

SIMS for Retail Business Sellers (Sales and Inventory Management System)

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OVERVIEW

SIMS for Retail Business Sellers is a stand-alone system made for retail businesses that features and incorporates sales forecasting and inventory threshold notification in one system. The forecasting method to be used on the system is a Time Series Forecasting Method. Features like data cleansing are also included as data redundancy is quite common in today's technology and correcting these redundancies and errors for correct forecasting. The system's forecasting uses predictive analytics to be able to predict the future value over a period of time. The system may determine the best-selling product among the stock, the performance of the business's sales, revenues, and the number of low inventory stocks. The system focuses on having a user-friendly design to establish a good user experience, that has features like a dashboard, account settings, sales forecasting, inventory threshold notification, and the tracking of sales and/or stocks. It also includes a Point Of Sale (POS) as to where transactions are made manually by the user to ensure that items are correctly given, reducing error in handling stocks. The researchers ensure that the system is automatically stored and that it may be used on any computer by using an online database to verify that the system to be used is free of alteration and accidental deletion. The researchers used Microsoft Visual Studio C# as the programming language of the system, Microsoft SQL Server Management Studio as the system's database while having Amazon RDS as its cloud-based service. The researcher's system is based on the beneficiary's preferences and requirements. The beneficiary selection is connected to the research since the category comes inside the retail business seller objective. The beneficiary is a convenience store known as Green Corner established in august 2021. It is located along the road of Barangay San Diego San Pablo City, Laguna 4000. Green Corner has an owner, cashier and two other staff personnel for their day-to-day work and transactions which has approximately 100-200 customers/buyers per day. For their daily sales and operation, they offer a manual system. They ask the customers for their order. Next, they check their inventory then charge for the customer's payment and give the change if necessary. Also, their receipts are not automated and it is all hand written. Although all their products are placed well, the level of the efficient work is very low due to their manual system. The process of their transactions is a bit slow to entertain more customers and gain more profit.

Categories and Subject Descriptors

Information systems > Data management systems > Database management system engines > Database transaction processing > Transaction logging

General Terms

Management, Performance, Design, Reliability, Security.

Keywords

Inventory system, Sales system, Forecasting, Sales forecasting, Business analytics, Data cleansing, Track, Record, Customer demands, Retail business, Dashboard, Point of sale, Product code, Transaction number, Predictive analytics, Automation, user-friendly, business data, user experience, error-free, risk-free.

1. THE PROBLEM AND ITS BACKGROUND

This chapter consists of the common problems that businesses are experiencing nowadays. Inventory management is absolutely necessary for running an efficient business and making money. Inventory system overlooks sales data and customer demand, causing them to track inventory levels, sales trends, and physical counts inconsistently. There may be concerns with excess inventory and insufficient inventory to satisfy client needs if there is tracking of mistakes involved in the process. These common tools used by businesses also need updating from monthly updates up to daily updates, in order to avoid bugs that can cause errors for users or businesses. These updates are more likely to be considered "band-aid solutions" as it doesn't completely fix problems of common tools and softwares. These common problems are still very visible in today's technology, and that is where the researchers plan to create a stand-alone system that can solve and answer those common problems that retail business sellers experience.

1.1 Project Context

1.1.1 Introduction

Nowadays technology is needed to lessen the burden for organization and make lifestyle more convenient and more comfortable especially for business. The most commonly

used system by organization is the sales system and inventory system. It will help the company's health because it helps to make sure there is rarely too much or little stock on hand, limiting the risk of inaccurate records. The paper or envelope filing system is now outdated. It's prone to error and makes the organization suffer. The tracking of inventory costs a lot in the organization. And the most important disadvantage without the inventory system is Delaying in Shipping or Delivery. It's difficult to track the inventory results in out of stock products when it is needed. On this day most of the entrepreneurs like the inventory management system because this method can help the organization to track and record their sales and transactions and it enables successful cost control of operations. The organization can also manage the inventory of their stocks and it allows the fulfillment of the customers needs. Because the beneficiary chosen falls within the category of a retail or convenience business. The system placed a greater emphasis on its data pertaining to the beneficiary. This shows that the system is a good thing for retailers, especially those who work by hand.

1.1.2 Background of the Study

Big companies nowadays are very familiar with business analytics applications that track and help them using predictive tools. Based on an article by Webb, R. (2020) [1], one common problem with data analytics applications is that they're expensive and it requires businesses to estimate the return of investment before being able to afford such applications. Another is that there is a shortage of skills, most people are not very familiar with in-depth data analysis, that is where the researcher's simplistic design and automation are focused on, the data representation that is easy to understand. Manufacturing companies cannot predict customer orders, they risk wasting stored material if customers change product specifications or materials. This concept helped the researchers come up with an idea of creating a sales and inventory management system, specifically for retail business sellers. This is essentially made to lessen the workload of users in the retail business, so that they are able to focus on many different things about the business they are running. Furthermore, it is a stand-alone system, and its information is automatically and securely kept in an online database, ensuring and backing up the information that is sensitive and crucial to the business.

Manual inventory systems are time consuming and require the business owners to update and track all sales on a daily basis. Even with the use of manual systems, tracking of stocks and sales isn't accurate enough. The Sales and Inventory Management System of the researchers came in handy for retail business sellers, which helped them improve the managing of their inventory as well as helping them gain insights about what they need to do with their business. With that idea present, the researchers then thought of having a time series forecasting as the forecasting method of the system, using the data sets of the products of Green Corner. The researchers aim to actually reduce the risks that are present now using this stand-alone system, that will help discern what is the top sales of the business and what supply of products needs restocking without relying too much on

online tools from an online platform. The daily data backup is to secure the important data for the organization like previous day-to-day sales and inventory. The researchers aim to have an internal backup and external backup for additional security. The beneficiary must note that they need a desktop or laptop to implement the system that the researchers develop.

1.2 Purpose and Description

The system requires the business to provide a few things for the system to function properly, which includes the listing of their products, the number of supplies they have, and the sales they have made as well. This is to ensure that the data sets needed to be tallied will be used by the forecasting method (time series forecasting) proposed by the proponents. The sales will be used to create a forecast that predicts which time period has the peak or the highest sales. It will also prompt the user that they will be needing new supplies of the product if the number of supplies comes down to a certain number. The system reduces the time needed to actually see how many supplies there are left, and increases productivity of users as the system has a forecasting feature that automatically sums up sales. The most common issue that organizations face is overselling products and running out of inventory, historical and seasonal data trends can help them predict customer orders more accurately. A recommended solution to that is an optimized inventory system that includes forecasting in sales and inventory threshold notification, data visualization, data cleaning analysis, and inventory management controls. The forecasted report includes the company's highest product sales. Because forecasts predict projected sales volume over a specific time period, businesses may use them to establish activity objectives and then make modifications to meet sales targets. When it comes to data backup plans, the system may make use of an internal backup plan and an external backup plan for additional protection. As a result, the researchers decided to use an online database to assure the storage of transactional and crucial records. The data that are utilized for the system came with the beneficiary's approved authorization of their product list, allowing the researchers to anticipate their sales and assist in monitoring their inventory stock levels, which is a significant advantage given that the beneficiary runs manually. Green Corner, a convenience store established in August 2021, is the benefactor. It is situated along the Barangay road. Laguna 4000, San Diego San Pablo City Green Corner employs an owner, a cashier, and two other staff members for day-to-day operations and transactions, with an average of 100-200 customers/buyers per day. They use a manual system for their daily sales and operations. They will next inquire for the customer's order, check their inventory, charge the customer's money, and provide change if necessary. Furthermore, their receipts are not automated and are entirely written by hand. Despite the fact that all of their products are well-placed, their degree of efficiency is relatively poor due to their manual system. Their transaction process is so slow that they can't accommodate more clients and earn more profits.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this project is to provide a stand-alone system that helps retail business sellers to track their sales and inventory, and has the capability of forecasting sales of the business that are data-driven.

1.3.2. Specific Objectives

The specific objectives of the study will consist of the main features of the system, which needs to be met in order for the system to work as intended. To achieve the general objective, the researchers put into detail the specific objectives below:

- Create a system that tracks sales and inventory.
- Add the main feature: forecasting that estimates the highest sale and notification on inventory threshold.
- Include a Point Of Sale (POS) for business transactions.
- Create a user-friendly and easy to manage interface.
- Provide a database for business data, specifically for stocks/supply.
- Incorporate automation for predictive analytics.
- Establish a secure system using user levels.
- Establishing a user account and assigning a role inside the system in order to expand the organizational levels covered by the business.
- Provide reports for daily, weekly, and monthly sales.
- Provide a database backup plan, daily.

1.4 Scope and Limitation

The researchers' goal is to create a sales and inventory management system with a point-of-sale system as part of the project. The scope and limitations of level 2 user privileges - staff and admin - in SIMS are as follows:

Scope

POS:

- Generates a cash invoice, calculates change, and prints receipts.
- Create transaction (View, Add, delete and modify the transact products.)
- Clear cart (Single or Bulk).
- View sales history.
- Void or Cancel orders.

SIMS:

- Add new products and update product details.
- Records all transactions.
- Keeps track of all inventories, and stock details.
- Activate/deactivate employees' accounts.
- Generate sales summary that can be used for forecasting.
- Inventory management and control monitoring.
- Tracks the top selling product,sold products and canceled products.
- Tracks user's action from time-in to log out.
- Generate and print daily, quarterly or monthly sales reports (SAP).

- Perform daily backup.
- Add role.
- Notify user with critical level products and back up data.

Limitations

Cashier- Can only navigate the POS and only be accessed with an internet connection.

- Credit/debit card transactions are not possible.
- The system cannot or will not receive bar code-based data.
- Stand alone system, cannot perform online transactions.
- Cannot be used by mobile devices, not App-based POS software.
- Employees' payrolls are not included.

Admin - can only be accessed with an internet connection.

Functional requirements specification

ADMIN

SIMS

- Login and Logout
- Dashboard
 - Sales forecast
 - Overview
- Inventory
 - Browse products
 - Product details
 - Add
 - Edit
 - Delete
- Sales
 - Top selling products
 - Sold products
 - Cancelled orders
- Stocks
 - Stock Entry
 - Add
 - Edit
 - Delete
 - Stock in history
- Reports
 - Summary reports
 - Daily
 - Weekly
 - Monthly
 - Quarterly
 - Annually
 - Print reports
- User log
 - Session
 - Log no.
 - Username
 - Timestamp
 - Action performed
 - Print Userlog

- Notification
 - Inventory notification
 - Critical level product
- Account Settings
 - Create Account
 - Add user
 - User list
 - Activation/Deactivation of user account
 - Change password
 - Role
 - Add role
 - Role list

CASHIER

POS

- New transaction
 - Browse product
 - Add products
 - Add Quantity
 - Add cash
 - Charge
 - Print
- Purchase
 - Add discount
 - Clear cart
 - Single clear
 - Bulk clear
 - Sales history
 - Daily sales
 - Void
- Account Settings
 - Change Password

Software we used

Microsoft SQL

Microsoft SQL Server is a relational database management system created by Microsoft that uses the structured query language SQL to access and change data. It is a software program that saves and retrieves data when other software programs request it. Its domain comprises data query and update, schema creation and modification, and data access control. To ease data access from Windows applications, the RDMS is incorporated into SQL Server's Visual Studio IDE.

This section provides a high-level summary of the primary software tools utilized to construct the application. Microsoft SQL Server, Visual Studio, and .NET are all included.

Visual Studio

Visual studio is a software development or integrated development environment that is used to create graphical user interfaces and consoles based on windows form applications such as websites, web services, and web applications of all code for all Microsoft platforms such as Windows Mobile and Net Framework (Microsoft Visual Studio, N.D.).

C#

C# is a Microsoft object-oriented programming language that tries to combine C++'s processing capability with Visual Basic's programming ease. It offers capabilities similar to Java. C# is similar to C and C++ and is designed to be an object-oriented language (Hans-Petter Halvorsen, N.D.).

Amazon Relational Database Service

Amazon RDS is a cloud-based web service that simplifies the setup, configuration, and scaling of relational databases. It will back up the database as well as the transaction logs and maintain them for the time period specified by the user. This enables you to restore your database instance to any point in time, up to and including the past five minutes.

Task Scheduler

Task Scheduler is a task automation system that assists in the creation and execution of multiple tasks that will perform automatically at the scheduled time that was set. These tasks can be assigned to a certain date, day, or hours.

1.5 Definition of Terms

- The terminology used within the system and study are given below in alphabetical order, with examples of how each term is used in the system and/or research:
- Amount - The entire cost of a certain item (Quantity * Price).
- Category - The type of specific goods you are looking for.
- Dashboard - The initial form displayed when logging into the system.
- Database - A collection of business data is maintained here.
- Data cleansing is the process of deleting redundant data.
- Date - The POS displays the day of the week, day of the month, month, and year for each transaction.
- Forecasting - The practice of examining data and predicting its future worth.
- Inventory - A list of the company's stored items.
- Time Series Forecasting - The examination of time series data using statistics and modeling to provide forecasts and informed strategic decisions.
- Microsoft SQL Server Management Studio - The database management software used to store all of the company's data.

- Microsoft Visual Studio C# - This is the programming language used to develop the user interface, design, features, and overall system.
- Point of Sale (POS) - Another form incorporated in the system that performs transactions and keeps a record of all transactions.
- Price - The cost of the item as entered into the purchasing form.
- Product code - A unique identification for products or objects used by businesses to minimize misunderstanding with identical products or categories.
- QTY (Quantity) - The total number of items on the order form.
- Sales - The quantity of things sold by the company.
- Security - Risk management of accounts used by internal business users.
- Stocks - The remaining quantities of an item in the inventory.
- Supply - The quantity of the item in the inventory that is available.
- Transaction Number - Used to trace shipping transactions.

2. REVIEW OF RELATED LITERATURE AND STUDY/SYSTEMS

This chapter mainly discusses research studies and other literature from international and local sources that will serve to further support and highlight the development of the system. It will discuss some of the previous research studies and literature on the following topics: the system's primary objective, which is sales forecasting, as well as its efficient inventory management and point-of-sale systems, as well as its other capabilities, such as data cleansing and visualization. While conducting and developing their own inventory management system, the researchers referred to the following studies.

2.1 Local Literature

2.1.1 Analysis of Inventory Management Systems of Selected Small-Sized Restaurants in Quezon Province: Basis for an Inventory System Manual

Inventory systems that are often used in small enterprises. While big firms have inventory requirements that may be calculated using complicated algorithms and computer programs, most inventory models for small enterprises can be classified into three categories. These are Heijunka, just-in-time inventory, and deterministic continuous review. Each idea is intended to guarantee that essential things are available for clients when they need them, without squandering supply or spending a fortune on surplus inventory.

The purpose of this research was to determine the effectiveness of the inventory management system that

caused the decrease in profit of the randomly selected small-sized restaurants in the four districts of Quezon province, in order to provide suggestions and solutions to the problems that they face on a daily basis. The researchers' objective is to develop an efficient inventory management system to ensure the seamless operation of services and products, as well as to trace all inventory transactions.. [2]

2.1.2 Point-of-Sale System at Bibingkinitan

At Bibingkinitan, the system is described as a point-of-sale. A point-of-sale system allows customers to pay merchants in return for goods and services. The company's recent transactions have been sluggish and unstable. For their business, the corporation uses a manual transaction. As a result, the company relies on its team's ability to accurately compute sales transactions, which might result in blunders and inaccuracies. This procedure is also time-consuming. With this method, the corporation may quickly do a computerized transaction without having to manually record the names of the sold items in the inventory records.

The feature of this Point-of-Sale article is similar to the researcher's system. It reports the sales activities within a company. It shows the different trends of sales over a certain period. Is less time consuming while also lessening the errors from the sales. [3]

2.1.3 Inventory System for Yanz & John Apparel

The main problem with this manual system is that it can lead to low profit and give the owner a hard time. The researchers proposed an inventory system for Yanz & John Apparel. Thus, the researchers can help the client to become more successful. The methodology that the researchers used was the systems development life cycle (SDLC) for the project plan. SDLC has seven phases, such as planning, analysis, design, development, testing, implementation, and maintenance. The researchers also used it to see the flow the researcher used and gather all of the data of the client. Yanz and John Apparel have a specific problem in using a manual inventory system because it is time-consuming. The unmonitored list of products can lead to important papers getting lost or misplaced. Yanz and John Apparel lack security because the files are stored in a filing cabinet; even with the presence of a padlock, someone can still steal all files.

In this article the main problem of the organization is they have a manual inventory system. The researcher's main goal is to have a system that tracks their goods through our system. It improves inventory accuracy because it is easy to track, and it's more organized inventory warehousing. [4]

2.1.4 A System Dynamics Modeling and Computer-based Simulation in Forecasting Long-term Sufficiency: A Philippine Chicken

Meat Sector

In the researchers studies As the human population continues to grow by an approximately annual 1.1% percentage, the growth of the livestock sector will continue to rise as well. The demand for meat is projected to grow by 70% in 2050 with 2005 as baseline. The poultry sector, which is basically chicken meat (CM) has the highest growth among meats at 121%. It is a challenge for the poultry sector to satisfy the demand and to align to the mandate on Sustainable Development Goals (SDG). The sector has to comply primarily to food security as expressed in SDG #2 Zero Hunger.

This article helped the researchers forecast the sales using the history of data as inputs to predict and estimate the direction of Green Corner. They can allocate the budget or plan for the future expenses of the organization. [5]

2.1.5 Application of Time Series Analysis for Philippines' Inflation Prediction

In the literature of economics, inflation has long been a well-known and unfavorably discussed subject that is crucial for both developing and developed nations. There are two types of forecasting: one is the well-known statistical forecasting that can be based on historical data, and the other is economic forecasting. Data mining is a well-known technique for uncovering unique patterns and knowledge in data. In fields like business intelligence, science, finance, government, economics, and marketing, data mining analytics such as neural networks, classification, clustering, decision trees, and more have become common.identified four problems in traditional methods of data storage such as it takes too long to acquire, it costs too much regarding maintenance, it is not scalable enough, and it requires too much commitment. The use of the manual process of data storage and traditional methods of data storage still exist in the university.

According to this study time series forecasting will help the researcher to forecast the weekly, monthly and daily total sales for the Green Corner. The researcher needs to have the right historical data to have a better forecasting of sales. [6]

2.1.6 Modeling National Trends on Health in the Philippines Using ARIMA

This article used time series data for trend analysis and data forecasting using the ARIMA model to display the trends of health data on the 10 major causes of death, illness, and infant mortality in the Philippines, which were given in tabular data. Using the GRETL program, figures for each illness trend are shown independently. The time-series forecasting was used in the analysis to forecast the growing and decreasing pattern of illnesses in the community. In terms of anticipated statistics, heart disease was determined to be among the top 10 major causes of mortality.

This article aims to predict future events. Predicting outbreaks also helps health authorities develop preventive measures against the spread of the disease. Time series forecasting can be useful not only in the healthcare industry but also in business and helps researchers predict sales in systems developed by researchers. [7]

2.2 Foreign Literature

2.2.1 Management Sales Forecasts and Firm Market Power.

The purpose of the article is to establish whether or not a firm's market position within its product market has an effect on the sales prediction provided by the management. It highlights the connection between market power and product sales forecasting, in which case the product sales projections result in a considerable increase in the motivation for management to continue marketing products. The article claims that the authors proved the company's market strength through projected sales, which included exclusive information regarding future sales. With the help of sales forecasting, the company can make a decision that is in line with the best competitor pricing and production options, as explained in the article.

According to the article, authors Acito et al. analyze how a firm's market strength within its product market influences management's choices to produce sales predictions. Furthermore, these writers discovered that the market drive of the company is linked with assessing the management sales forecast as a distinctive reporting choice for their marketing sales. It is possible to utilize accurate sales data anticipated by this feature to guide procurement strategy by using this feature. The inventory system, which includes the essential element of sales forecasting, allows the organization to reduce the danger of stocking up on goods. With its assistance, the company now has just enough inventory on hand to match customer demand. [8]

2.2.2 An Explainable Machine Learning Model for Material Backorder Prediction in Inventory Management.

This article focuses on the need of having a backorder prediction system in place since stock unavailability and longer delays in product delivery would result in increased production costs and dissatisfied consumers as a consequence. Incorporating a backorder rate prediction analysis into an inventory system would increase the efficiency of the supply chain and, as a result, the overall performance of the company. On the basis of its results, the article demonstrated that the inventory supply of a product, the amount of items that can be supplied, the immediate demand of its sales, and the accuracy of the forecast of future demand may all contribute considerably to the right prediction of backorders.

In light of the article's statement that the company may avoid

the effects of backorders if it makes accurate tracking for inventory supply of products and ensures that each customer's requested item is delivered within the specified time frame, backorders can be avoided. Among the features incorporated in the inventory system that the researchers developed is a notification tool that alerts the company when a critical amount of inventory has been reached in the system. With this notification notice, it is also easier to prevent backorders, which is especially beneficial for the company's best-selling items. The inventory system that the researchers put in place improves the efficiency of the company's operational management. [9]

2.2.3 An improved forecasting approach to reduce inventory levels in decentralized supply chains

When it comes to inventory management in decentralized supply chains, the paper focuses on forecasting approaches that help to lower inventory levels. It asserts that it has shown its efficiency inside the recommended forecasting technique in order to provide more improved solutions in supply chain management systems. The forecasting approach, according to the article, helps to increase the competitiveness of a company in the market.

In this article, it was determined that the forecasting technique used in decentralized supply chains was more effective than the typical approach, which was initially thought. Researchers have focussed on sales forecasting as its most important attribute in order to give even better solutions in supply chains and to help in the enhancement of a company's competitiveness in the market, among other objectives. Demand forecasting that is more accurate aids the organization in enhancing its supply chain management by looking ahead to guarantee that the right quantity of inventory is available at the appropriate time for the customer. Inventory threshold notification is used to assist supply chain management in predicting how much stock they need to fulfill customer demand while avoiding overstocking the shelves. [10]

2.2.4 Forecasting intermittent demand for inventory management by retailers: A new approach.

The retail business has a large number of items that have inconsistent demand, which creates an issue for inventory management. According to the paper, accurate forecasting of demand is essential for effective inventory management practices. The forecasting of intermittent demand in the retail business is the subject of this article. It has been shown in this article that forecasting may assist in providing correct data for the inventory of their goods when faced with inventory management challenges.

In addition, the article emphasizes that precise demand forecasting is required for good inventory management procedures to function well. This suggestion has had a greater influence on retailers and their inventory management systems as a result of it. The researchers'

primary goal is to provide reliable data, which may assist the organization in prioritizing their efforts in order to increase cost efficiency and product availability across the supply chain. The inventory management system may be recorded and predicted using the sales history data from the point of sale system, which is included into the implementation system. [11]

2.2.5 Blood Bank Management and Inventory Control Database Management System

An in-depth strategy to develop an effective blood bank database management system is presented in this paper. The database is the single most beneficial environment for caching data, and it is also an outstanding instrument for constructing, maintaining, updating, and amending data from a variety of perspectives and viewpoints on the database. The advantages of a properly-structured blood bank database are many, and they include the benefits of increased efficiency as well as time savings.

Because of poor database management and inefficient databases, the gap between demand and supply has become even wider. The article came to the conclusion that database management has assisted in connecting users with the many blood banks in the city and obtaining information about the availability of different kinds of blood as well as information about donors in the event of an emergency situation. The researchers created databases that only administrators could change in order to manage their data, and employees could only see databases based on their privileges in order to prevent data mismanagement and to ensure that the database's efficiency remained kept. [12]

2.2.6 Creating an Affordable, User-Friendly 'Electronic Inventory System for Lab Samples

The capacity to manage universal inventory is critical for effective space sharing, item monitoring and availability, and data mining; as a result, this article was interested in a tool that could be used for these objectives. It is more efficient to share physical laboratory space across research departments in order to maximize resource use, promote cooperation, and save expenses. It finds that the use of a universal inventory system enables for the creation of physical inventory reports in a timely manner, which in turn helps to protect sample quality by minimizing redundancy and the time required to locate vials. Storage information can be readily evaluated for statistically significant patterns, samples have trustworthy traceability, and data can be audited to ensure that it contains accurate information.

The article emphasizes the need of having an inventory system, which enables for the compilation of physical inventory reports in a timely manner. Storage information can be readily evaluated for statistically significant patterns, samples have trustworthy traceability, and data can be audited to ensure that it contains accurate information. For their physical inventory reporting, several businesses continue to rely on manual systems rather than computerized systems. Automated inventory system was developed by the

researchers, which workers may simply access and utilize for their physical inventory. Within the system, the database stores important information they need, and users may create reports using a templated structure inside the system to conveniently obtain the information they have recorded. [13]

2.2.7 Building Scalable and Resilient Database System to Mitigate Disaster and Performance Risks

The purpose of this paper is to provide a design database system implementation approach that takes into account both backup management and performance management factors at the same time. It is stated in the article that backup management should take into consideration the element of disaster recovery for the purpose of business continuity, and that performance management should take into consideration the component of scalability as part of its database design process.

The objective of this paper is to emphasize the need of including backup management and performance management into the building of a database system as early as possible. Back-up management should be integrated with a disaster-recovery system since it should take into consideration the element of business continuity in order to ensure that corporate activities continue uninterrupted. On the basis of this decision, the research team has chosen to create a database backup on the system, which enables them to store data in the database on a daily basis. According to the researchers, those who benefit from the program should build a hard drive database backup in order to ensure that more files are kept on the hard disk of the computer. It is recommended that external backups and database backups be done in order to improve data security. [14]

2.2.8 The Application of Forecasting Sales of Services to Increase Business Competitiveness

The goal of this article is to test the accuracy of revenue prediction models in the service sector against six precision criteria to see if using certain criteria leads to the adoption of certain models to enhance competitive forecasting. This article tries to identify the greatest accuracy predictors in NACE's 32 service categories.

Accurate forecasting of business variables is a critical component of a company's competitiveness, which is becoming increasingly important in the current globalized and digitalized world. Researchers included a forecasting feature to the system to help retail company sellers achieve a competitive advantage in their market and boost future sales. [15]

2.2.9 Software Quality Analysis for Halodoc Application using ISO 25010:2011

The Halodoc app provides features that make it easy to consult with doctors, particularly in the case of Covid-19. The goal of this study was to assess Halodoc's quality using an International Organization for Standardization (ISO) standard, namely ISO 25010:2011. This model may be used as a foundation for testing in a software quality management

system.

The research focuses on the application to ensure that users are happy when they utilize it. The system's performance or software factors may be evaluated by assessing the software. Researchers utilize the ISO 25010 software quality standards to obtain an accurate evaluation and to decide what has to be improved and maintained in terms of quality. [16]

2.3 Local Study/Systems

2.3.1 Demand Elasticities of Canned Tuna at Point of Sale of a Large Retail Chain in Southern Philippines: Implications for Sustainability Policy

In this study, Castro, Miko Mariz C., et al. (2021), gathered data of 459 weekly point-of-sale (POS) observations from 2010-2012 on three store branches of supermarkets in the southern parts of the Philippines. As they used the data to determine the expenditures and price elasticities of canned tuna for a more sustainable fishery. There are three mediums for the canned tuna which are, tuna in sauce with vegetables, tuna in oil, and tuna in sauce with no vegetables. For high- and low-income consumers, all three mediums have higher quantity demands, as income of consumers increases. While high-income consumers are based more on income change when consuming tuna in sauce with and without vegetables. Promoting that having more use of vegetables may lead to lower volume of tuna meat that are being used in canned tuna and all which contributes to the sustainability of canned tuna.

With just the weekly POS monitoring done by Castro, Miko Mariz C., et al., they were able to come up with such a conclusion that provides better sustainability for those businesses that sell tuna in the southern parts of the Philippines. All the more relevant given that the POS had only been tracking the business's sales for around two years, the accuracy supplied by the point-of-sale is critical in establishing a route for sustainability and stability for both sellers and retail chains. Similar to the researcher's system, its POS is one of the main features that give data-driven answers for the forecasting, tallying the sales of the business. [17]

2.3.2 POINT OF SALE SYSTEM WITH INVENTORY FOR ARM'S FOOD AND DELICACIES

According to Mendoza, A., et al. (2019), the point of sale system with inventory that they have created for Arm's food and delicacies lets them make predictable, dependable, and convenient choices. As the system provides the business with extra support in creating faster transactions, faster record retrieval, and managing products in the system's inventory. The main point of this system is to make all of their exchanges quicker and more efficient. They also established user levels for the administrator and the cashier, this is to ensure that there are restrictions.

Precisely what the researcher's system includes, a point-of-sale feature with the means of inventory threshold notification and sales forecasting, having the ability to track almost anything the business inputs in the system makes all of its previous ways of retrieval of data, transactions, etc. much quicker and better. As well as having user levels as privileges to those involved in the business. [18]

2.3.3 Effectiveness of Systems Applications and Products (SAP) Business One in the Inventory Management of CPAC Monier Philippines Inc.

In this study, Legaspi, D. (2019) created a system called Systems Applications and Products Business One or simply, SAP Business One for CPAC Monier. Legaspi, D noticed that the rate of On-time In-Full Invoice Complete (OTIFIC) of CPAC Monier is low. This means that the business productivity of CPAC Monier's directors are low. Once establishing the inventory management system, SAP Business One aims to increase OTIFIC rate. The level of effectiveness of this system was measured using six factors of business productivity which were collaboration, business insight, flexibility, usability, familiarity, and transactional efficiency. Results say that "SAP Business One information system is most effective in terms of usability based on the perception of the user. This shows that SAP Business One is user friendly and can easily be navigated."

It shows similarities with the researcher's system, as it has a user-friendly interface with easy navigation from start to finish, having easy access menus like a dashboard for a quick look at the overview of sales, purchases, and inventory. These similarities show one of few effective ways of increasing the productivity of the retail business whilst having to be able to handle the system with ease is through a simplistic design that focuses on efficiency.[19]

2.3.4 Inventory Management System

In this study by Castillo, E., et al. (2020), they tackled how hotels and restaurants have the inconsistencies of trying to keep products or materials up-to-date and far from their expiry dates, in the real world it takes too long to check on too many items in just a day. In the system they have made, they used agile methods as means to construct their inventory management system. With the system, they are prompted by the system with products that are nearing expiry date and newly arrived products are of course listed immediately.

As complex as it sounds, agile methods are often used and many other developers take into account these methods in creating their own system. Similarly the researchers plan to create such an inventory management system with features like forecasting on sales and tracking of inventory threshold. [20]

2.3.5 DESIGNING AND IMPLEMENTING E-JUSTICE SYSTEMS: AN INFORMATION

SYSTEMS APPROACH TO REGIONAL TRIAL COURT CASE DOCKET MANAGEMENT IN NORTHERN MINDANAO, PHILIPPINES

According to Grepon, B., the standalone system that he has made for the trial courts in Northern Mindanao, Philippines is often going to face management challenges, data security, and data processing. With this, the deployment of the standalone system comes with a file manager program that supports file backup and recovery for safekeeping. The host can also create a database and importation of (.sql) files which contain electronic records.

