

Point of Sale with Queuing System for I Love MilkTea

A Research Project
Presented to the Faculty of the
Information and Communications Technology Program
STI College Global City

In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Information Technology

Agnes, Jerome B.
Bernal, Lawrence
Sagun, Klein Neal L.
Tantay, Christian L.

January 2023

Table of Contents

	Page
Title Page.....	i
Table of Contents.....	ii
Chapter I	
Introduction.....	1
Background of the study.....	1
Overview of the current state of technology.....	2
Current System Use-Case Diagram.....	3
Current System Flow Chart.....	4
Statement of the problem.....	5
Objectives of the study.....	5
Scope and limitations of the study.....	6
Significance of the study.....	6
Chapter II	
Review and Related Studies.....	7
Foreign Literature.....	7
Foreign Study.....	8
Synthesis.....	9
Local Literature.....	10
Local Study.....	11
Synthesis.....	12
Chapter III	
Methodology.....	13
Data Gathering and Procedure.....	13
Research Design.....	13
Research Instrument.....	13
Calendar of Activities.....	14
Gantt Chart of Activities.....	15
Chapter IV	
Develop System.....	16
Description of the develop system.....	16
Develop System Flow Chart.....	30
Develop System Use-Case.....	31
Entity Relation Diagram.....	32
Data Flow Diagram.....	32
Specific Requirements.....	33
Functional Requirements.....	33
Non-Functional Requirements.....	34
System Requirements.....	35

Software Requirements.....	35
Hardware Requirements.....	35
Chapter V	
Conclusion.....	36
Recommendations.....	36
Appendixes.....	38
Appendix A - References.....	38
Appendix B - Letter to the client.....	39
Appendix C - Transcript of Interview.....	40
Curriculum Vitae.....	43
List of Figures	
Figure 1 - Current System Use-Case Diagram.....	3
Figure 2 - Current System Flow Chart	4
Figure 3 - Gantt Chart of Activities.....	15
Figure 4 - Develop System Flow Chart.....	30
Figure 5 - Develop System Use-Case.....	31
Figure 6 - Entity Relation Diagram.....	32
Figure 7 - Data Flow Diagram.....	33

Chapter I

Introduction

Background of the study

In today's generation, all of us are engaged in highly computerized technology aiming to make our lifestyles more comfortable and easier, especially in the business field. The manual system is now considered the first process before the computerized system evolved. Nowadays, it is increasingly popular to conduct business online in order to increase a company's target market. Given that it can help customers save time and is thought to be hassle-free, it becomes more efficient for them. The most used system by several companies is the sales system and inventory system creating an application system. The advanced system for sales provides more reliable recording of sales. Additionally, it is simple to generate the data and information that the business needs to make decisions regarding inventories. Moreover, inventory control guarantees that the right items are stocked in the right quantities and are in high demand. This sales and inventory system can help the company to manage and monitor the business.

In modern society, the computer is a practical technological advancement that makes doing our task simple. These days, computer technology is developing and expanding quickly. Nowadays, every business in our society has started shifting from using the manual system to an automated one that makes our work easier and faster. Overall, the Point of Sales and Inventory System is a simple, quicker, and more reliable alternative to manually checking and listing the company's sales. The system can minimize human errors in editing and be easily accessed anytime by the company. With a sales and inventory system, the business is more efficient, productive, and convenient for both the business and its clients. The system is being made to help the establishment show more relevant items to the customers.

I Love MilkTea is a coffee and MilkTea store located at West Rembo Makati City, Philippines. The store was established in the year 2021. Business hours are Monday-Saturday from 10am-12am. The owner of the store is Mrs. Erica David and the store has 2 employed staff. They sell different products such as Coffee, MilkTea, Iced Tea etc. They are currently using manual process for inventory and store transactions using Microsoft Excel and during purchase transactions from customers, the cashier only uses a calculator to compute the total sales for the payment and how much change needs to be given back to the customers.

Point of Sale with Queuing is one of the most commonly used in Groceries, Restaurants and Fast Food Chains, however Coffee and MilkTea Shops are now popular businesses and customers love to drink their Coffee and MilkTea while doing their job, school task while enjoying a cup of drinks with aesthetic place, but one thing is missing and that is the integration of technology to their business, most Coffee or MilkTea shop doesn't use any Point of Sale System, they just ask your order and prepare and that will take time approximately seven to ten minutes then give it to you while other customer is waiting having a long queue on the back, when using

traditional way they might commit human error when giving change, wrong order for multiple drinks order because they don't have a receipt for the order and they might give the drinks to the wrong customer, with that being said the advantage of using Point of Sale System with Queuing Service, they will be able to synchronize the order to the right customer by calling their number on the queue monitor, with that there will be no mistakes on the order and give it to the right customer, it will also provide a better inventory system for the Coffee or MilkTea Shop, since most of them they don't really create an inventory one if they see that the Coffee bean is almost empty that is the time that they will buy a new stocks same for the fresh milk, with the help of Point of Sale they can have a better inventory system, that will automatically deducted when the customer order a cup of Coffee or MilkTea, when they order using Point of Sale the order will automatically calculate the price depending on the sizes, type of drinks and the add on, in overall this will save time that they will prepare for the customer which giving them a great customer services, great employee management, time saving and better company images.

Overview of the current state of technology

It is without a doubt that technology keeps progressing as the years pass by and new innovative ideas are being created. There have already been major changes in technology which significantly made our lives easier and more efficient. However, even with the available advanced technology that we currently possess, our society is still nowhere nearly as advanced as we hope we think. With similar scenarios regarding our proposal, many in our society still use traditional methods of recording and saving data. For instance, many people still use paper and logbooks as a way to either record sales, managing inventories, etc. The disadvantages of the aforementioned are that it is very vulnerable and prone to damage like burning and even misplacement. Switching to a technology/computer-based system for recording sales and managing inventories is a great way to better protect it, save a backup, and as well as edit it as much as you can without worrying of running out of workspace. This can be especially important for companies, convenient stores, and establishments like a Coffee or MilkTea shop which will be very useful and will save time.

Current System Use-Case Diagram

The employee takes the order from the customer, then writes that order before calculating the price, change of the customer. Next, the employee will process the particular order and once done, the order will be served to the customer. Lastly, the employee will record the necessary input sales on Microsoft Excel before proceeding to count the number of sales, inventory, and payments.

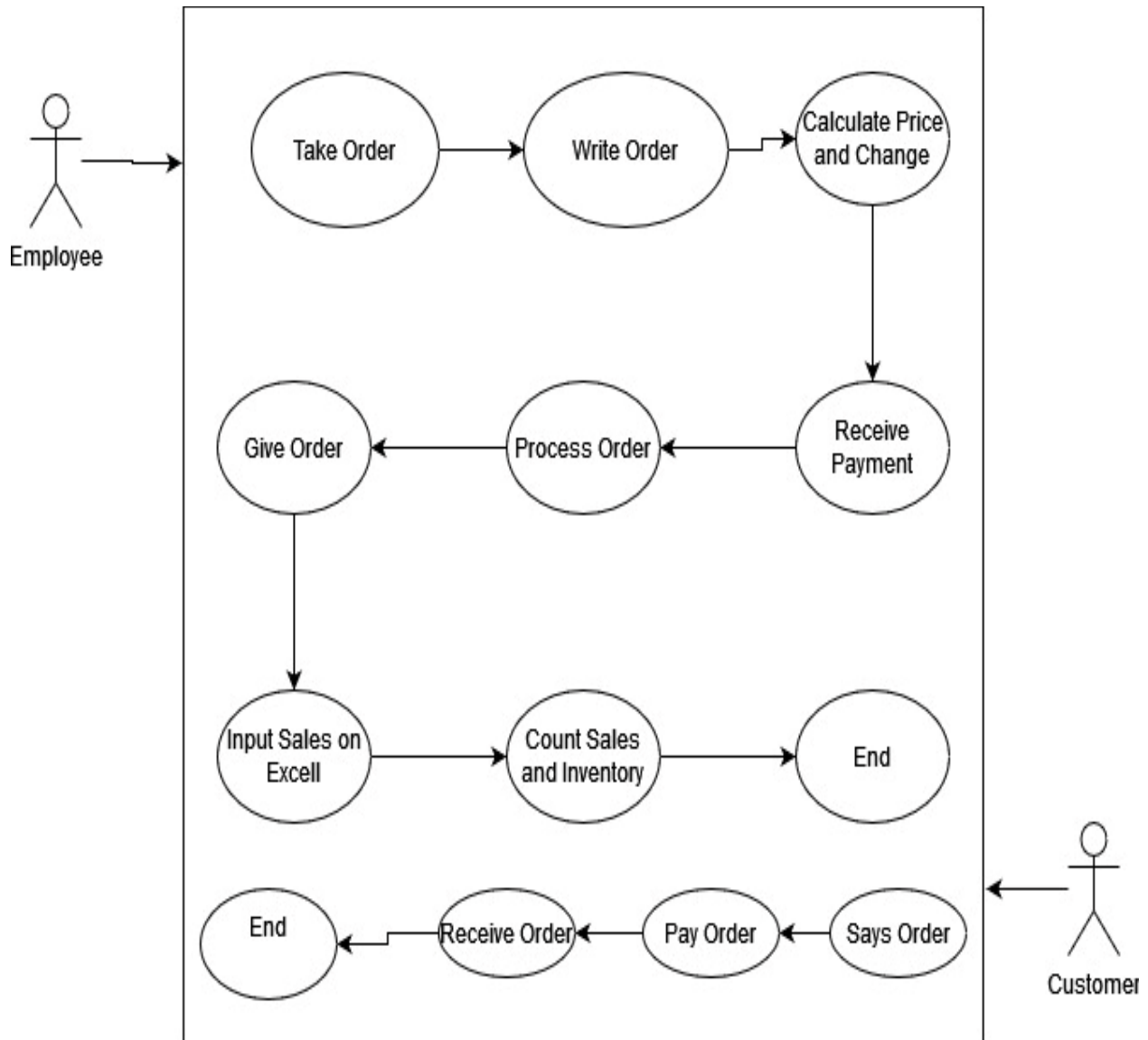


Figure 1: Current System Use-Case Diagram

Current System Flow Chart

The first step process would be the customer making an order, then the employee would take that order and prepare it. Next, the employee would input all the necessary details into Excel before proceeding to count the cost. Then, the employee counts the total number of sales and money on hand.

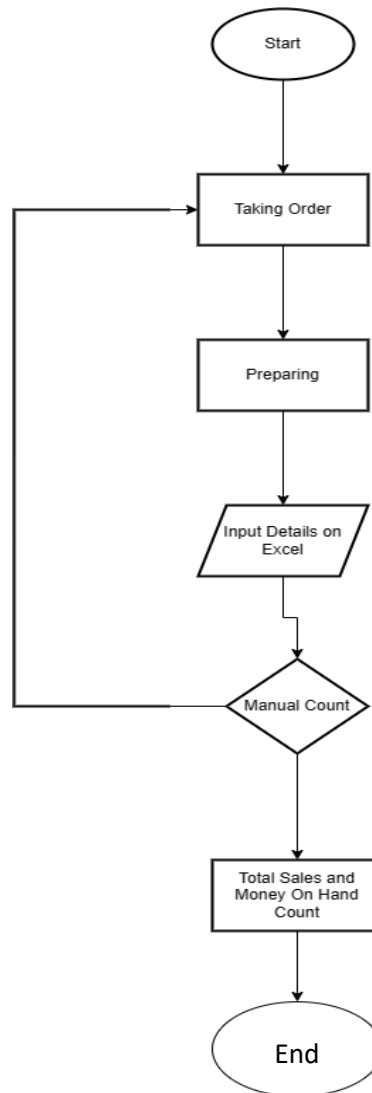


Figure 2: Current System Flow Chart

Statement of the problem

The study aims to determine the general problem of the business. The researchers found out that the business is currently relying on manual processes from sales to managing their day-to-day inventory counts using Microsoft Excel. The system they use is not advanced enough in place to help the staff and the owner with purchase transactions and managing their inventory at the same time. Using manuals has a high risk of being vulnerable to errors, miscalculation, misplacement, negligence, and theft.

The developers specifically sought to answer and give solutions for the following problems:

- Slow Control and Monitoring process of the inventory.
- Unable to accurately track the daily sales.
- Processing of purchase is time consuming; it delays transaction which the costumers can be impatient.

Objectives of the study

The objective of the study is to provide new ways of saving data through high or advanced technology that can be protected more than the conventional traditional ways of placing it on physical records. As with regards for the Coffee or MilkTea shop, we believe that such examples are great to implement and to demonstrate the need to move to a more advanced, technological ways of being efficient when generating a data information and faster input of managing inventory control.

The researchers firmly believe that this will be the first step in showing the reason of convenience for how the implementation of the Point of Sale and Queuing System are much faster and as well as that it helps the organization process of an establishment like our Coffee or MilkTea shop make us work efficiently.

Specific Objectives:

- Create an Inventory system that can monitor the stocks that goes in and out of the store in a faster and more efficient manner wherein they can see the fast-moving items, slow moving items, out of stock items and in critical stock items.
- Create a module that generates reports daily sales and inventory.
- Develop a Point of Sale to make purchase processes faster.

Scope and limitations of the study

This management system will be designed to minimize the manual work in maintaining managing employee and customer details, working of token system, generating reports according to the working of the system and menu card for the shop.

It aims to maximize the productivity and provide improved managed system. This system is designed to allow an admin to manage the product and stock records and other management in the Coffee or MilkTea shop.

This management system will not cover the financial aspect of running and managing a Coffee or MilkTea shop such as the revenue and salary of the employees of the shop.

Significance of the study

This study will eradicate the encountered human error in inventory monitoring with the use of the proposed system. This will also provide relevant information to the owner regarding the availability of actual stocks, purchase orders to supplier and order management. The proposed system also features a Point of Sale module wherein the customer could order in advance. This will provide better opportunities for customers to come due to the efficiency of the proposed system.

This study will also be beneficial to the following:

To Economical Significance, it enhanced the process of the transactions of the shop. The owner will no longer need to compute adding up of the orders because the proposed system can generate the total payments in just a few clicks. The proposed system is designed to improve the processes and transactions of the shop.

To Educational Significances, the proposed system enhanced the ideas of the researchers in developing a system. Developers gained more knowledge in designing the UI of the system that will match and be appropriate to the business.

To Technological Significance, the proposed study will serve as a reference or guide, particularly a study related to a Point of Sale system, and the proposed system will become the basis on writing of research in the field of Information Technology.

Chapter II

Review of Related Literature and Studies

Foreign Literature

¹The growing specialty coffee market also indicates that there is a need for local businesses that have some economies of scale, i.e. similar efficiency standards as large coffee chains. In large companies like Starbucks, there are systems that take care of operational tasks like purchasing, pricing, marketing, and staff management; whereas many local coffee shops are still paper driven (Odeko, 2019). On the other hand, some SMEs are starting to use digital technology products increasingly, such as web ordering, proprietary tech or private-label apps, analytics tools, Point of Sale systems and HR solutions. They are able to avoid excessive orders and waste, also decrease out of stock levels thanks to accurate forecasts and artificial intelligence tools that are capable of ordering supplies in a smarter way. They can now conduct their business in a way that did not exist before due to technology, and get closer to having similar efficiency standards as large corporations.

According to the study article written by Aini Syafiqah Adznan Adzen, it is become a standard technology when starting a coffee shop business to have a point of sale system is to have a better employee engagement to the customer and accurate order specially on a rush hour in a morning where a flock of employees will get their coffee before they start they work, where in the system will help to attain Better Customer Management.

²Your POS system can be used as a secondary layer of accountability. For example, by requiring that every active employee be signed into the system using a login or unique code, you can prove who was handling the money at any given point in time. Additionally, if your POS allows data to be stamped with identifying information regarding who entered the data, you may be able to see which employees were entering inventory in what departments on what dates and times. All of this information could be very useful in the event that anything goes missing, or if you need to uncover any other sales information.

In research (from Heiiema, 2022) the POS system possesses a great security when doing inventory check or cash checking, you will be able to track who uses and log on to the POS system and who's employee handled the sales on that day to prevent any shortage from the cash if an employee gave excess change to the customer, or if the cash have exceeded the amount of money on the drawer basing on the sales for the day, it can also be used as attendance mode when the employee log on to the POS System making it easier to check when the employee started working on the cashier or when she/he clocked out on the cashier.

³Employees who can focus on one customer at a time and not worry about the throng of people visibly waiting in line are better able to serve that one customer. They don't feel the need

to rush the interaction and are more inclined to go the extra mile because there is less pressure to get to the next customer. A queue management system can also collect information about customers and waiting inline. That Intel becomes instantly available to the staff, who can tailor service or designate a specialist for each customer who reaches the front of the virtual queue.

According to new research (Kuklin, 2022) the Queuing System will helps them to prepare the customer order without being anxious about the next customer hurrying up because we have a queuing system that the customer follows, it will help the employee to work and prepare the coffee on time and also giving the customer a satisfaction on the waiting time, with the help of queuing system it can provide an organized waiting system to prevent any trouble on both employees and customers.

Foreign Study

⁴The morning commuter rush or Saturday morning brunch can be hectic for a cafe and staff can sometimes make mistakes. During peak hours it can be difficult for staff to remember to ask the right questions every single time – especially if there’s a long queue out of the door. A good cafe POS system prompts staff to ask the right questions at the right time. This is an easy yet effective way to provide customers with a great, consistent experience.

