DESIGN AND DEVELOPMENT OF CAFÉ MANAGEMENT SYSTEM

BY

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A REPORT

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ABSTRACT

The growing demand for efficiency in the food and beverage sector, especially within cafes, is the driving force behind the development of a Café Management System. This initiative is motivated by several factors. Firstly, the industry has seen significant expansion due to evolving consumer preferences and lifestyles, making cafes popular venues for socializing, working, and relaxing. Secondly, managing café operations involves many complex tasks, such as order processing and inventory control, which can be challenging to handle effectively. The traditional method of paper-based record-keeping requires substantial resources in terms of labour, time, and cost, making it less efficient compared to a digital management system. While existing management systems exist, there is still space for improvement. Therefore, this project aims to enhance the current system by creating a more efficient solution, The Café Management System is designed to streamline operations, enhance customer experience, and provide data-driven insights to support informed decision-making, these objectives align with broader industry trends toward digitalization and sustainability in the food and beverage sector.

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LIST OF ABBREVIATIONS

RAD	Rapid Application Development
PHP	Hypertext Preprocessor
MySQL	My Structured Query Language
HTML	Hypertext Markup Language
CSS	Cascading Style Sheets

Chapter 1
Introduction

This chapter provides a detailed overview of the introduction, problem statement, motivation, and objective related to this project. The project will introduce the development of a system designed to manage overall café operations. The problem statement will explain about primary issue and some subproblems that exist in the project. Motivation discusses the inspiration behind implementing the project, while the contribution will explain how the system can help the user in their business.

Food and Beverage industry is experiencing rapid growth nowadays since food is a basic need, the industry never runs out of customers. Due to the large number of customers, restaurants often encounter significant challenges in meeting customer demands during busy periods. The rush can lead to instances where incorrect orders are served to customers, potentially resulting in a loss of customer loyalty due to poor service quality [1]. Café Management System will handle information accurately and can add and manage an endless amount of data in the system. Many transactions occur and lot of activity in a cafe in single-day operation. In a cafe, a variety of tasks occur, including taking customer orders, processing payments, monitoring stock levels, replenishing food supplies, preparing meals, recording staff attendance, and keeping tables clean [2]. If a user works manually, it is a waste of time and lacks effectiveness. Using a digitalized method, the user will be able to handle his café stock and sales information effectively rather than a manual system.

Café Management System is a comprehensive software solution aimed at optimizing and improving the daily operations of cafes, coffee shops, and similar food service businesses. It leverages technology to automate various tasks involved in managing a café, enabling owners and staff to efficiently handle day-to-day operations, improve customer service, and enhance overall business performance. The Café Management System is a platform that caters to the unique needs of cafes, ranging from small independent coffee shops to larger chain establishments. This system integrates

multiple functionalities into a centralized system, creating a seamless and well-organized environment for managing various aspects of the café business.

The Café Management System comprises two main panels: the Admin Panel and the Staff Panel. In the Staff panel, the user can manage daily ordering records. Upon selecting the order option, the system displays a list of available meals, and the user can place an order with the item quantity. After that, he proceeds to confirm the order and select a payment method. The role of the administrator is to manage staff user information, such as adding, deleting, and updating staff records and tracking customer order records in the system.

1.1 Problem Statement and Motivation

Cafes and Coffee Shops face several specific issues or challenges in their day-to-day operations, ranging from order management to customer service and business efficiency. These issues can hinder the smooth running of the operation and impact overall profitability.

***Inefficient Order Handling*:** Manual order processing like handwriting the orders and communication between the front-of-house staff and the kitchen or barista team can lead to various issues. Handwritten orders may be misread or misunderstood, resulting in incorrect items being prepared. Additionally, verbal communication of orders may be prone to errors and miscommunication during peak periods, leading to delays in order preparation and delivery [3].

Limited Access to Real-Time Data: Managers and administrators may have lacked access to timely and comprehensive data about various aspects of the café business, such as sales performance, order transactions, customer feedback, and total income [4]. This made it difficult to make good decisions and adapt quickly to changes in the market conditions. Managers may have used manual methods to collect the data, leading to inefficiency and inaccuracy in decision-making.