The researchers also thought of a backup plan for the database that would be good for the beneficiary and the business. This is to avoid losing data. Every data of the beneficiary is valuable, that is why preparing a monthly or weekly backup plan or even daily is necessary, depending on how often the beneficiary wants to backup their data. [21]

2.3.6 Evaluation of Mangrove Crab Classification System

Based on the Figure 5 System Architecture that was made by Almarinez, J., and Hernandez, A., they have a data processing algorithm then a database that stores and represents data in the Management Layer. The storing of data in the database is dedicated for backup while the representation of data is for the End-User Layer.

Just like the researcher's plan, before having a representation of data for the user, there must be a data storage and data backup to avoid risking any important data. Data representation proceeds once data storage and data backup is all set for the beneficiary. Backup plan of the database depends on how the beneficiary wants it, whether it be monthly or weekly, however researchers have set it to daily as its recommendation. [22]

2.3.7 ISSUES IN THE IMPLEMENTATION OF KATARUNGANG PAMBARANGAY – PHILIPPINE LOCAL JUSTICE SYSTEM: INPUT TOWARDS THE DEVELOPMENT OF E-PABARANGAY

In this study by De Torres, J., and Del Rosario, M., Jr., they made an information system dedicated for the filing of transactions and handling of complaints of Katarungang Pambarangay, since most barangays are still using manual filing and handling of complaints.. The system is also made to determine the readiness of barangays in utilizing an information system and proposing a software application as a solution to the problems. Admins of the system are able to manage users by allowing them to add end-users to the system, create forms, provision to import and export databases for backup and restore of data, and view user logs (audit trail) to trace the actions of every end-user of the system.

Just like the researchers, they saw that the beneficiary is still

using manual filing on their transactions as well as the recording of stocks. With the proposed system having data visualization and data storage, the beneficiary is able to handle their transactions well while also easily inputting new items in the database. [23]

2.3.8 Forecasting Tourist Arrival in the Province of Surigao del Sur, Philippines using Time Series Analysis

Using historical tourists arrival data from 2012 to 2016, the study sought to anticipate the number of tourist arrivals in the province of Surigao del Sur. The findings indicated that tourist arrivals in the province are expected to increase. As a result of the forecast model, more foreign and domestic tourist arrivals are projected. Furthermore, it demonstrated a long-term increase in visitor arrivals in the province.

Based on this study, the forecasting tool of time series model has helped anticipate the long term growing tendency within the historical data of tourist arrivals. The researchers will utilize the time-series forecasting approach, as well as data from the beneficiaries, to assist in forecasting their sales. [24]

2.4 Foreign Study/Systems

2.4.1 Applying Forecasting methods to reduce the cost of spare parts inventory in company

According to TAVUKÇU, Alper Sadık and SENNAROĞLU, Bahar (2021). With thousands of stock items and millions of dollars in inventory investment, demand forecasting using Holt-Winters' Multiplicative technique improves the company's forecasting significantly. As a result, it will be recommended that the company adopt Holt-Winters' Multiplicative approach and conduct such studies on a regular basis in the future. The study presents an application for companies to see the benefits of quantitative forecasting techniques. It explains how to deal with uncertain and variable demand, the importance of determining the type of pattern on demand data, determining the appropriate forecasting method based on data pattern, and forecasting future values step by step. The study considers the amount of on-hand stock and lost sales, and so proposes a method for lowering the cost of spare parts inventory.

The researchers' project aims to analyze the data and utilize it to construct a data model that would benefit retail business sellers in gaining knowledge and making better decisions by using a forecasting method. Series of patterns on data can lower the cost of the retailers. [25]

2.4.2 Accounting System Features: Usage for Different Types of Businesses.

According to the study Accounting System Features: Usage for Different Types of Businesses (2019). Each type of business has varied requirements for an accounting system. Most significantly, each company must define its own

requirements in order to create a software system that best meets those requirements. Although popular accounting software such as QuickBooks, NetSuite, and Sage provide the essentials, some businesses demand more features than those systems provide. Payroll, document management, inventory, job costing estimates, and point-of-sale data collecting are some of the other functions that businesses may need to integrate. To ensure that the company's operational functions are maintained, the software should combine each of these functions into the organization's accounting system. The organization will be fully capable of handling all of their financial information as long as they have the necessary software system in place, as well as the required features built into that system. It is up to the corporation to conduct the necessary study into the many software systems that have the capabilities and functions to store the financial data required by that particular organization.

The researcher's project has a point of sale system (POS) that helps assist in the management of retail business inventories by executing sales and payments. It can also keep track of the consumer and sell inventory items. It provides a good perspective of the company and automatically keeps track of its cash flow. It saves information on a company's financial, inventory, and sales status. [26]

2.4.3 Importing Automated Management System to Improve the Process Efficiency of Dental Laboratories †.

According to Yang, C.-J., Chen, M.-H., Lin, K.-P., Cheng, Y.-J., & Cheng, F.-C. (2020). To improve the productivity of dental laboratories, an automated inventory management system was designed. A sensing system based on the Internet of Things was created to collect information on cobalt-chromium disks in both the storage room and the manufacturing area, and an expert system was created to execute inventory management automatically based on the defined rules. The proposed system can help the manager configure and manage material orders by reducing the time it takes to record data. The trial results revealed that a significant amount of work time is saved, resulting in cost savings and increased efficiency in dental manufacturing.

Automation helps not only in reducing the chaos, also helps in the flow of information as per defined workflow. The researcher's project aims to develop an inventory system with POS to make retail business transactions easy and efficiently. [27]

2.4.4 Data Cleansing: An Omission from Data Analytics Coursework

According to Snyder, J. (2019). Quantitative decision-making textbooks (management science, business statistics) rarely address data purification difficulties; instead, these textbooks provide students with nice, clean, well-formatted data sets to analyze. However, because data analysts spend the majority of their time obtaining, cleaning, and pre-conditioning data, students must be taught what to look for

while generating or receiving data. Before data analysis, a critical scan of the data must be undertaken (at a minimum) to look for errors in the data set.

A data cleansing approach is included in the researcher's project to prevent data redundancy, erroneous, poorly structured, or otherwise untidy data from being organized and repaired. It also entails discovering data issues and then modifying, updating, or eliminating data to remedy them and prevent future problems with retail business sellers' data. [28]

2.4.5 Enhancement of an Optimized Key for Database Sanitization to Ensure the Security and Privacy of an Autism Dataset

According to Rahman, M. M., Muniyandi, R. C., Sahran, S., & Mohamed, S. (2021). This study looked into the security and privacy of the autism dataset using the cleaning technique. The goal of this strategy was to keep patients' sensitive information hidden. In particular, an optimal key for concealing sensitive data was created, which was chosen by the suggested Enhanced Combined PSO-GWO framework and solved the concerns indicated in the introduction. In addition, our recommended model's outcomes were compared to current traditional algorithms for justification. Specifically, our proposed technique was tested against various attacks and compared to current traditional algorithms, and the desired results were obtained, according to the experimental review.

In business, data privacy and security are crucial. The researcher's solution contains security features such as a user log, which allows administrators to follow the actions of logged-in users, and a user level, user privilege, which allows administrators to specify what users can and cannot do in the system. [29]

2.4.6 Assessment of a laboratory critical risk result notification protocol in a tertiary care hospital and their use in clinical decision making.

According to Rodríguez, J. A. D., García, M. I. P., Cobo, C. G., Más, A. R. P., Alabern, I. L., & Bauça, J. M. (2019). Communication of important risk test results is critical for patient safety because it enables for early decision-making. Their goals were to review the current procedure for telephone notification of significant risk outcomes in terms of rates, efficiency, and recipient satisfaction, assess their application in clinical decision making, and provide alternative instruments for a better assessment of notification protocols.

A quick-to-the-point alert and call to action should attract a user's attention in a notification. When the products reach critical levels and it's time to back up the data, the researchers' project receives a notification. [30]

2.4.7 Towards a delivery scheme for speedup

of data backup in distributed storage systems using erasure codes.

According to You, P., Huang, Z., Peng, Y., Wang, C., & Yan, G. (2019). Built on peer-to-peer networks, distributed storage systems can enable large-scale data storage and high data reliability through redundancy. The technique of storing data in a group of redundant storage nodes is known as data backup. It is vital to complete such a process quickly in order to maintain system performance. Traditional data backup in distributed systems based on erasure coding use a star-structured architecture, in which each redundant block is delivered directly from the source node to each target storage node, limiting storage throughput and latency owing to bandwidth heterogeneity. To speed up data backup, a new "in-network" redundancy creation approach exploits the locally repairable property of self-repairing codes.

Backup copies allow data to be recovered from an earlier point in time, which can help a firm recover after an unexpected event, e.g. interruption of power. The researcher's project data is backed up on a daily basis, especially when transactions are involved. [31]

2.4.8 A Comparative Study on Forecasting of Retail Sales

In this study, the authors use historical sales data from Walmart to benchmark forecasting algorithms in order to anticipate future sales. Authors present a thorough theoretical overview and analysis of the most recent time series forecasting models. The results show that the ARIMA model outperforms the Facebook Prophet and LightGBM models

Predicting product sales for major retail organizations is a difficult endeavor due to the fluctuating nature of trends and seasonalities. The authors want to project future sales using forecasting methodologies based on previous data for time series forecasting. The researchers also want to anticipate the future sales of a retail business seller, and the system will employ the time series forecasting approach to accomplish so. [32]

3. METHODOLOGY, RESULTS AND DISCUSSION

This chapter focuses mostly on the methodologies that were employed in the study and serves as a guide for the researchers. This covers Requirements Analysis where system development software cycle is employed and flow of the existing and proposed system can also be viewed. It also contains the system's requirements documentation as well as its technical background.

3.1 Requirements Analysis

3.1.1 Software Development Life Cycle

The Waterfall Model was used as a guide in the development of the proposed system as part of the SDLC process. The

Waterfall model is considered the ideal way to approach software development since it is regarded as beneficial for systems with clear requirements, such as the researchers' project. According to Mitch Kramer (2018) [33], the waterfall methodology is effective and delivers accurate results in most cases. As a result of the rigidity and precision of the stages, each step is done one at a time, making it simple to maintain. It assures the highest level of quality while also identifying deliverables and milestones. The Waterfall Model was selected by the researchers because it offers a framework for planning and directing a software development project, which was important in this study. It is easy to understand the beginning and ending circumstances, which helps to lessen the amount of stress. Additionally, it aids researchers in defining the foundation for gaining the resources required to deliver the solutions. In the first stage, the researchers begin to outline the project's scope and objectives. The requirements for the project and the organization are collected, and analysis commences in order

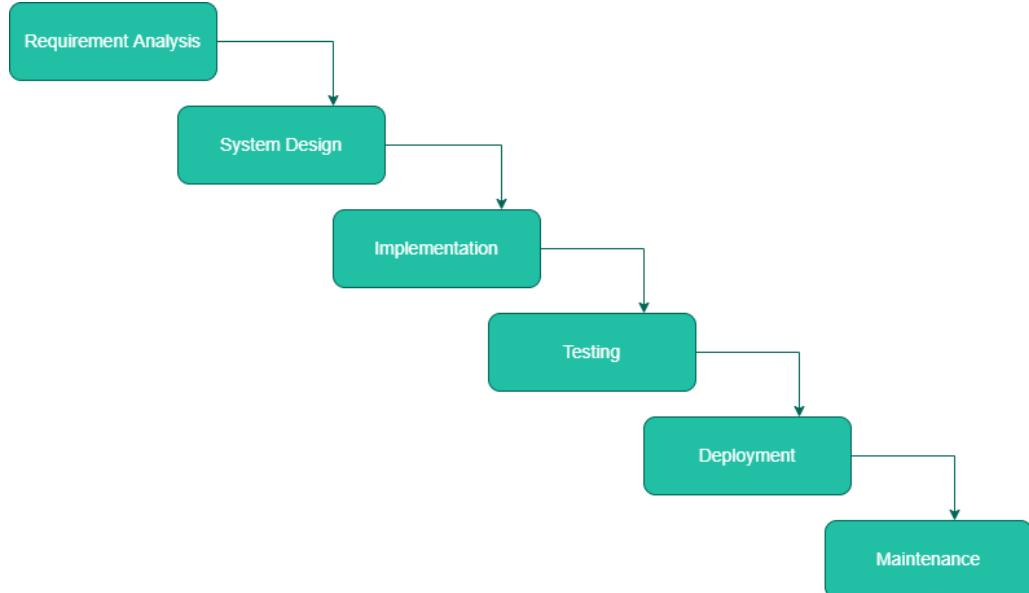


Figure 1. SDLC - Waterfall Model

3.1.2 Conceptual Paradigm

The conceptual paradigm depicts the user's input requirements, which the system will process and provide a set of possible outputs, including screen outputs such as Dashboard (Sales, Purchase, and Stock preview), Inventory (Top selling products and sales details), and selected level screens, as well as hard copy outputs such as receipts and

sales summaries, depending on the user's requirements. The proposed system's Conceptual Paradigm is depicted in the diagram below.

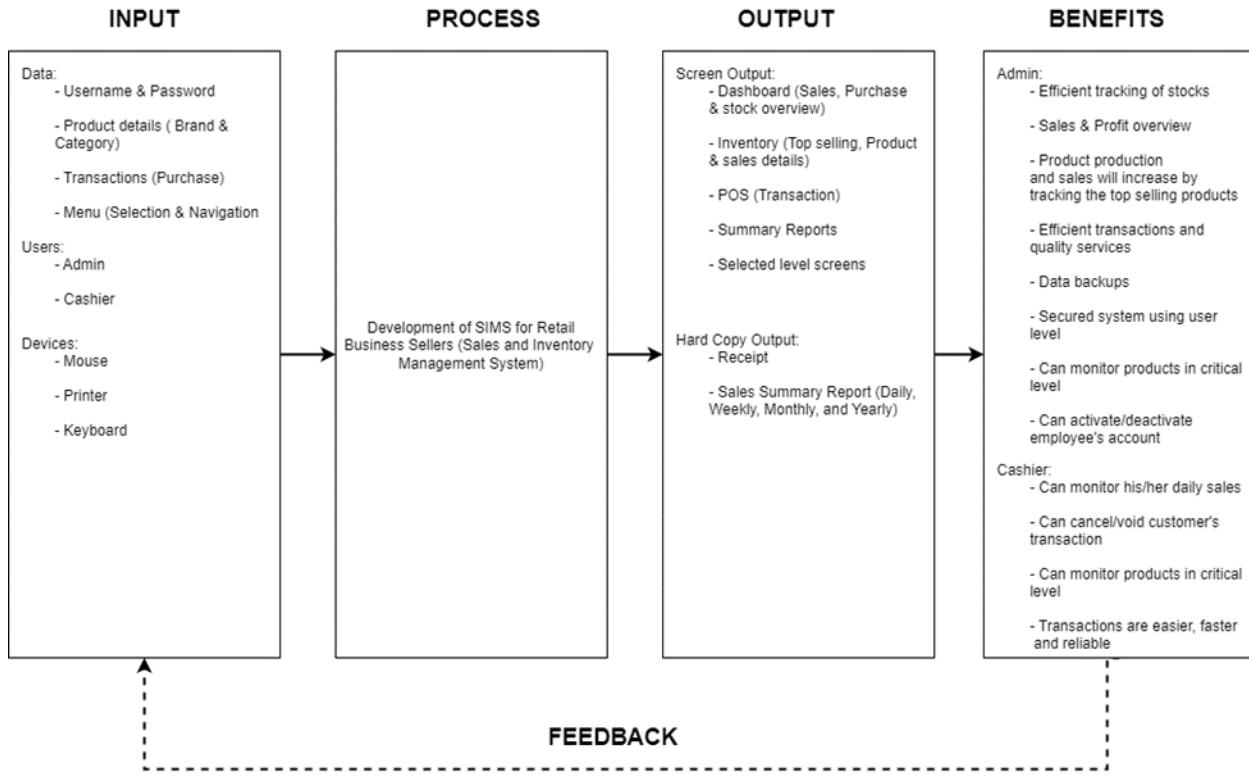


Figure 2. Conceptual Diagram

3.1.3 Flow of Existing System

3.1.3.1 Flowchart or Wireframe of the Existing System

This flowchart describes the day-day manual operation of the beneficiary. From asking customer's orders by serving the customers, handling stocks and handling payments.

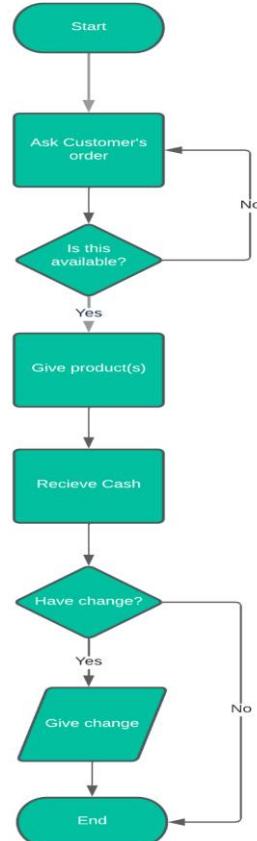


Figure 3. Flowchart of the Existing System (Manual System)

3.1.3.2 Data Flow Diagram of the Existing System or Unified Modeling Language (Use Case) Diagram of the Existing System

In the Data Flow Diagram of the Existing System, the figure shows the day-day manual operation of the retail grocery management system. It depicts the flow from the beginning of the customer ordering a product to the end of getting the product whereas in admin, performing a new transaction, and finally receiving the payment.

The current system only circulates between customer and owner after the customer purchases an item it will go to the

manual system of the current system of the beneficiary then the transaction of every purchase will go to the owner of the beneficiary.

The current system of the beneficiary is a manual system that does not involve any sort of device. Sometimes creating errors when listing records of the transaction done with customers.



Figure 4. Context Diagram of the Existing System(Manual System)

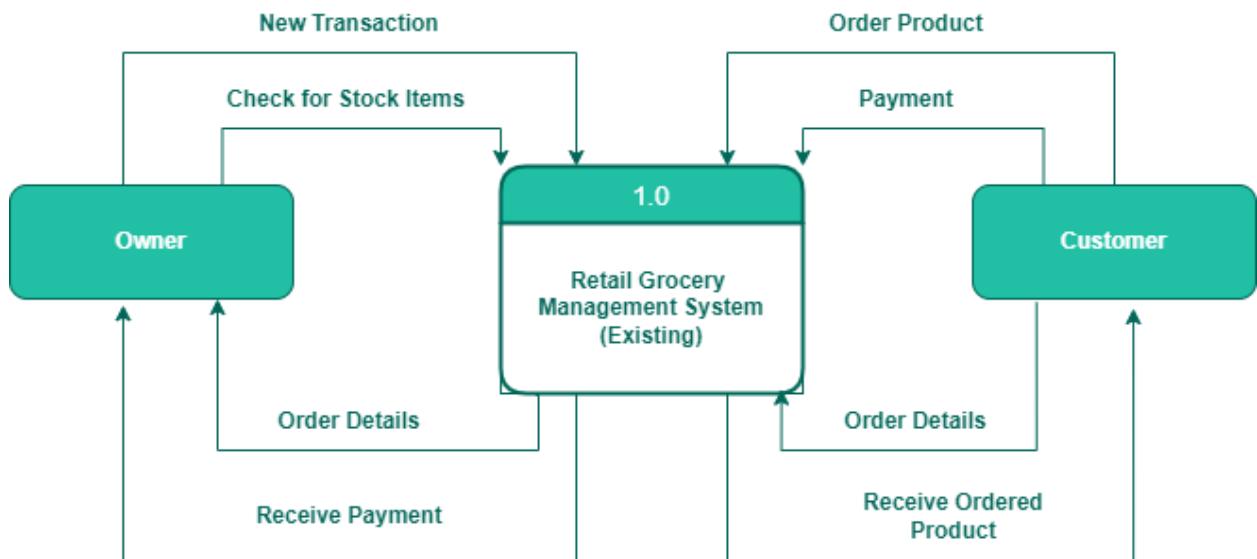


Figure 5. Data Flow Diagram of the Existing (Manual) System

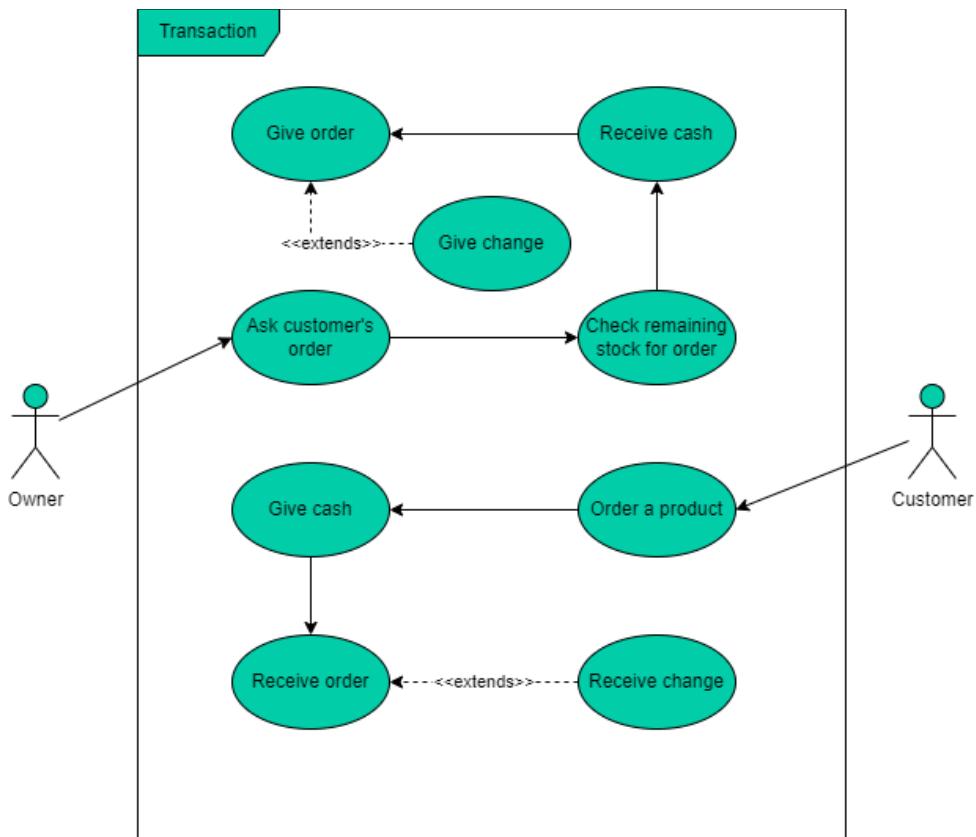


Figure 6. UML (Use Case Diagram) of the Existing System

3.1.4 Flow of Proposed System

3.1.4.1 Flowchart or Wireframe of the Proposed System

The proposed system's flowchart shows the process of the researcher's system, starting from the login form wherein the system asks for a username and password. Upon opening the login form, the main form opens and the user has access to

the main features of the system (SIMS) which consist of Dashboard, Inventory, Sales, Reports, Settings for accounts and POS for Sales transactions . The simplified process of the system can be seen in the flowchart below.

See appendix for figure 7.1 - 7.3 (PAGE 33–35) Figure 7. Flowchart of the Proposed System (SIMS)

3.1.4.2 Data Flow Diagram of the Proposed System or Unified Modeling Language (Use Case) Diagram of the Proposed System

The proposed system's Data Flow Diagram depicts an overview of the retail grocery management system. The system is broken down into many subsystems, each of which manages a different flow of data and, as a result, contributes to the overall functioning of the process. The first level data flow diagram illustrates its distribution function within the system. The second level of the DFD demonstrates additional elements that are more in-depth or comprehensive than those visible on the first level of the DFD. These features were used to accomplish the important components of the retail grocery management system.

The contextual diagram of the system that is being shown, provides more detail on the process that is being observed as well as the processes that are being managed all throughout the system. There will be a transmission of data between the cashier and the customer since the system includes a point-of-sale, while the admin has access to all of the features of the inventory management system. Because the current system only communicates between the customer and the owner after the customer has purchased an item, the proposed system is able to monitor the items from the point of purchase all the way through the listing of its records and the tracking of end sales.

User Level 1 consists of the cashier and staff, who can only access limited features of the system, e.g., POS and Inventory, or just POS alone. User Level 2 is the admin and has access to all of the features of the system and can assign

what features that User Level 1 can access (if the business grows).

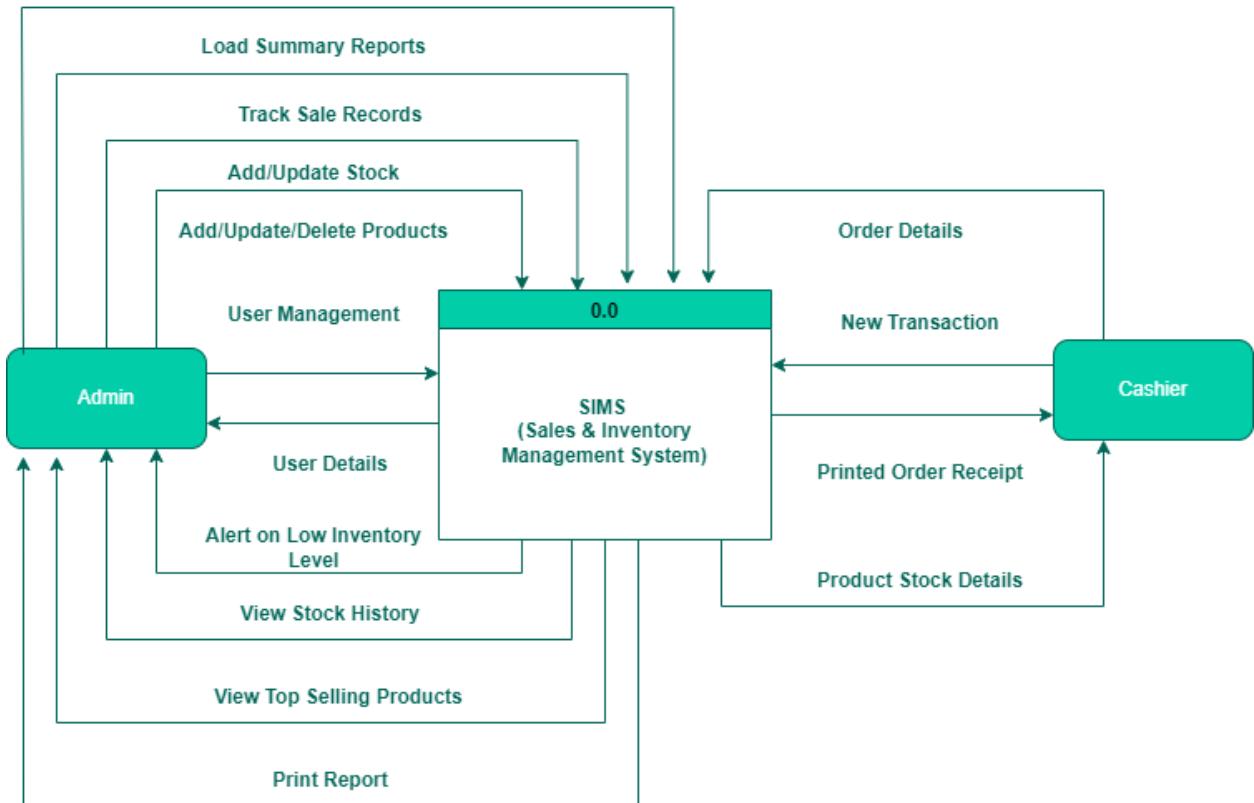


Figure 8. Context Diagram of the Proposed System

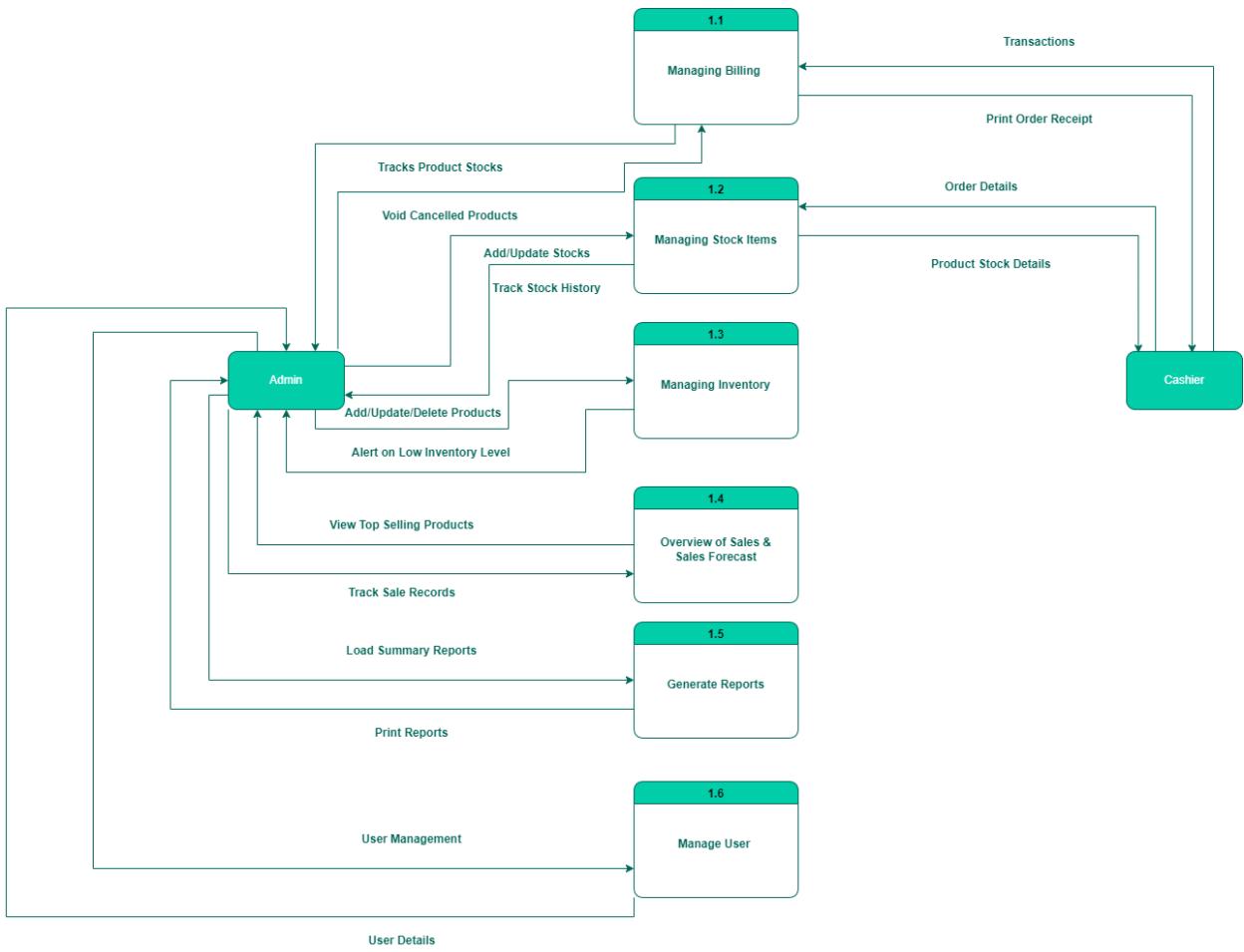


Figure 9. Data Flow Diagram of the Proposed System (Process 1 - Level 1)