According to the article written by Katie Nelson (2021-1-18) "Cafe POS System: Save Time and Maximize Sales", having a POS system for an establishment, especially and specifically for a coffee shop, has many benefits which will result in better employment experiences. Implementing a POS system will have effective ways to manage business transactions and faster time-saving.

⁵If you have spent any time on our coffee business blog, you'll know the importance we place on managing your coffee shop's inventory. Whether you have extensive menu or a small limited coffee menu, you can quickly move through your inventory. Keeping track of inventory helps you avoid running out of products, keeps your workflow running smoothly, and helps you calculate your costs with ease. Waste, employee theft, or mismanagement is essentially to avoid. With the POS market today, you should not have to settle for a POS system that doesn't offer you robust inventory management or easy-to-use integrations with third-party inventory software QuickBooks.

According to the article found on Coffee Shop Startups (The Best Coffee Shop Point-Of-Sale Systems for Cafes). The implementation of a POS with Queueing System for a coffee shop can help manage the inventory system of the business you're running. "Keeping track of inventory helps you avoid running out of products, keeps your workflow running smoothly, and helps you calculate your costs with ease" as the phrase suggests, the technology-based POS system will solve

difficult inventory management problems or situations by offering employees easy-to-use integrations along with a third-party inventory software.

⁶A good POS should help you move through the queue quickly, and one thing that can help you do that is a mobile POS. The best thing about a mobile POS? It's mobile. If your line starts growing at a faster rate than your staff can handle, the option to break away from the counter to take orders becomes...magical. With mobile capabilities, your customers won't be late for their morning meetings, your staff won't be snapped at, and you may be able to divert some of that counter manpower to pumping out more drinks. Another way to increase the speed with which you're cranking out orders is to make automation your best friend. Your coffee shop's POS should allow your staff to execute a transaction seamlessly, which means automating as many steps as possible. For example, if an order costs \$7.90 and the customer is paying cash, your POS automatically knows that they are most likely to hand over a \$10 or \$20 bill. Then, it presents your staff with a one-tap option so they can quickly see the correct change.

According to the article written by Tiffany Regaudie (June 7, 2017) "The 4 Things You Must Have in a Coffee Shop POS" suggests that a coffee shop must offer speed and automation for better working experience, customer service, and to get by with the ever-moving technological fields of advancements. According to this article, one of the best POS systems to implement is through mobile. If you have more customer than in which the number you can manage, a POS system with mobile capabilities can assist your customer problems at the moment. Another effective way is to implement automation, automation can be a worthwhile investment for companies in virtually any industry. Not only does automation implementation free human resources so they can focus on high level tasks, but this technology can also bring other benefits such as reduced time coverage when dealing with transactions.

Synthesis

The proponents believe that every literature and every study stated in this research is similar to the present study, the proponents relate and differentiate the research based on the flow of their transaction from the proposed study. The transaction and process and the design specialization will easily help to acquire and accommodate and communicate with the user. The proponents get and use other research in this chapter, in which it helps them, because they get knowledge while creating the systems.

This review of related literature and studies illustrates the specific and general task of the inventory management system, also the types of inventories that give a lot of knowledge for everyone before entering business and using inventory. In this chapter the proponents put a different opinion of others in terms of inventory, the literatures and studies should get on the book articles on the internet.

Local Literature

⁷According to Kentwatak (2013), inventory system is a product of human knowledge with the use of technology and benefits us. It proposed inventory system aims to lighten works involving strict and complex recording. Flordayuha (2013), asserts that inventory system is important to all companies that has a large inventory that can make their work timeless to spend.

The literature and studies mentioned above are believed that the inventory systems are a result of human knowledge combined with technological use, and they are advantageous to us, claims Kentwatak. Its suggested inventory approach intends to simplify labor-intensive, meticulous recording tasks. Moreover, according to Flordayuha, any businesses with a huge inventory that can make their job timeless to spend so it should be have an inventory management system.

⁸According to Bisagas, Arivada, and Tanteo (October 2009). “Inventory System for Best Choice Rice Dealer” The process of counting the sacks of rice is done manually, which corresponds to difficulty in tallying the number of available stocks and sold items. The Manual generation of inventory reports such as daily, weekly, quarterly, and annual inventory list of records remains as one of their key problem since the establishment of the business. The transaction processing system for Best Choice Rice Dealer will minimize the difficulty the owner in processing inventory. It will monitor the availability of product items for reorder to prevent under stocking, overstocking, or running out of stocks. The system will also generate necessary reports of inventory such as sales reports.

The literature and studies mentioned above talks about System for Best Choice Rice Dealer's inventory. Manual labor is used to count the rice sacks, which makes it challenging to calculate how many stocks are available and how many products have been sold. Since the start of the company, one of their main issues has been the manual compilation of inventory reports, such as daily, weekly, quarterly, and yearly inventory list of data. The inventory management procedure for Best Choice Rice Dealer will be made easier by the transaction processing system. To avoid understocking, overstocking, or running out of stock, it will keep an eye on the availability of product items for replenishment. Additionally, the system will produce the sales reports that are required for inventory.

⁹According to (Globe Business Philippines 2017) “Inventory Ordering system" With just a few keystrokes, track your supplies using Globe’s Inventory Ordering System. The cost-effective and highly innovative inventory management system gives you instant access to stock levels, allowing for timely orders and zero wastage. What the inventory system does is allow you to order supplies based on the most current data. This minimizes overstocking and at the same time, frees up resources for more urgent needs. The Inventory Ordering System gives you better control over your supply chain, affording you the convenience of being able to place orders online or via SMS. And because the system automatically generates inventory and sales reports, your employees will

have less paperwork to file and more time to focus on operations. Perfect for businesses with franchise operations, this user-friendly inventory management system can be customized for any multi-site company, commissary, or warehouse backend ordering operation.

The literature and studies mentioned above focus on how to track your supplies with the help of Globe's inventory ordering system with only a few keystrokes. You get immediate access to stock levels with the creative and cost-effective inventory management system, enabling you to place orders on time with no wastage. The inventory system enables you to place supply orders based on the most recent information. By doing this, overstocking is reduced and resources are made available for requirements that are more urgent. With the ease of being able to make orders online or by SMS, the Inventory Ordering System gives you improved control over your supply chain. Additionally, because the system generates inventory and sales reports automatically, your personnel will spend less time filing paperwork and more time concentrating on operations. This user-friendly inventory management system is ideal for companies with franchise operations and can be tailored for any multi-site corporation, commissary, or warehouse backend ordering process.

Local Study

¹⁰Running a retail business takes a lot of work, but the process becomes significantly more efficient when you have the proper tools. One of the must-have tools in this industry is the POS system. For businesses that are open during the lockdown, it is highly essential that they keep their transactions fast and smooth. POS system can do both while people who are paying up would not be staying long in the line.

According to article written by Enzo Luna (Oct 8, 2021) A POS system can significantly make the checkout process flow more quickly and smoothly, especially with barcode technology. Cashiers can quickly scan the code, locate the product, assign it to a transaction, and update the inventory immediately after payment. In this manner, customers can get in the store, shop around for what they want, and acquire the products they like with no time wasted. With an optimized checkout process, customers will have a more pleasant shopping experience and are more likely to come back to your store and shop for more.

¹¹Most waiting line problems are centered on the question of finding the ideal level of services that a firm should provide. These facilities must decide how many counters should be opened and attendants should be on duty. This has been the unresolved problem of the Land Transportation Office. Gradual increase of pending license plates, small number of servers, red tape, fixers and hasty or planning with no deliberation causes unentertained concerns that leads to chaos in the office and hassle to the applicants. These are just few feedbacks surveyed from customers. Land Transportation Office is an agency of the Philippine government under the Department of Transportation and is responsible for all land transportation in the Philippines. Functions of the Land Transportation Office include the inspection and registration of motor

vehicles, issuance of license and permits, enforcement of land transportation rules and regulations, adjudication of traffic cases, and the collection of revenues for the government of the Philippines. Its mission is to rationalize their services and facilities, to effectively implement the various transportation laws, rules and regulations and to promote safety and comfort. Its vision is a front-line government agency showcasing fast and efficient public service. (LTO, 2016)

According to LTO waiting line problems should be provide idea level of service depending on what firm wanted to do. Problems in queueing is a big issue in LTO because applicant would turn to fixers to process their license, plate number or registration on their vehicles. That is why a queueing system is important and it should be efficient and fast so satisfy whoever uses a service.

¹²At times, customers do not admire being delayed whenever they buy something. If the payment transaction is in chaos, the customers might put back their chosen items and will leave the place displeased. With that, having a POS terminal is an excellent choice as it helps the persons in charge to do their tasks quickly and efficiently. In that way, the customers will be glad as you are not taking too much of their time. Whenever you need one, it can be purchased anywhere for your convenience. It is available inside the mall, online shops, and current IT companies in the country. If you are interested, its functions and benefits as a product are written below for you to know more information (INVEIT 2020).

According to the article by INVEIT – customers dislikes being delayed when they buy or use an service, so Point of sale system is the good solution to provide the cashier to do their task quickly and efficiently by having an POS system in turn this will reduce that that takes place to finish the transaction and satisfies the customers.

Synthesis

Inventory management system tackled how you manage your inventory whether manual or computerized, both of that having advantages and disadvantages for the business, this chapter give an idea also for the reader to review what's use of inventory to the business. By studying this part of the study, the researchers were able to come up with ideas to produce a system that is fitting to the client's needs. It is important to understand that every system can provide basic management tools, but the effectiveness and efficiency of the software that would be employed by a certain business depends on the number of the needs or errors in the old system were solved. In relation to this, researchers concluded that all software's has its own edge and falls. But the purpose of these systems is the same presumably to innovate the experience of managing information to lessen cost in inventory management system and increase profitability. Furthermore, some systems, especially those developed and used in foreign countries have advanced features and integration of other information systems such as advanced accounting, and supply chain management. These features cannot be applied to the development of this project but are relevant to the improvement of technologies. Despite not being able to adapt to these changes the system remains to be standard and fitting in with the client's needs.

Chapter III

Research Methodology

This research presents the method that is used, the data gathering procedure, research design and research instrument used for the research that helps find information about Point of Sales and Inventory System. Moreover, the developers gathered information and conducted research for the development of the proposed system.

Methodology

The developers use Agile Methodology because it is a system of development based on iterative development. The developers use this kind of method because this method can easily show the relationship of the two variables, the client and developed system to make their business more efficient when they use it to their business. As stated above agile methodology needs an approach because agile methodology begins with an assessment of customer needs. Based on the needs of the customer the development team then breaks down the needs into small self-organizing groups which means the developers needs to assess and predict so that they will know the relations of it or the possible outcomes that can affect the study.

Data Gathering and Procedure

The developers formulate the interview questionnaires based on what they know about their particular system. The developers conduct an interview with the chosen client and after the interview the developers gather information to answer the questions needed from the client to developers to interpret data.

Research Design

The developers presented the methodology that was used in development and design of the proposed system. The proposed system is designed, developed, and evaluated to know if the proposed system meets the criteria of consistency and effectiveness. The researchers used developmental research because it assesses changes over an extended period of time by looking at the same groups of subjects for months or even years. Looking at academic and social development which may access to choose a small sample from each of the low- and high-income areas also, it employs the systematic method of designing, developing programs and processes that must meet the criteria of material consistency and effectiveness.

Research Instruments

The developers choose to gather data online and use interview guide questions, transcript of interview and video recording that the developers created. This will be the key to get some answers or data from the client and this will help the developers to accomplish their study. The questionnaires are based on developers reading, previous study and knowledge about Point of

Sales and Inventory System. The developers would use computer, mobile devices and screen recorder while interviewing the client by using the questionnaires, the instruments that the developers use is the proof to make their project solid and more believable and additionally this will help on conducting the study and finding information or data. The developers record a video on how the developers do the interview to the chosen client and this helps the developers to gather more data and information from the client by answering the questionnaires.

The developers used different kinds of instruments to make this study possible. The following tools were used for gathering of data:

- **Interview.** The developers conducted an interview with Mrs. Erica David, the owner, to gather all the information needed for the development system.
- **Analysis.** The developers were able to come up with an interview guide that aims to tackle how the transactions are done, how they manage and monitor their sales.
- **Web Research.** The developers used the internet in gathering supportive and related facts and latest information associated with the proposed system for the purpose of further understanding.
- **Library Research.** The developers used the library to further gather information relevant to their research. The library was able to provide information that helped the researchers to further enhance their documentation and provide information for their system development.

Calendar of Activities

The Gantt chart presents the summary of activities. Listed are the activities and opposite them are their duration or periods of execution. The overall time process of our research is depicted in this Gantt chart. The process begins in the second week of September where the researchers initiated to form a group and conceptualized brainstorming of our project. After we formulated a topic for our project, The developers started looking for a client to conduct the interview once we decided on a topic for our project. During the interview process, the researchers commenced the system user interface design. Every week, the researchers gathered the resources in making the system to consult with the client. During the 1st week of November up to the third week of January, we started to document Chapter 1 up to Chapter 5 together with our system. The last remaining documents and final revisions were finalized in the months of December and January until the final paper works, and modifications were completed.