***Menu and Pricing Updates*:** Updating menus and prices with printed menus manually can be time-consuming and prone to inconsistencies. Especially during seasonal

changes or special promotions, getting all channels to reflect accurate menu items and prices will become challenging and may lead to customer confusion [5].

Security risks: Without dedicated user access, the system may lack appropriate authentication and authorization mechanisms for controlling staff access to sensitive information and system functionalities. This may pose security risks such as unauthorized access to customer data, financial records, and administrative functions [6].

Manual Table Reservations: Traditionally, the café has been processing table reservations and waiting lists manually. This means front-of-house staff have to constantly deal with walk-ins and calls, and table reservations are often complicated. Customer no-shows and last-minute cancellations may disrupt the entire operation of the café, making the work of café owners and employees busier.

Ineffective Sales Tracking: If cafes are unable to track their sales effectively, they are essentially navigating blindly through a fast-paced and competitive industry. Without monitoring sales performance, these café risk missing out on insights that are critical to understanding their business performance [11]. Without this data, they cannot accurately measure the success of each branch store, identify trends or respond quickly to changes in customer behaviour.

The motivation for developing a café management system was to address the specific challenges and complexities faced by cafes and coffee shops in their daily operations. Traditional manual café management methods often lead to inefficiencies, errors, and limitations that can hinder the growth and success of a café. The Café Management System was developed to overcome these challenges and bring many benefits to café owners, employees, and customers.

1.2 Objectives

To manage user access, ensure only authorized personnel can access the system.

- Login to the system: Provide a secure method for users to log into the system.
- Logout system: Ensure users can safely log out to protect their accounts

To enable the efficient management of the café's menu, ensuring that offerings are up-to-date and accurate.

- Add Menu: Allow administrators or managers to add new items to the menu.
- Edit Menu: Provide functionality to update existing menu items, including descriptions and pricing.
- Delete Menu: Enable the removal of outdated menu items.

To facilitate the management of staff users, ensuring appropriate access and control over user roles within the system.

- Add Staff User: Allow for the creation of new staff user accounts with specific access rights.
- Edit Staff User: Provide the ability to modify existing staff user accounts.
- Delete Staff User: Enable the removal of staff user accounts as necessary.

To streamline the order and payment process to enhance customer service and improve operational efficiency.

- Place the order: Allow staff to efficiently process customer orders
- Remove the order: Enable the cancellation or modification of orders as needed.
- Process Payments: Facilitate secure payment processing for orders.
- Print the receipt: Provide customers with printed receipts for their transactions.

To provide real-time insights into key business metrics, helping managers make informed decisions.

- Display Staff User Count: Monitor and display the number of staff members.
- Display the total income: Present the café's total income to facilitate financial tracking and reporting
- Display total orders: Monitor and display the total number of orders processed across all branches, providing insights into operational efficiency.

To monitor and analyze revenue, helping to optimize business performance and profitability.

- Track Daily Sales: Record and monitor sales data daily to keep a clear view of daily revenue.
- Compare Sales Performance: Allow comparison of sales across different periods (e.g. daily, monthly, annually) or different branch stores to assess business performance and growth.

1.3 Project Scope and Direction

This project aims to design and develop a comprehensive Café Management System to enhance operational efficiency and customer experience. The system will include functionalities such as menu and pricing management, order and payment module, staff user access management, dashboard module, and sales tracking module. The project scope encompasses creating user-friendly interfaces for administrators and staff, ensuring data security and privacy, and delivering thorough documentation. The implementation of the system will follow a specified timeline, including the availability of required hardware, software, and necessary approvals.

A Café Management System typically consists of several modules that work together to help plan, organize, and execute events. Some common modules of a café management system include:

1.3.1 Modules

Order and Payment module

An order and payment module allows customers to view menus, select items, customize orders, and make secure payments online. The module handles order confirmation and real-time tracking. It supports various payment methods like paying by cash or e-wallet payment. This module is essential for enhancing the customer experience, streamlining food ordering, and ensuring efficient payment processing in the café.