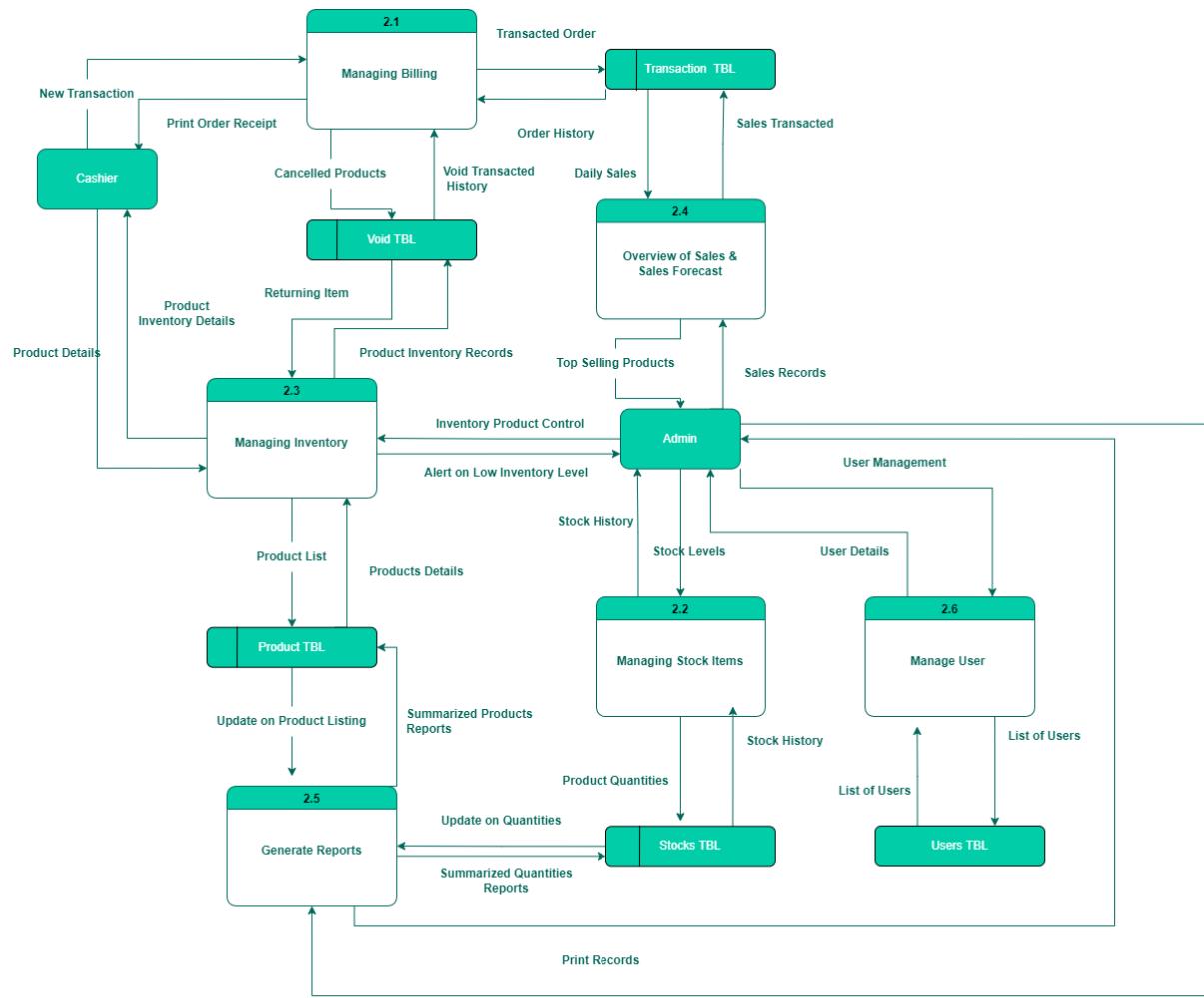


Figure 10. Data Flow Diagram of the Proposed System (Process 1 - Level 2)

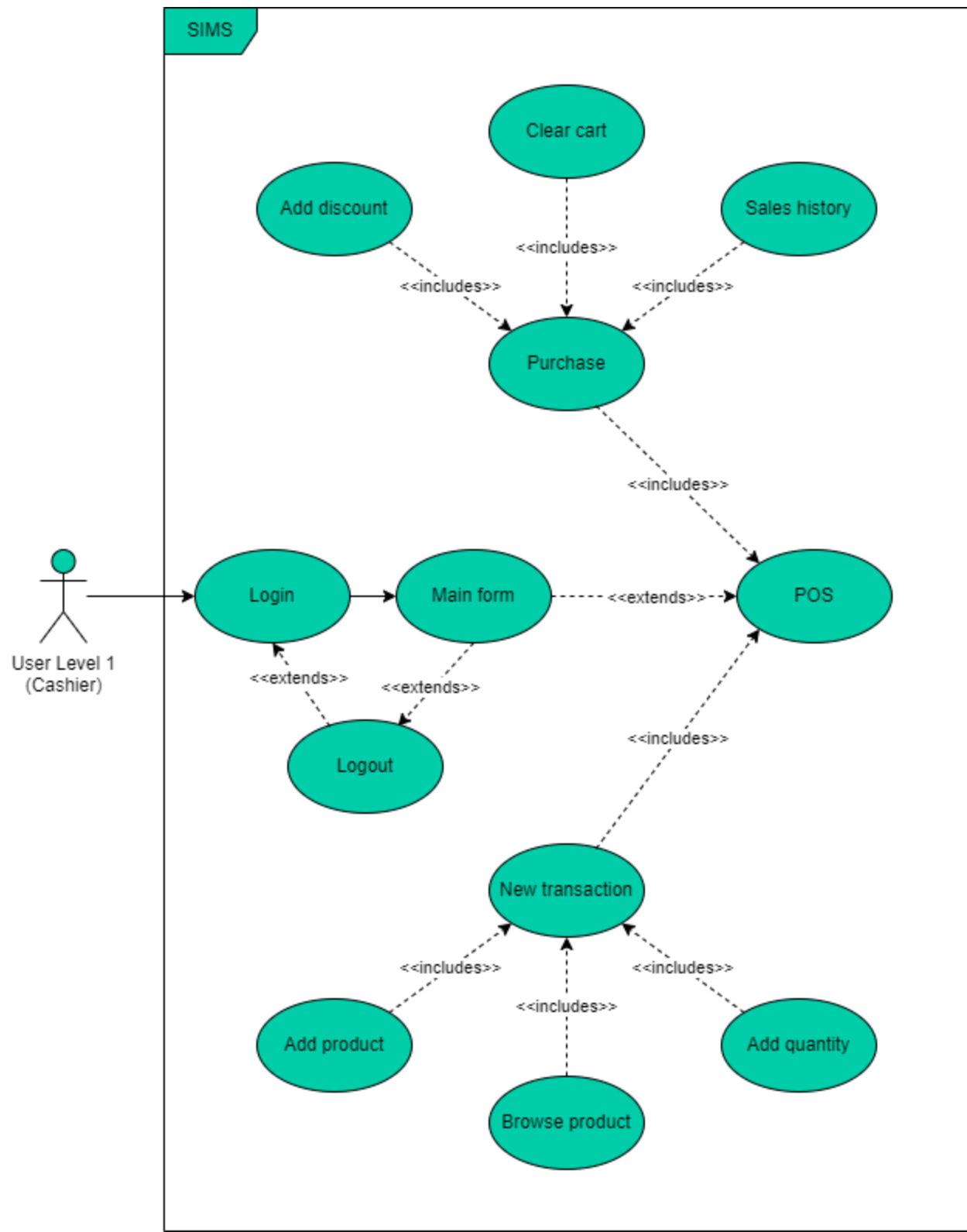


Figure 11. UML (Use Case Diagram) of the Proposed System (User Level 1)

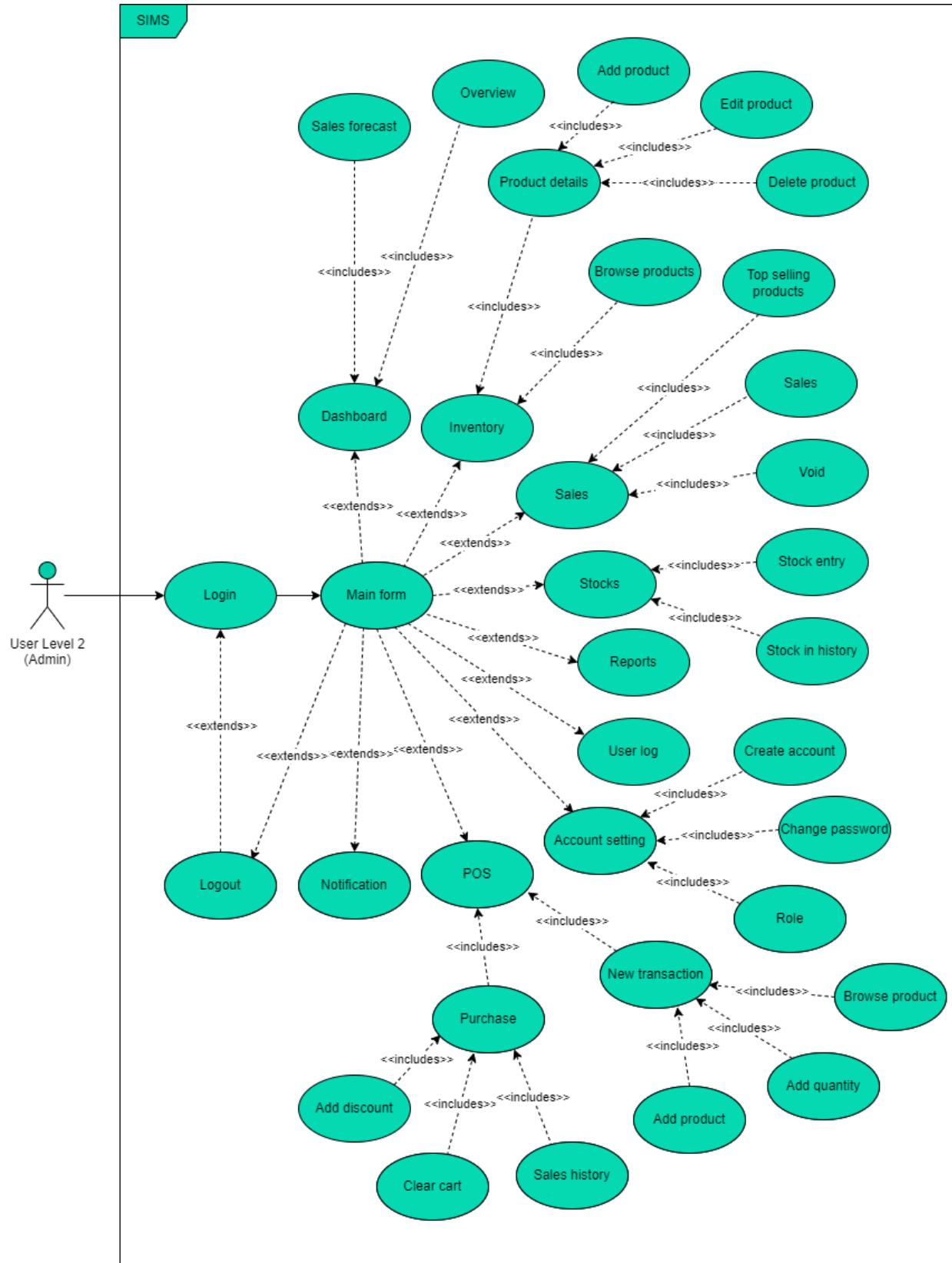


Figure 12. UML (Use Case Diagram) of the Proposed System (User Level 2)
3.2 Requirements Documentation

3.2.1 Methods of Research

The qualitative research method is used throughout the duration of the study. When doing this study, the researchers used information acquired via interviewing, observation, and surveying as the primary sources of information. The qualitative method was chosen by the researchers as the method of research to be used in this project. This is due to the fact that authenticity is to be ensured through the implementation of these techniques in order to obtain data of high quality and to put a good system in place for the benefit of the beneficiary. Because of this, the accuracy of the data that was gathered is increased. In addition to this, qualitative research has the potential to provide industry-specific insights, which are then used to effectively explain the value propositions of the business. The researchers benefit from using this method because it helps them understand the beneficiary's goals and point of view. This also allows the researchers to build a user-friendly interface for the beneficiary.

3.2.2 Research Instruments

Interview

The researchers conducted the interview with the beneficiary in order to obtain additional information such as feedback, beneficiary feelings, expectations from the proposed system, and the beneficiary's opinion and whether there were existing devices ready to be used with the system when it was delivered to the beneficiary. The interview with the beneficiary was performed twice in order to keep them informed as well as to tell them of the work that researchers would be doing in the system and the information that is supplied by researchers during the interview. During the interview, the researchers presented their suggested system and were prepared to answer open-ended questions from them. With this method approach, there was effective communication between the two parties, and it was possible to identify problems, which assisted the researchers in executing the purpose and meeting the needs of the beneficiary within the proposed system.

Observation

Obtaining results and data from survey questionnaires and interviews is critical in order to improve the system and meet the demands of those who benefit from the system in the long run. Additionally, one of the factors that the researchers are evaluating is assessing how helpful the system would be to the beneficiary. Because of these findings, the researchers are able to make improvements to the system in order to make it more effective in the future.

Records

Previously collected data are used in this study, including beneficiary's records, which is assessed by the researchers. These existing data that the beneficiary provided to the researchers are to only be used for the purpose of managing the inventory of the implemented system, and will not be used for any other purpose. This includes information such as a list of currently available items, pricing, and product stock levels. This data is also used as the database's data source, and it was provided by the beneficiary via a social media messaging program in the form of a photograph.

Survey Approach

The researchers prepared an online survey for the beneficiary via the use of a Google form in order to examine the beneficiary's requirements for an inventory system as well as to learn about the gadgets that are already accessible in their store and their specifications. Researchers also included information on what they anticipate to get from the system and what they would be looking for once they do receive it. The researchers also designed another survey for their feedback on using the system to determine whether or not they were pleased with it and what improvements would be required to make it more user-friendly in the future. The ISO 25010 software quality standards are used by the researchers in order to get accurate evaluation and to be able to determine what has to be improved and maintained in terms of quality.

3.3 Technical Background

3.3.1 Product Description

The beneficiary will be using SIMS for their day-to-day checking of sales and inventory, as well as transactions using the POS of the system. The beneficiary can also see the forecasting of sales and notification on inventory threshold upon clicking the dashboard button and notification button. They can also use stock in entry for restocking new items. Another notable feature to be used by the beneficiary is the reports button that shows the summary report, and it is also printable. The POS also consists of features like adding discounts, clearing carts, and printing receipts.

3.3.2 Economic Use of the Product

The proponents sought that the business scope of the beneficiary is to simply to serve customers and to maintain its products and services. The usage of manual systems has been a common procedure by the beneficiary but there are a lot of errors when it comes to tracking of sales, inventory, and transactions. With this, the proponents have thought of creating a system dedicated to tracking the sales, inventory, and transactions of the beneficiary.

3.3.3 User Requirements

User level 2 is the administrative level that has all access to every feature of the system, while user level 1 consists of the employees of the business like cashier or staff. The first user level has limited privileges depending on what user level 2 gives to user level 1.

User Level 1

- Knows cashier/staff username (issued by user level 2)
- Knows cashier/staff password (issued by user level 2)

User Level 2

- Knows admin username
- Knows admin password

3.3.4 System Requirements

The main software to be required by the researchers is having internet provided in the device, this is required for the system to operate correctly and back up any transacted records during its operation. Hardware specifications are as listed below, starting with the minimum requirements and

recommended requirements.

Software requirements:

- OS: Windows 7/8/9/10 64-bit
- Internet Connection (1mbps or higher)

Minimum hardware requirements:

- Operating system
 - Microsoft Windows 7 or higher
- Processor
 - 1.8 GHz or faster 64-bit processor; Quad-core
- Graphics card
 - Anything that supports a minimum display resolution of WXGA (1366 by 768)
- RAM
 - 4 GB or higher
- HDD / SSD
 - Minimum of 20 GB of available space

Recommended hardware requirements:

- Operating system
 - Microsoft Windows 10 or higher
- Processor
 - 2.4 GHz or faster 64-bit processor; Quad-core or better, recommended
- Graphics card
 - Anything that supports a display resolution of 1920 by 1080 or higher
- RAM
 - 8 GB or higher
- HDD / SSD
 - 50 GB of available space or more

3.4 Development and Testing

The Sales and Inventory Management System (SIMS) is used for sales forecasting and inventory monitoring of the beneficiary and the data stored in the SQL Server database. The waterfall model was utilized to guide the development of the researchers' system. A Gantt chart is used to keep track of the researcher's schedule. The researchers completed chapter 3 on time, and the working prototype had a progress of more than 50%, which included all of the system's primary functions.

In order to get an accurate review and to be able to establish what aspects of the program's quality need to be improved and maintained, the developer of the software will evaluate the system that the researcher is using in accordance with the ISO 25010 software quality standards, and hold a virtual meeting for the beneficiary. Once the system is fully operational, the researcher's team will discuss how it works.



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Figure 13. Splash screen

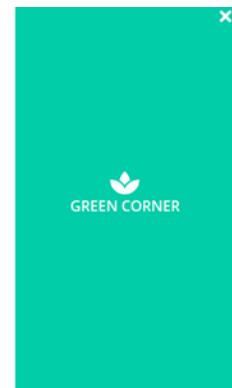


Figure 14. Login form



Figure 15. Password checkbox

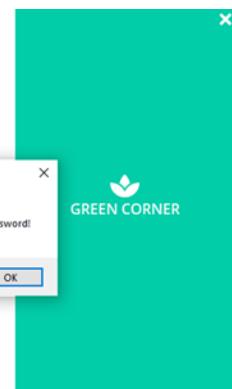


Figure 16. Login form (No username or & password)

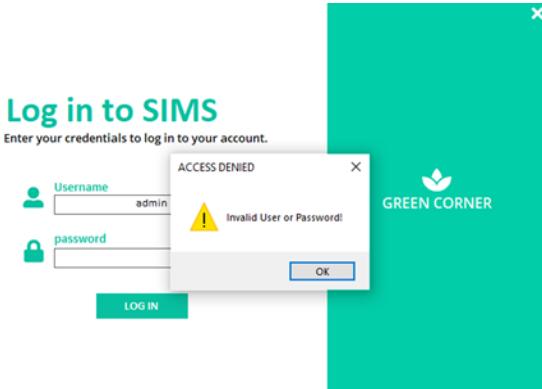


Figure 17. Login form (No password)

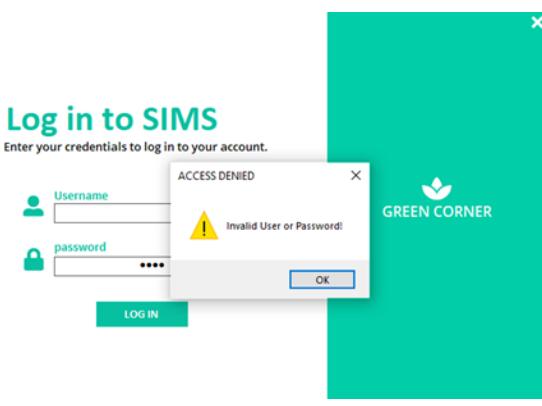


Figure 18. Login form (No username)

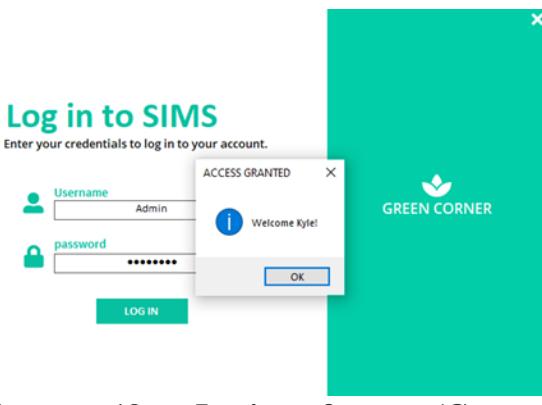


Figure 19. Login form (Correct credentials)

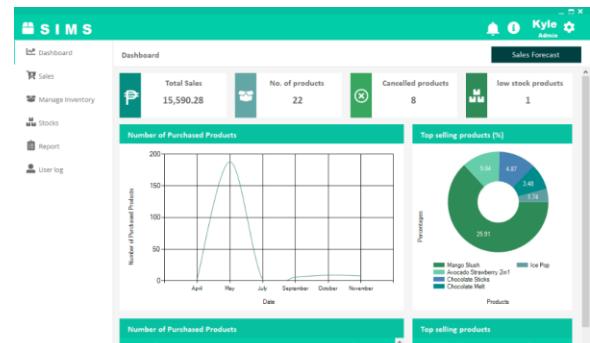


Figure 20. Dashboard form



Figure 21. Dashboard form (Forecasting)

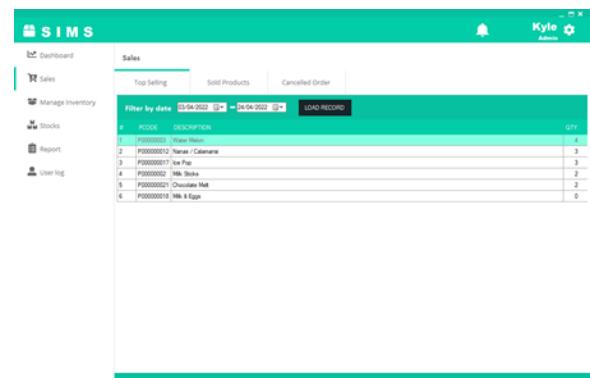


Figure 22. Sales form (Top selling products)

DESCRIPTION	PRICE	QTY	DISCOUNT	TOTAL
Milk Shake	10.00	2	0.00	20.00
Water Melon	10.00	4	0.00	32.00
Ice Pop	15.00	3	0.00	44.10
Milk & Egg	20.00	0	0.00	0.00
Chocolate Milk	20.00	2	0.00	40.00

Figure 23. Sales form (Sold products)

TRANSACTION NO.	PRICE	DESCRIPTION	DATE	REASON	ACTION
P00000010	20.00	Milk & Egg	Wednesday, 11 April 2022	Admin Canceled	Canceled YES
P00000010	20.00	Milk & Egg	Thursday, 21 April 2022	Admin Canceled	Canceled YES

Figure 24. Sales form (Cancelled order)

CATEGORY
Beverages
Ice cream
Soda
Snacks

Figure 25. Manage Inventory form (Category)

Category name
Beverages

Figure 26. Category form (Add category)

Category name
Beverages

Figure 27. Category form (Update category)

Are you sure you want to delete this Category?

Yes No

Figure 28. Category form (Delete category)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 29. Manage Inventory form (Brand)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 30. Brand form (Add brand)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 31. Brand form (Update brand)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 32. Brand form (Delete brand)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 33. Manage Inventory form (Products)

SIMS	
Dashboard	Kyle Admin
Sales	
Manage Inventory	
Category	
Brand	
Product	
Stocks	
Report	
User Log	

Figure 34. Products form (Add products)

Figure 35. Products form (Update products)

Figure 36. Products form (Delete products)

Figure 37. Stocks form (Stock entry)

Figure 38. Stocks form (Add stock entry)

Figure 39. Stocks form (Stock history)

Figure 40. Report form (Summary report)

Figure 41. Report form (Custom report)

INVOICE #	PRODUCT CODE	DESCRIPTION	QTY	DISCOUNT	TOTAL	DATE
					TOTAL 0.00	

Figure 42. Report form (Daily Sales report)

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
20221071001	Chocolate / Strawberry Cup	P00000001	4	0.00	104.00	07/11/2022
20221081001	Mochi Vanilla	P00000015	4	0.00	60.00	08/11/2022
20221091001	Chocolate Melt	P00000021	3	0.00	60.00	09/11/2022
20221091001	Mango Slush	P00000007	2	0.00	40.00	09/11/2022
TOTAL 264.00						

Figure 43. Report form (Daily Sales report)

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
20221071001	Chocolate Sticks	P00000008	4	0.00	104.00	07/11/2022
20221071001	Chocolate/Strawberry/ Avocado Sundae	P00000008	4	0.00	104.00	07/11/2022
20221071001	Strawberry Crispy	P00000008	4	0.00	104.00	07/11/2022
20221071001	Nanas / Calamansi	P00000008	4	0.00	104.00	07/11/2022
20221071001	Milk Melon	P00000008	4	0.00	104.00	07/11/2022
20221071001	Red Bean Sandwich	P00000008	4	0.00	104.00	07/11/2022
20221071001	Mochi Vanilla	P00000008	4	0.00	104.00	07/11/2022
TOTAL 164.00						

Figure 44. Report form (Weekly Sales report)

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
202209281001	Chocolate Sticks	P00000016	29	0.00	340.00	28/09/2022
202209281001	Chocolate/Strawberry/ Avocado Sundae	P00000016	29	0.00	340.00	28/09/2022
202209281001	Strawberry Crispy	P00000016	29	0.00	340.00	28/09/2022
202209281001	Nanas / Calamansi	P00000016	29	0.00	340.00	28/09/2022
202209281001	Milk Melon	P00000016	29	0.00	340.00	28/09/2022
202209281001	Red Bean Sandwich	P00000016	29	0.00	340.00	28/09/2022
202209281001	Mochi Vanilla	P00000016	29	0.00	340.00	28/09/2022
202209281001	Avocado Strawberry	P00000016	29	0.00	340.00	28/09/2022
202209281001	Ice Pop	P00000016	29	0.00	340.00	28/09/2022
TOTAL 3,480.00						

Figure 45. Report form (Quarterly Sales report)

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
202205041004	Chocolate Sticks	P00000001	2	0.00	20.00	04/05/2022
202205041004	Chocolate/Strawberry/ Avocado Sundae	P00000001	2	0.00	20.00	04/05/2022
202205041004	Strawberry Crispy	P00000001	2	0.00	20.00	04/05/2022
202205041004	Nanas / Calamansi	P00000001	2	0.00	20.00	04/05/2022
202205041004	Milk Melon	P00000001	2	0.00	20.00	04/05/2022
202205041004	Red Bean Sandwich	P00000001	2	0.00	20.00	04/05/2022
202205041004	Mochi Vanilla	P00000001	2	0.00	20.00	04/05/2022
TOTAL 20.00						

Figure 46. Report form (Annual Sales report)

USERNAME	ACTION PERFORMED	TIMESTAMP
Kyle Admin		13/11/2022 6:39:25pm

Figure 47. User log form

The screenshot shows the SIMS application's dashboard. On the left, there is a sidebar with icons for Dashboard, Sales, Manage Inventory, Stocks, Report, and User log. The main area is titled "Critical Level Stocks" and contains a table with the following data:

#	PCODE	BARCODE	DESCRIPTION	BRAND	CATEGORY	PRICE	REORDER	STOCK ON HAND
1	P0000001	000000001	Chocolate Sticks	Ace	Ice cream	10.00	10	14
2	P00000016	000000016	Avocado Strawberry 2in1	Ace	Ice cream	120.00	10	0

Figure 48. Notification form (Critical level products)

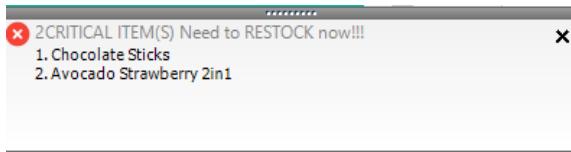


Figure 49. Notification prompt (Critical items)

The screenshot shows the "Account Settings" section of the SIMS application. Under the "Profile" tab, there are fields for Username (Admin), Password (*****), Role (Admin), and Name (Kyle). There is also an "Edit" button.

Figure 50. Account setting form (Profile)

The screenshot shows the "Account Settings" section of the SIMS application. Under the "Change Password" tab, there are fields for Username (Admin), Old Password, New Password, and Re-type Password. There is also a "Save" button.

Figure 51. Account setting form (Change password)

The screenshot shows the "Account Settings" section of the SIMS application. Under the "User List" tab, there is a table with columns: #, USERNAME, ROLE, NAME, ACTIVE, and ACT/DEACT. A modal window titled "Activate/Deactivate" is open, showing a "Username" field with "Sue" and a checked "Act/Deact" checkbox. There is a "Save" button at the bottom of the modal.

Figure 52. Account setting form (Activate/Deactivate account)

The screenshot shows the "Account Settings" section of the SIMS application. Under the "Create Account" tab, there are fields for Username, Password, Re-type Password, Role, and Name. There is also a "Show/Hide" checkbox and a "Save" button.

Figure 53. Account setting form (Create Account)

The screenshot shows the "Account Settings" section of the SIMS application. Under the "Add Role" tab, there is a table with columns: #, ROLE, and several checkboxes. Below the table are "Save", "Update", and "Cancel" buttons.

Figure 54. Account setting form (Add, Update, Delete role)

This screenshot shows a POS system interface. At the top, it says 'POS' and 'James | Cashier'. Below that is a 'Purchase' section with buttons for 'Search Product', 'Add Discount', 'Clear Cart', and 'Daily Sales'. It displays 'Total Amount: 0.00', 'Disc.: 0.00', 'Vat: 0.00', and 'Vatable: 0.00'. A large green button labeled 'Payment' is at the bottom. The main area shows a table with one row: 'DESCRIPTION' (Ice cream), 'PRICE' (40.00), 'QTY' (1), 'DISCOUNT' (0.00), and 'TOTAL' (40.00). The total amount is also displayed as '0.00' at the bottom.

Figure 55. POS form

This screenshot shows a POS system interface similar to Figure 55, but with a different transaction number ('202209281004'). The 'Purchase' section and table are identical, showing a single item transaction with a total of 40.00.

Figure 56. POS form (New transaction)

This screenshot shows a POS system interface with a search bar for products. The 'Purchase' section and table are identical to previous figures, showing a single item transaction with a total of 40.00.

Figure 57. POS form (Search products)

This screenshot shows a POS system interface where a user has searched for a product ('Ice cream') and added a quantity of 2. The 'Purchase' section and table are identical to previous figures, showing a single item transaction with a total of 40.00.

Figure 58. POS form (Search products - Add qty)

This screenshot shows a POS system interface with a 'Discount' dialog box open. It contains fields for 'Total Price' (40.00), 'Disc. type' (Senior Citizen), 'Discount (%)' (0.00), and 'Discount Amount' (0.00). Below the dialog, the 'Customer info' section shows a name ('Aman Date Out') and an account number ('123456789'). A 'Confirm' button is at the bottom right. The main transaction table shows a total of 40.00.

Figure 59. POS form (Add discount)

This screenshot shows a POS system interface with a 'Clear' dialog box open. It contains fields for 'Username' and 'password'. A 'Cancel Order' button is at the bottom right. The main transaction table shows a total of 40.00.