Gantt Chart of Activities

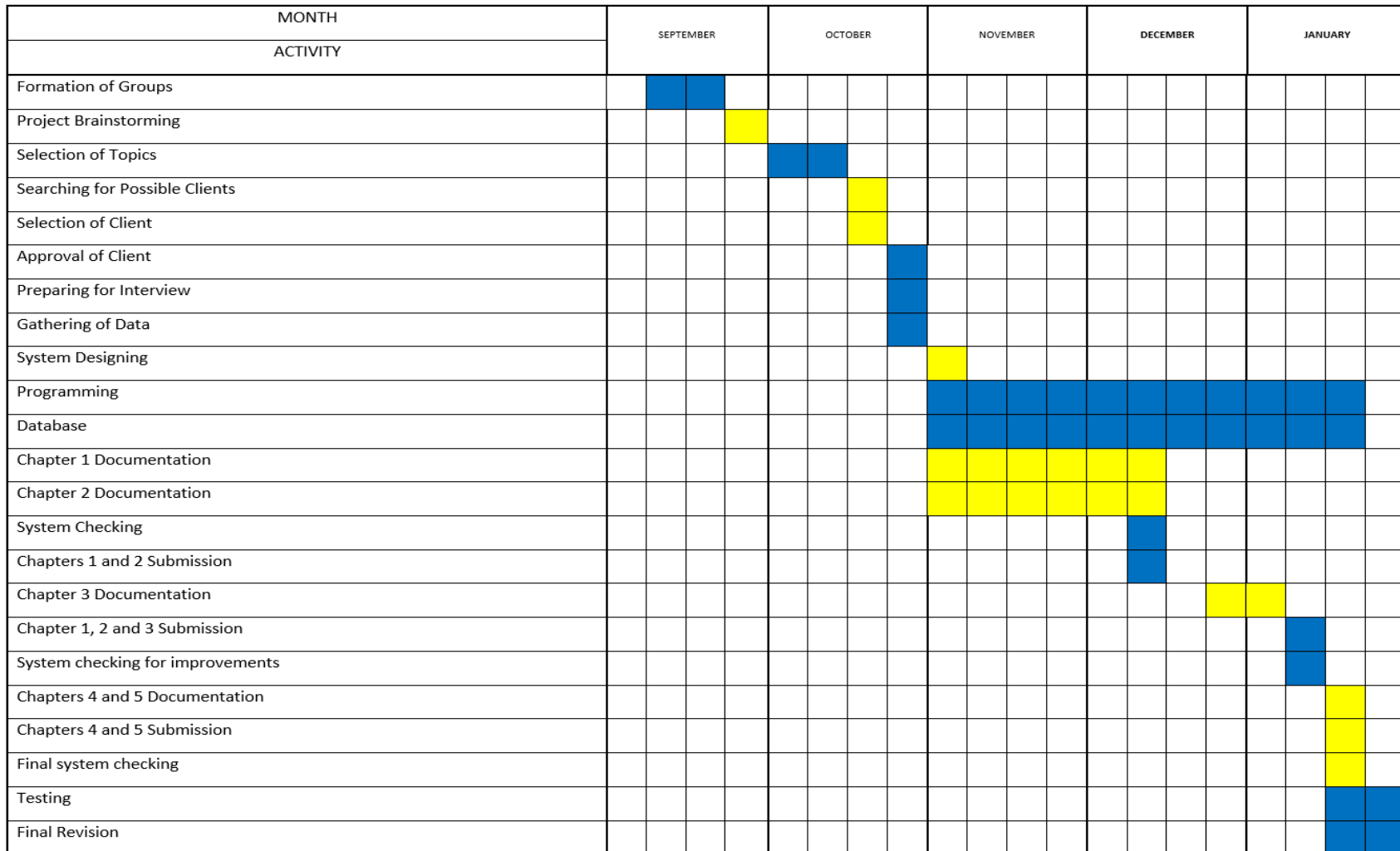


Figure 3: Gantt Chart of Activities

Chapter IV

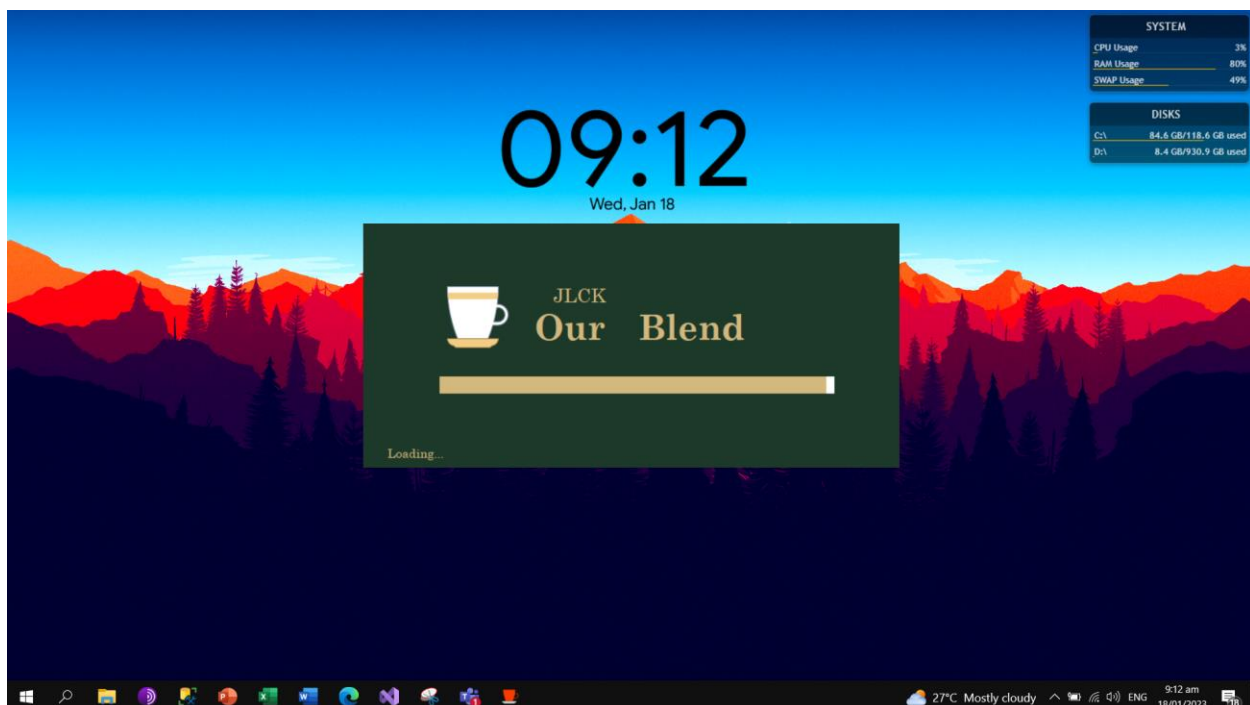
Develop System

In this chapter, the developers will provide data that shows the Develop System Flow Chart, Develop System Use-Case, Entity Relation Diagram, Data Flow Diagram, Specific Requirements and also the System Requirements. In addition, this chapter presents the data gathered, the result of the statistical analysis and interpretation of data. These are presents in Specific Requirements regarding the impressions and realizations of data.

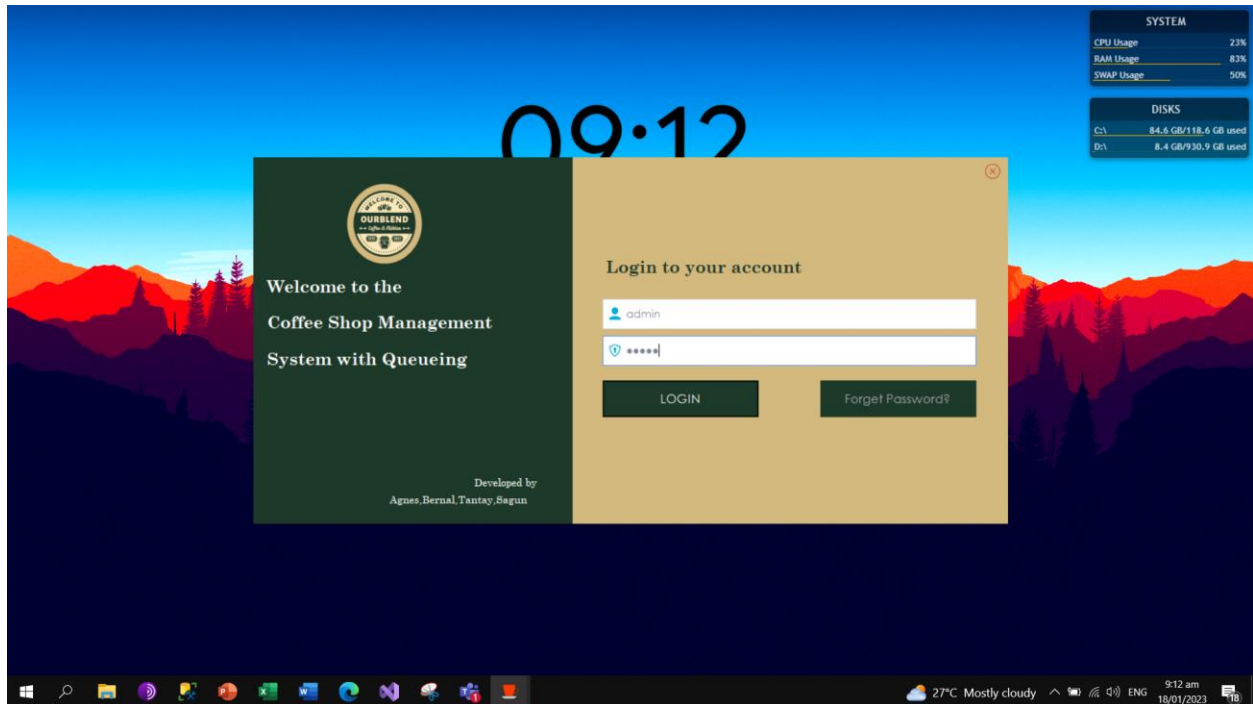
Description of the develop system

The main purpose of this system is to provide an innovative solution to ongoing inventory management problems of I Love MilkTea shop. As a resolution, an automated inventory system is being proposed. The system would compose of three (3) major modules; Point of Sale, Inventory and Accounting, wherein these components are related to stocks management only. Specifically, this real-time management system would automate inventory processes from ingoing and outgoing of products. Such a generation of sales reports and billing should also be included. Furthermore, a link between the accounting system and inventory would also be established for an accessible ratio of carrying costs to sales. By providing a application inventory management system to I Love MilkTea store, the staff who oversees inventory would be expected to accurately project future acquisition of supplies which will minimize carrying costs, allocate resources efficiently, and increase profitability.

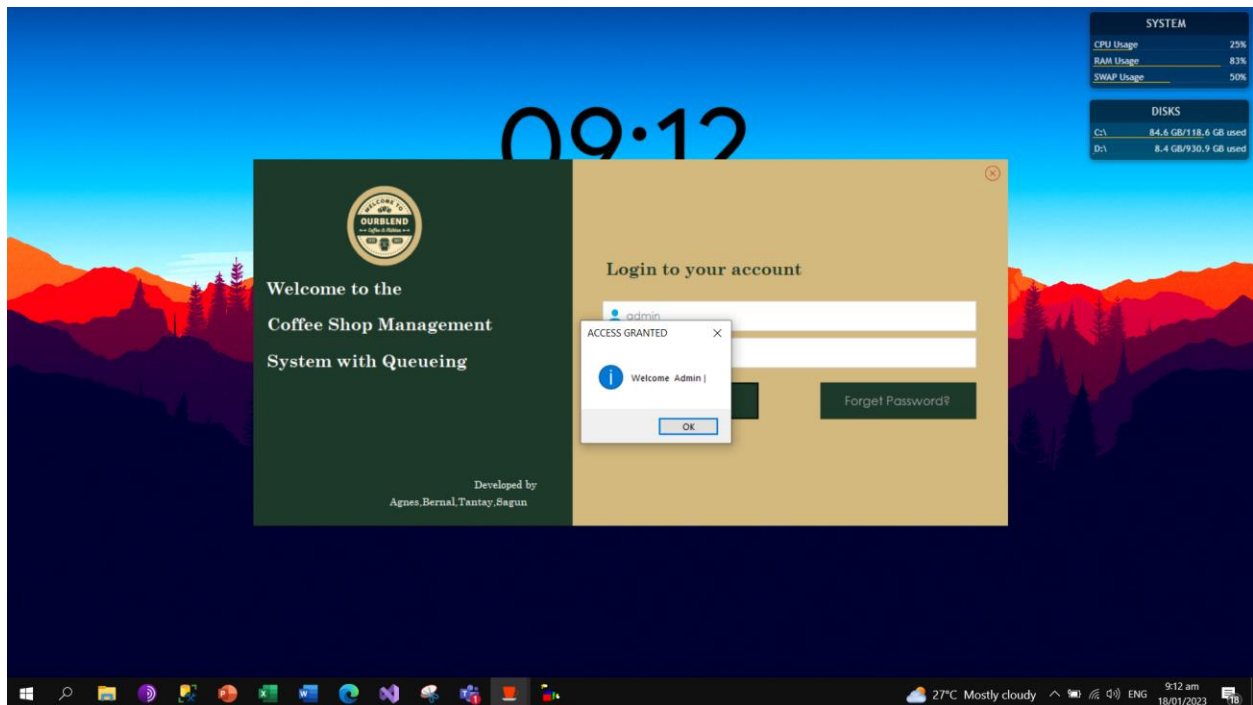
First, the user will be greeted with the business name accompanied by a loading screen indicating that the system needs to load data before the user can proceed.



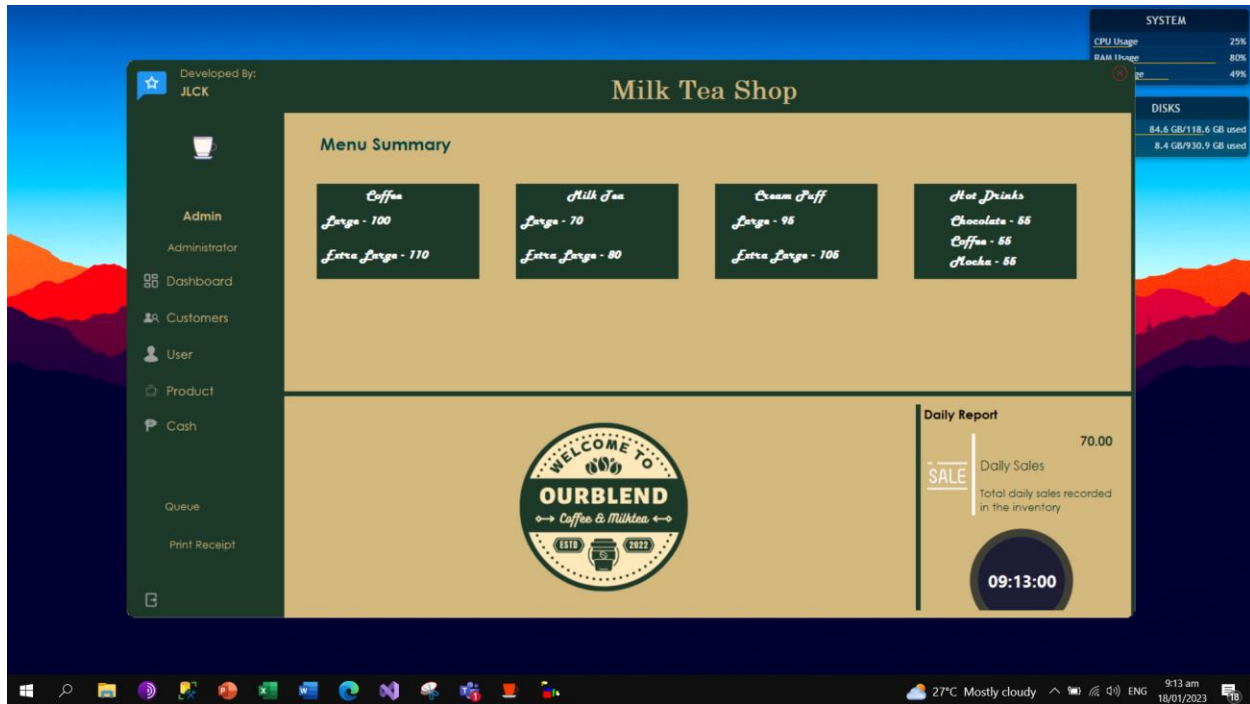
Next, the user will be required to enter their credential information to the system, the user must enter their username and password to login successfully. If password is forgotten, the password lets you reset your password via email.



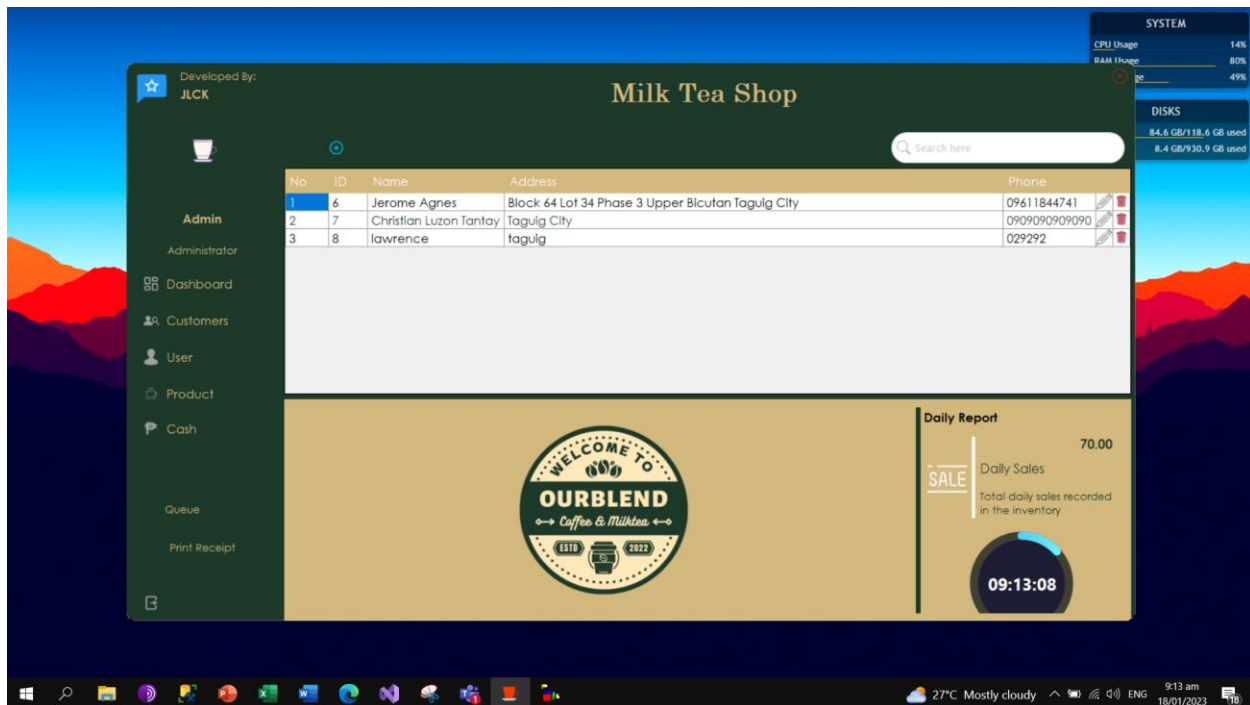
If login is successful, the user will now be able to access the interface of the system.



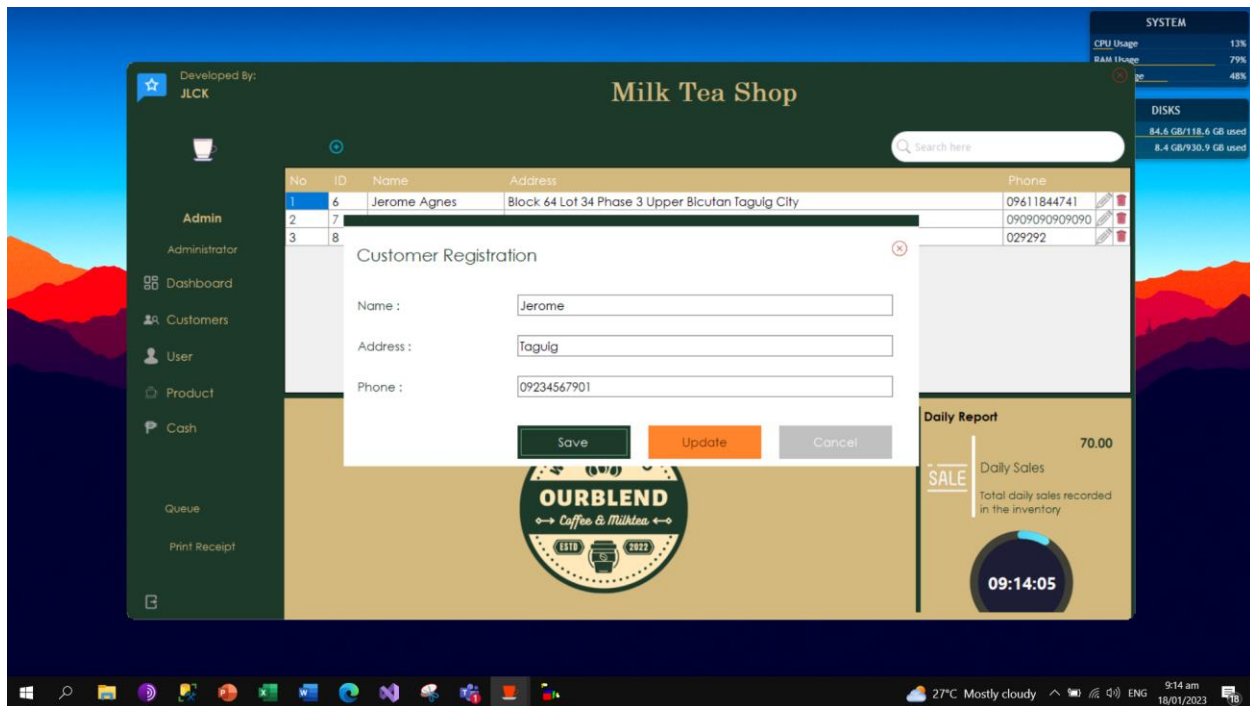
The user now has access to the interface, which lets them see various options and management settings.



