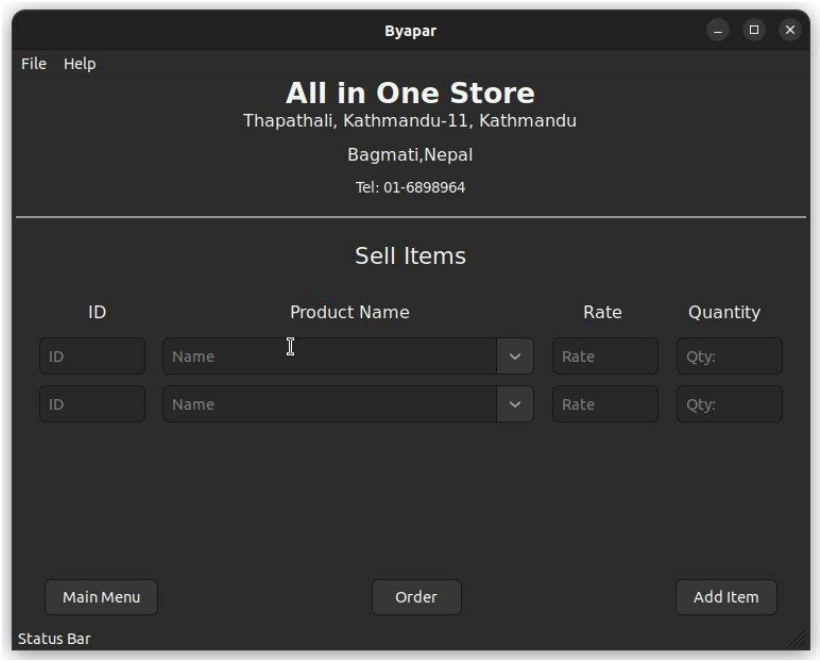


Fig 8-3: Sell Items Window

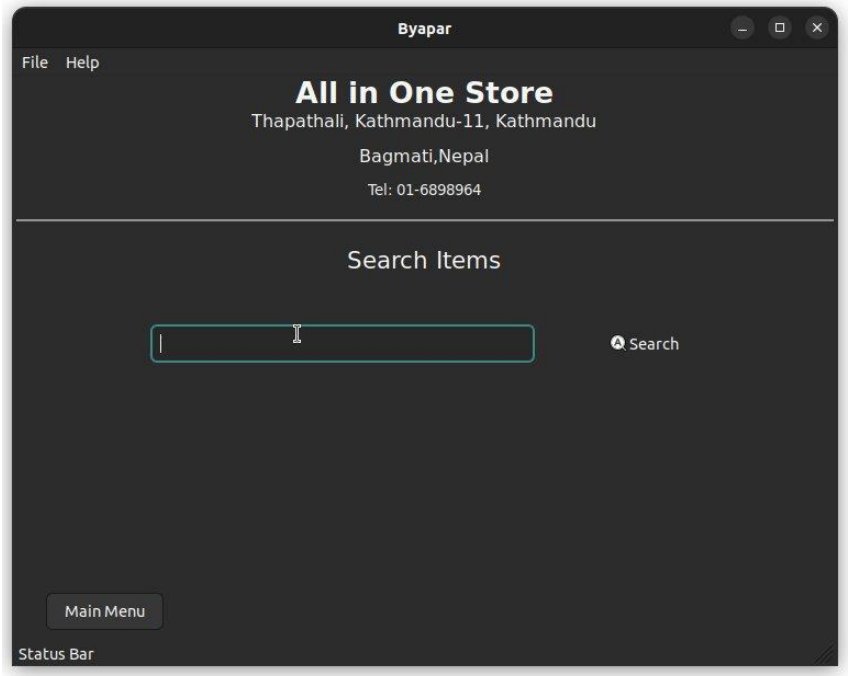


Fig 8-4: Search Items Window

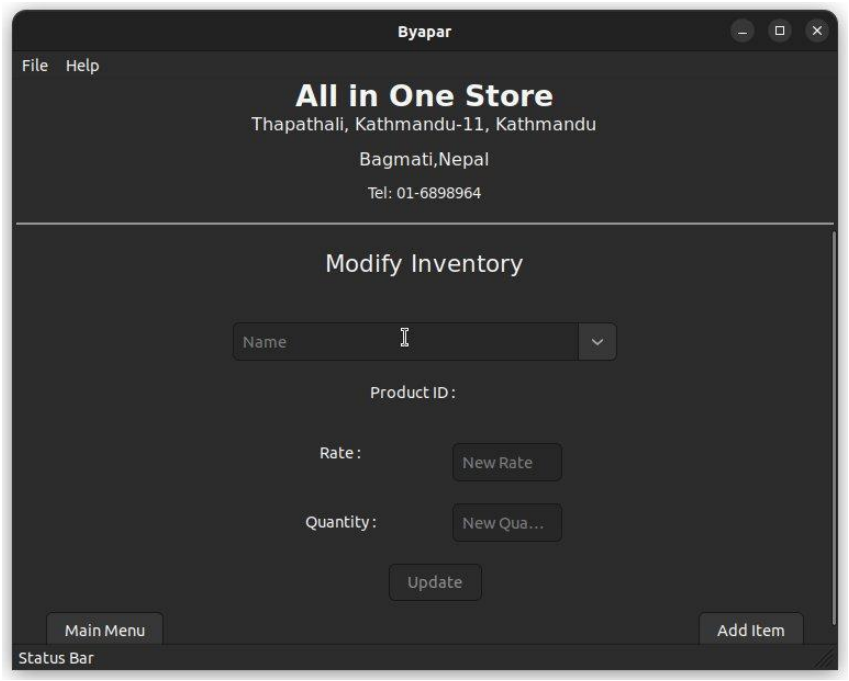