Figure 60. POS form (Single product clear)

This screenshot shows a POS system interface with a 'Clear' dialog box open. It contains fields for 'Username' and 'password'. A 'Cancel Order' button is at the bottom right. The main transaction table shows a total of 40.00.

Figure 61. POS form (Bulk clear)

This screenshot shows the POS software interface after a payment has been settled. The main window displays a receipt for a transaction with a total of 40.00. A modal window titled 'Settle Payment' confirms the payment was successfully saved. The receipt details include the date (Wednesday, 28), time (12:29 pm), and transaction number (202209281004). The receipt itself lists a single item: Chocolate Melt at 20.00.

Figure 62. POS form (Settle payment)

This screenshot shows the POS software displaying a receipt for a transaction. The receipt is from 'Green Corner' located at 'Brgy. I-B (Pob.) San Pablo City, Laguna 4000'. The receipt number is 202209281004. It lists a single item: Chocolate Melt at 20.00. The receipt also includes the date (Wednesday, 28), time (12:29 pm), and transaction number (202209281004).

Figure 63. POS form (Receipt)

This screenshot shows the POS software displaying a summary of daily sales. The total amount for the day is 3,860.00. The sales details table lists four transactions, each with an invoice number, product code, description, price, quantity, discount, and total. The products listed are Chocolate Melt, Chocolate Stick, Mocha Vanilla, and Chocolate Nut.

Figure 64. POS form (Daily Sales)

This screenshot shows the POS software displaying a 'Cancel order details' dialog. The dialog lists a single item: Chocolate Melt. The user is prompted to enter a reason for cancellation, which is set to 'Cancel reason'. The dialog also shows the transaction number (202209281004), price (20.00), quantity (2), and total (40.00). The total amount for the day is 0.00.

Figure 65. POS form (Cancel order)

This screenshot shows the POS software displaying a 'Void' dialog. The dialog lists a single item: Chocolate Melt. The user is prompted to enter a reason for voiding, which is set to 'Cancel reason'. The dialog also shows the transaction number (202209281005), price (20.00), quantity (2), and total (40.00). The total amount for the day is 0.00.

Figure 66. POS form (Void)

This screenshot shows the POS software displaying a 'Change Password' dialog. The dialog contains fields for 'Old Password', 'New Password', and 'Confirm Password'. The total amount for the day is 0.00.

Figure 67. POS form (Change password)

This screenshot shows the SIMS application dashboard. The dashboard includes a 'User Manual' section with links to 'SIMS', 'POS', and 'Task Scheduler'. Below the manual, there are sections for 'Using SIMS with Admin account', 'Managing the Inventory', 'Going around Sales', 'Notification for critical items', 'Report on sales', 'Account Settings', and 'User Log'. The top right corner shows a user profile for 'Kyle'.

Figure 68. SIMS User Manual

This screenshot shows the SIMS application dashboard. The dashboard includes a 'User Manual' section with links to 'SIMS', 'POS', and 'Task Scheduler'. Below the manual, there are sections for 'Using point of sale with cashier account', 'Searching for a product for new transaction', 'Void for transaction', 'Payment and receipt upon changing the customer', and 'Daily sales of the user'. The top right corner shows a user profile for 'Kyle'.

Figure 69. POS User Manual

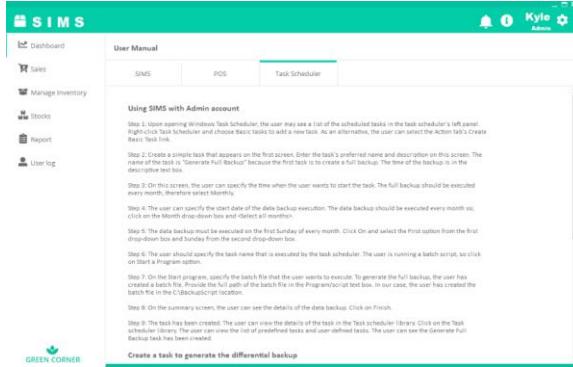


Figure 70. Task Scheduler User Manual

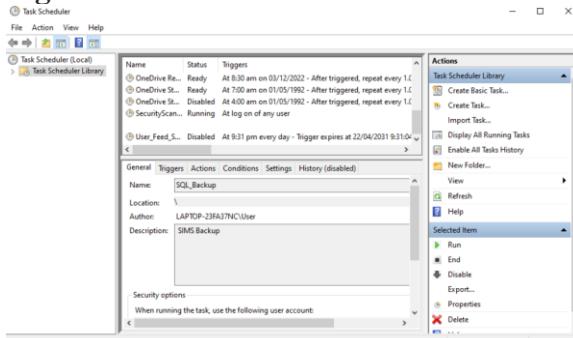


Figure 71. Task Scheduler Database Backup

3.5 Implementation Plan

The researchers will first start testing the proposed system using the given data by the beneficiary, as well as seeing if the beneficiary has the necessary hardware and software requirements. If the beneficiary meets all the requirements, then the researchers will then start to communicate with the beneficiary once the proposed system is finished. By then, the proposed system will be implemented by the researchers. The researchers will monitor the implemented system upon deployment, if there are any errors visible. The beneficiary may contact the researchers for technical support.

3.6 Implementation Results

As the proponents have gained the trust and consent of the beneficiary, the beneficiary provided their data and information that is now inputted in the database of the proposed system to begin testing. Once the proponents finish the proposed system, the proponents will then be able to deploy the system and provide for the beneficiary with the working system for them to use in their day-to-day transactions.

4. SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter gives a summary of the project that was

implemented as well as results derived from data analysis utilizing the ISO 25010 evaluation approach. The chapter concludes with recommendations for future researchers on how to improve on the system established in this study.

4.1 Summary

The researchers created SIMS (Sales & Inventory Management System for Retail Business Sellers) as a stand-alone system for retail business owners. In an inventory management system that focuses on the beneficiary's preferences and needs, the system integrates sales forecasting and inventory threshold notification. The researchers began testing the proposed system with the beneficiary's provided data, as well as determining if the beneficiary possessed the requisite hardware requirements. The researchers utilized the ISO 25010 software quality standards for the survey to obtain an accurate evaluation and to establish what has to be improved and maintained in terms of quality. The beta testing was conducted both virtually and physically, with 30 respondents from 5 IT specialists, 6 employees, 6 business owners, and 13 students completing the survey.

Indicators	Total Mean	Interpretation
Functional Suitability	4.4	Very Good
Performance Efficiency	4.13	Very Good
Compatibility	4.3	Very Good
Usability	4.35	Very Good
Reliability	4.27	Very Good
Security	4.27	Very Good
Maintainability	4.28	Very Good
Portability	4.33	Very Good

Table 1. Results/Findings of the Survey

4.2 Conclusion

In conclusion of the project, the researchers were able to accomplish and achieve the objective of providing the main features of forecasting that estimates the highest sale and notification on inventory threshold to the retail business seller. The system was able to assist retail company sellers in tracking their sales and inventories, and it also included a Point of Sale (POS) for business transactions. SIMS (Sales & Inventory Management System for Retail Business Sellers) was able to create a secure system by utilizing user levels, a user account, and providing a role inside the system to broaden the organizational levels covered by the business.

The researchers aim the system to be a user-friendly and simple-to-manage interface, which it has achieved in the findings of Usability with an average mean of 4.35 and Functional Suitability with an average mean of 4.4, both of which are evaluated as very good. The objectives of providing a daily backup and reports for daily, weekly, and monthly sales were also met, with the system's reliability having an average mean of 4.27 and performance efficiency having an average mean of 4.13, resulting in a very good rating from the 30 respondents.

The researchers also have tallied the following other data: Compatibility's average mean is 4.3. Security's average mean is 4.27. Maintainability's average mean is 4.28. Portability's average mean is 4.33. And the overall mean of the results is 4.29. Based on the findings and interpretation of the researchers, the system is overall very good. The capstone project proposed by the researchers was able to give a solution to the business challenges that a lot of entrepreneurs encountered in an inventory manual system, while also meeting the needs of the beneficiary.

4.3 Recommendations

Based on the findings of the research project and the panelists' insights, the following recommendations are made for future researchers who will continue to develop the system. Integrate a hardware component into the system, such as a barcode scanner, to read bar code-based data and eliminate errors in the inventory system. Have an online transaction platform and an online payment system in place to allow cashless payments for goods via cards, mobile phones, or the internet. Incorporate a credit/debit card reader for future transactions to provide retailers and business owners with a quick, efficient, and secure way to accept electronic payments from their customers. The researchers propose including an employee's payroll to boost employee morale where the salary is paid properly. It is recommended for the future researchers to simplify the system's field of interpretation, describe the forecasted graphs more thoroughly, change the daily forecasted to annual as the business grows, and implement a dynamic modification in VAT and discount in the admin form page. It is also suggested that the system be app-based software that can be used on mobile devices.

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APPENDICES

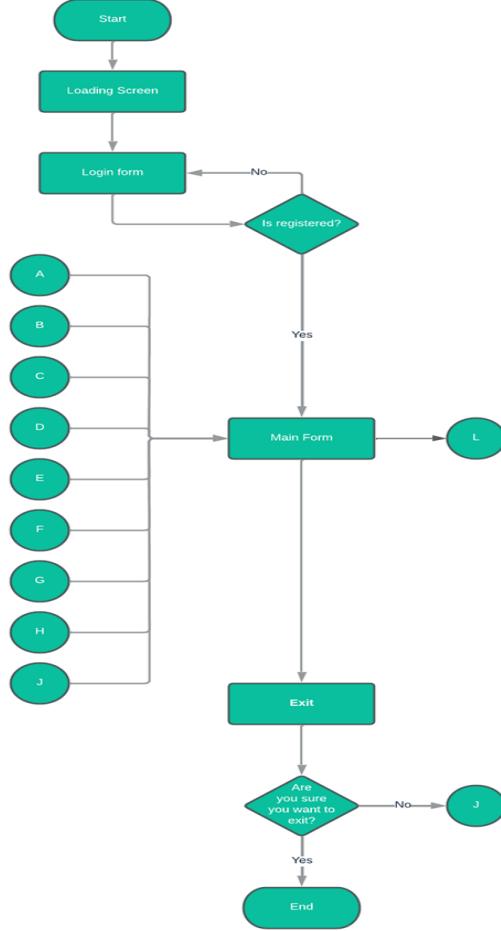


Figure 7.1 Flowchart of the Proposed System (SIMS)



Figure 7.2 Flowchart of the Proposed System (SIMS)

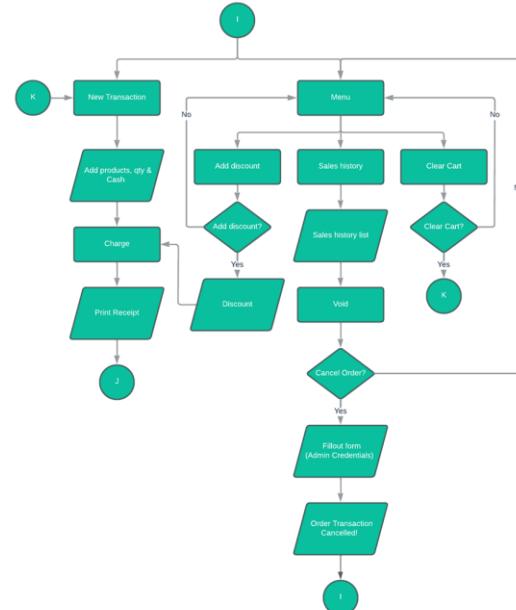


Figure 7.3 Flowchart of the Proposed System (SIMS)

A. GANTT CHART

DEVELOPMENTAL SCHEDULE

TASK ID	TASK DESCRIPTION	PREDECESSORS	TASK DURATION	PROJECT START DATE
				PROJECT DURATION
A	Documentation (Chapter 10.2)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	5/15/2022
B	Non-Working Prototype	UI Designer & Software Engineer	4	5/19/2022
C	Code Creation	System Analyst & Technical Writer	1	5/19/2022
D	Revised Non-Working Prototype	UI Designer & Software Engineer	1	5/19/2022
E	Preparation for Preliminary Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	3	5/15/2022
F	Online Pre-Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	5/20/2022
G	Code Revision & Documentation (Chapter 10.2)	UI Designer, Software Engineer, System Analyst & Technical Writer	4	5/20/2022
H	Documentation (Chapter 3)	UI Designer, Software Engineer, System Analyst & Technical Writer	5	5/30/2022
I	Software Engineer	System Analyst	14	4/5/2022
J	Connecting Database	Software Engineer	2	4/20/2022
K	Code Creation	Software Engineer	3	4/20/2022
L	ReDesigning the System	Software Engineer	3	4/21/2022
M	Revision of Documentation (Chapter 1-3)	UI Designer, Software Engineer, System Analyst & Technical Writer	7	5/5/2022
N	Preparation for Final Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	5/13/2022
O	Online Final Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	5/14/2022

Figure 72. Developmental Schedule 1.0

Task	Description	Duration	Start Date	
P	Revision of Documentation	UI Designer, Software Engineer, System Analyst & Technical Writer	7	5/17/2022
Q	Revision of System	UI Designer, Software Engineer	14	5/25/2022
R	Code Revision	Software Engineer	3	5/26/2022
S	Mid year postponed	UI Designer, Software Engineer, System Analyst & Technical Writer	40	6/3/2022
T	Forecasting Research	UI Designer, Software Engineer, System Analyst & Technical Writer	20	7/24/2022
U	Connecting Additional Software	Software Engineer	1	8/4/2022
V	Documentation	UI Designer, Software Engineer, System Analyst & Technical Writer	7	8/4/2022
W	Code Revision	Software Engineer	14	8/30/2022
X	Code Testing	Software Engineer	3	9/4/2022
Y	Documentation Revision	Project Manager	1	9/8/2022
Z	Preparation for Preliminary Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	5	9/10/2022
AA	Online Prelim Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	10/2/2022
BB	Document Revision (Chap 1-3)	UI Designer, Software Engineer, System Analyst & Technical Writer	5	10/4/2022
CC	Code Revision & Code Testing	Project Manager	25	10/10/2022
DD	Documentation (Chap 3)	Software Engineer	3	10/10/2022
EE	Beneficiary Testing & Survey	System Analyst & Technical Writer	7	11/3/2022
FF	Revisions of Documentation	Project Manager	7	11/7/2022
GG	Revisions of System	Software Engineer	5	11/25/2022
HH	Preparation for Final Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	2	12/1/2022
II	Final Defense (I)	UI Designer, Software Engineer, System Analyst & Technical Writer	1	12/4/2022
JJ	Revisions & Implementation	Technical Manager & Software Engineer	7	12/6/2022
KK	Final Documentation Submission	UI Designer, Software Engineer, System Analyst & Technical Writer	1	12/9/2022

Figure 73. Developmental Schedule 1.1

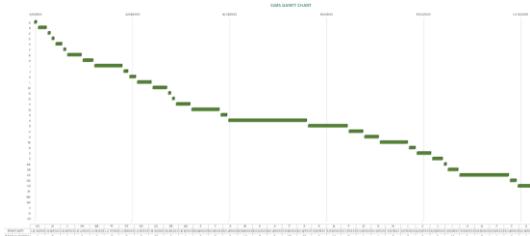


Figure 74. Developmental Schedule Chart

B. PRESENTATION OF FINDINGS

Indicators	Total Mean	Interpretation
Functional Suitability	4.4	Very Good
Performance Efficiency	4.13	Very Good
Compatibility	4.3	Very Good
Usability	4.35	Very Good
Reliability	4.27	Very Good
Security	4.27	Very Good
Maintainability	4.28	Very Good
Portability	4.33	Very Good

Table 2. Results/Findings of the Survey

a. Profile of Respondents

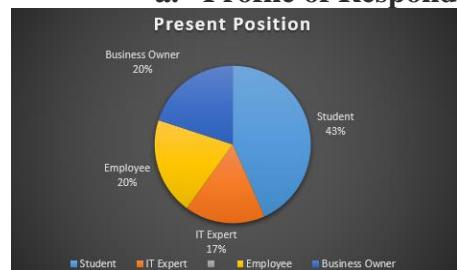


Figure 75. Summary of Findings 1.0

As seen in the figure above, a total of thirty

(30) respondents from this survey evaluated the system. It is made up of five (5) information technology experts, six (6) employees, six (6) business owners, and thirteen (13) students.

b. Functional Suitability

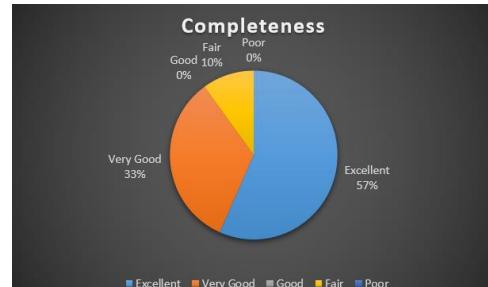


Figure 76. Summary of Findings 1.1

In terms of completeness, fifty-seven (57%) of respondents which contains 17 respondents agree and rated the system excellent where the set of features of the project meets all of the defined tasks and user objectives. While the remaining (33%) rate the system as very good, only a handful (10%) rate it as fair.



Figure 77. Summary of Findings 1.2

In terms of correctness, eighteen of the respondents which contains sixty percent (60%) rated the system excellent that it produces the correct result with the required degree of precision. While thirty percent (30%) say it is very good, three percent (3%) believe it is good, and seven percent (7%) believe it is fair.

c. Performance Efficiency



Figure 78. Summary of Findings 1.3

In terms of time behavior in the evaluation of performance efficiency, forty-three percent (43%) rated it excellent as the system's response and processing times and throughput rates while executing its functions and achieving standards. While the remaining thirty-three percent (33%) believe it is very good, seventeen percent (17%) believe it is good, and the remaining two respondents with seven percent (7%) believe it is fair.

d. Compatibility



Figure 79. Summary of Findings 1.4

In terms of the system's compatibility, fifty-four percent (54%) believe it is excellent since the system can execute its needed operations properly while sharing a shared environment and resources with other products, with no detrimental impact on any other product. While the remaining thirty-three percent (33%) say it is very good, three percent (3%) believe it is good, and the remaining three respondents, which contains ten percent (10%) of the respondents rated it as fair.

e. Usability



Figure 80. Summary of Findings 1.5

In terms of appropriateness recognizability, sixty-three percent (63%) of 19 respondents gave the system an excellent score as users can recognize whether a product or system is suitable for their needs. While twenty percent (20%) say it is very good, ten percent (10%) believe it is good, and the remaining two respondents, which contains seven percent (7%) believe it is fair.



Figure 81. Summary of Findings 1.6

In terms of learnability, fifty-three percent (53%) rated the system as excellent for it can be used by specified users to achieve specific goals of learning to use the system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use. While thirty percent (30%) believes that it is very good which contains nine respondents, seven percent (7%) believe it is good and remaining 3 respondents which contains ten percent (10%) of the respondents rated it as fair.



Figure 82. Summary of Findings 1.7

In terms of operability, sixty-four percent (64%) of respondents ranked the system as excellent because it contains attributes that make it simple to operate and control. While twenty-three percent (23%) say it is very good, ten percent (10%) believe it is good (three respondents), and the remaining three percent (3%) believe it is fair.

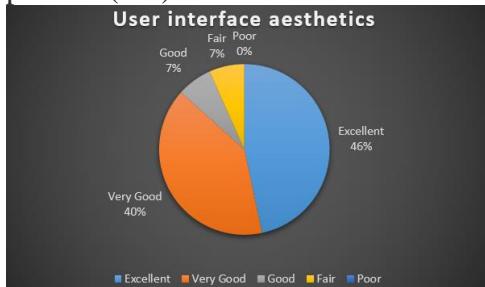


Figure 83. Summary of Findings 1.8

In terms of User Interface Aesthetics, forty-six percent (46%) evaluated the system as excellent in areas where the user interface allows for pleasing and satisfying interaction. While forty percent (40%) of the twelve respondents thought it is very good, seven percent (7%) believe it is good, and seven percent (7%) of the remaining respondents evaluated it as fair.

f. Reliability



Figure 84. Summary of Findings 1.9

In terms of availability, fifty-three percent (53%) with a number of sixteen of respondents ranked the system as excellent since it is operational and available when needed. While 37% believe it is very good, the remaining 3 respondents (which include 10% of the respondents) believe it is fair.

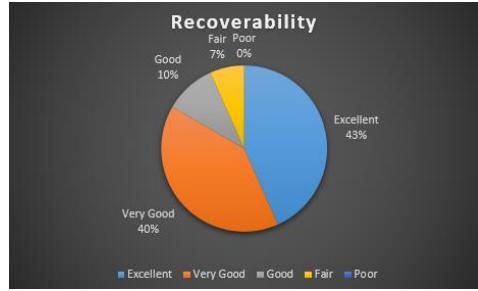


Figure 85. Summary of Findings 1.10

In terms of recoverability, forty-three percent (43%) of respondents evaluated the system as excellent for its ability to recover directly affected data and restore the system to its desired condition. While forty percent (40%) believe it is very good, three respondents consider it good with a ten percent (10%) and the remaining two respondents rated it as fair with a seven percent (7%).

g. Security

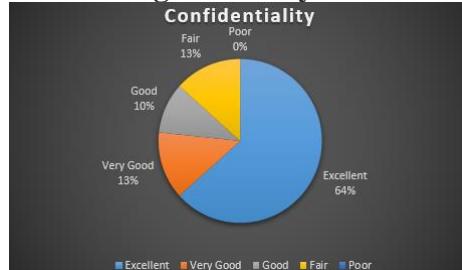


Figure 86. Summary of Findings 1.11

In terms of confidentiality in the category of security, sixty-four percent (64%) of respondents which contains nineteen of it rated the system as excellent, seeing as the system ensures that data is only available to those who are authorized to have access. While thirteen percent (13%) believe it is very good, three respondents say it is good with ten percent (10%) and the remaining four respondents assessed it as fair with thirteen percent (13%).



Figure 87. Summary of Findings 1.12

In terms of integrity, sixty-four percent (64%) of respondents, including nineteen of individuals, assessed the system as excellent, due to the system's ability to prevent unauthorized access to, or alteration of, computer or data. While thirteen percent (13%) believe it is very good, three percent (10%) believe it is good, and the remaining four respondents believe it is fair with thirteen percent (13%).

h. Maintainability



Figure 88. Summary of Findings 1.13

In the category of maintainability for modifiability, fifty percent (50%) of the respondents rated the system excellent for its ability to be effectively and efficiently modified without introducing defects or deteriorating existing product quality. With eleven responses, thirty-seven percent of the respondents (37%) feel it is very good, one respondent with three percent (3%) believe it is good, and the remaining ten percent (10%) believe it is fair.



Figure 89. Summary of Findings 1.14

In the category of maintainability for testability, fifty-three percent (53%) of respondents evaluated the system excellent, noting its effectiveness and efficiency in establishing test requirements for a system, product, or component and performing tests to assess whether those criteria were satisfied. With eleven responses, thirty-seven percent of respondents (37%) say it is very good, two respondents (7%) believe it is fair, and three respondents (3%) believe it is poor.

i. Portability



Figure 90. Summary of Findings 1.15

In terms of portability, sixty-four percent (64%) of nineteen respondents rated the system excellent, citing its efficacy and efficiency in successfully installing and/or uninstalling a product or system in a specified environment. With seven responses, twenty-three percent (23%) believe it is very good, three percent (10%) believe it is fair, and the remaining three percent (3%) say it is poor.

C. LETTER OF REQUEST FOR APPROVAL

ADAMSON
UNIVERSITY

Adamson University | College of Science | IT and IS Department
900 San Marcelino St., Ermita, Manila 1000

APPROVAL LETTER

November 21, 2022

Sally Abenido
Owner of Green Corners

Dear Mrs. Abenido,

Greetings in the name of St. Vincent de Paul!

We are Adamson University students pursuing a BS in Information Systems and would want to seek permission to cooperate with your business on our Capstone Project which is entitled "SIMS for Retail Business Sellers (Sales and Inventory Management System)", an inventory system for your business, where it forecasts your sales in order to monitor stock levels and physical counts. As a beneficiary, the output of this research will be free of charge and this will forecast the highest sales based on your customers' transacted orders in the market.

With that said, we humbly ask for your approval and permission for your business to take part in our capstone as our beneficiary. We guarantee that any information you provide will be used only for this purpose and will be kept confidential.

Respectfully yours,
Hector Adriano Jr.
Hector Adriano Jr.

Kyle Andrew Tong
Kyle Andrew Tong

Nicole Evelyn Tomagan
Nicole Evelyn Tomagan

James Arnold Edilberto Verzosa
James Arnold Edilberto Verzosa

NOTED BY:

JL
Dr. Leonard L. Alejandro
Technical Adviser

Figure 91. Request Approval Letter

D. SAMPLE SURVEY QUESTIONNAIRE (WITH RESPONSE)

EVALUATION CRITERIA FOR SOFTWARE MATERIAL (ISO 25010)

<CAPSTONE PROJECT TITLE>					
Name: <u>JL Santiago</u>	Designation:	Name of School / Company: <u>Mitsubishi</u>	Date and Time Administered: <u>November 09, 2022</u>	Student No. / ID No. _____	
Instrument: Please evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.					
Numerical Rating	Equivalent				
5	Excellent				
4	Very Good				
3	Good				
2	Fair				
1	Poor				
INDICATORS					
A. Functional Suitability					
1. Completeness. Set of functions covers all the specified tasks and user objectives. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
2. Correctness. System provides the correct results with the needed degree of precision. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
B. Performance Efficiency					
1. Time Behaviour. Response and processing times and throughput rates of the system, when performing its functions, meet requirements. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
C. Compatibility					
1. Co-existence. The system can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
D. Usability					
1. Appropriateness recognizability. Users can recognize whether a product or system is appropriate for their needs. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
2. Learnability. The system can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
3. Operability. The system has attributes that make it easy to operate and control. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
4. User Interface Aesthetics. User interface enables pleasing and satisfying interaction for the user. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
E. Reliability					
1. Availability. The system is operational and accessible when required for use. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					

ISO 25010 – for System

Figure 92. Sample Survey Questionnaire 1.0

1. Recoverability. In the event of an interruption or a failure, the system can recover the data directly affected and re-established the desired state of the system. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
F. Security					
1. Confidentiality. The system ensures that data are accessible only to those authorized to have access. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
2. Integrity. The system prevents unauthorized access to, or modification of, computer or data. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
G. Maintainability					
1. Modifiability. The system can be effectively and efficiently modified without introducing defects or degrading existing product quality. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
2. Testability. Effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
H. Portability					
1. Installability. Effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					

Any further comments regarding the software: Nice ✓

Summary:	Average	Certified True & Corrected by: <i>DR. LEONARD L. ALEJANDRO</i> Signature over Printed Name
A. Functionality/Suitability	_____	
B. Performance Efficiency	_____	Date: _____
C. Compatibility	_____	
D. Usability	_____	
E. Reliability	_____	
F. Security	_____	
G. Maintainability	_____	
H. Portability	_____	
Evaluator		
Total Score	/ 8 = _____	
Equivalent Meaning	_____	

ISO 25010 – for System

Figure 93. Sample Survey Questionnaire 1.1

E. APPROVAL FOR TESTING

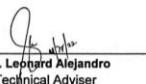
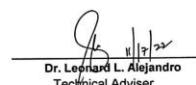
<p>CAPSTONE PROJECT'S INITIAL TESTING</p> <p>APPROVAL SHEET</p> <p>In partial fulfilment of the requirements for the degree of BACHELOR OF SCIENCE IN INFORMATION SYSTEM, this capstone project in IS Research Project 2 entitled SIMS for Retail Business Sellers (Sales and Inventory Management System) has been prepared by Herbert Abenido Jr., Nicole Sydney Tomagan, Kyle Andrew Tong, and James Arnold C. Verzosa who are hereby recommended for initial testing of the system to the beneficiary.</p> <p> _____ Dr. Leonard L. Alejandro Technical Adviser</p>	<p>CAPSTONE PROJECT'S FINAL TESTING</p> <p>APPROVAL SHEET</p> <p>In partial fulfilment of the requirements for the degree of BACHELOR OF SCIENCE IN INFORMATION SYSTEM, this capstone project in IS Research Project 2 entitled SIMS for Retail Business Sellers (Sales and Inventory Management System) has been prepared by Herbert Abenido Jr., Nicole Sydney Tomagan, Kyle Andrew Tong, and James Arnold C. Verzosa who are hereby recommended for final testing of the system to the beneficiary.</p> <p> _____ Dr. Leonard L. Alejandro Technical Adviser</p>
--	--

Figure 94. Initial Testing Approval

F. CERTIFICATE OF IMPLEMENTATION



Figure 96. Certificate of Implementation Given to Beneficiary

G. CERTIFICATE OF AUTHENTIC AUTHORSHIP

H. USER MANUAL

*SIMS for Retail Business Sellers (Sales and
Inventory Management System)*

USER MANUAL

Developed by:

Herbert Abenido Jr.

Nicole Sydney Tomagan

Kyle Andrew Tong

James Arnold Eduardo Verzosa

1. Application Review

SIMS is a stand-alone application that mainly features sales forecasting, stock and inventory management, reports on sales, user log, and point of sale (POS) that helps Green Corner in their day-to-day operations.

2. System summary

This section will talk about the hardware and software requirements as well as user access of SIMS.

3. Hardware and software requirements

Minimum Hardware Requirements:

- Operating system
- Microsoft Windows 7 or higher
- Processor
- 1.8 GHz or faster 64-bit processor; Quad-core
- Graphics card
- Anything that supports a minimum display resolution of WXGA (1366 by 768)
- RAM
- 4 GB or higher
- HDD / SSD
- Minimum of 20 GB of available space

Software requirements:

- Must have Microsoft SQL Server Management Studio
- Must have SIMS.bacpac for the database
- Must have SIMS.msi to install SIMS application

4. User access

To access the application, the user must have the installed SIMS application that can be opened using SIMS.exe.