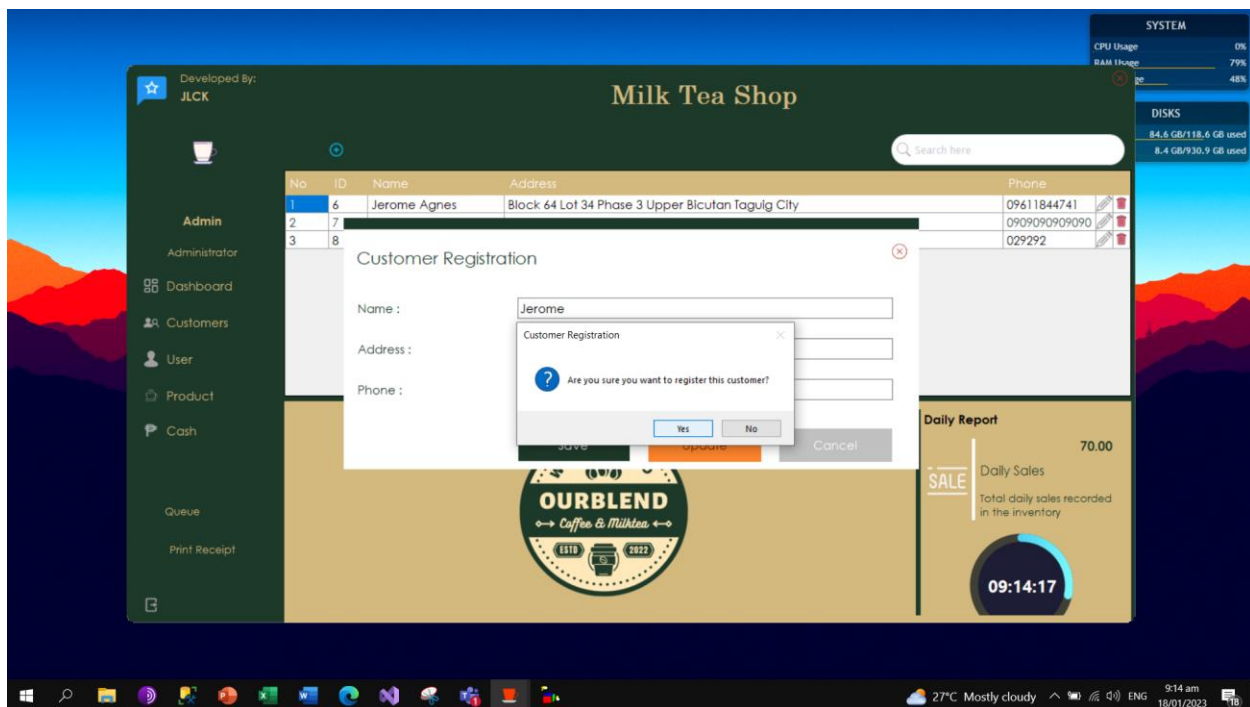
In this procedure, we are viewing the customer list within the system. The list shows the information of the customers such as the name, ID, address, phone number, etc.



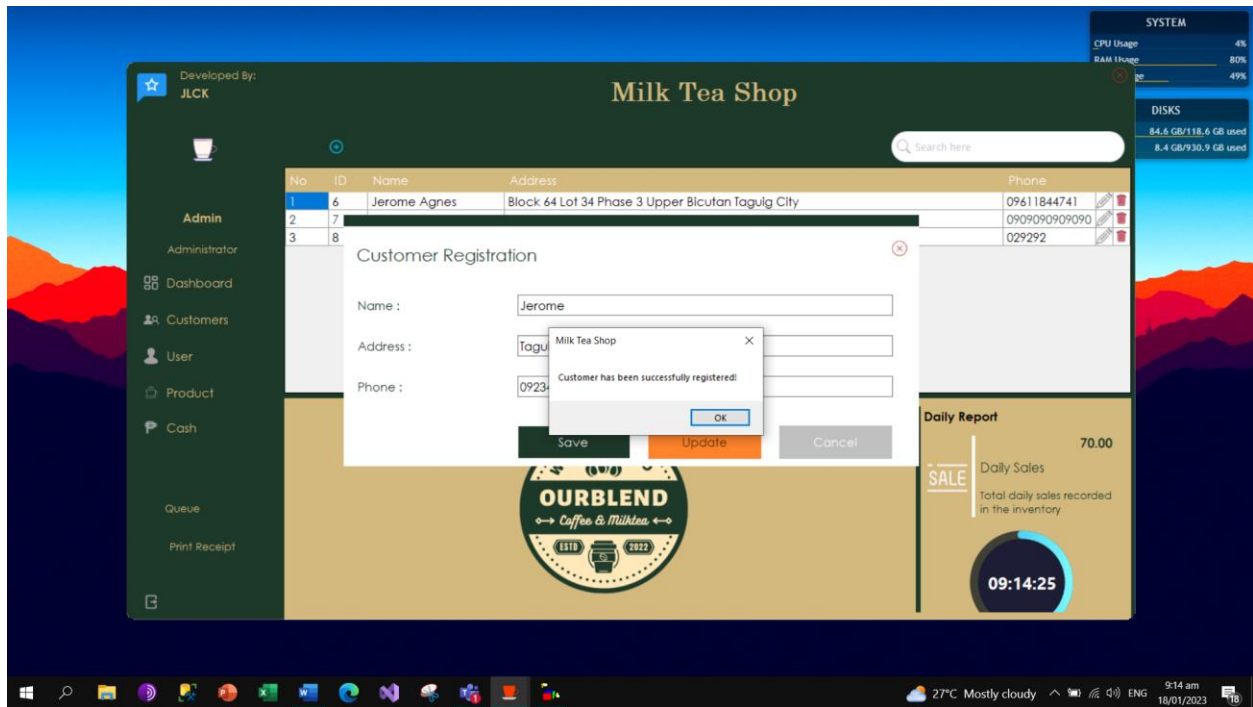
The system also lets you register a customer and add it to the list. To do this, simply register the information of a specific customer to add to the list.



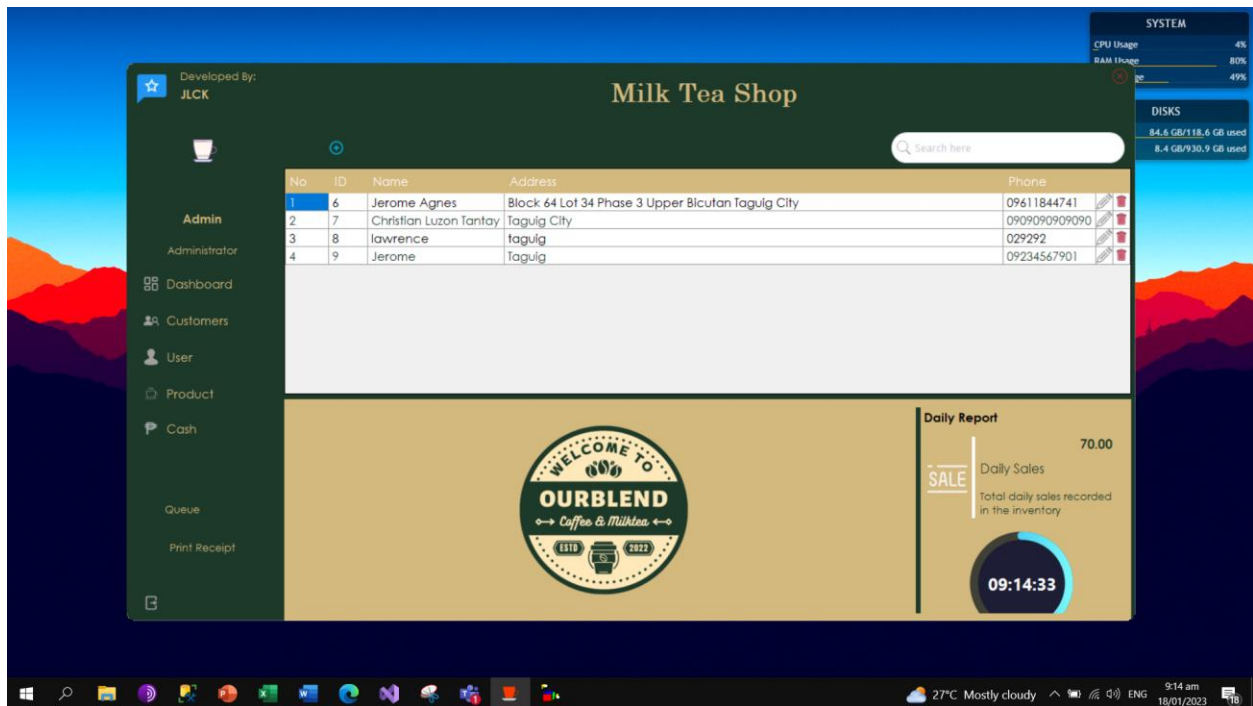
Then it will pop-up a message box asking question “Are you sure you want to register the customer?”



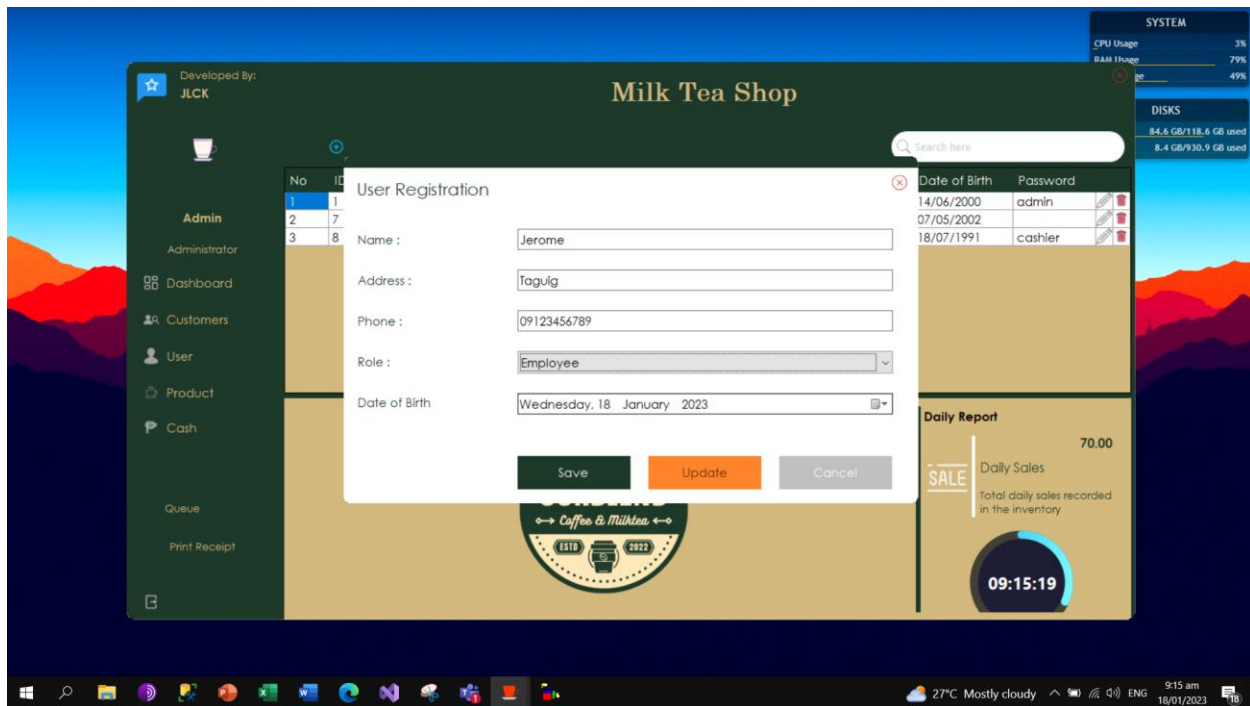
Then it will pop-up a message box showing “Customer has been successfully registered!”



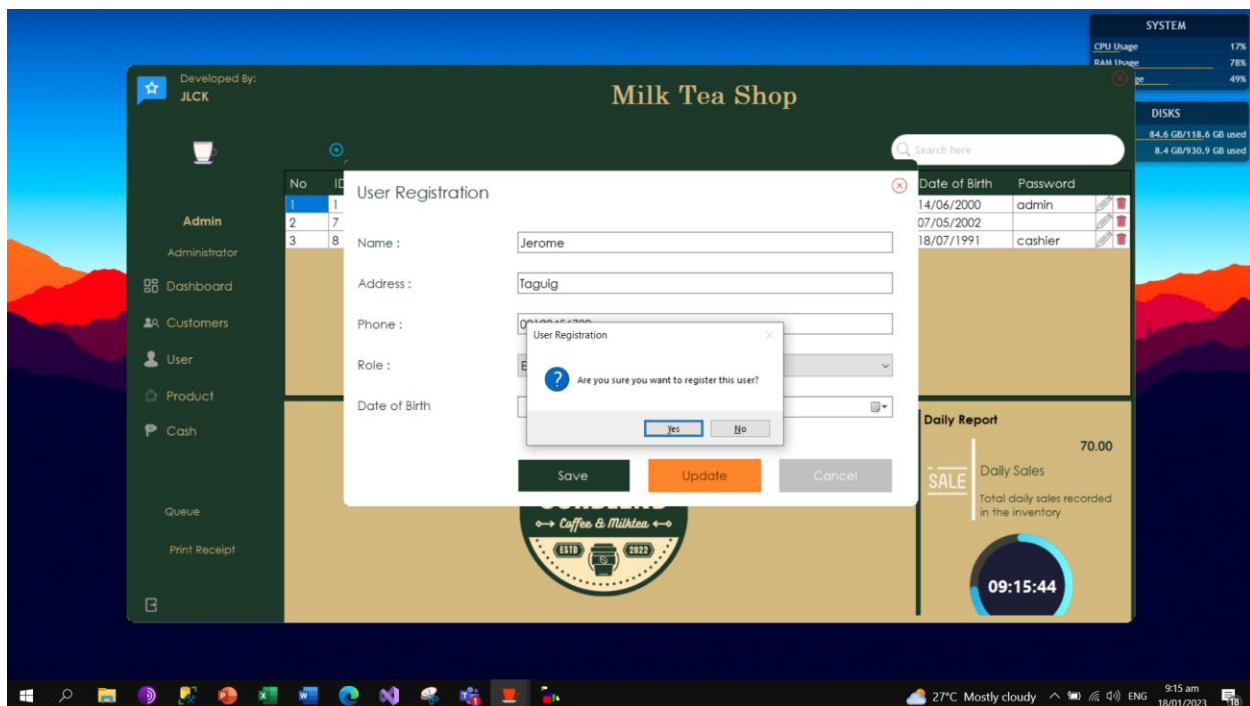
After registering a new customer, they will now be listed in the customer list column below.



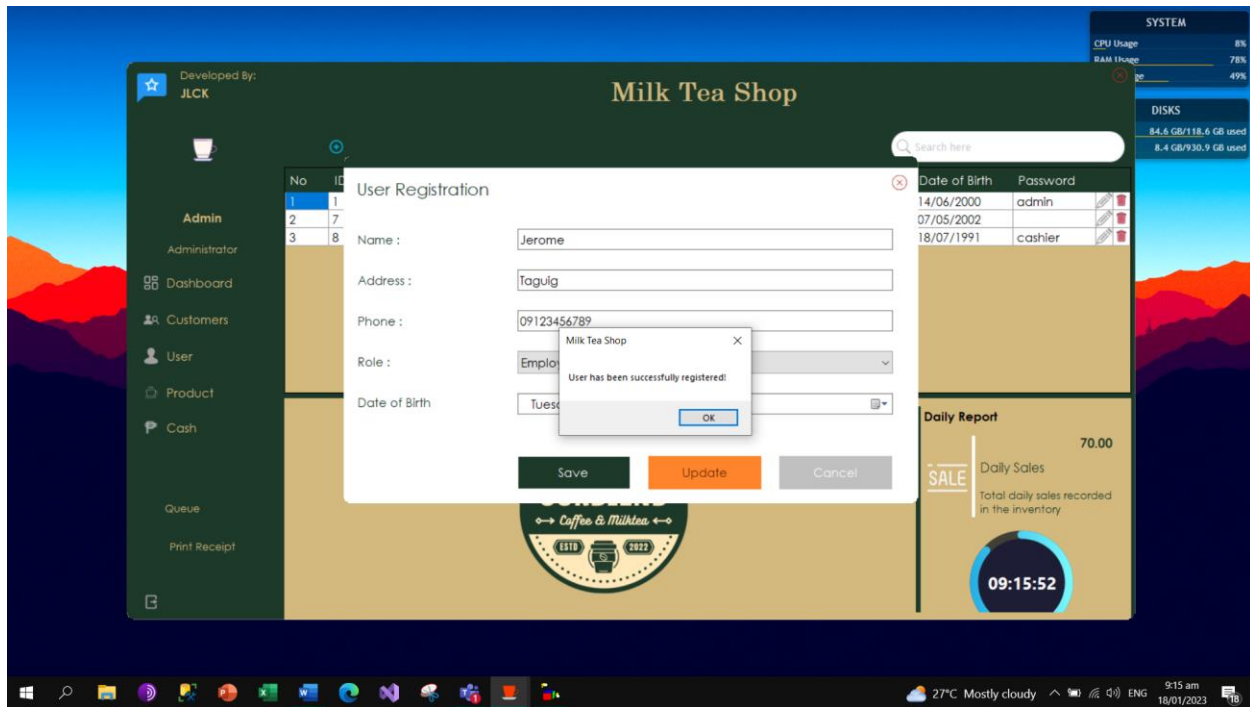
The same method can also be used in the User interface of the system, where the list shows the current users of the system.