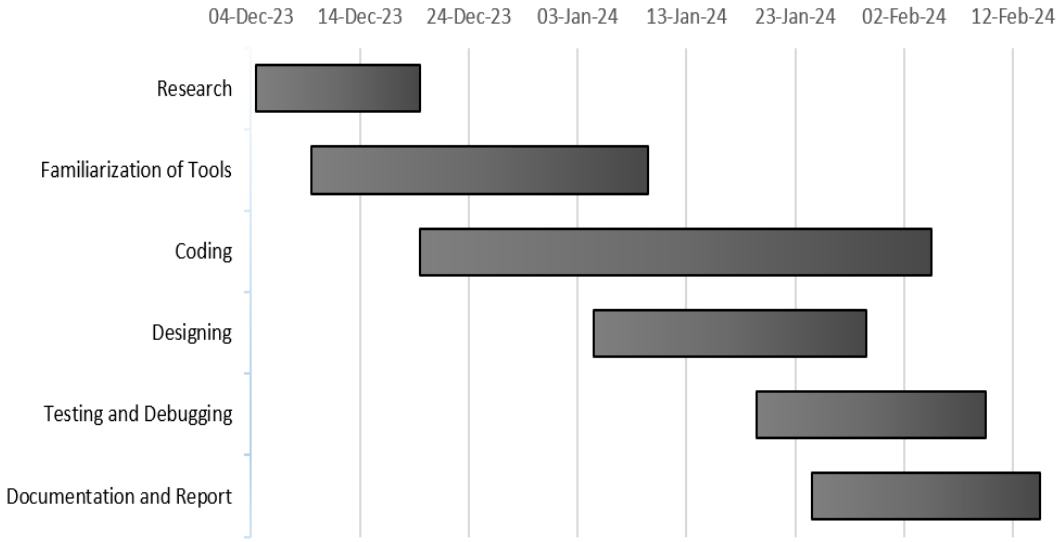


Fig 8-5: Modify Inventory Window

8.2. Time Estimation Chart

Table 8.1: Time Estimation Gantt Chart



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