5. How to access the application

To access SIMS, user must have the following:

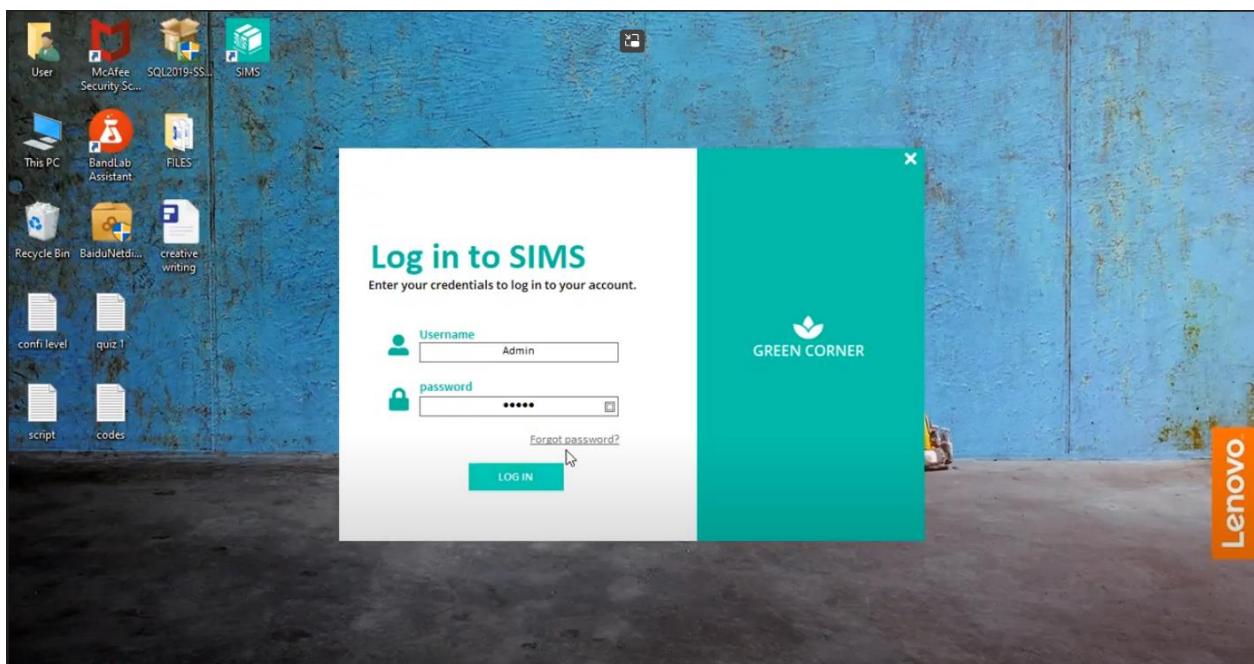
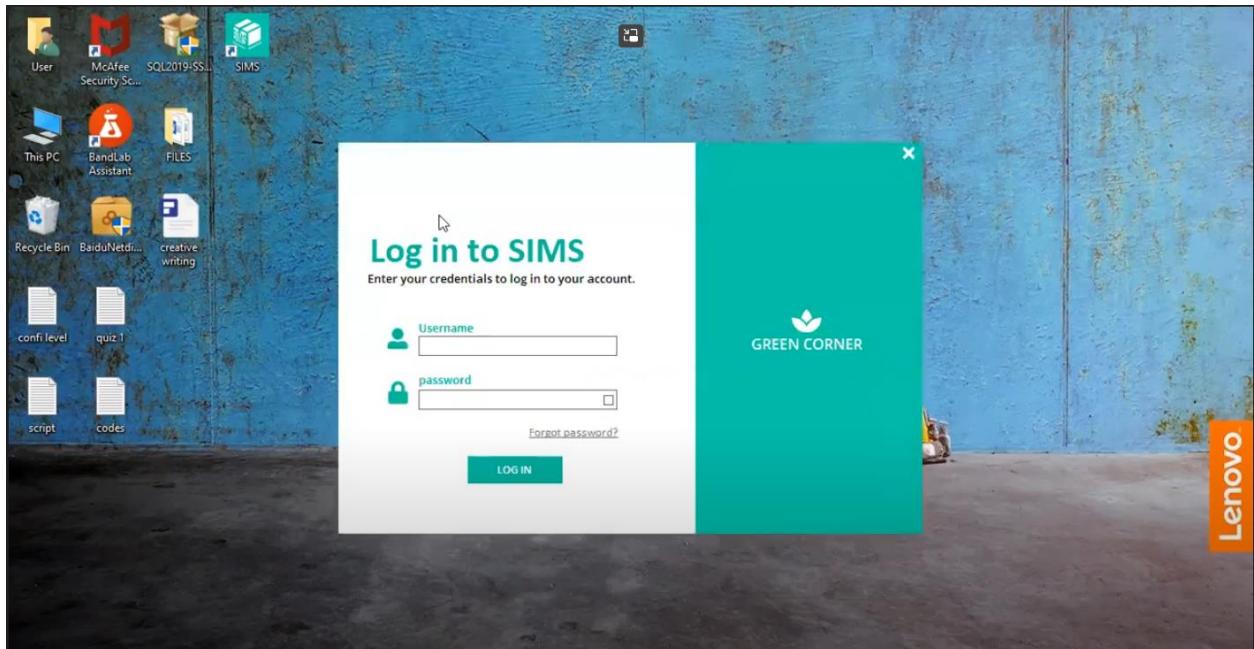
- Microsoft SQL Server Management Studio
- SIMS.bacpac for the database
- SIMS.msi to install SIMS application

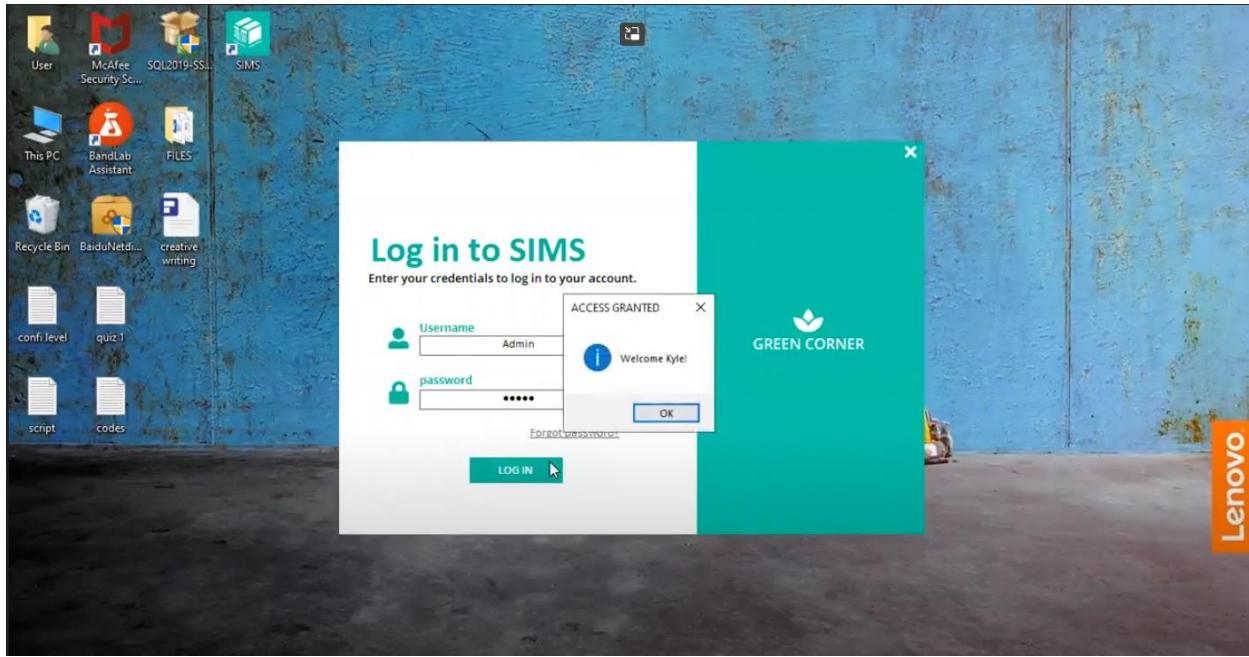
5.1. Installing the application and database

5.2. Using SIMS with Admin account (User Level 2)

Step 1: Logging in using admin credentials

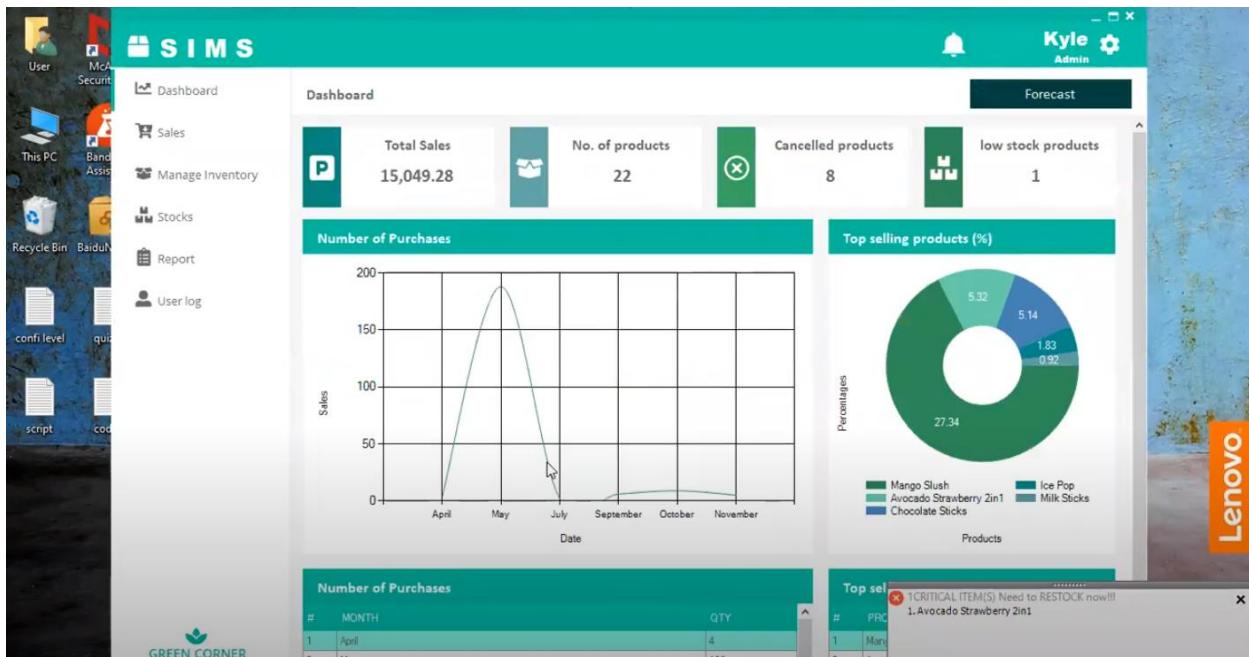
Upon opening the application, the user will be asked to input their credentials (username & password)

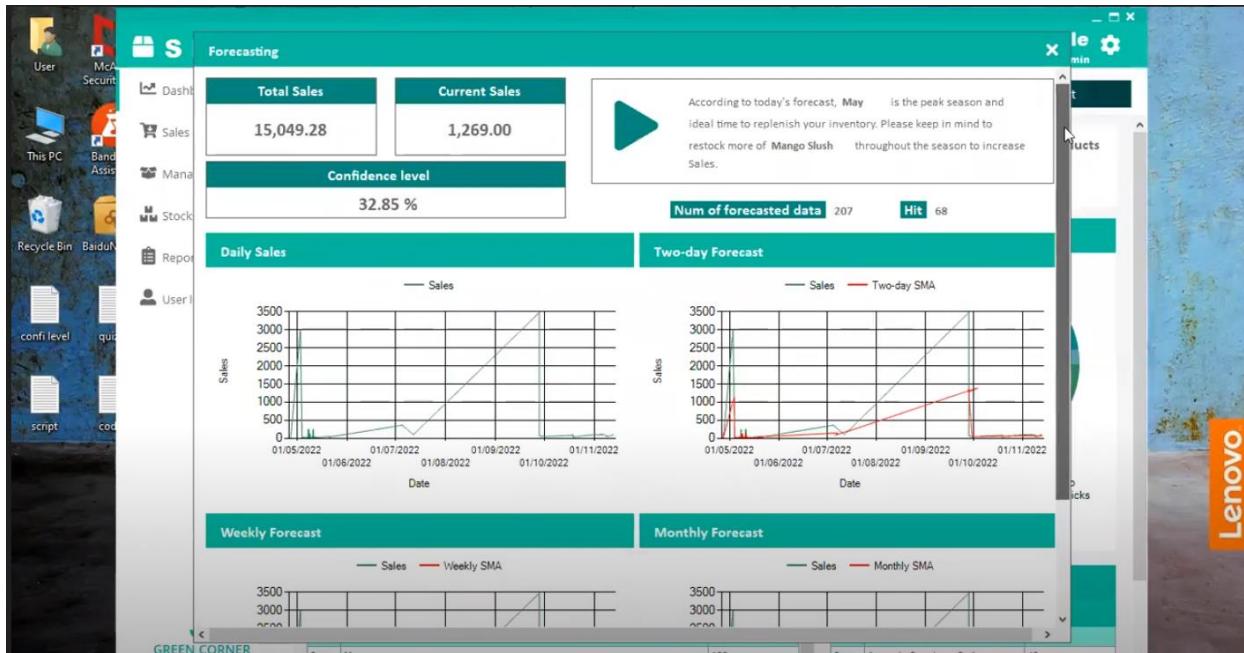




Step 2: After login (Dashboard w/ notification on critical items)

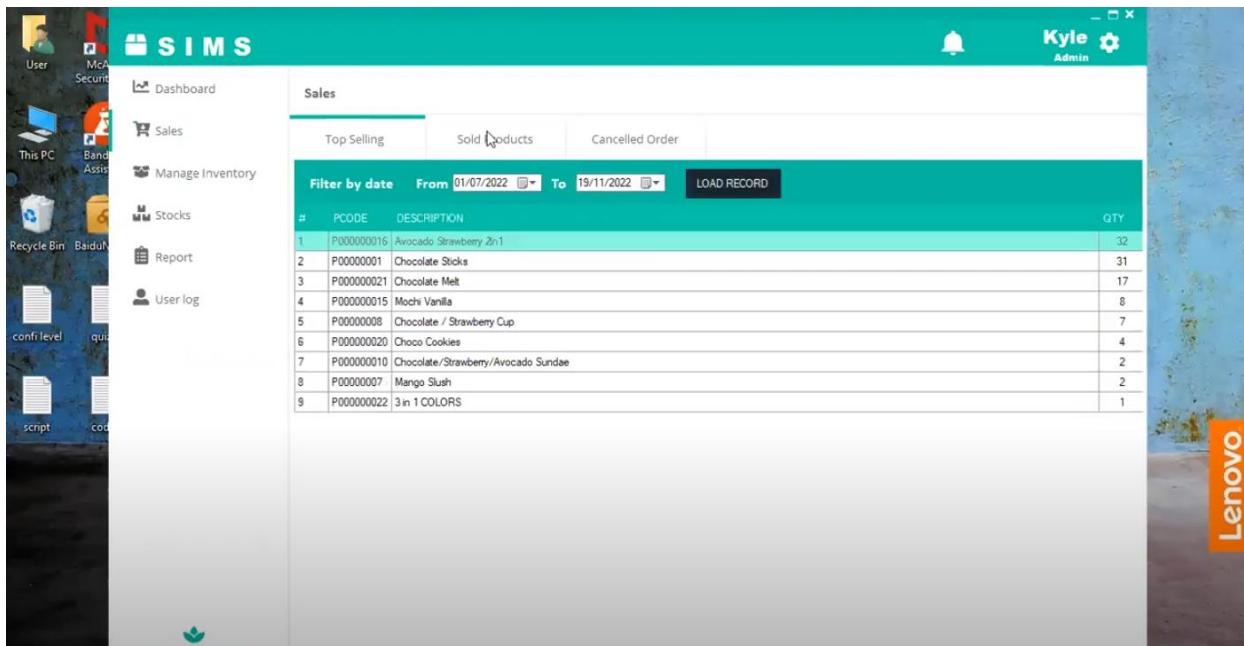
This part of the application is only accessible by User Level 2 which is the admin. Upon successfully logging in using admin credentials, the user is greeted with the dashboard and notification of any products that are low on stock. Once the user clicks the forecast button, it will show the forecasted sales of data.

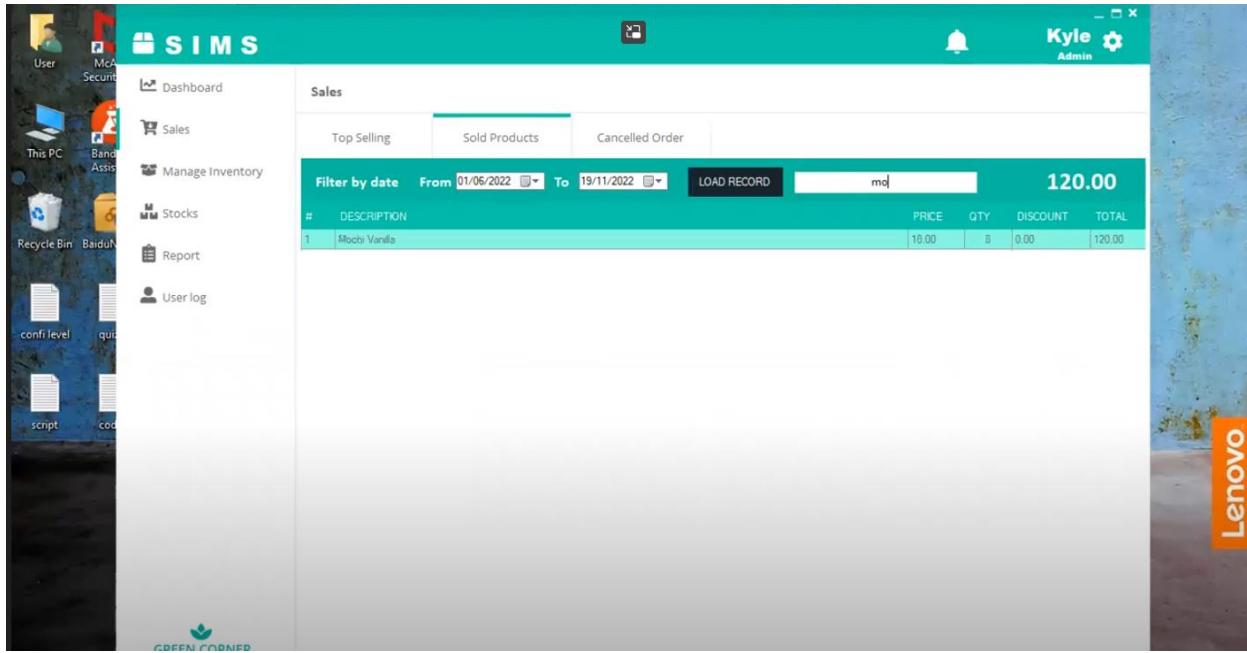




Step 3: Going around Sales

In this part of the application, the top selling, sold products, and canceled order are shown here. It can also be filtered by date, in case the user needs a specific date.

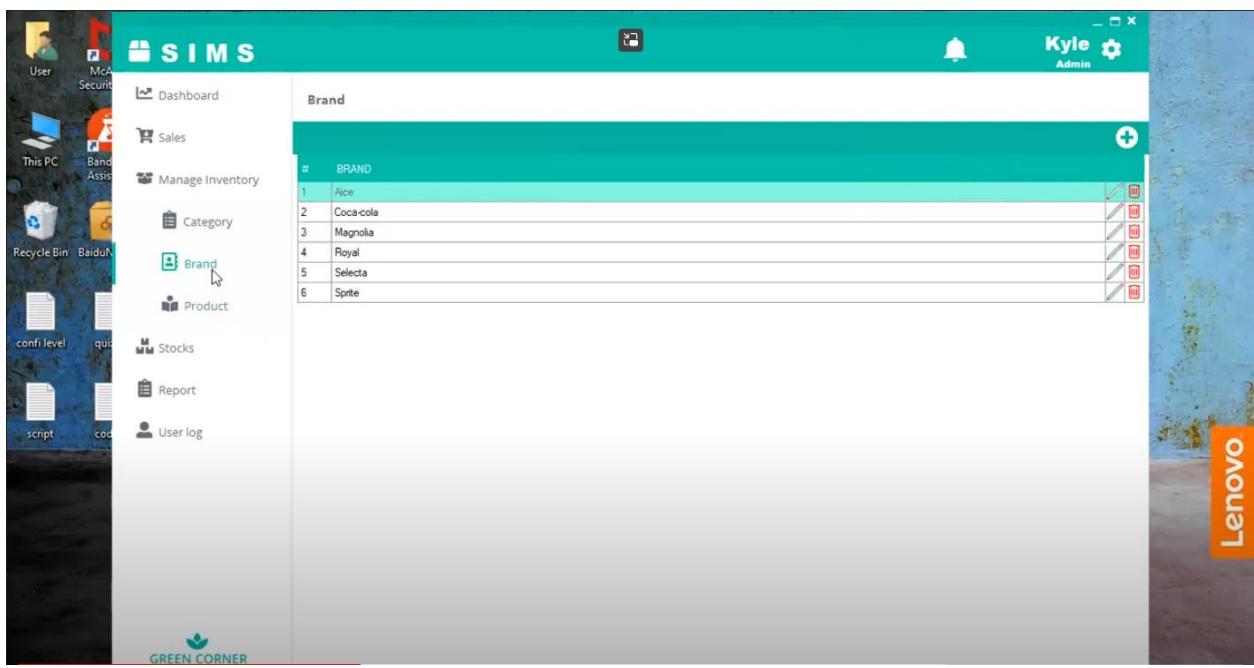
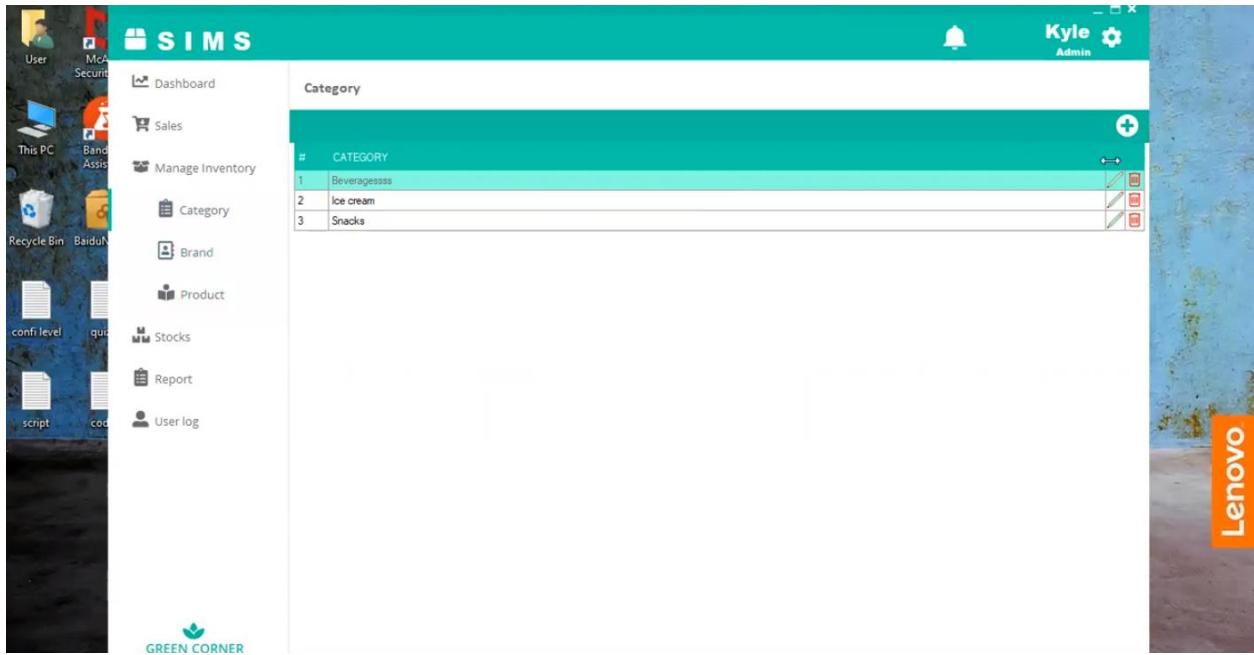


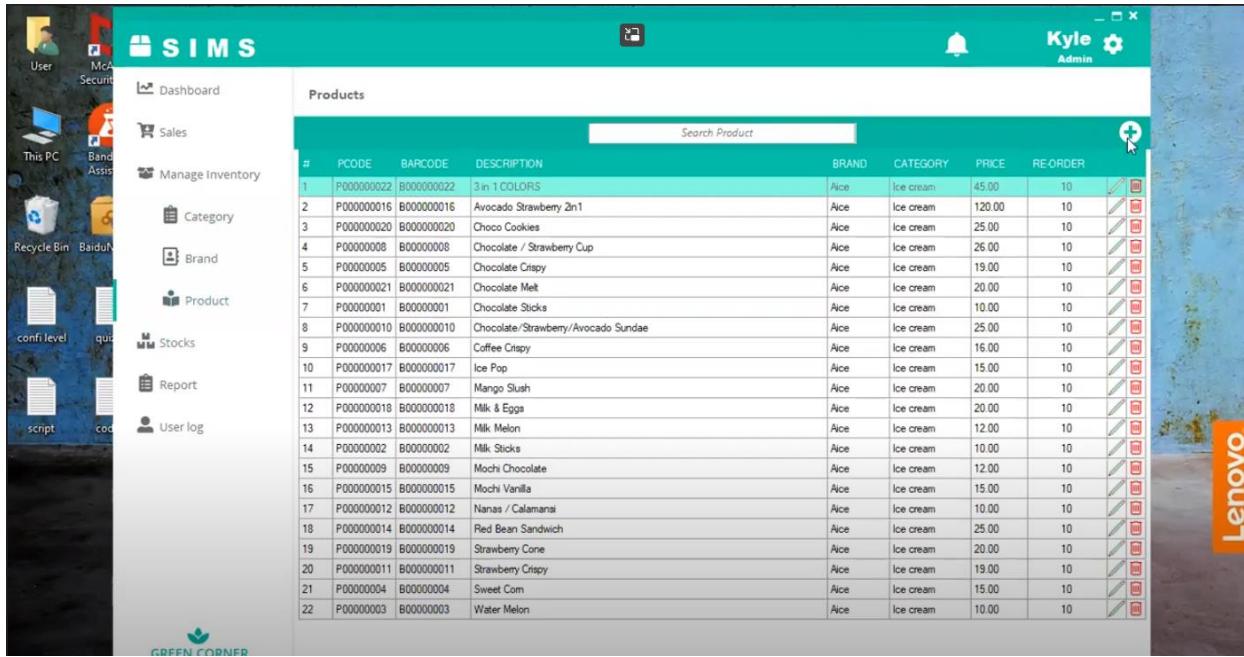


#	TRANS NO	PCODE	DESCR	PRICE	QTY	TOTAL	DATE	VOID BY	CANCELLED BY	REASON	ACTION
1	202209221001	P00000008	Choc...	26.00	20	520.00	Thursday, 22 September 2022	Admin	James	Cancel order(s)	YES
2	202209281004	P000000021	Choc...	20.00	2	40.00	Wednesday, 28 September 2022	Admin	James	Cancel order(s)	YES
3	202210011001	P00000008	Choc...	26.00	4	93.60	Saturday, 1 October 2022	Admin	James	Cancel order(s)	YES
4	202210021002	P00000008	Choc...	26.00	2	41.60	Sunday, 2 October 2022	Admin	James	Cancel order(s)	YES
5	202210021003	P00000008	Choc...	26.00	2	52.00	Sunday, 2 October 2022	Admin	James	Cancel order(s)	YES

Step 4: Managing the inventory

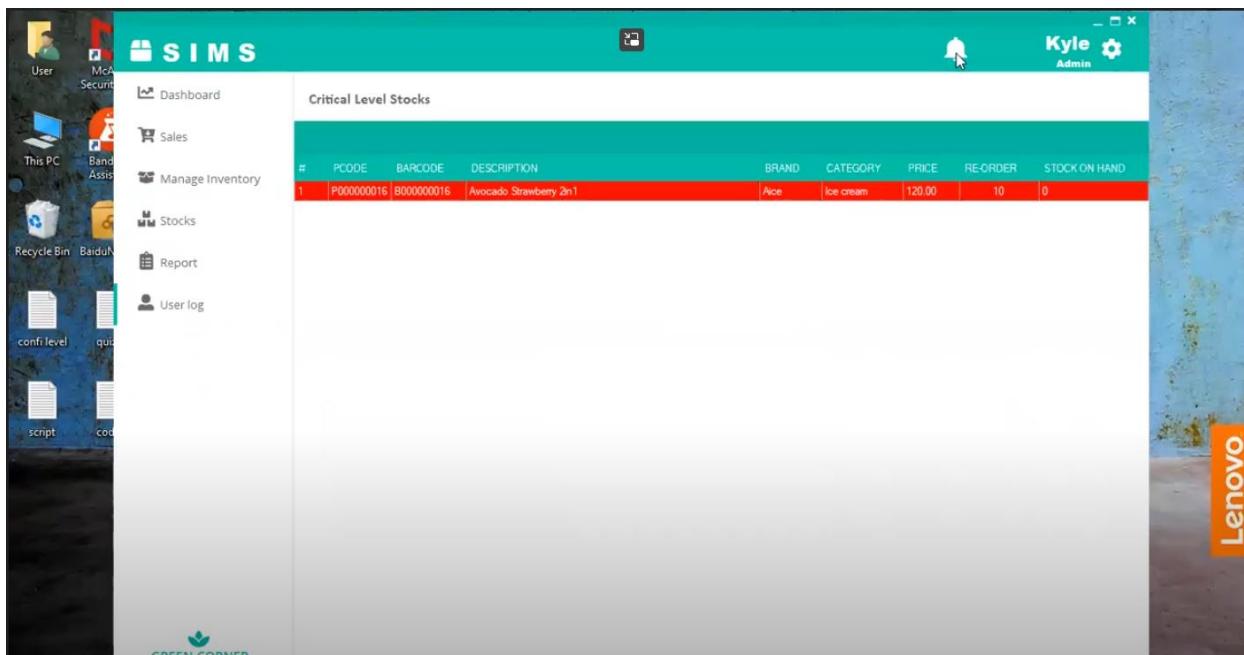
The “manage inventory” section has the list of category, brand, and products. The user can add a new item or edit an already existing item, as well as deleting it which will be archived.