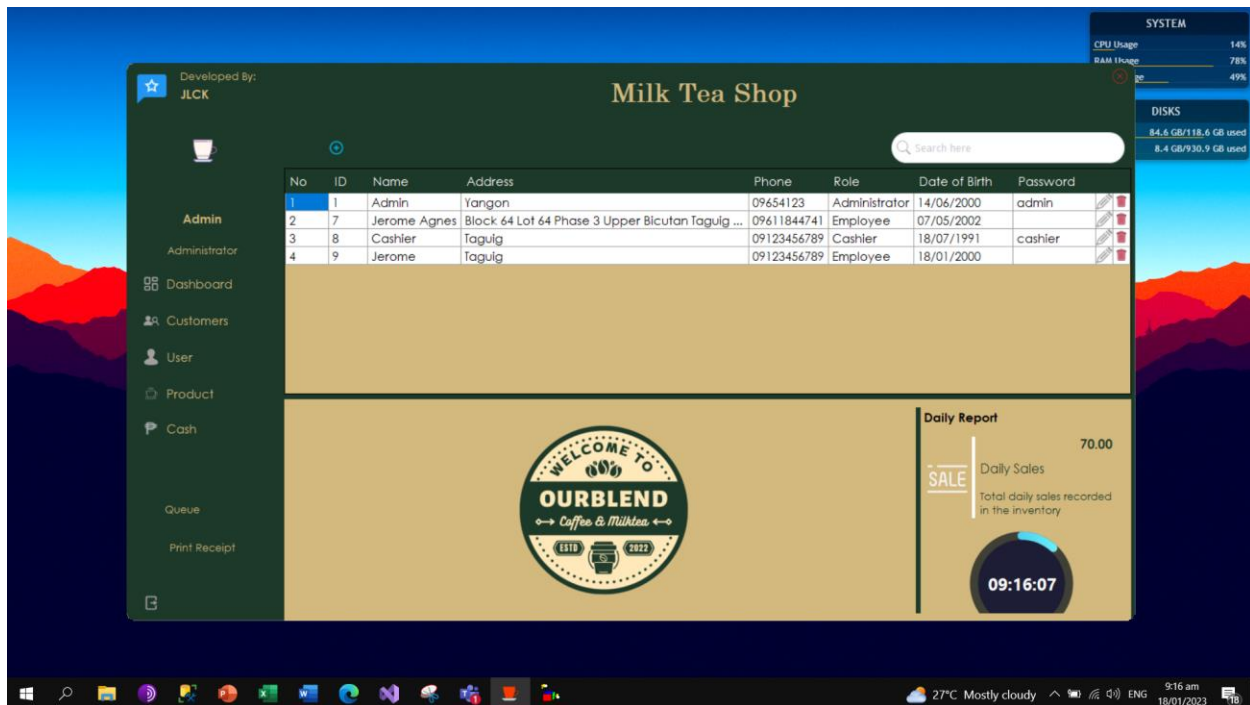
Then it will pop-up a message box showing “Are you want to register this user?”



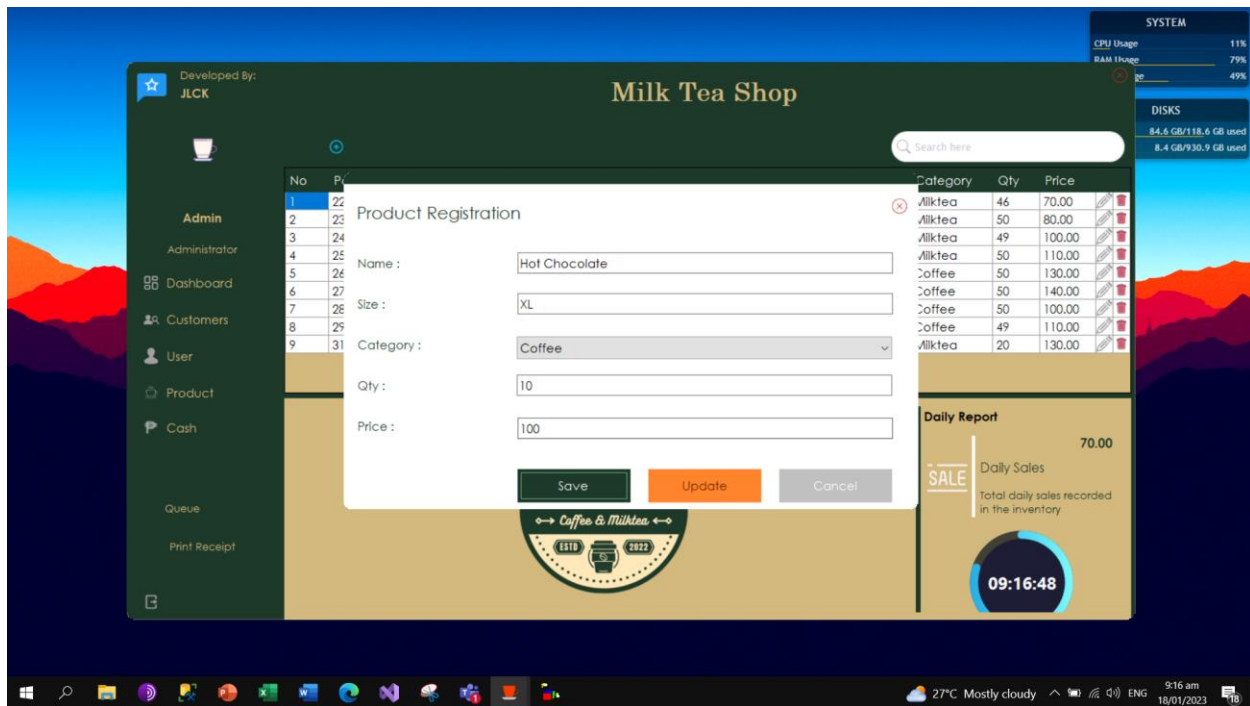
Then it will pop-up a message box showing “User has been successfully registered!”



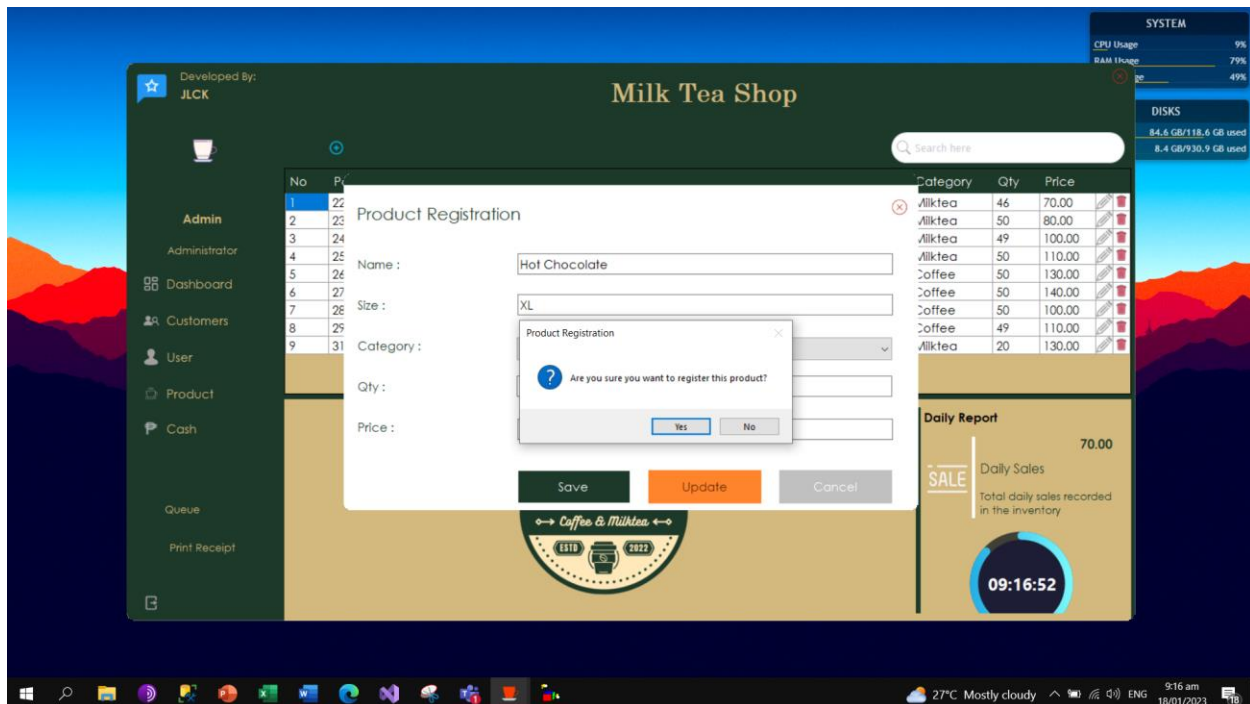
In the registration options for the user, the user managing the system would be required to enter credentials of a certain user, especially their role.



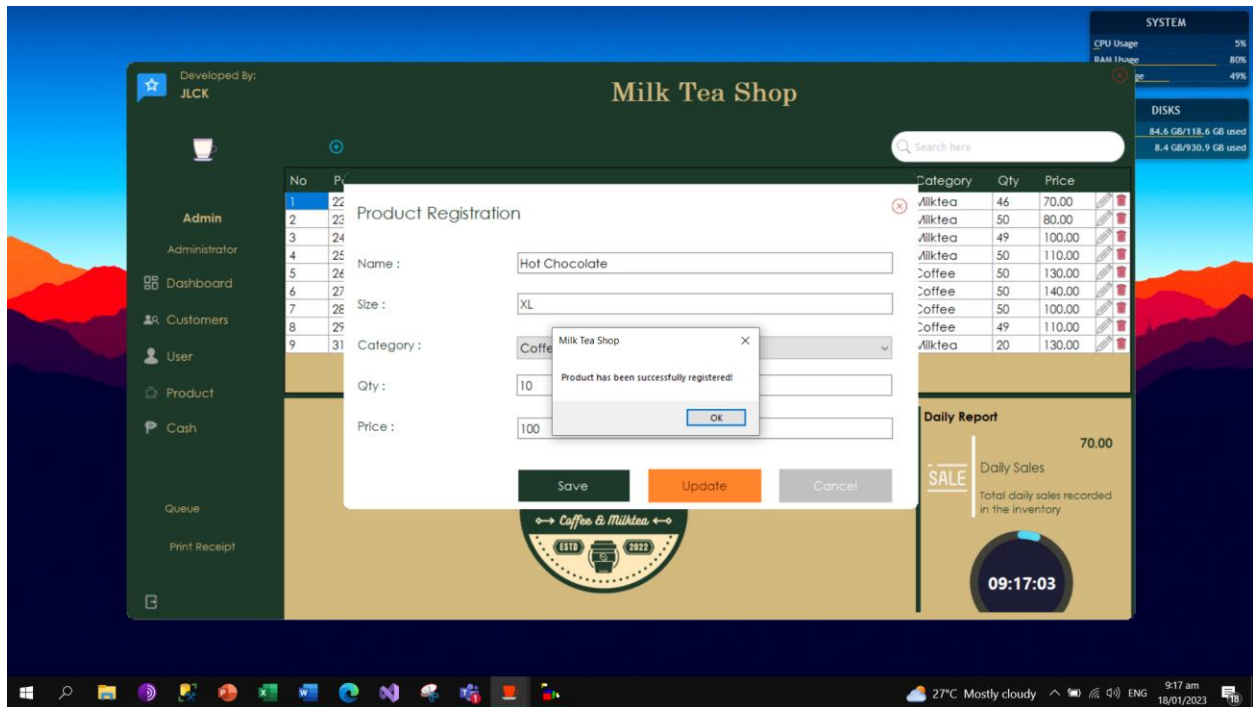
This window shows if the user wants to add, removed, and edit the stocks to monitor the business.



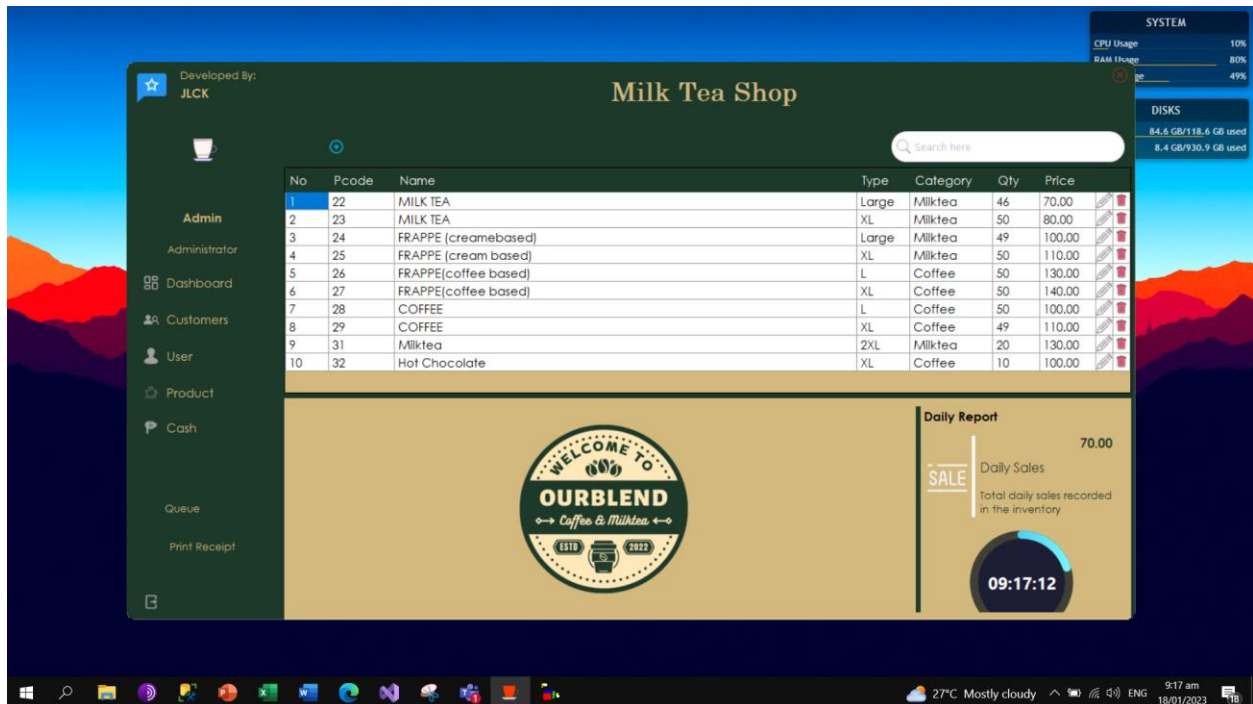
Then it will pop-up a message box asking “Are you sure you want to register this product?”



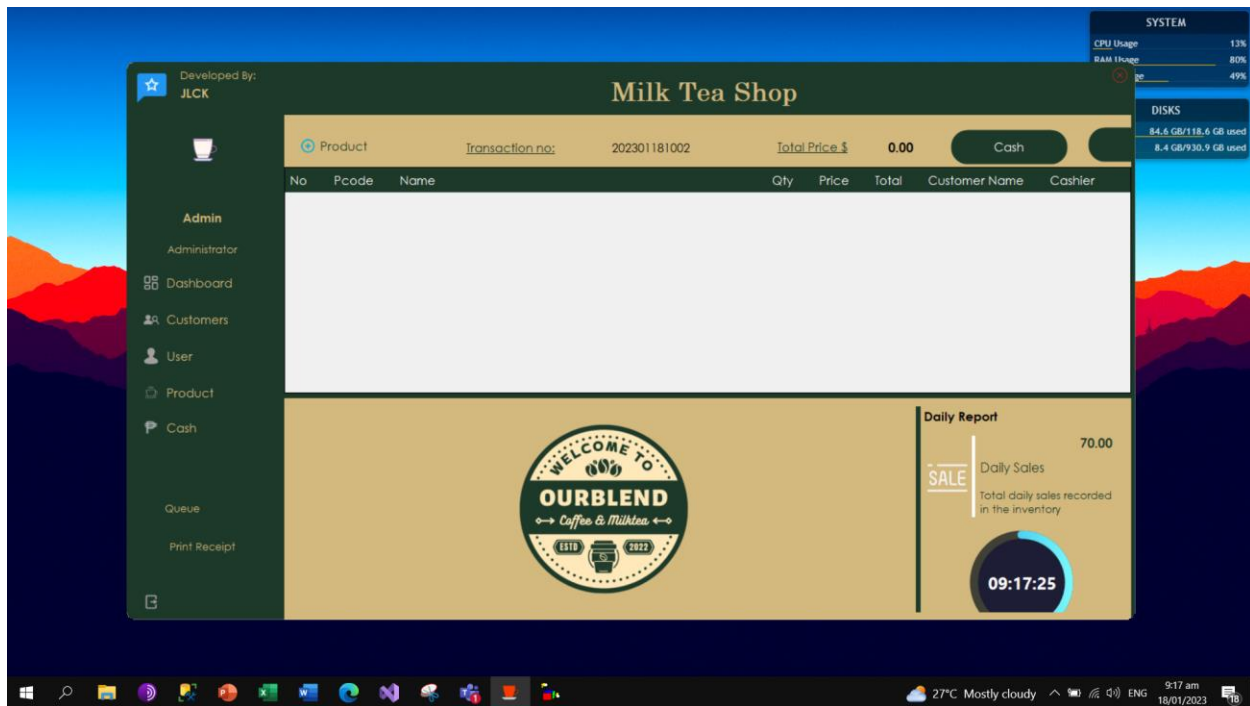
Then it will pop-up a message box showing “Product has been successfully registered!”



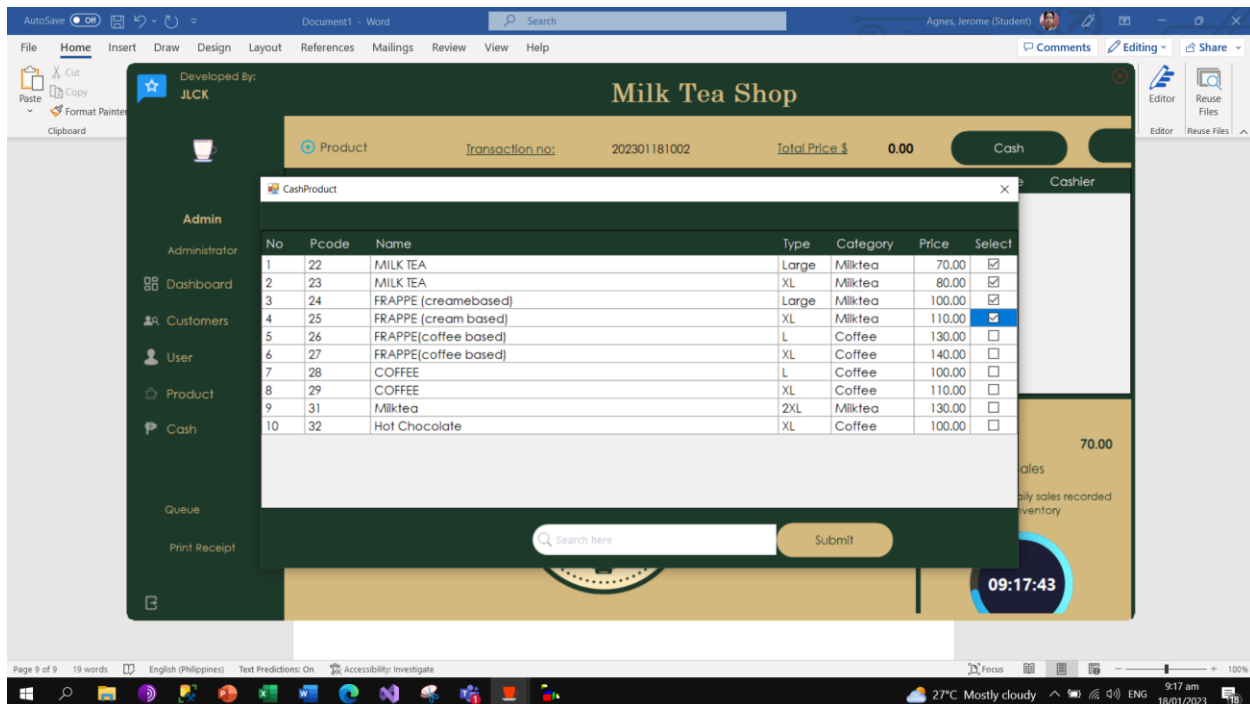
This window shows the products or stocks of the store that can monitor of the user/owner.



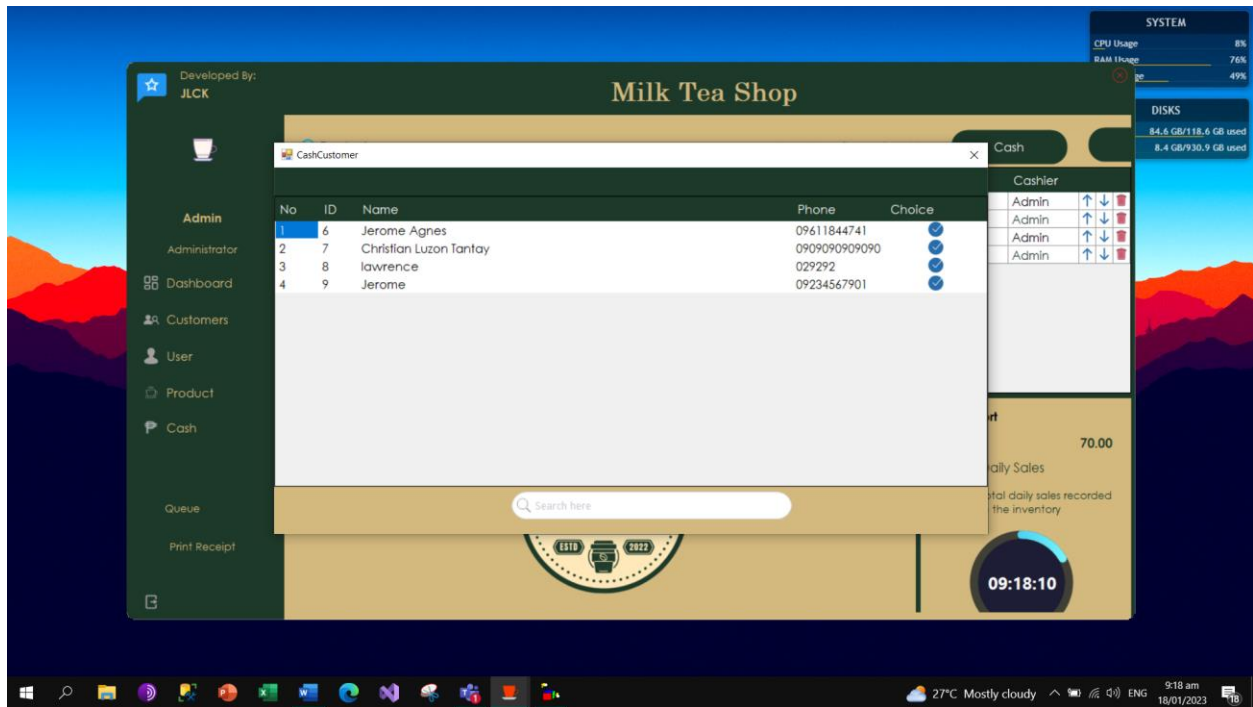
In this section, the user needs to click “Product Button” to view the menu or list of the products.



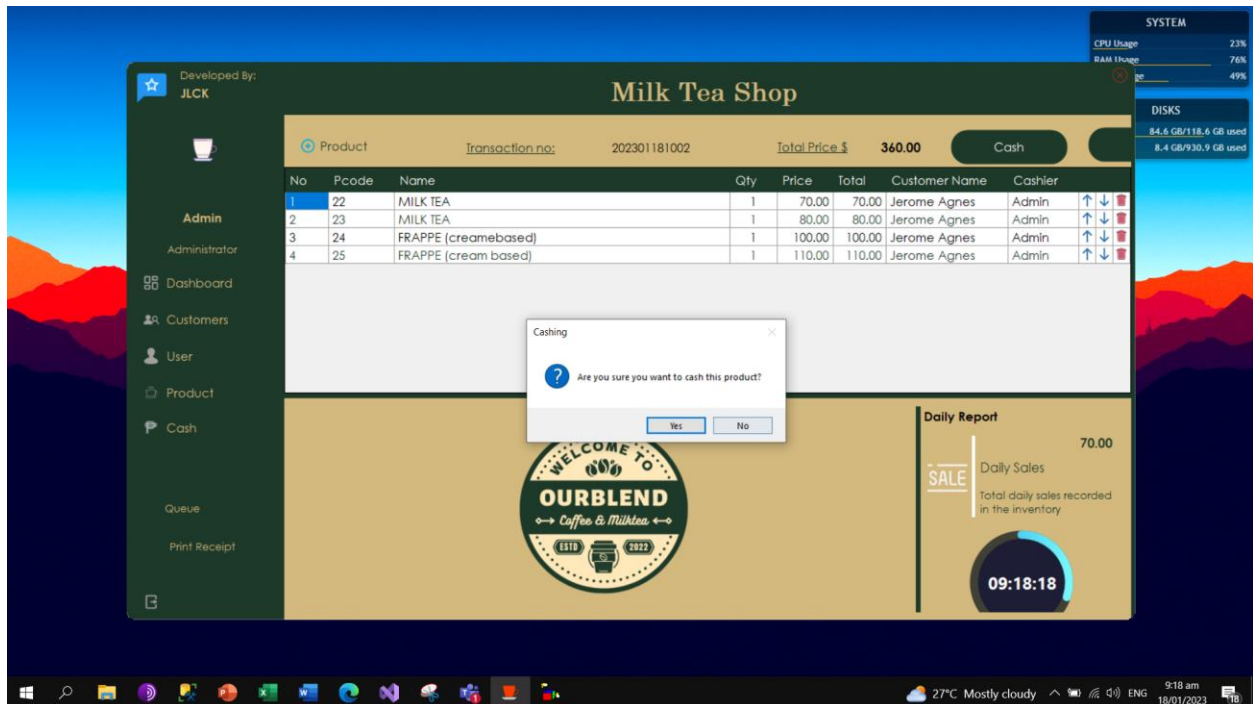
Here, the user can easily choose or place the order.



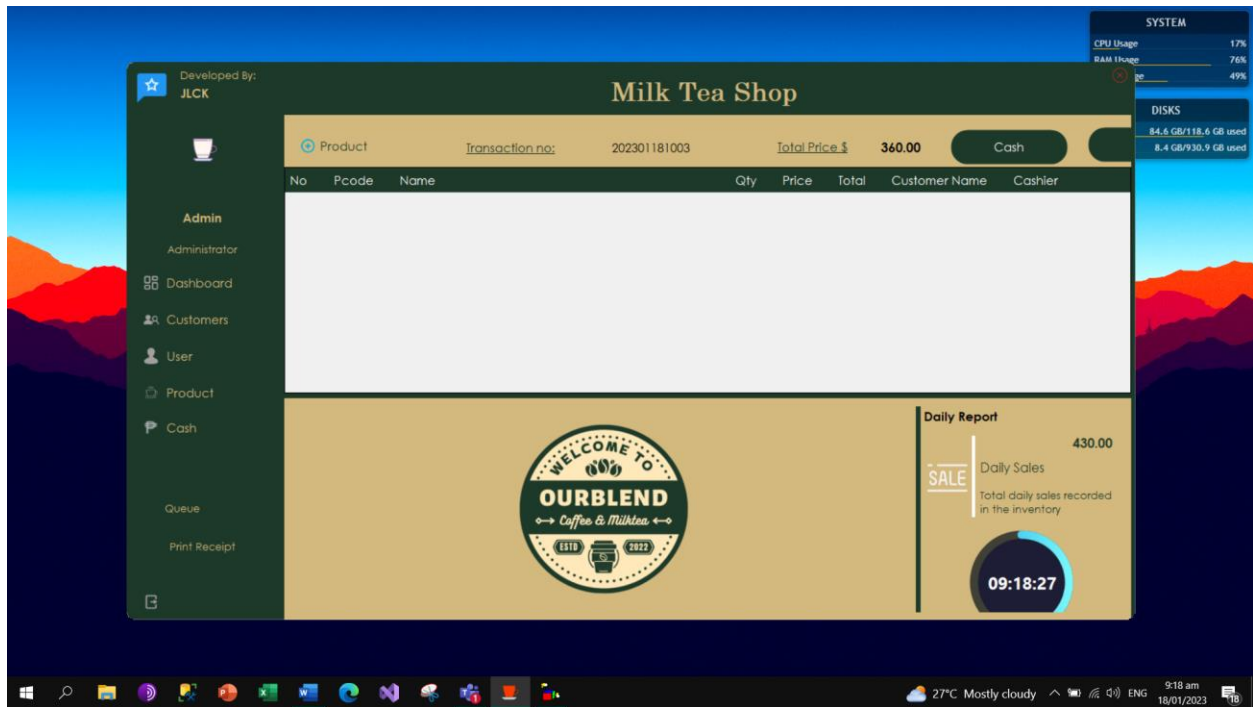
Here we can see and choose who is the buyer or simply who place his/her order.



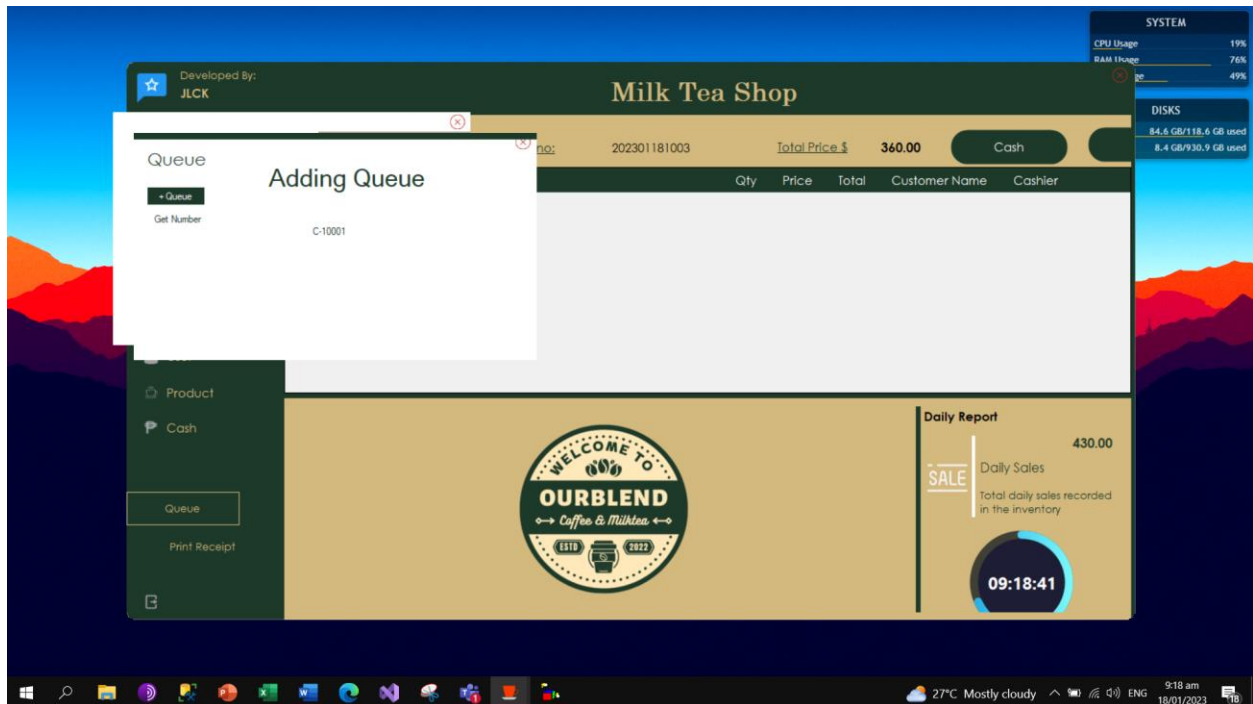
Then it will pop-up a message box asking “Are you sure you want to cash this product?”