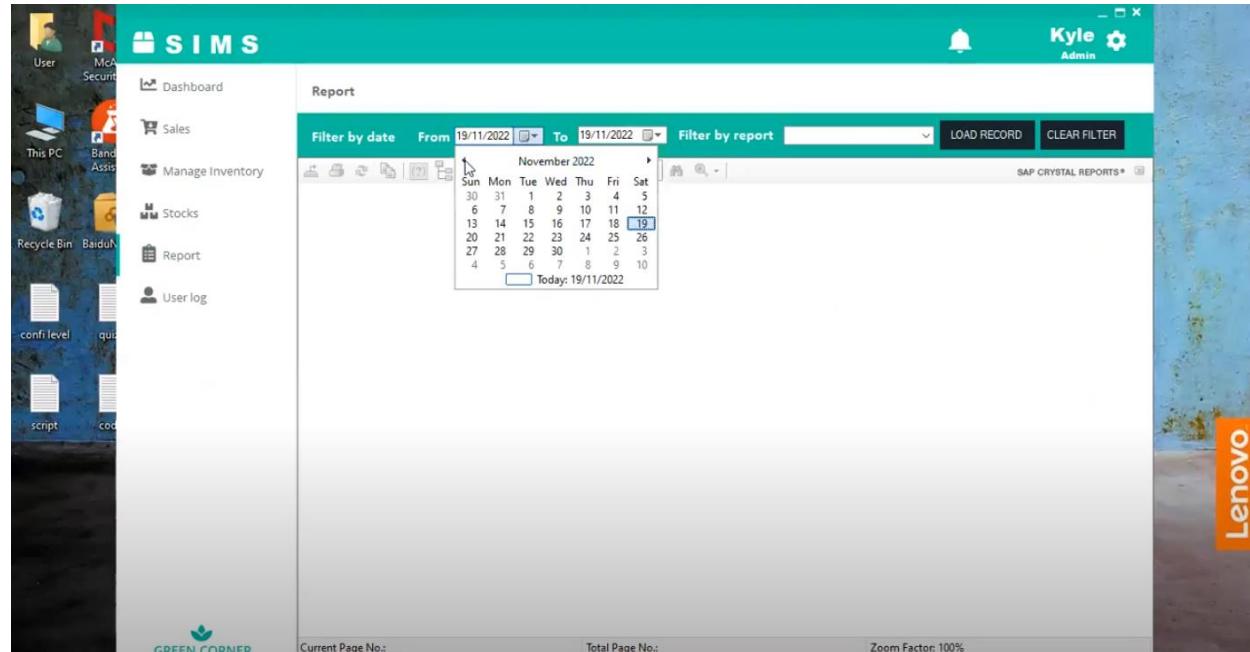
Step 5: Notification for critical items

The notification bell on the top right corner of the application leads the user to the critical level stocks. This section shows any items that are low on stock.



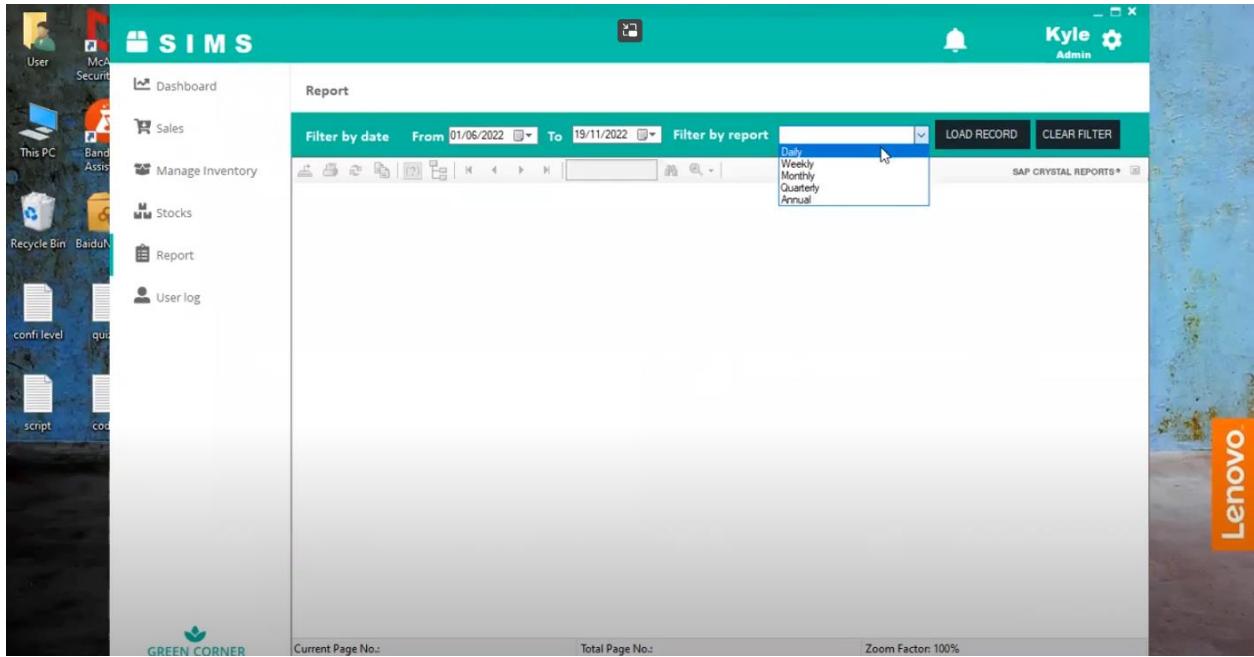
Step 6: Report on sales

In this part of the application, the user needs to filter the date first then upon clicking load record, it will show the sales from the input date. The report can also be filtered by daily, weekly, monthly, quarterly and annually.



202210191001	P00000021	Chocolate Melt	4	0.00	80.00	19/10/2022
202210191001	P00000001	Chocolate Sticks	3	0.00	30.00	19/10/2022
202210271001	P00000008	Chocolate / Strawberry Cup	3	0.00	78.00	27/10/2022
202211071001	P00000008	Chocolate / Strawberry Cup	4	0.00	104.00	07/11/2022
202211081001	P00000015	Mochi Vanilla	4	0.00	60.00	08/11/2022
202211091001	P00000021	Chocolate Melt	3	0.00	60.00	09/11/2022
202211091001	P00000007	Mango Slush	2	0.00	40.00	09/11/2022
202211131001	P00000021	Chocolate Melt	5	0.00	100.00	13/11/2022

TOTAL 5,011.00



This screenshot shows the same SIMS software interface as above, but the main area displays a 'Monthly Sales Report' window. The report title is 'Monthly Sales Report' and it includes a timestamp 'DATE & TIME: 19/11/2022 11:42:53pm'. The report is titled 'Summary Report' and contains a table of sales data:

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
202211071001	P00000008	Chocolate Sticks	4	0.00	104.00	07/11/2022
202211071001	P00000008	Chocolate/Strawberry/ Avocado Sundae	4	0.00	104.00	07/11/2022
202211071001	P00000008	Strawberry Crispy	4	0.00	104.00	07/11/2022
202211071001	P00000008	Nanas / Calamansi	4	0.00	104.00	07/11/2022
202211071001	P00000008	Milk Melon	4	0.00	104.00	07/11/2022
202211071001	P00000008	Red Bean Sandwich	4	0.00	104.00	07/11/2022
202211071001	P00000008	Mochi Vanilla	4	0.00	104.00	07/11/2022

At the bottom of the report window, there are status bars for 'Current Page No.: 1', 'Total Page No.: 5', and 'Zoom Factor: 100%'. The background features a blue wall with a 'Lenovo' logo.

Quarterly Sales Report

DATE & TIME: 19/11/2022 11:43:09pm

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
202209281001	P000000016	Chocolate Sticks	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Chocolate/Strawberry/ Avocado Sundae	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Strawberry Crispy	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Nanas / Calamansi	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Milk Melon	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Red Bean Sandwich	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Mochi Vanilla	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Avocado Strawberry 2in1	29	0.00	3,480.00	28/09/2022
202209281001	P000000016	Ice Pop	29	0.00	3,480.00	28/09/2022

Annual Sales Report

DATE & TIME: 19/11/2022 11:43:23pm

INVOICE #	DESCRIPTION	PRODUCT CODE	QTY	DISCOUNT	TOTAL	DATE
202205041004	P00000001	Chocolate Sticks	2	0.00	20.00	04/05/2022
202205041004	P00000001	Chocolate/Strawberry/ Avocado Sundae	2	0.00	20.00	04/05/2022
202205041004	P00000001	Strawberry Crispy	2	0.00	20.00	04/05/2022
202205041004	P00000001	Nanas / Calamansi	2	0.00	20.00	04/05/2022
202205041004	P00000001	Milk Melon	2	0.00	20.00	04/05/2022
202205041004	P00000001	Red Bean Sandwich	2	0.00	20.00	04/05/2022
202205041004	P00000001	Mochi Vanilla	2	0.00	20.00	04/05/2022

Step 7: User log

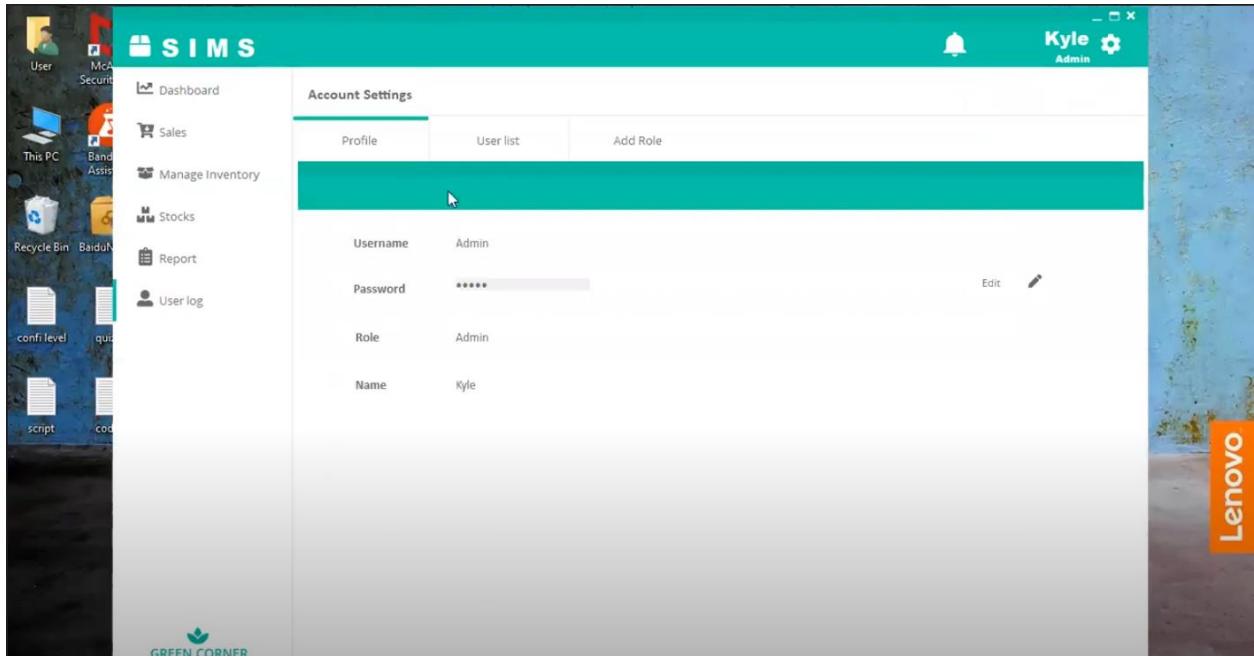
In the user log section, it shows the actions made by users in the application and it can also be filtered by username. The user log can also be printed using the “print record” button.

#	USERNAME	ACTION	TIMESTAMP
1	Cashier	Logout	25/04/2022 2:37:44 am
2	Admin	Login	25/04/2022 2:39:09 am
3	Admin	Login	25/04/2022 7:03:49 pm
4	Cashier	Login	25/04/2022 8:03:00 pm
5	Cashier	Login	25/04/2022 8:14:27 pm
6	Cashier	Logout	25/04/2022 8:14:40 pm
7	Admin	Login	25/04/2022 8:19:30 pm
8	Admin	Exit Application	25/04/2022 8:19:43 pm
9	Admin	Login	25/04/2022 8:20:37 pm
10	Admin	Logout	25/04/2022 8:28:36 pm
11	Cashier	Login	25/04/2022 8:28:57 pm
12	Cashier	Exit Application	25/04/2022 8:57:27 pm
13	Admin	Login	25/04/2022 9:00:35 pm
14	Admin	Login	25/04/2022 9:05:56 pm
15	Admin	Add Stocks	25/04/2022 9:15:50 pm
16	Admin	Login	25/04/2022 9:22:55 pm
17	Admin	Exit Application	25/04/2022 9:44:42 pm
18	Cashier	Login	27/04/2022 6:05:19 pm
19	Cashier	New Transaction	27/04/2022 6:05:26 pm
20	Cashier	Login	27/04/2022 6:12:53 pm
21	Cashier	New Transaction	27/04/2022 6:12:57 pm
22	Cashier	Settle Payment	27/04/2022 6:13:22 pm
23	Cashier	Logout	27/04/2022 6:14:59 pm

USERNAME	ACTION PERFORMED	TIMESTAMP
Admin	Login	01/09/2022 1:00:11 am
Admin	Logout	01/09/2022 1:02:04 am
Admin	Login	01/09/2022 1:09:36 am
Admin	Login	01/09/2022 12:02:05 am
Admin	Login	01/09/2022 12:06:46 am
Admin	Login	01/09/2022 12:08:58 am
Admin	Exit Application	01/09/2022 12:11:49 am
Admin	Login	01/09/2022 12:20:34 am
Admin	Exit Application	01/09/2022 12:34:53 am
Admin	Login	01/10/2022 12:13:30 am
Admin	Logout	01/10/2022 12:19:43 am
Admin	Login	01/10/2022 12:20:30 am
Admin	Logout	01/10/2022 12:23:41 am
Admin	Void	01/10/2022 12:25:59 am
Admin	Exit Application	02/09/2022 1:01:06 am
Admin	Login	02/09/2022 1:36:27 am
Admin	Login	02/09/2022 1:38:55 am

Step 8: Account Settings

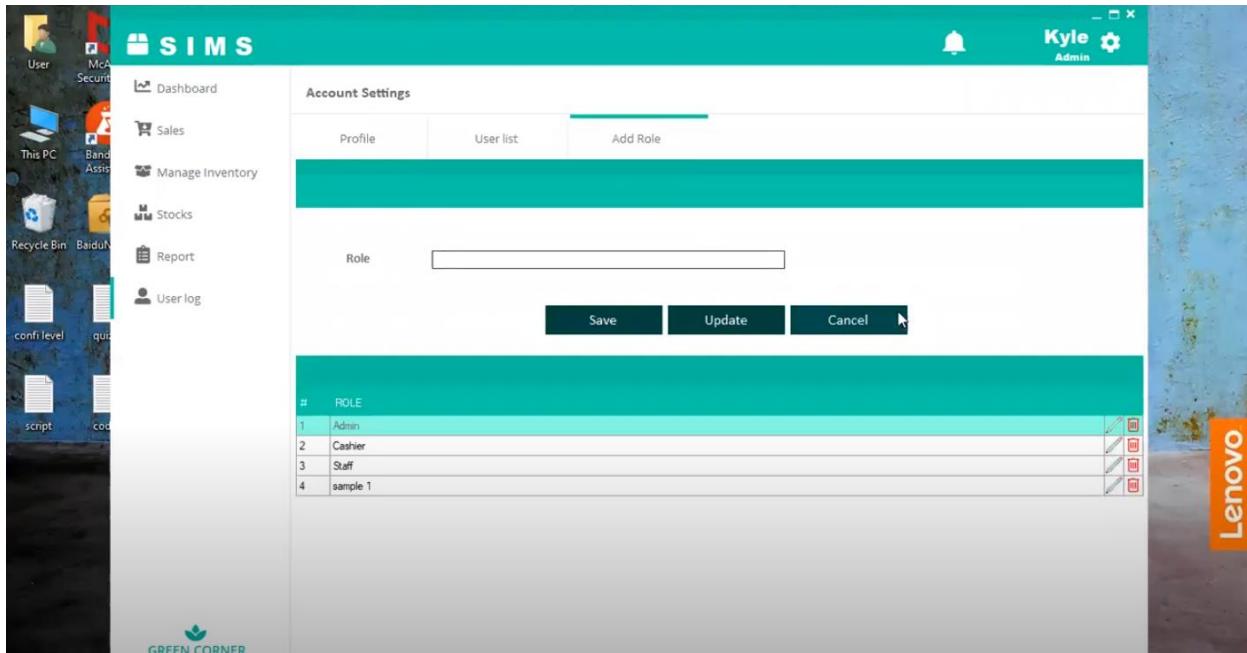
The account setting consists of the profile, user list, and add role. The admin can edit any of the users accounts, like activating or deactivating the account. The admin can also add a new role for a new user in case there is any and edit any role.



The screenshot shows the SIMS software interface, similar to the previous one but with a different view. The left sidebar and top navigation bar are identical. The main content area is titled 'Account Settings' and has three tabs: Profile, User list (selected), and Add Role. The 'User list' tab displays a table of users:

#	USERNAME	ROLE	NAME	ACT/DEACT
1	Syd	Cashier	Sydney	
2	James	Cashier	James	
3	Sample	Cashier	Syd	
4	Cashier	Cashier	Jim	

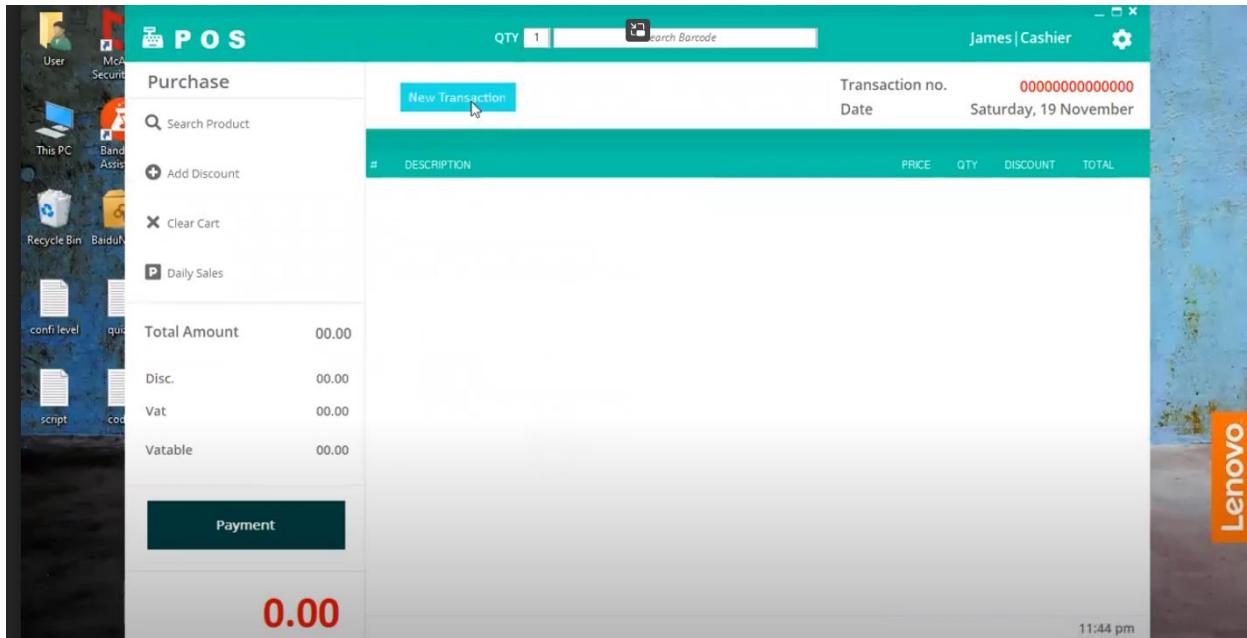
A small orange 'Lenovo' logo is visible on the right side of the screen.



5.3. Using point of sale with cashier account (User level 1)

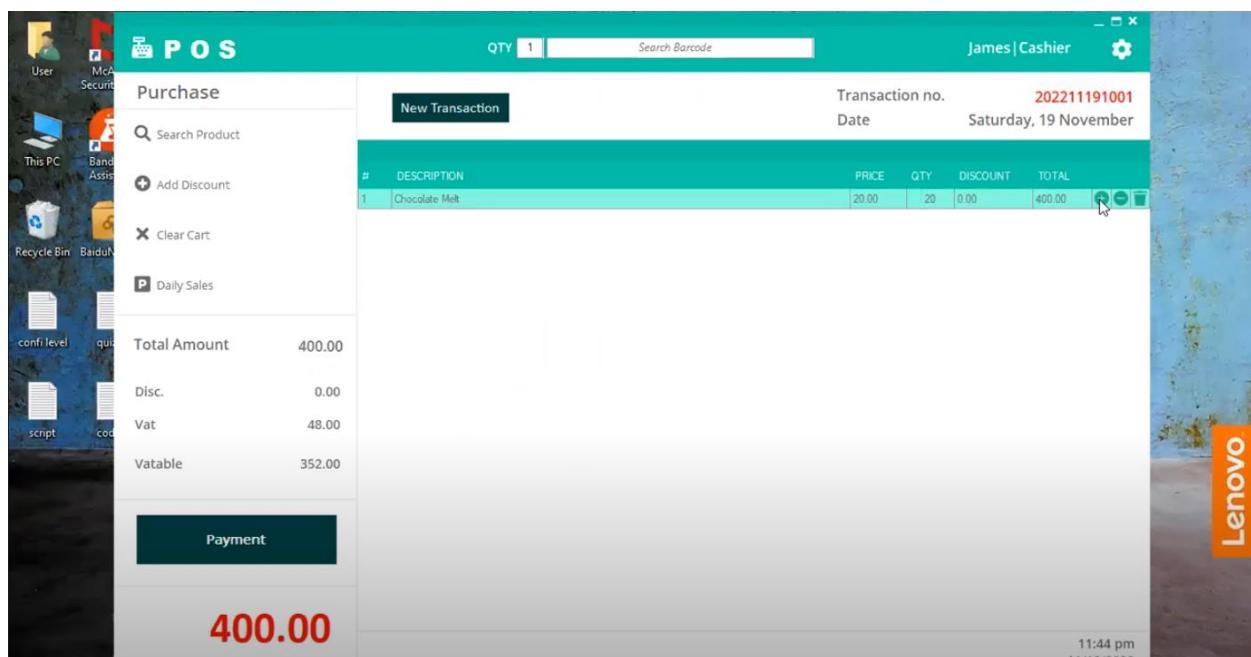
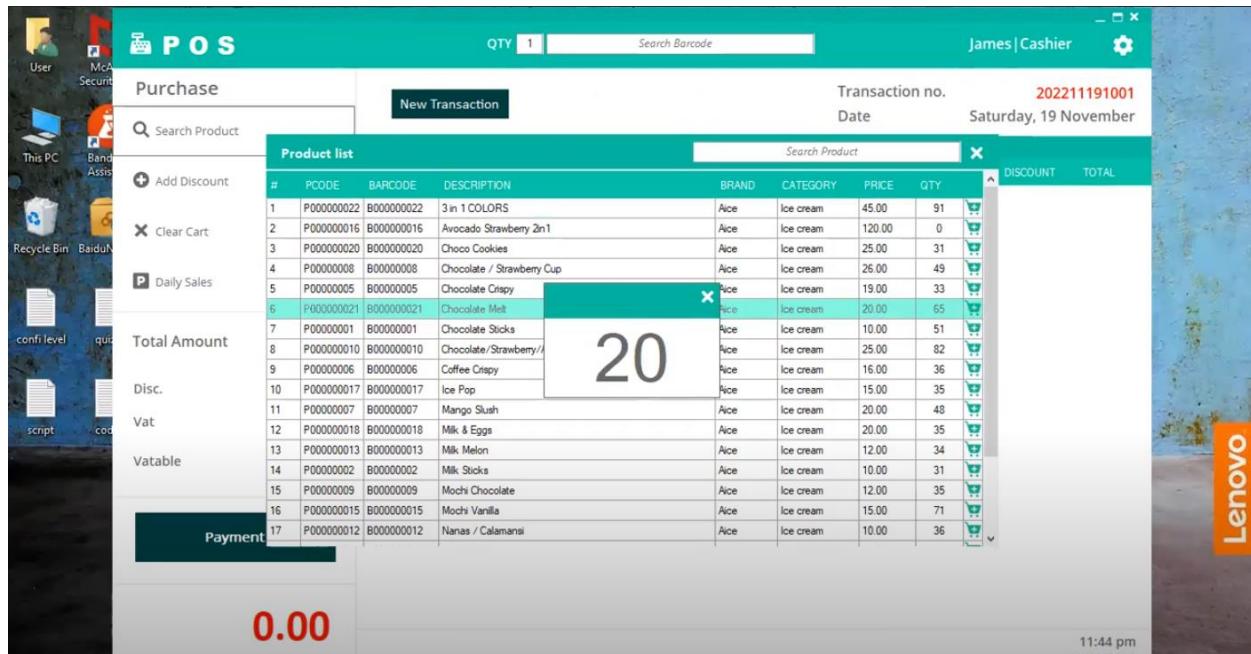
Step 1: Using point of sale

This part of the application is accessible by both User level 1 and 2. Once the user is at the point of sale (POS), he/she is able to produce a new transaction with a transaction number along with the current date.



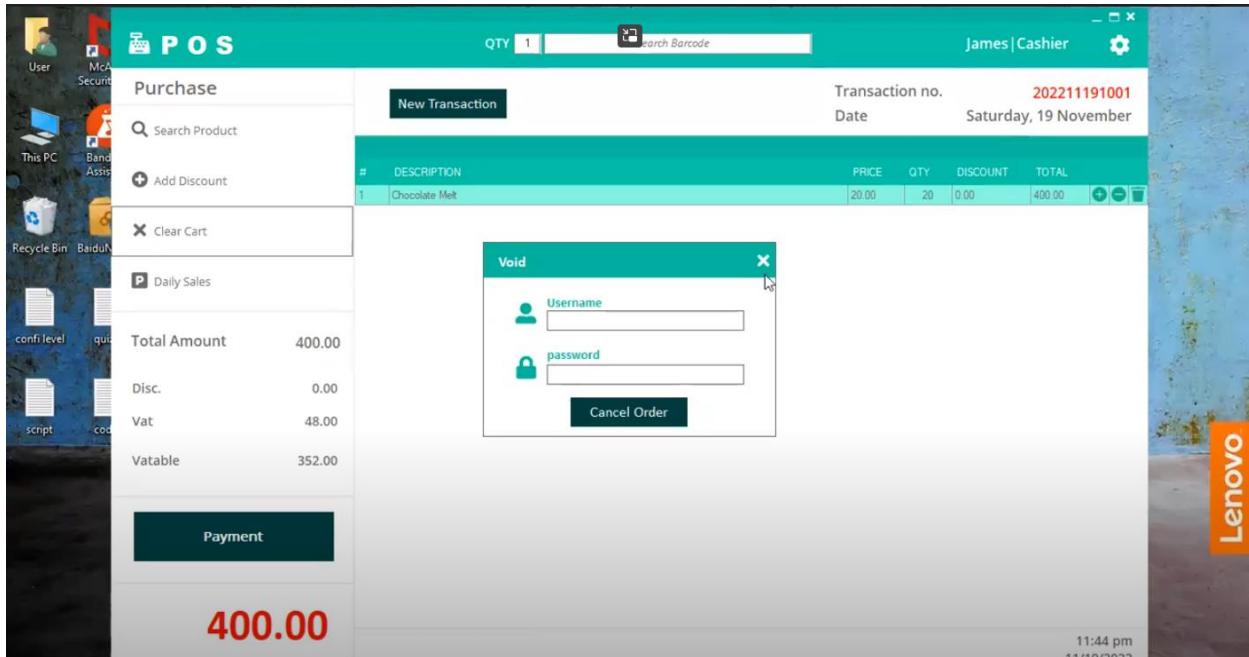
Step 2: Searching for a product for new transaction

The user may add a quantity of the selected item and it will be listed on the transaction.



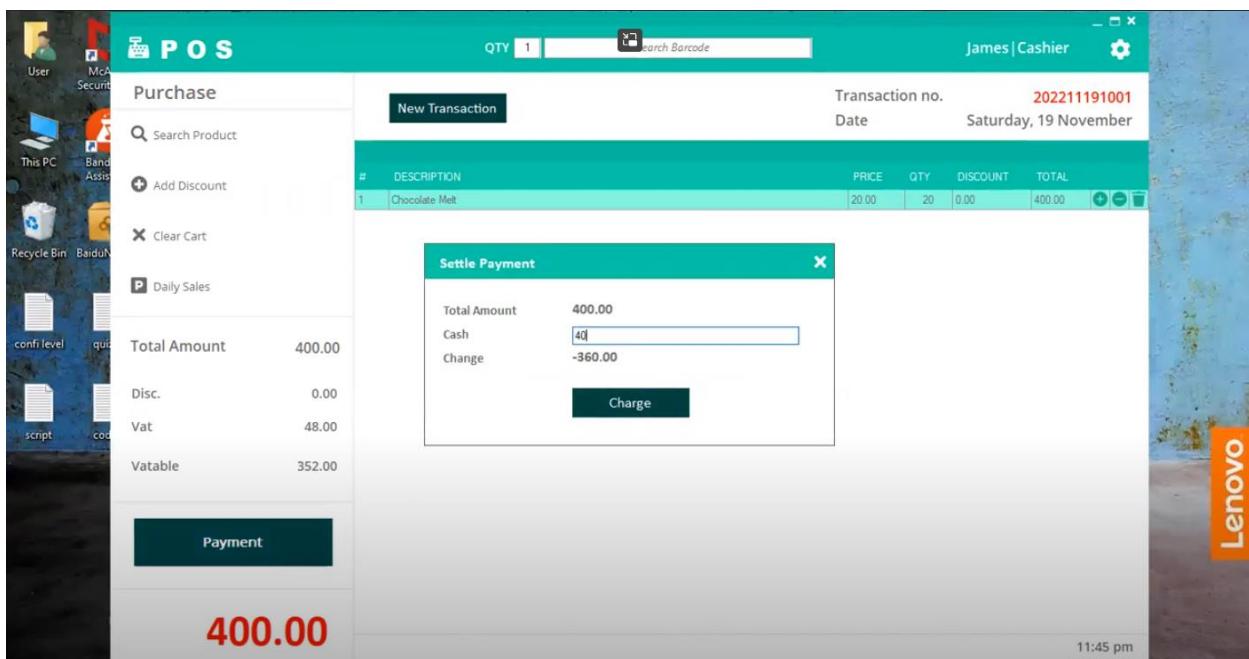
Step 3: Void for transaction

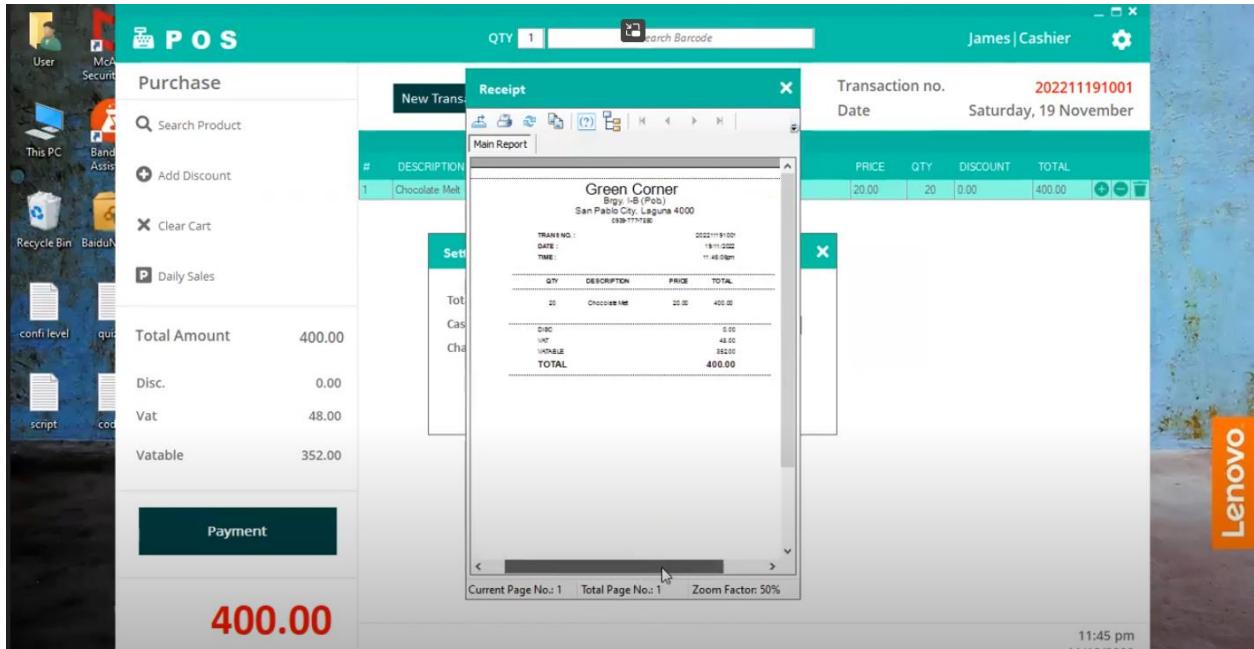
The admin must be the one to input their username and password for the voiding of transactions.



Step 5: Payment and receipt upon charging the customer

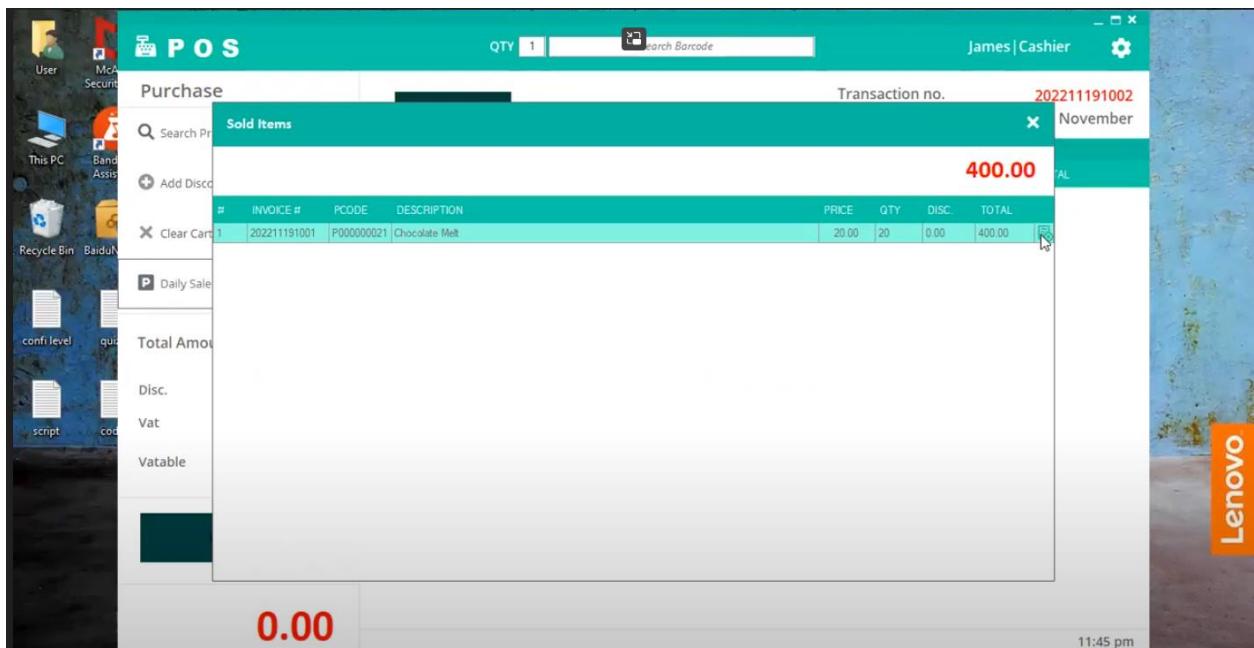
Upon clicking “payment” the user will input the cash given by the customer and upon charging, the receipt will then be generated.

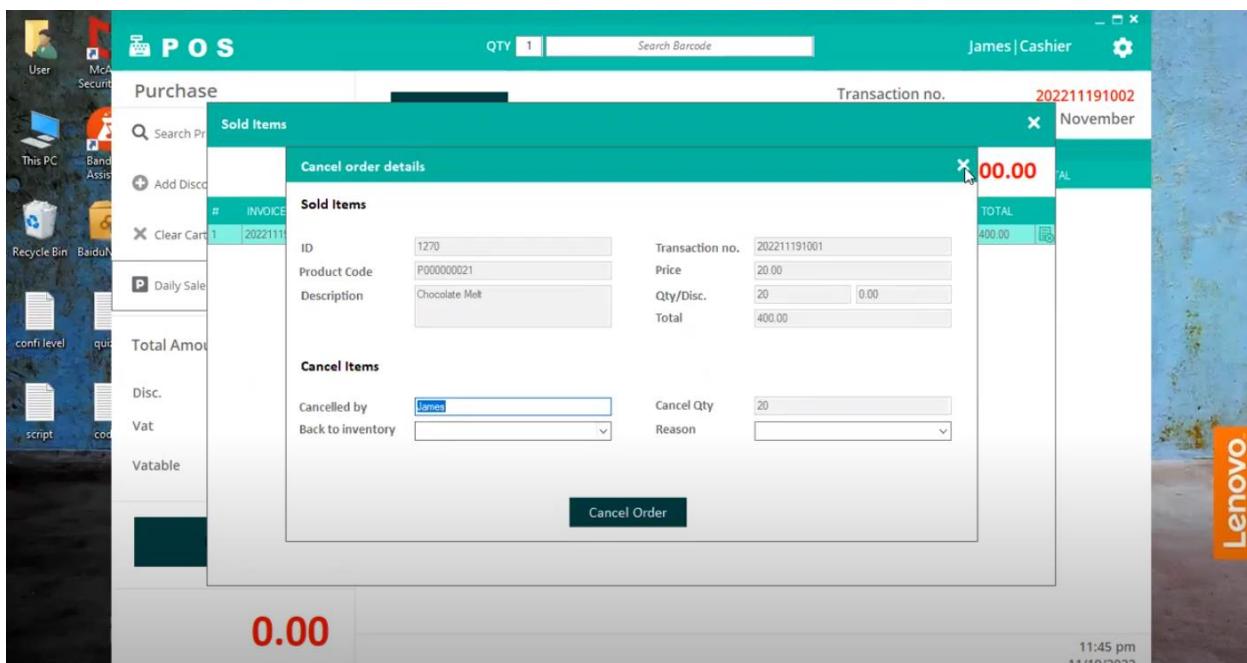




Step 4: Daily sales of the user

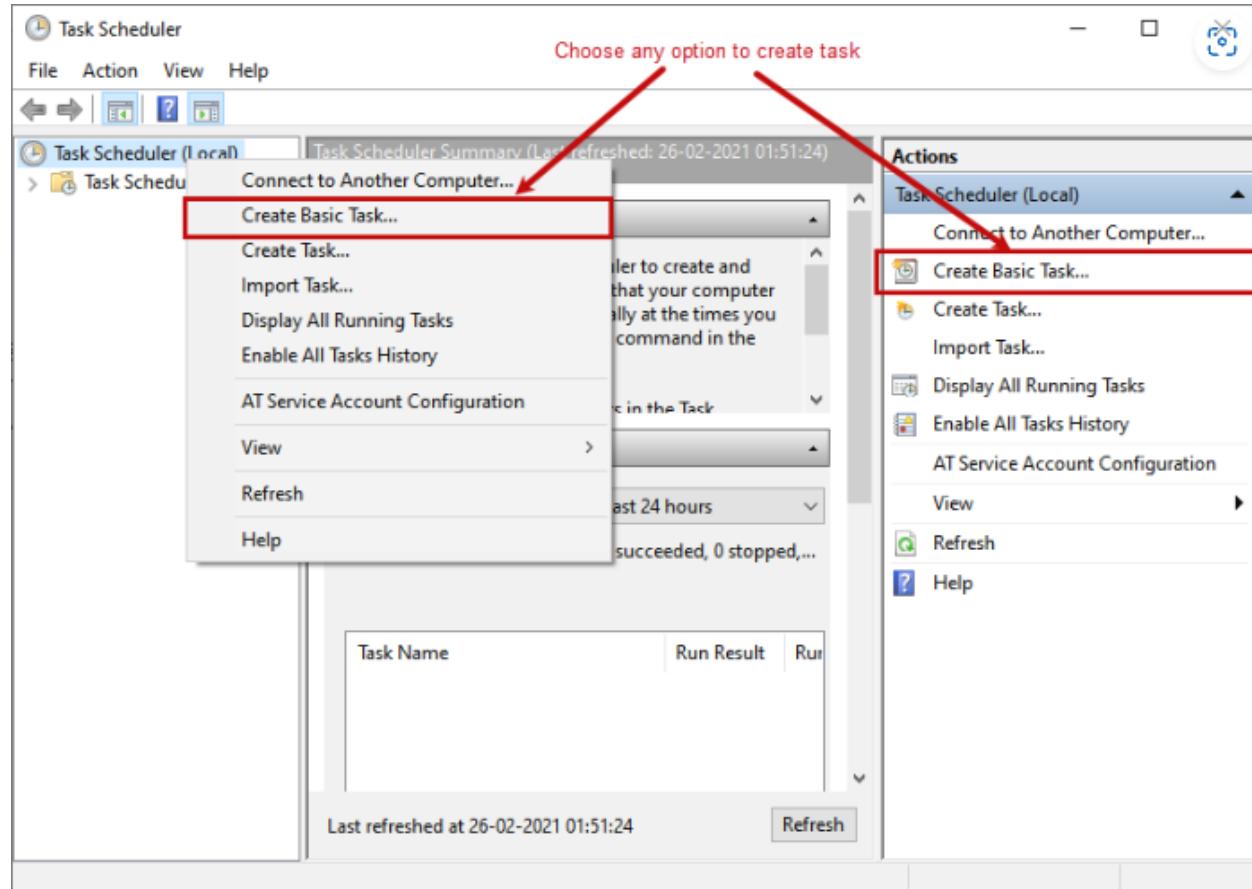
The sold items are shown here upon clicking “daily sales” and it can be canceled using void, which will then need the admin username and password.



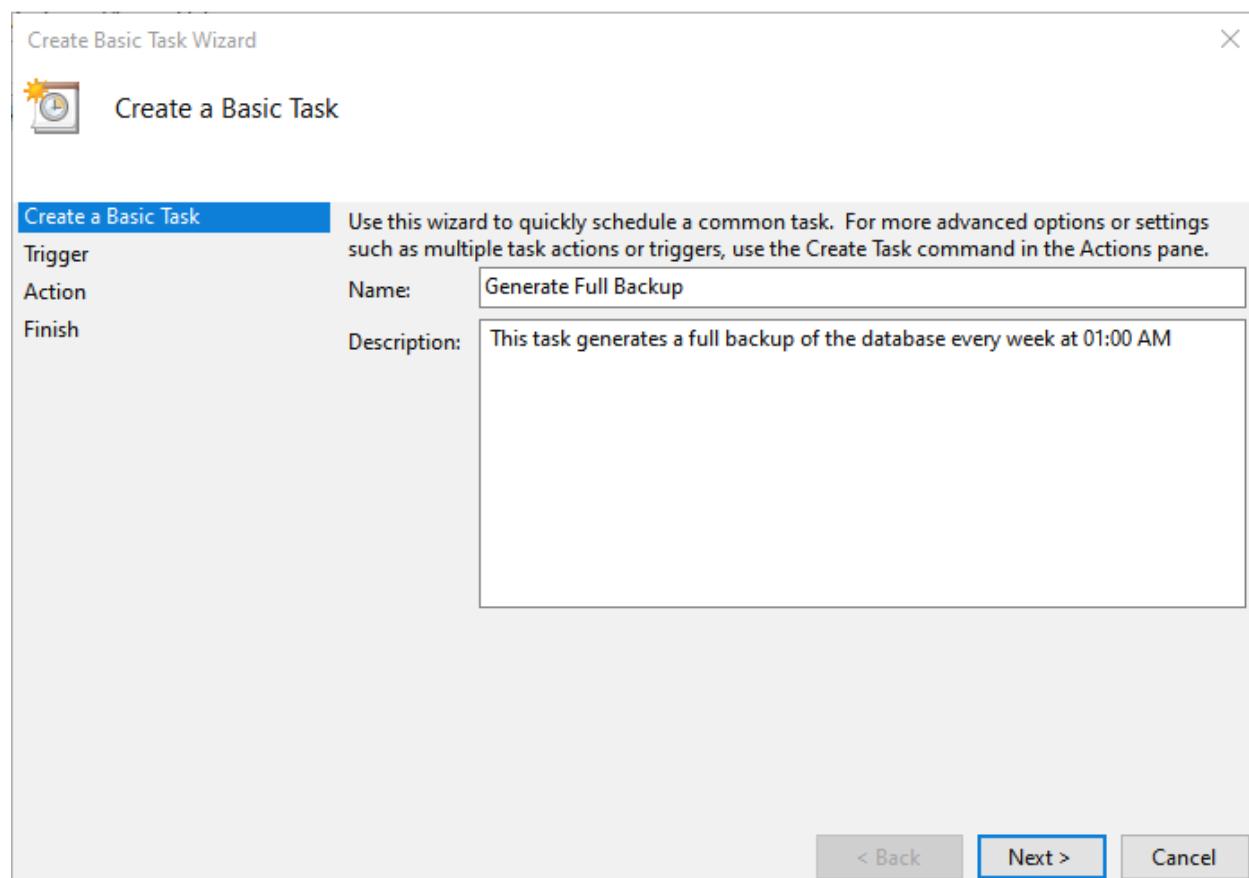


Create a task to generate the Full database backup

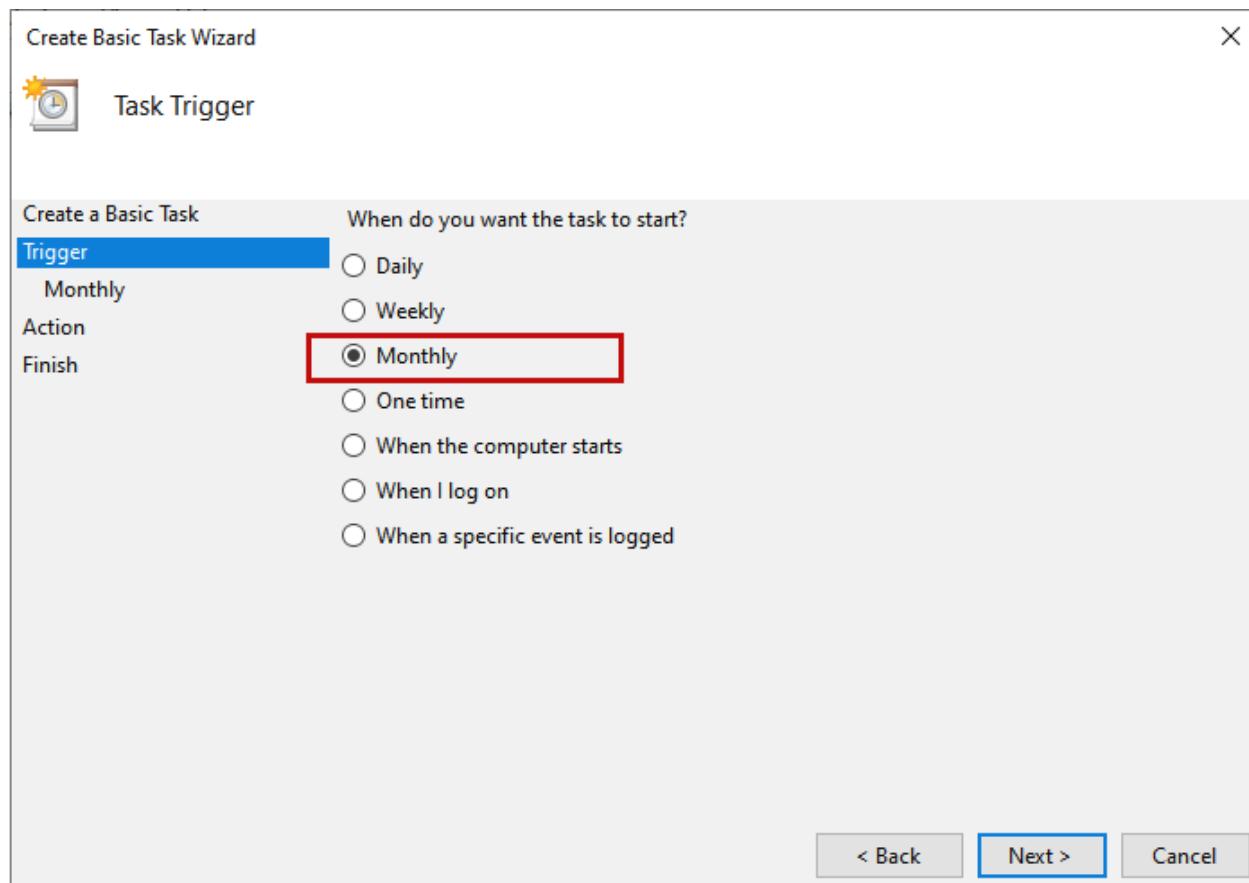
Step 1: Upon opening Windows Task Scheduler, the user may see a list of the scheduled tasks in the task scheduler's left panel. Right-click Task Scheduler and choose Basic tasks to add a new task. As an alternative, the user can select the Action tab's Create Basic Task link.



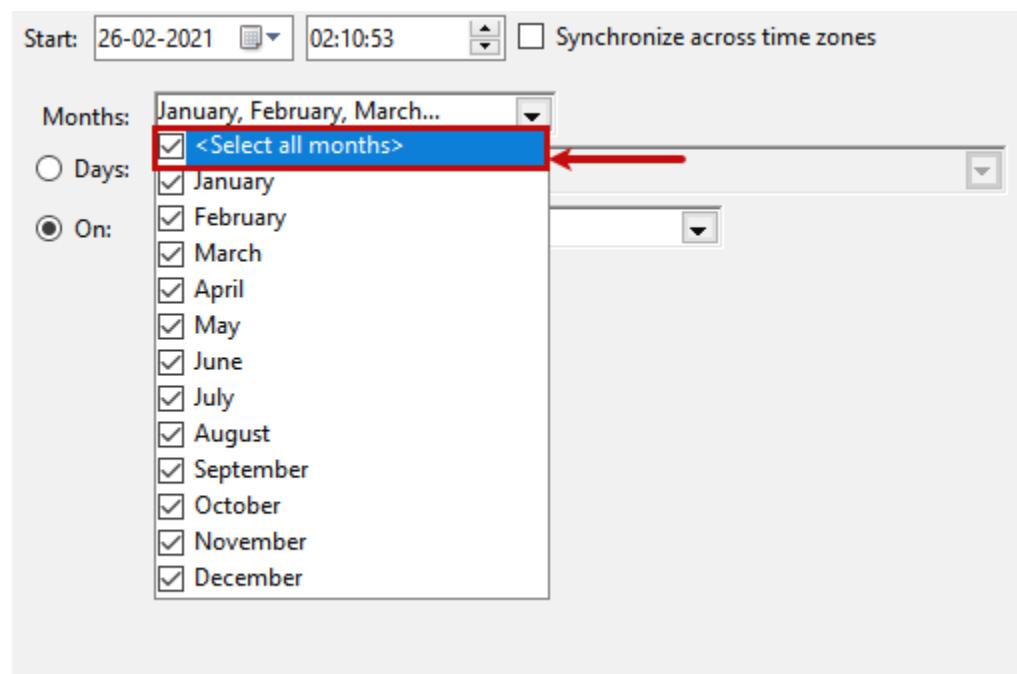
Step 2: Create a simple task that appears on the first screen. Enter the task's preferred name and description on this screen. The name of the task is "Generate Full Backup" because the first task is to create a full backup. The time of the backup is in the descriptive text box.



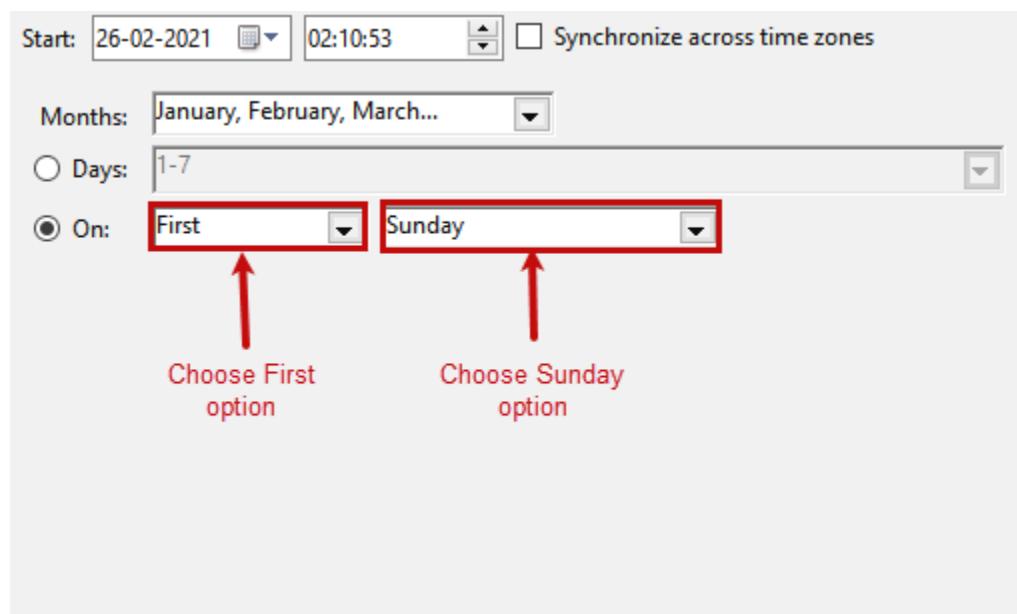
Step 3: On this screen, the user can specify the time when the user wants to start the task. The full backup should be executed every month, therefore select Monthly.



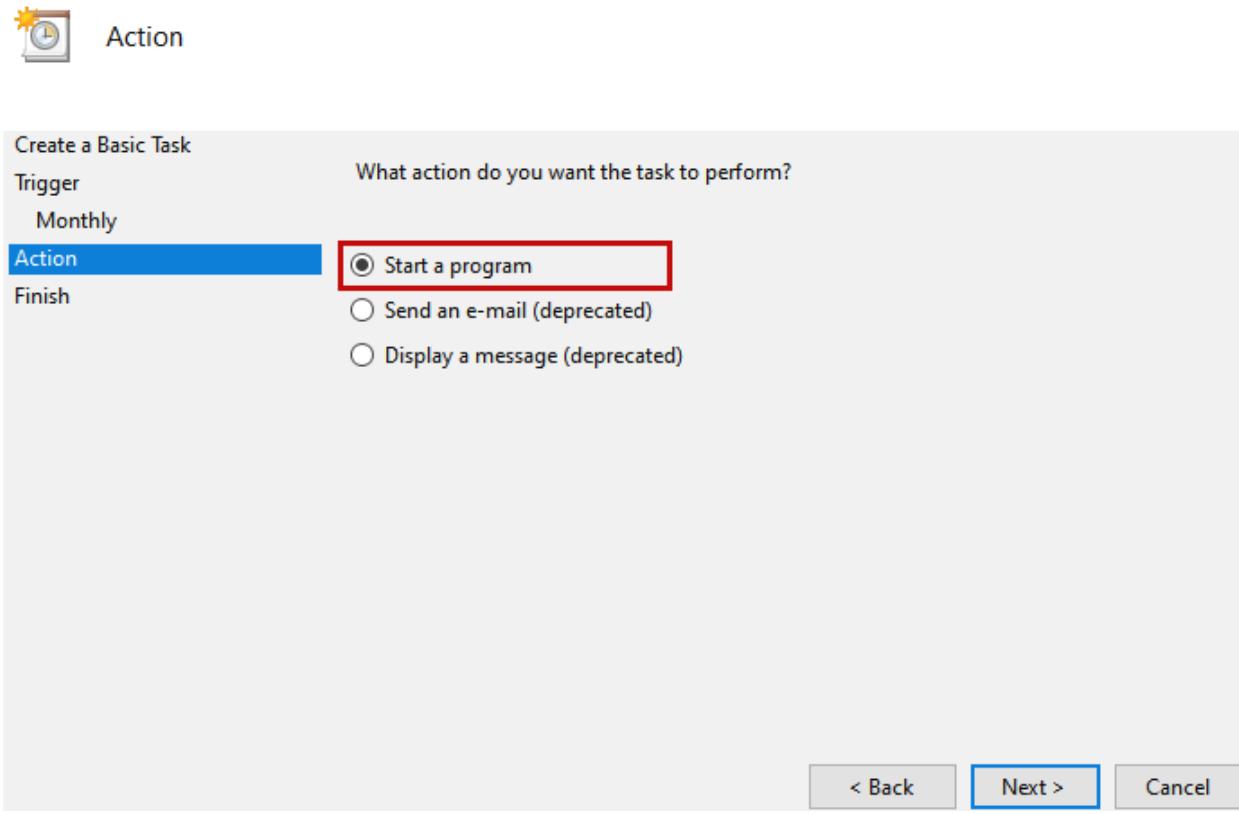
Step 4: The user can specify the start date of the data backup execution. The data backup should be executed every month so, click on the Month drop-down box and <Select all months>.



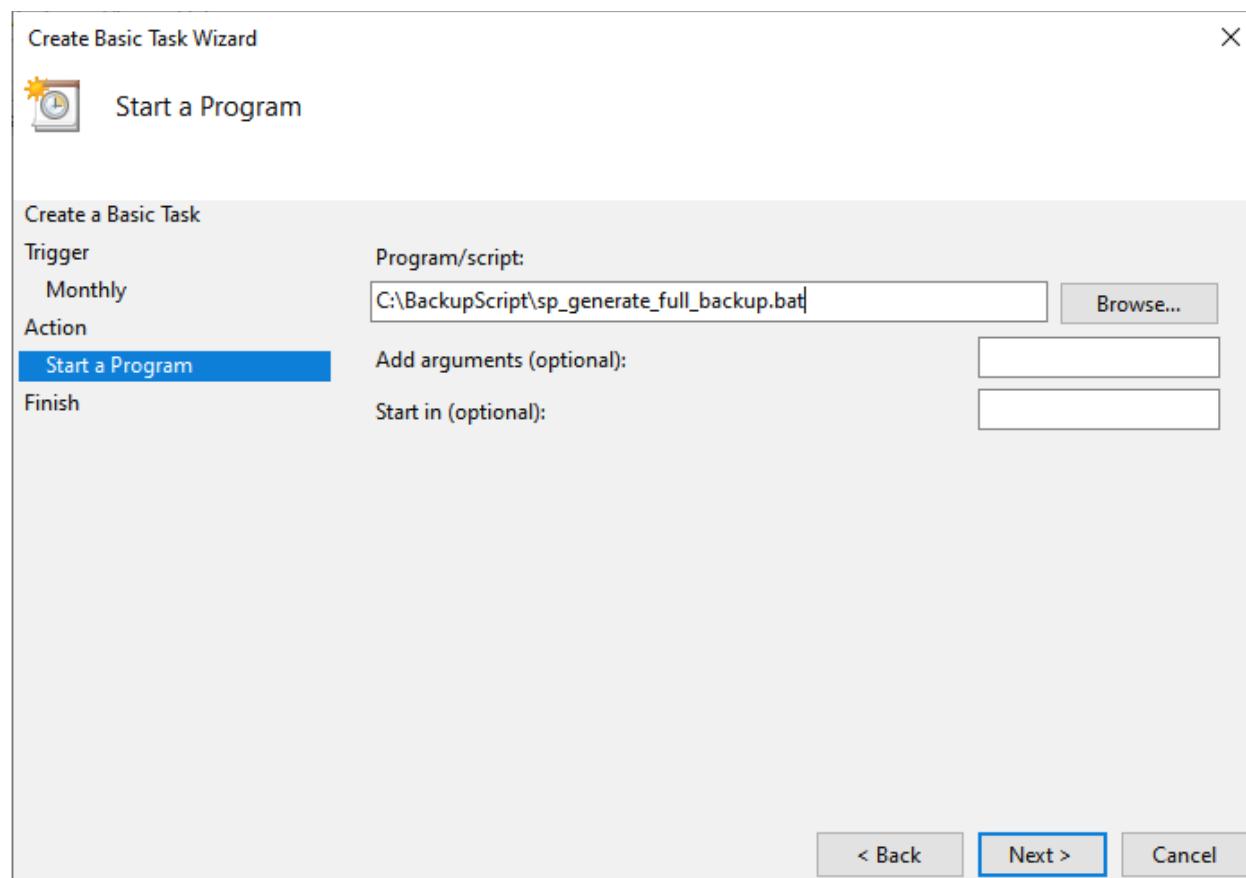
Step 5: The data backup must be executed on the first Sunday of every month. Click On and select the First option from the first drop-down box and Sunday from the second drop-down box.



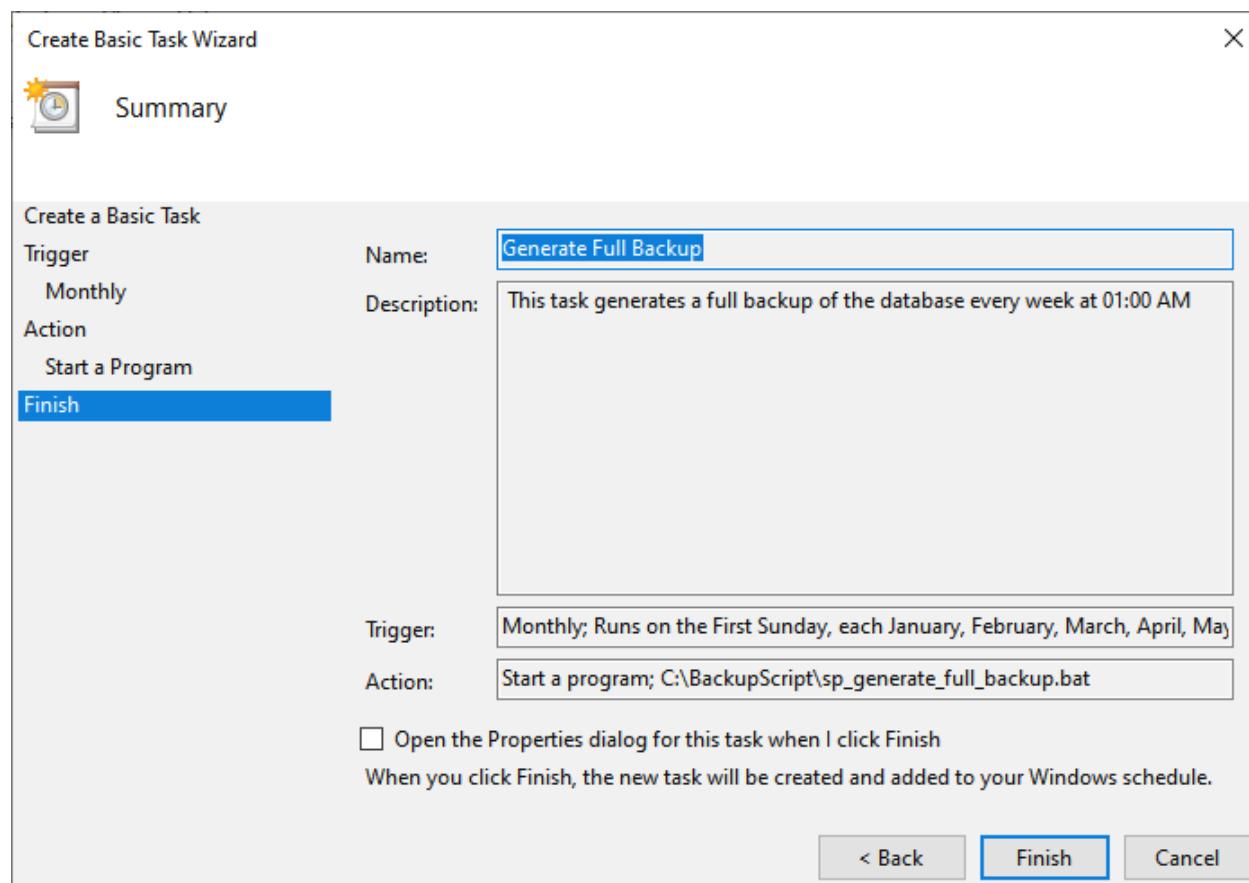
Step 6: The user should specify the task name that is executed by the task scheduler. The user is running a batch script, so click on Start a Program option.