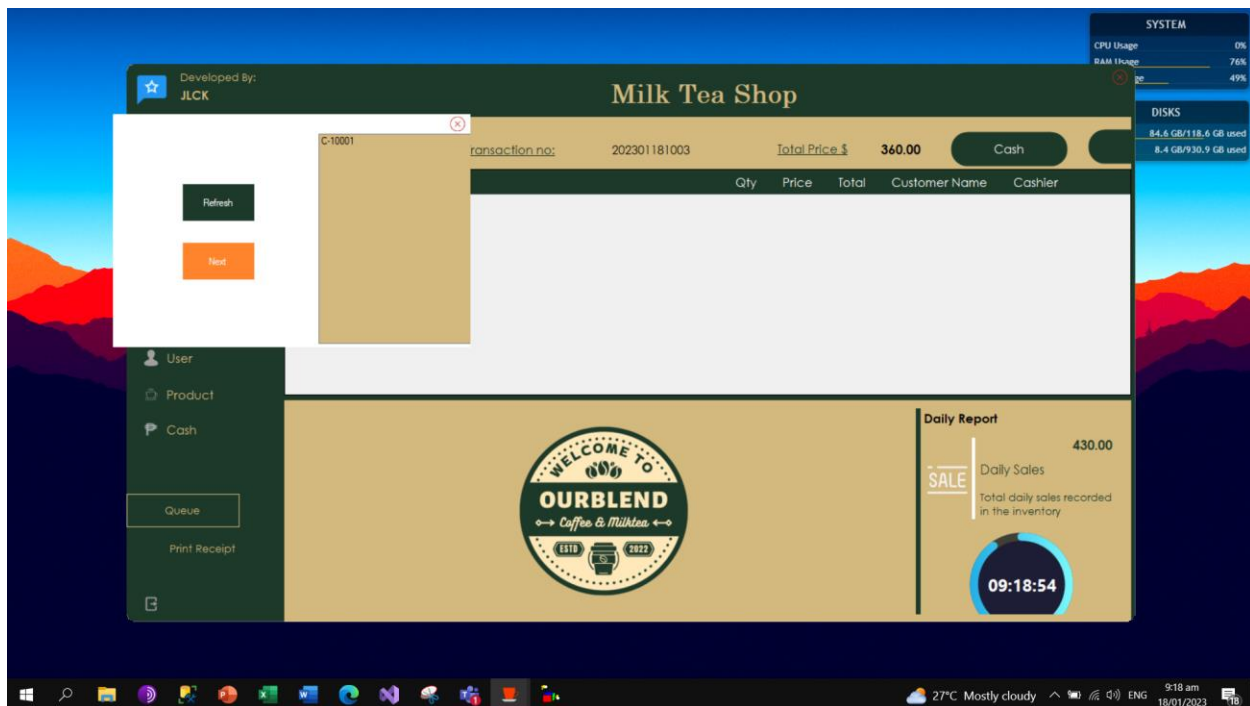
Then here we can see the total price of the place order of the user.



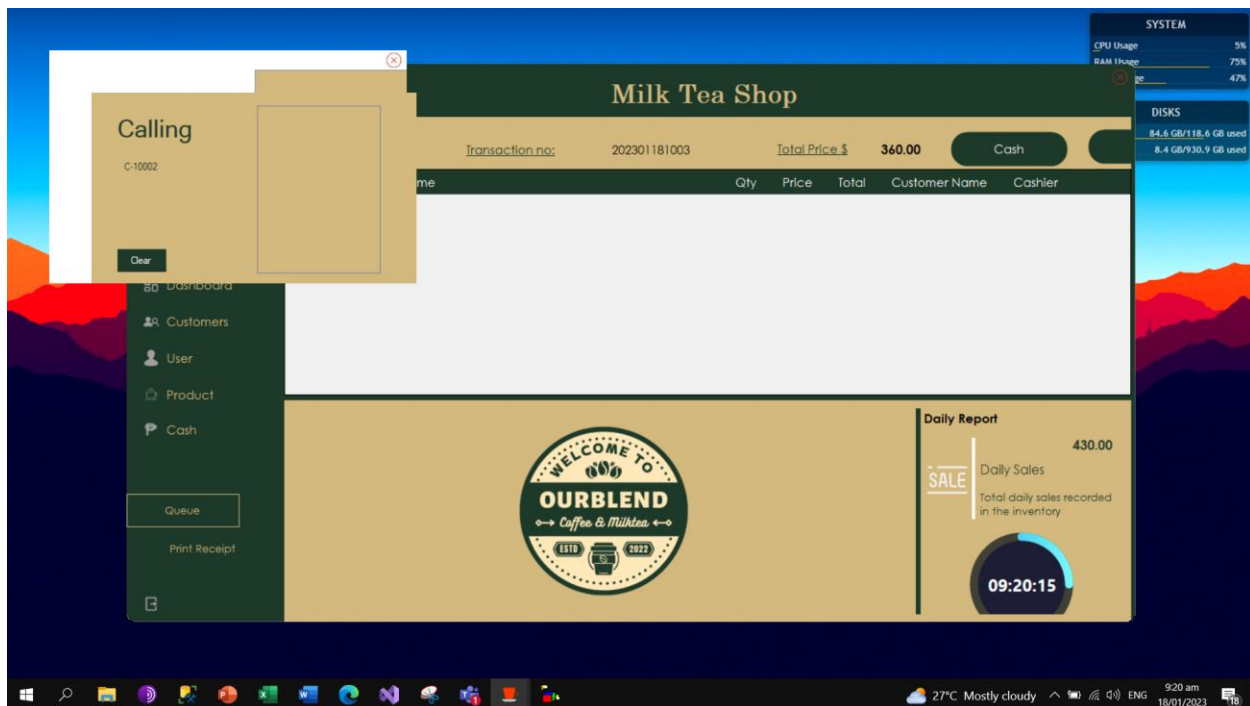
Here is the Queuing part of the system.



After queuing, the serving window will show.



After that, the system will call or notify the user that the place order is ready to be served.



After all the transactions, we can see on the database what particular items did the customer buy together with the information such as price and quantity.

The screenshot shows a window titled "PrinterForm" with a table of transactions and a form for printing a receipt. The table has columns: cashid, transno, pcode, pname, qty, price, total, cid, and cashier. The second row is highlighted in blue.

	cashid	transno	pcode	pname	qty	price	total	cid	cashier
	36	202301181002	23	MILK TEA	1	80.00	80.00	6	Admin
▶	37	202301181002	24	FRAPPE (creameb...	1	100.00	100.00	6	Admin

Below the table, there are input fields for the selected transaction (37):

1	FRAPPE (creameb...	100.00
202301181002	1	6
24	100.00	Admin

A "Print" button is located at the bottom left of the form area.

Lastly, the user must click the print button to print the customer receipt.

The screenshot shows the same "PrinterForm" window, but now with a receipt preview on the right side. The receipt is titled "Coffee" and contains the following information:

CashID	1
Cashier Name	Admin
CID	6
Code Name:	24
Price	FRAPPE (creamebased)
Quantity	100.00
Total Amount	1
Transaction Number	202301181002

The "Print" button is now highlighted with a blue border.

Develop System Flow Chart

The employee would first log-in their necessary credentials before proceeding to the Main Form of the system where the employee would then use the interface of the POS. Next, the employee would record the purchase and determine the quantity and the payment amount before proceeding to add the order to the list of purchases.

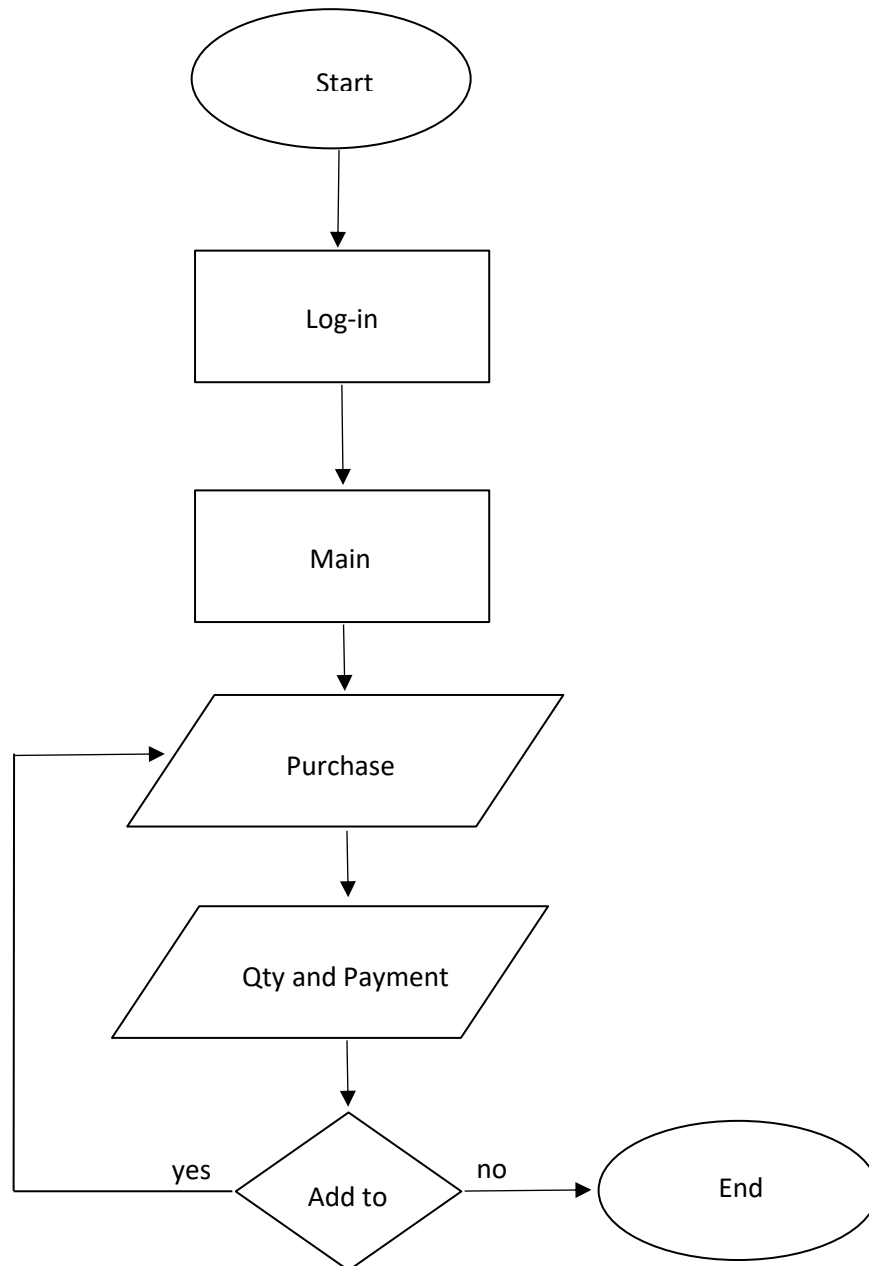


Figure 4: Develop System Flow Chart

Develop System Use-Case

First, the employee enters their credentials such as password and username, then they will proceed to the Process Customer Order where they will begin the order processing of a customer or activities involved in order fulfillment. Next, the employee will proceed to the Select Product Quantity where they can either add an item into the inventory or find a specific record in that inventory. Proceeding next, is the Input Money where the employee accepts the cash from the customer and the employee in return will print out a receipt. In the final procedures, the order will now be processed in the "Added to Preparation Queue" where the order will be added and awaiting process while in the "Preparing Queue" would be when the order is now in the process.

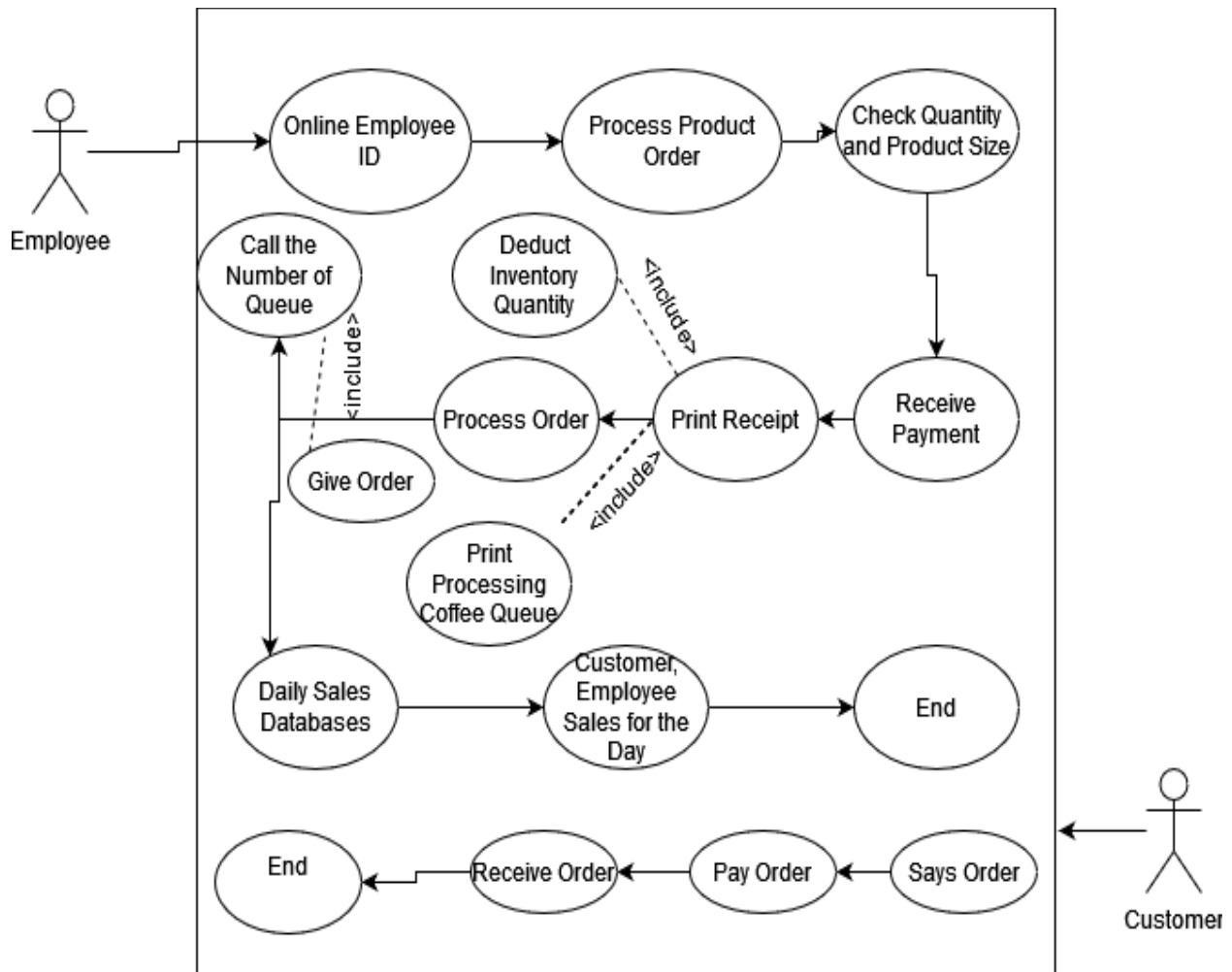


Figure 5: Develop System Use-Case

Entity Relation Diagram 1

From Database, Table Customer for Customer information database, using id as Primary key, names for customer name, address and phone number, for Product information using Table Product, pcode primary key for the id of product, names, ptype for product type, pcategory for product category databases, pqty and pprice, for Table Cash when a customer made purchase, cashed will be a primary key and transno for transaction number, pcode from the product databases, and Table User for the Employee of the System Databases when logging in and accessing the system Inventory and Service.

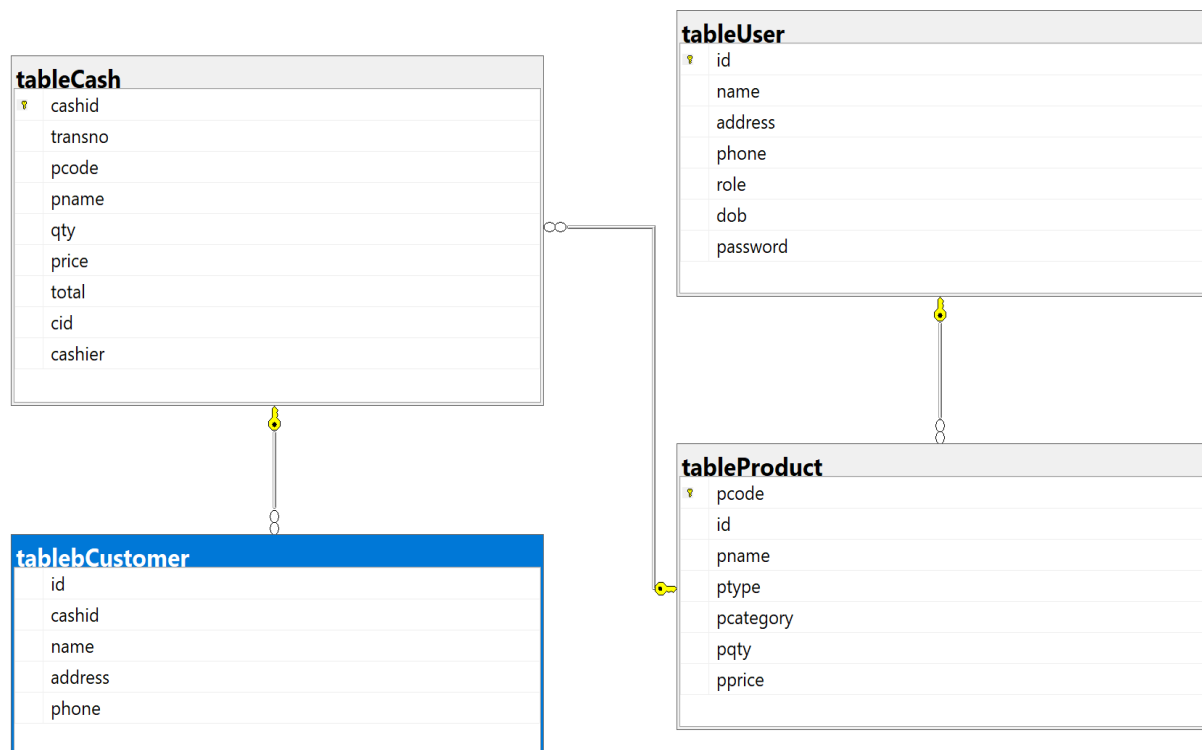


Figure 6: Entity Relation Diagram

Data Flow Diagram

Starting with the User , The User Will log on to the System and then the user / employee may now start with processing orders, input customer name and update as well that will automatically add to the database, and when the order has been process it will deduct the inventory quantity on the product database, and for the user that wanted to update his/her information on the databases they can edit their information on the system itself and it will be updated on the User

Databases, as well as the product information , prices, and quantity can also be updated, and insert a new product as well.

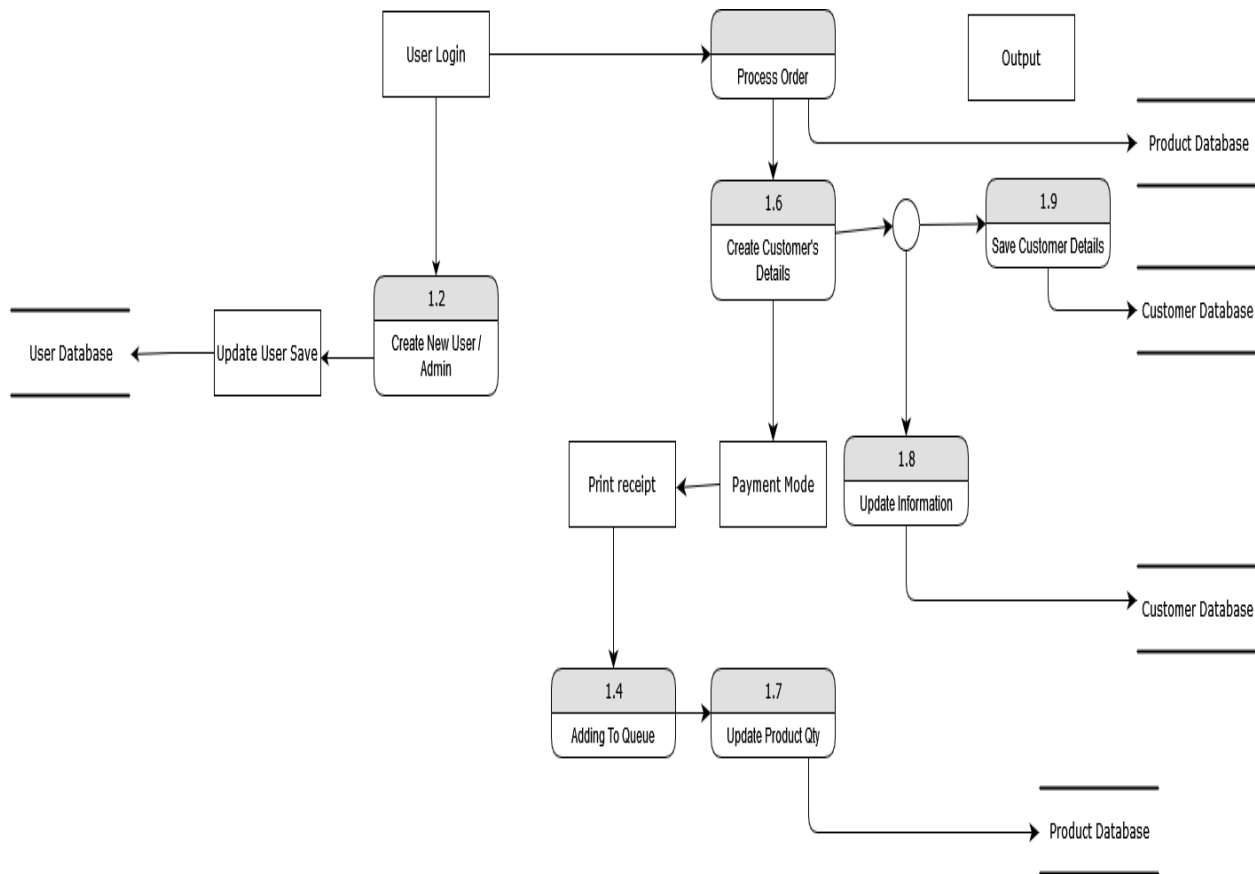


Figure 7: Data Flow Diagram

Specific Requirements

Functional Requirements

- REQ001. The Point-of-Sales system allows employees to view and monitor all products inventory. This feature totally reduces the time cost for management of products.
- REQ002. With a POS system, your data is more secured from unknown intrusion. Such feature may require double authentication; however, this reduces the intrusion of malicious users into your system.

- REQ003. A Point of Sale helps make payments faster. The employee inputs the products of the consumer wants to buy and the system automatically calculates the price. The invoice can be sent by email or printed directly on the spot with a receipt printer.
- REQ004. By using the POS system, it is now possible to document your customers' information in your system.

Non -Functional Requirements

Operational Requirements

- REQ005. The POS system can run on almost all devices but mostly prominent on PCs and mobile devices and other digital devices used by employees.
- REQ006. In terms of a compatible Operating System (OS), the Point-of-Sale System is almost consistent and compatible to all OS platforms. The only crucial requirement needed is a stable device.

Performance Requirements

- REQ007. Most POS applications do not use large amounts of space and therefore would not affect much of available storage on the device.
- REQ008. POS does not require internet when using to type certain products. However, internet is required when saving an information. They use a cloud-based system in order to save all data processed.

Security Requirements

- REQ009. Security is one of the biggest risks of POS system environments. However, as stated before, POS has guaranteed by many as one of the safest software to use and prevents unknown intrusions from breach.
- REQ010. Employees are able to use end-to-end encryption for POS systems. Encrypting credit card and other sensitive data as soon as the POS device receives the data and when it gets sent to the POS software server will ensure it is never vulnerable.

Cultural and Political Requirements

- REQ011. All data information, credentials, and important data is protected in compliance with the Data Protection Act, which ensures that personal

information and support organizations/establishments/businesses with their lawful processing of personal data.

- REQ012. Most POS apps includes the ability to choose multiple languages to read the system interface of the POS. This way, it implies that the system app is available to many people in different areas.

System Requirements

Software Requirements

The proposed Inventory System and Point of Sale with Queuing System for Coffee or MilkTea Shop needs the following software in developing the system:

- Windows 7/8/8.1/10/11 32/64 bit
- Microsoft Visual Studio 2019 or Higher
- Microsoft SQL Server

Hardware Requirements

The proposed Inventory System and Point of Sale with Queuing System for Coffee or MilkTea Shop needs the following hardware in developing the system:

- CPU: AMD/INTEL Dual core or more
- Ram: 4GB RAM and up
- Hard disk: 120GB or more
- Printer
- Monitor: 720p monitor and up

Chapter V

Summary of Findings, Conclusions and Recommendation

In this chapter will show the summary of the developers on finding data or answers from the client and it contains based on their answers about the about Point of Sales and Inventory System.

Conclusion

Development of Inventory System and Point of Sale software developed for I Love MilkTea Store Business has been designed to achieve maximum efficiency and reduce the time taken to handle the payments and data. It is designed to replace an existing manual record system, thereby reducing time taken for calculations and for storing data. The system uses Microsoft Visual Studio for development and Microsoft SQL Server Management Studio as a backend for the database. The system is strong enough to withstand regressive daily operations under conditions where the database is maintained and cleared over a certain time of span. The implementation of the system in the organization will considerably reduce data entry, time, and provide readily calculated reports. Additionally, the researchers concluded that the proposed system is beneficial to the chosen store because it lessens the materials used in manual systems like writing transactions in a record book. The admin will be able to monitor the sales income and make changes to the proposed system in terms of adding a menu of the store and the proposed system can generate instant total of adding up of orders. In conclusion, we have determined that using POS is beneficial especially nowadays where we keep technology part of our everyday commodity. By using the I Love MilkTea shop here in West Rembo, Makati as an example, we have determined to say that implementing a Point-of-Sale system into a business can reduce the time of waiting and would also be a wise option since it can organize better customer management. We further concluded that businesses that have implemented the POS system fared better than businesses without any POS in terms of providing customer service, efficiency, and data.

Recommendations

To have a good performance and effective inventory and Point of Sales System, the proposed system should be replaced with the present manual system used by their business, the proposed system is highly recommended for the basis of improvement. The use of a system and receipt printer would be essential in making it easier to keep track of items. At long last, all actual exchanges from the physical store ought to be done out in the open spots to keep away from any type of illegal movement. The implementation of the POS system will automate the transactions and interaction between the customers and the sellers. The researchers also highlight the importance of having sufficient knowledge about how to use and operate the system correctly.

Based on all the information we have gathered; the researchers specifically recommend the following:

- Most establishments and restaurants have already largely incorporated a Point-of-Sale system within their working environment. Thus, it further recognizes the benefits and reasons to switch to POS.
- If you are planning to expand your business, implementing upgrades to your working environment would be recommended such as Point-of-Sale, where you can manage your customers' orders, have a simplified invoicing method, reduce errors, etc.
- The implementation of the POS system is strongly recommended because it will facilitate quick and simple business transactions, particularly for establishments like coffee and milk tea shops.
- The researchers highly recommend the use of POS systems, especially in related to enterprises. POS systems will provide businesses with greater flexibility, control, and intelligence over their daily business operations and transactions. Overall, the system will improve their business productivity and efficiency as well as the user-friendly experience and satisfaction.

References

- 38

Appendix B
Letter to the Client

October 23, 2022

Dear Mrs. Erica David

Greetings!

We are presently conducting a study and developing a system entitled “Point of Sale with Queuing System”, as a requirement for the Bachelor of Science in Information Technology.

In this connection, we would like to request you to be our client in our study. We hope you can help us by answering the instrument sincerely and truthfully.

Thank you in advance.

Sincerely theirs,
JEROME B. AGNES
LAWRENCE BERNAL
KLEIN NEAL SAGUN
CHRISTIAN L. TANTAY
Researchers

Appendix C

Transcript of Interview

Interview with Mrs. Erica David

Owner

Researchers: What does your business do?

Client: Our business sells milk tea to customers directly, but we also endorse our products using social media.

Researchers: What products do you sell?

Client: Mostly milk tea, as the name of our establishment suggests, but we do serve coffee and other refreshments such as fruit tea and smoothies.

Researchers: What Is your primary goal?

Client: To Provide a customer service to maintain loyal customers and provide a quality product.

Researchers: Are you in charge of decision-making process?

Client: Yes, I am in charge of any changes and decision-making processes of this establishment.

Researchers: Do you think this project can help you perform better?

Client: I think this project of yours will help my day-to-day basis since I am currently using excel to manually input my employee, since I am still a novice seller on the field.

Researchers: What solution are you looking for?

Client: I am looking forward to having ease on my business, since handling a business gave a lot of stress on my mental health and I am physically exhausted doing manual work.

Researchers: How and when did you start your business?

Client: I applied on this job when the pandemic hit as a way to earn a passive income. As the year passes by, decided to continue my job here until I earn a hefty amount of money to work on a bigger business.

Researchers: Are you satisfied with your current situation of your business?

Client: As of now not yet, I am still starting at the bottom but learning step by step on how to properly manage the business on my own.

Researchers: Do you prefer working with a team or individually?

Client: I cannot do this alone, I started with myself and my sister so that is why I was able to push everything accordingly and hire people due to the demand rose, I must work with team because I can't handle them on my own with packing, checking inventory and so on.

Researchers: Are you happy with your specific role or position?

Client: Yes, as a business owner I am satisfied with my role though it is not that easy to become an entrepreneur but as the day goes by, I learned a lot.

Researchers: What do you think would be the impact of this project to your business?

Client: This will help me lessen the manual work of Inputting and editing the stuff for my employees, I still used the logbook for out daily time records, and I have to manually inserted it to a excel document that will consume a lot of time, instead of doing things that needed to be done.

Researchers: When have you done something like this before or not?

Client: This project of yours will be the first time that I am trying to use, it never came to my mind since I am too focused on what I've been doing on the business, I tried some applications, but it is not that reliable.

Researchers: What are you biggest challenge on a business?

Client: Maintaining the business is one of the most challenging tasks, it is not that easy as a small-time seller, it is a different work set up from where I came from, I am a full time employee who works 8 hours a day then transited to a business that consume my hours for about 10 to 16 hours a day 7 days a week.

Researchers: Do other sellers have the same problem on employees daily time record?

Client: I think the small-time business or seller have the same issue that I have, we cannot afford to have that kind of system, I am sure that it will cost us.

Researchers: Have you tried other options?

Client: Yes, I tried every application from windows to handheld application it did not help me the thing is it have a lot of advertisement and I cannot use the apps properly.

Researchers: How much more efficient would your business be if this issue didn't exist?

Client: If I have a system like what you have shared, I guess this one will change my strategy on how I can handle my business.

Researchers: How much is the issue/problem costing you in time/money/resources/staff/energy?"

Client: The issues cost me a whole lot, from a time consuming, if I made a mistake on their Daily time record, I have to double check everything if I miss some, I have to redo it again to make sure that I have input everything in correctly or else my employee would get mad if they got underpaid from my mistakes.

Researchers: Can this problem have any effect on productivity?

Client: Yes, it affects my business, instead of doing other things that are urgent I have to finish the employee records, I have to cancel other plans.

Researchers: Do you have a sense of connection to your superiors and coworkers?

Client: Yes, I feel connected to my employees, we are open to every problem, I always ask them if they encountered problems, offered them free lunch sometimes.

Researchers: Do you have comments or suggestions?

Client: I am looking forward to testing the application that you shared to me, hopefully that I will be able to use one to help me fix things so that in the near future I can managed my business at ease.

Researchers: On average, does your customers have favorable or good reviews regarding your business?

Client: Yes, they always gave me 5 stars review on every purchase, the impact of the reviews helps me to gain more customers, so for that I am very thankful to my loyal customers.

Researchers: Based on your current situations on your business, what are the pros and cons of not having a system?

Client: The downside of not having a system is the cost, less productivity and worse management information, while having a system I believe that it will boost my business capabilities to produce a better result, productivity, and it can be accessed by my employee for them to check their daily time record and pay.

Researchers: Is this a priority for you?

Client: The system will be on the top of the list that I need to obtain for me to fully remove the burden of consuming too much time so that my employee and I will be productive and done our task on a fast pace without leaving any unfinished goal for the day.

Curriculum Vitae of

JEROME B. AGNES

Block 64 Lot 34 Phase 3 Upper Bicutan Taguig City

jeromeagnes24@gmail.com

09611844741



EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2020 to Present	STI College Global City
Vocational/Technical	None	None
High School	2014 - 2018	Upper Bicutan National Highschool
Elementary	2008 - 2014	Silangan Elementary School

SKILLS

SKILLS	Level of Competency	Date Acquired
Programming (Java, Python, C++, etc.)	70%	June, 2021
Writing and editing	70%	August, 2021
Create and repairing PC	70%	March, 2019

Curriculum Vitae of

LAWRENCE BERNAL

164A Ivory Bldg Rosewood Acacia Estate Brgy Ususan Taguig City

bernallawrence0711@gmail.com

09052349026



EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2020 to Present	STI College Global City
Vocational/Technical	2015 - 2018	Gateways Institute of Science and Technology
High School	2012-2015	Ricardo Papa Memorial High School Annex
Elementary	2005 - 2012	Talimundok Elementary School

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
2018 - Present	Technical Support / Chat Support	Teleperformance
January, 2017	Technical Support	Alorica
July, 2016	Technical Support	Harte Hanks
September, 2015	Technician	Kabayan Exchange Corp

SKILLS

SKILLS	Level of Competency	Date Acquired
Hardware Troubleshooting	90%	January, 2015
Hardware Repair	70%	January, 2015
MS Office	70%	February, 2014

TRAININGS, SEMINARS, OR WORKSHOPS ATTENDED

Inclusive Dates	Title of Training, Seminar, or Workshop
March 2018	Computer System Servicing NCII

Curriculum Vitae of

KLEIN NEAL L. SAGUN

5 - I F. Balagtas St., West Rembo, Makati City

klein1504@gmail.com

09672053574



EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2020 to Present	STI College Global City
Vocational/Technical	2018 - 2020	Pateros Catholic School (Annex Building)
High School	2014 - 2018	Pateros Catholic School
Elementary	2008 - 2014	Pateros Catholic School

SKILLS

SKILLS	Level of Competency	Date Acquired
Intermediate experience using various application software (MS Word, MS PowerPoint, video editing, etc.)	65%	January 2020
Adaptable to the working environment	75%	January 2020
Intermediate skills in computer components literacy	65%	January 2019

Curriculum Vitae of

CHRISTIAN L. TANTAY

40 P. Burgos Street Barangay Santa Ana Taguig City

tantay.234855@globalcity.sti.edu.ph

09091946805



EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2020 to Present	STI College Global City
Vocational/Technical	2016	St. Therese School of Technology Quezon City Branch.
High School	2014 - 2018	Taguig Integrated School
Elementary	2008 - 2014	Doña Juana Elementary School

SKILLS

SKILLS	Level of Competency	Date Acquired
Skilled in major relevant computer applications like MS Word and MS Excel	80%	September, 2016
Skilled in using Adobe Photoshop and Flash	77%	June, 2018
Basic skilled in programming such as Java, Python and C#	60%	June, 2018

TRAININGS, SEMINARS, OR WORKSHOPS ATTENDED

Inclusive Dates	Title of Training, Seminar, or Workshop
January, 2020	Web Page Design Workshop (Immersion)
October, 2018	Visual Assembly
October, 2018	Artificial Intelligence