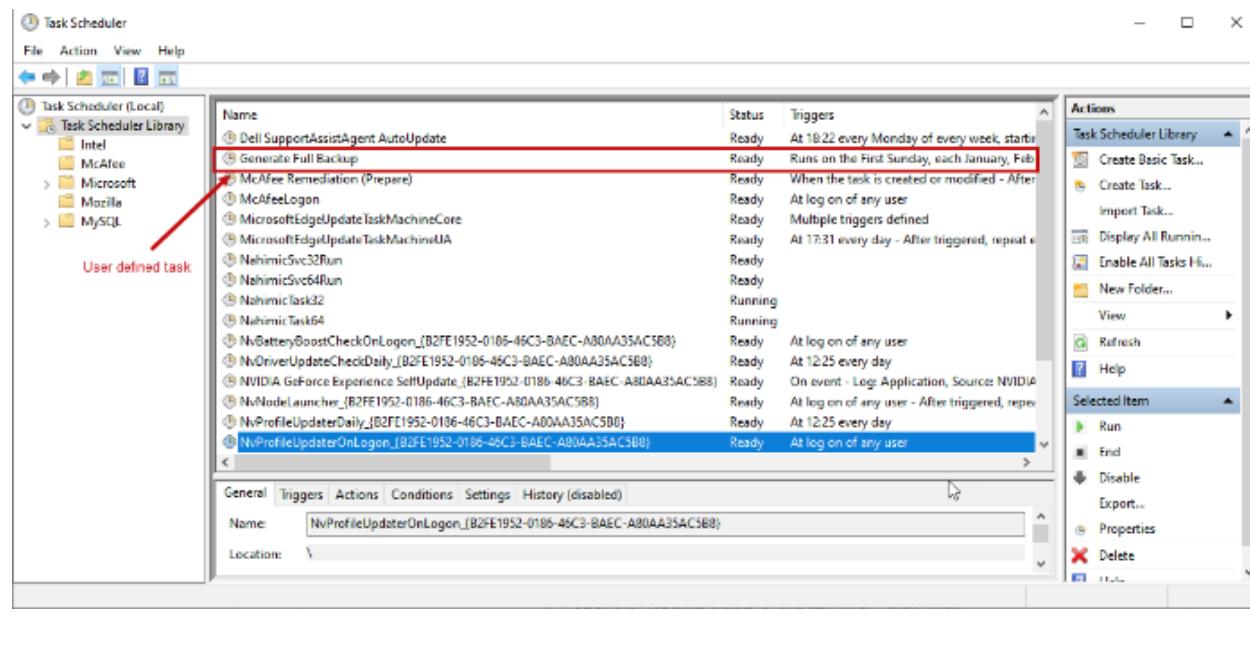
Step 7: On the Start program, specify the batch file that the user wants to execute. To generate the full backup, the user has created a batch file. Provide the full path of the batch file in the Program/script text box. In our case, the user has created the batch file in the **C:\BackupScript** location.



Step 8: On the summary screen, the user can see the details of the data backup. Click on Finish.

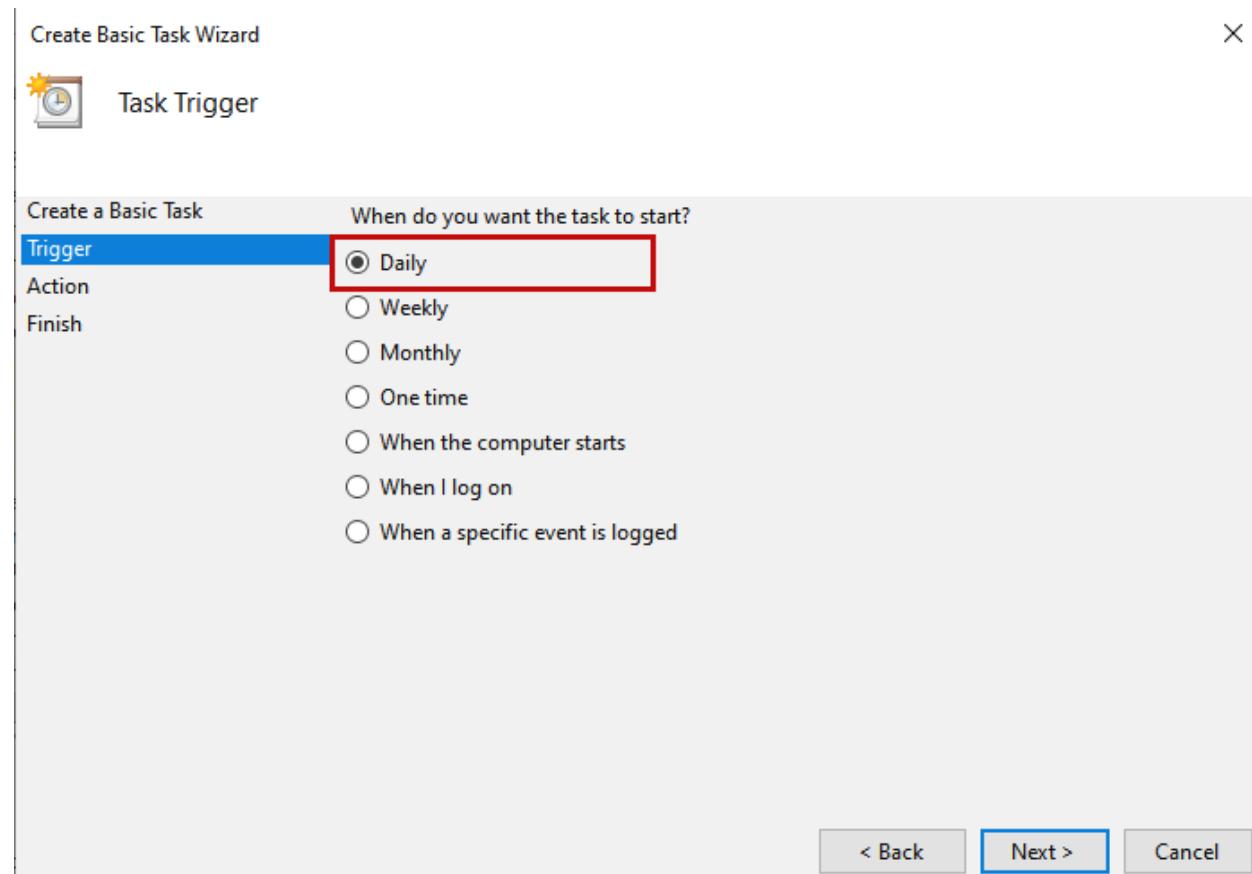


Step 9: The task has been created. The user can view the details of the task in the Task scheduler library. Click on the Task scheduler library. The user can view the list of predefined tasks and user-defined tasks. The user can see the Generate Full Backup task has been created.

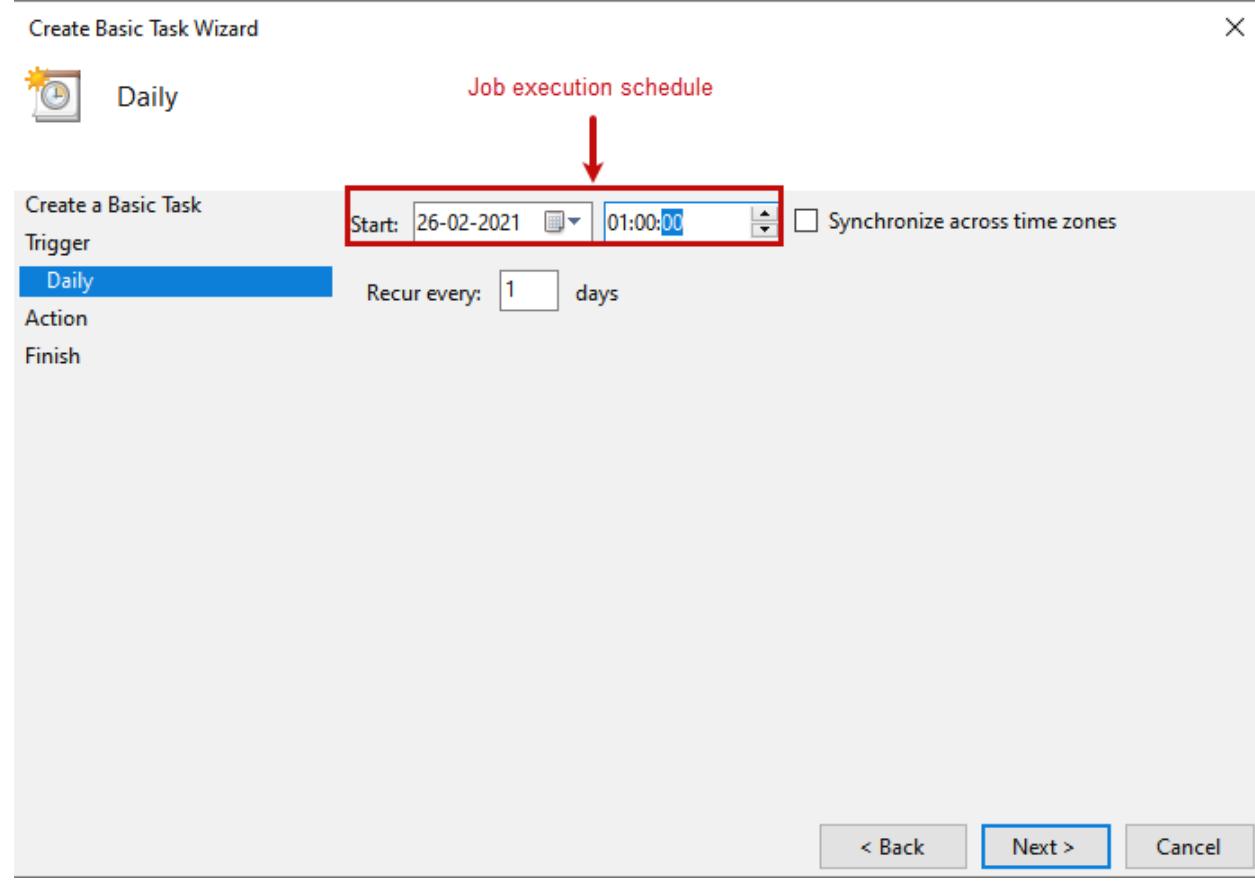


Create a task to generate the differential backup

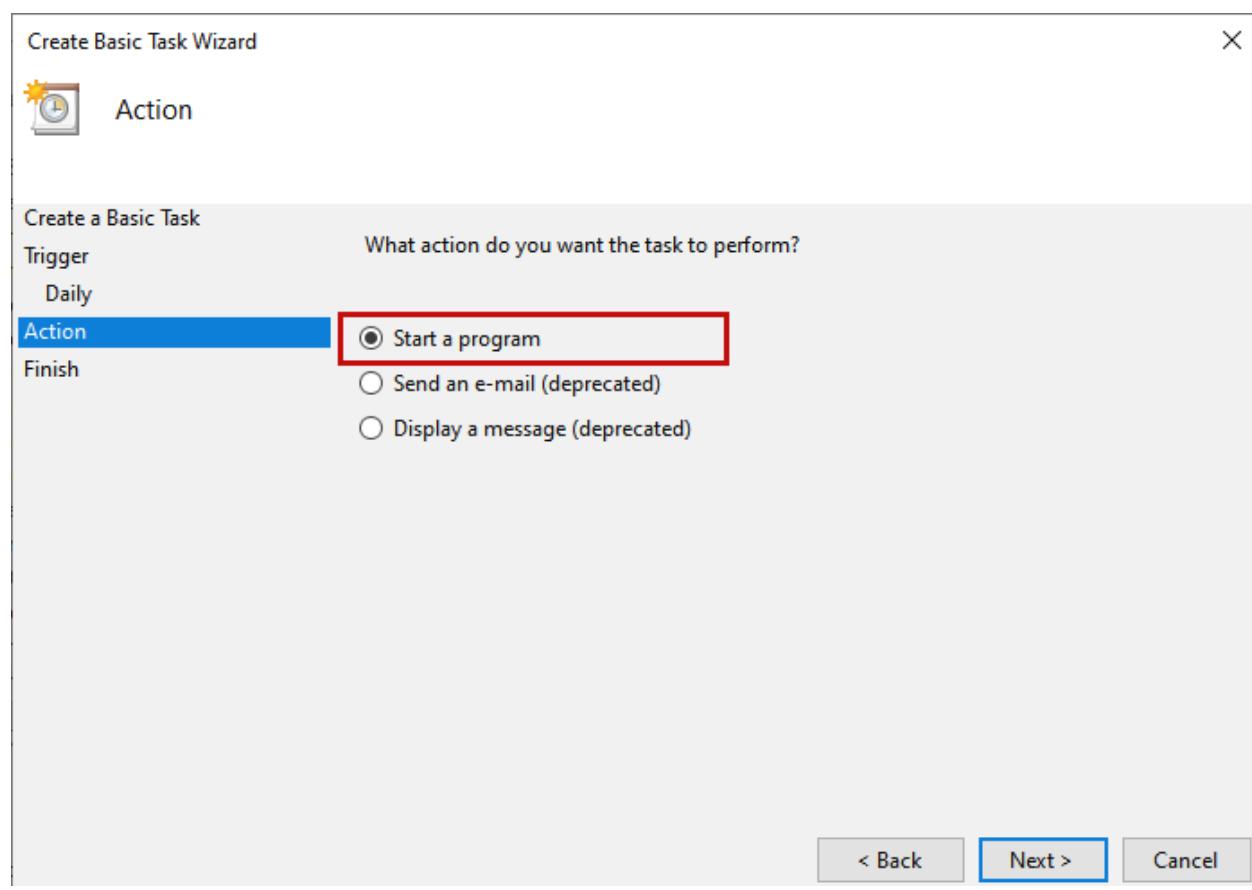
Step 1: As specified, the job should be executed every day at 1:00 AM. To configure the schedule, select the Daily option on the Task Trigger screen.



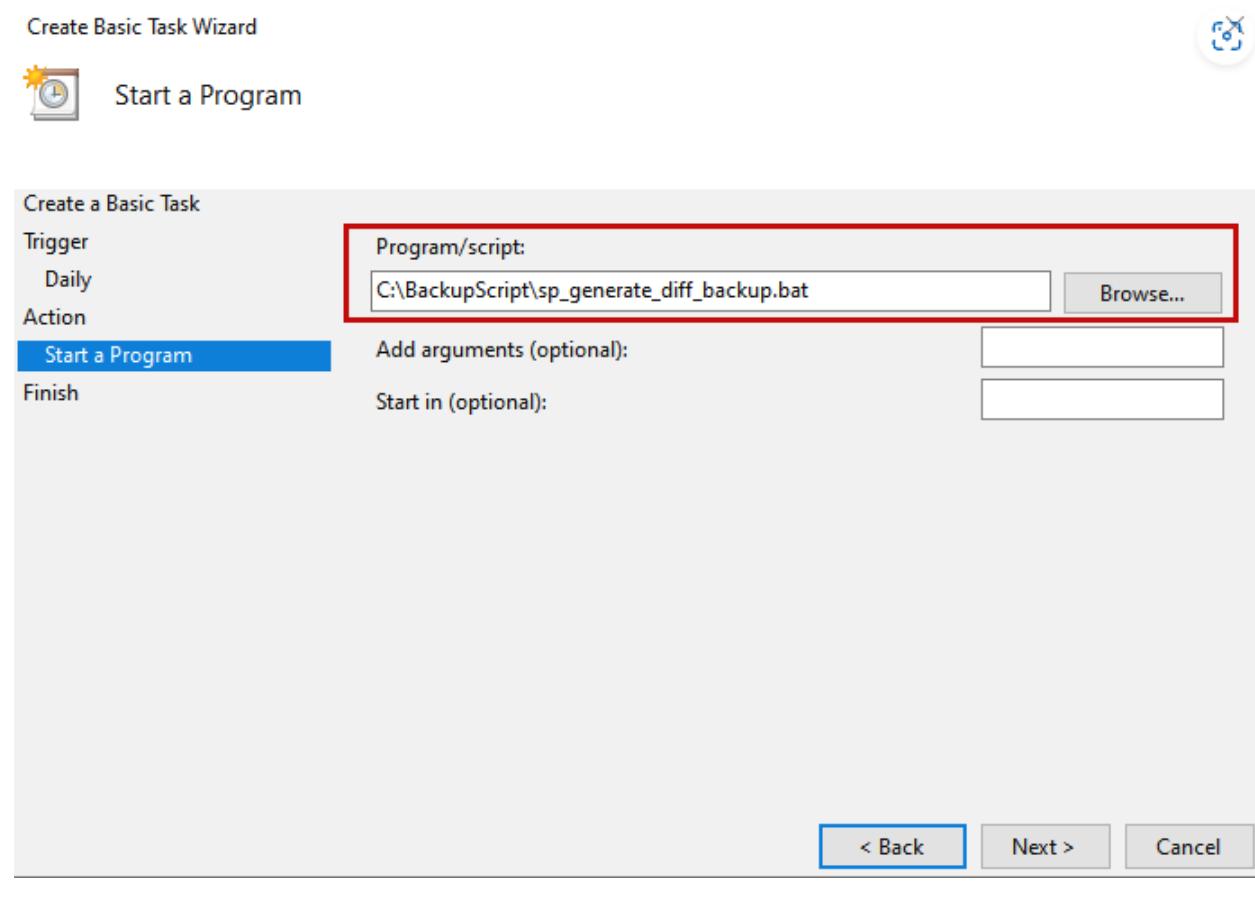
Step 2: On the Daily screen, specify 1:00:00 in the time text box. The job should execute once a day, so specify 1 in Recur every text box.



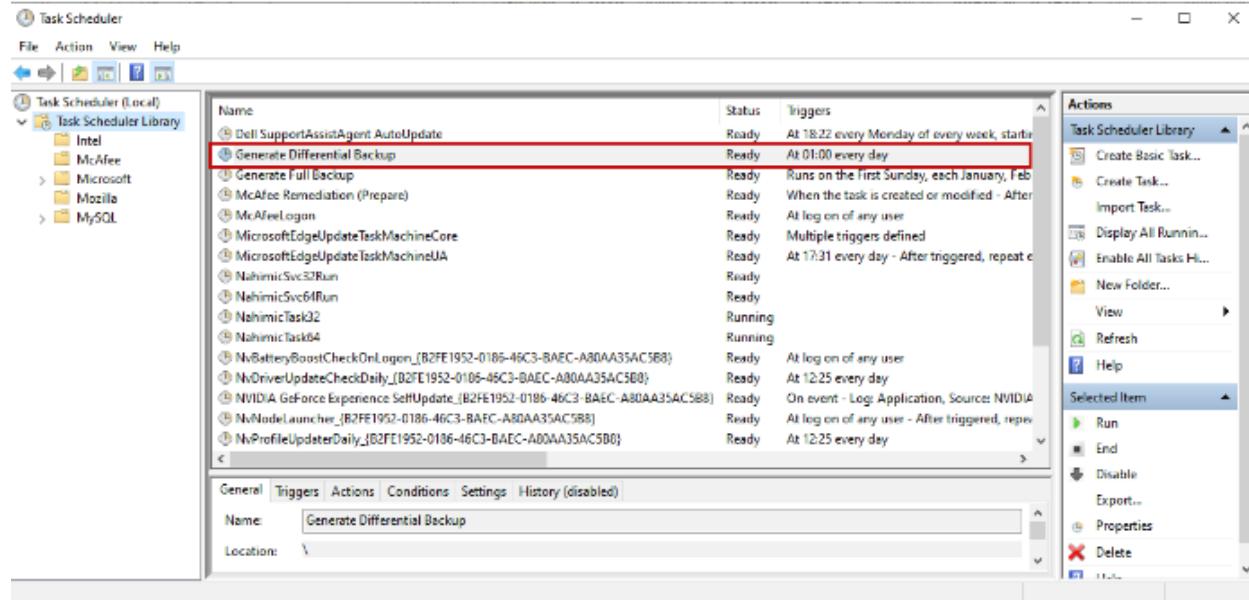
Step 3: To execute the batch file to generate the differential backup, Choose the **Start a Program** option on the Action screen.



Step 4: On the **Start, a Program** screen, enter the full path of the batch file used to generate the differential backup.

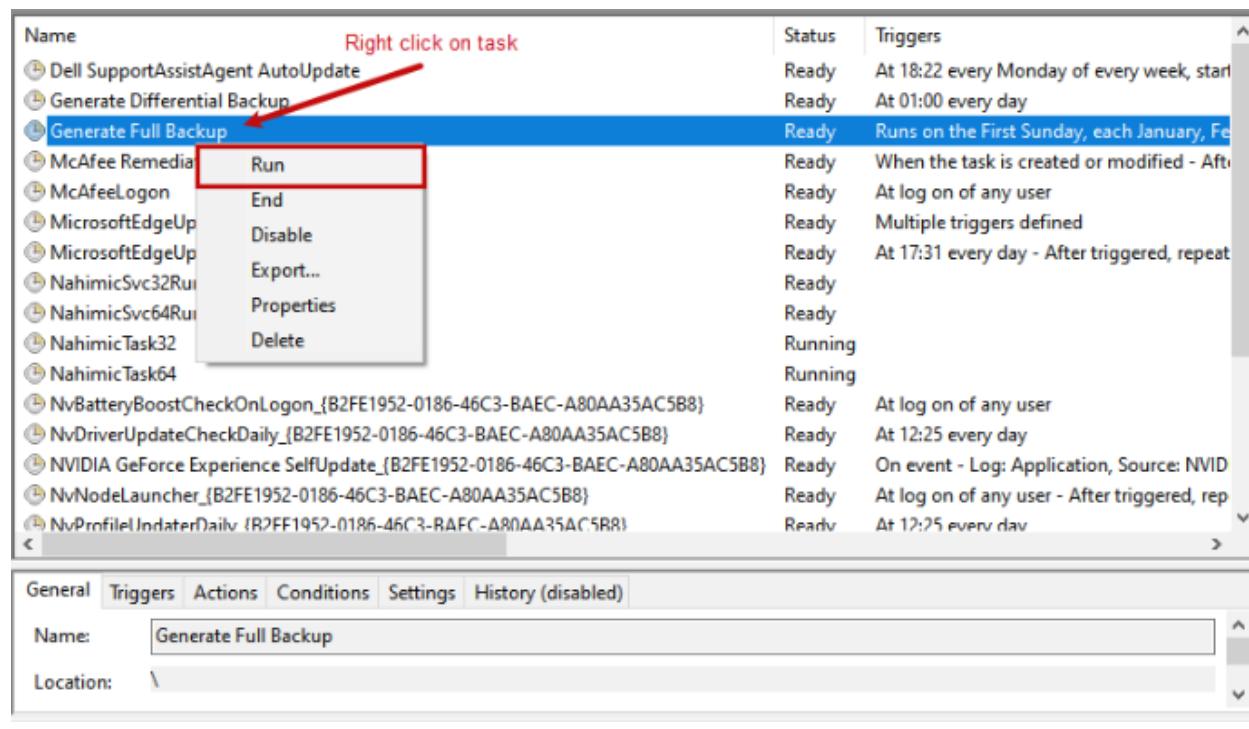


Step 5: On the summary screen, the user can view the details of the task and click on Finish to create the task. The user can view the task in the list of task scheduler libraries.

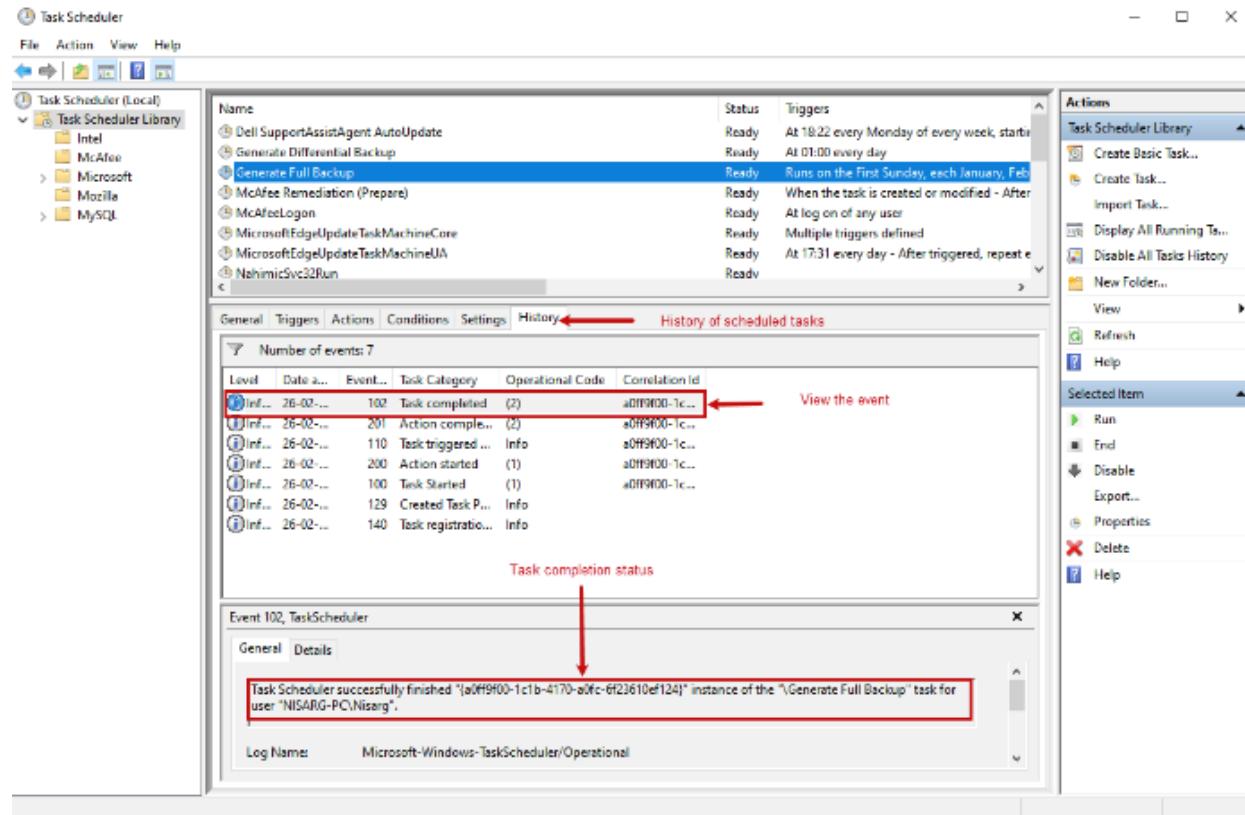


Test the backup tasks

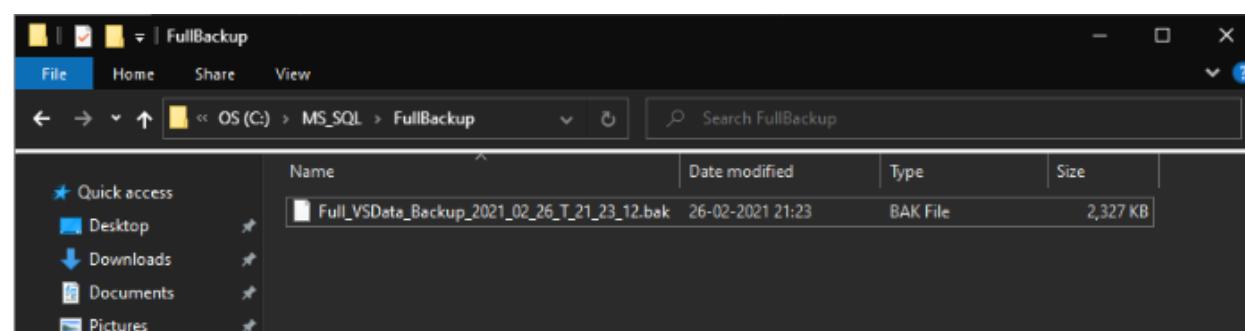
Step 1: Now, let test all the tasks that have been created. First, let us run the Full backup job. Right-click on Generate Full Backup task and click on Run.



Step 2: The database is small, so it does not take a long time to finish. The user can confirm the execution status from the history of the task scheduler.



Step 3: As the user can see in the above image, the Generate Full Backup has been completed successfully. Open the backup destination.



Step 4: The backup has been created. Now, let us test the Generate Differential Backup task. The process is the same. Once the task completes, the user can view the execution task from the history tab.

The screenshot shows the Windows Task Scheduler interface. The 'History' tab is selected, displaying a list of events. One event is highlighted: 'Generate Differential Backup'. Below this, a detailed view of the event is shown:

Level	Date a...	Event...	Task Category	Operational Code	Correlation Id
Info	26-02-...	102	Task completed	(2)	9a10faf9-e3...
Info	26-02-...	201	Action completed	(2)	9a10faf9-e3...
Info	26-02-...	110	Task triggered by user	Info	9a10faf9-e3...
Info	26-02-...	200	Action started	(1)	9a10faf9-e3...
Info	26-02-...	100	Task Started	(1)	9a10faf9-e3...
Info	26-02-...	129	Created Task Process	Info	

Below the table, a window titled 'Event 102, TaskScheduler' shows the message: 'Task completed sucessfully'. A red arrow points down to the log message: 'Task Scheduler successfully finished "{9a10faf9-e3fd-44d2-866a-20ff2e215866}" instance of the "\Generate Differential Backup" task for user "NISARG-PC\Nisarg"'.

Step 5: As the user can see in the above image, the task was executed successfully. Open the backup destination.