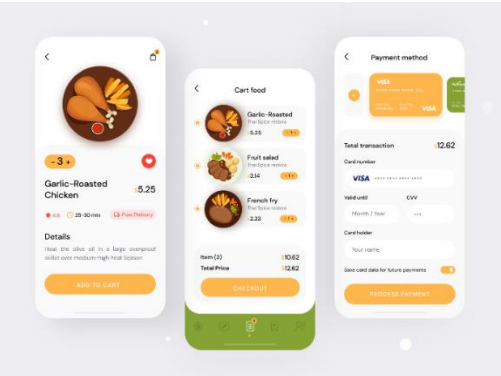

Figure 1.3.1.1 Sample of Ordering and Payment

Menu and Pricing module

Menu Management module assists a café in creating, updating, and maintaining its menus. It enables menu customization, item details, pricing management, and supports digital and online menu display. This module helps cafes ensure menu accuracy, comply with regulations, and provide a user-friendly experience for customers.

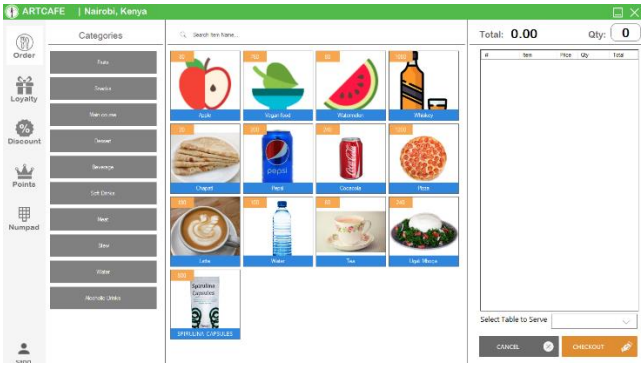

Figure 1.3.1.2 Sample of Menu Management

Dashboard Module

This module encompasses functions such as sales tracking, revenue reporting, profit margin analysis, customer insights, and expense tracking. It provides valuable insights into sales trends, revenue, customer preferences, and cost control, enabling data-driven decision-making and the optimization of café operations. This module helps café owners and managers effectively manage their business, enhance profitability, and provide an excellent dining experience to customers.

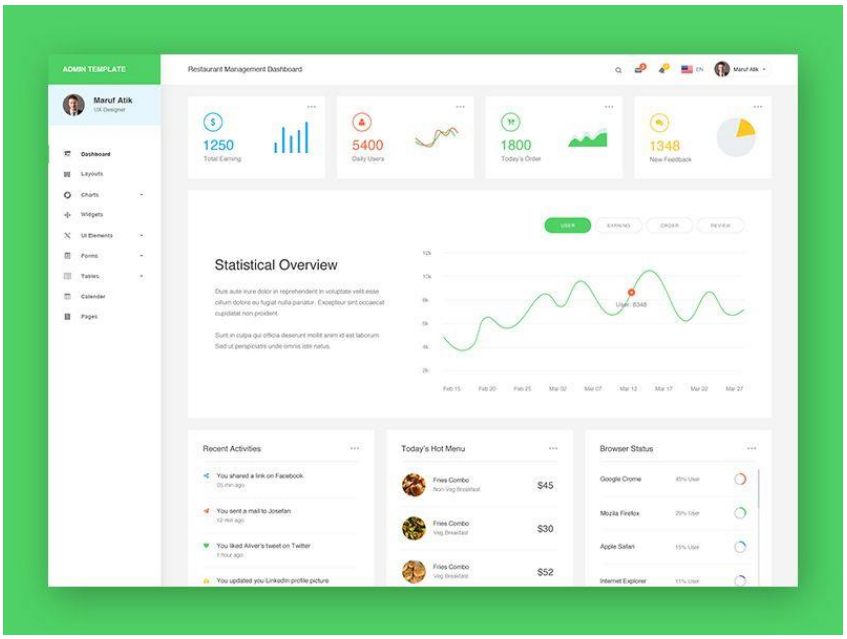

Figure 1.3.1.3 Sample of Dashboard Module

Customer Order Record Module

Customer Order Record Module allows administrators and staff to view and manage customer orders within the café management system. This module provides functionality to record, track, and analyze customer records.

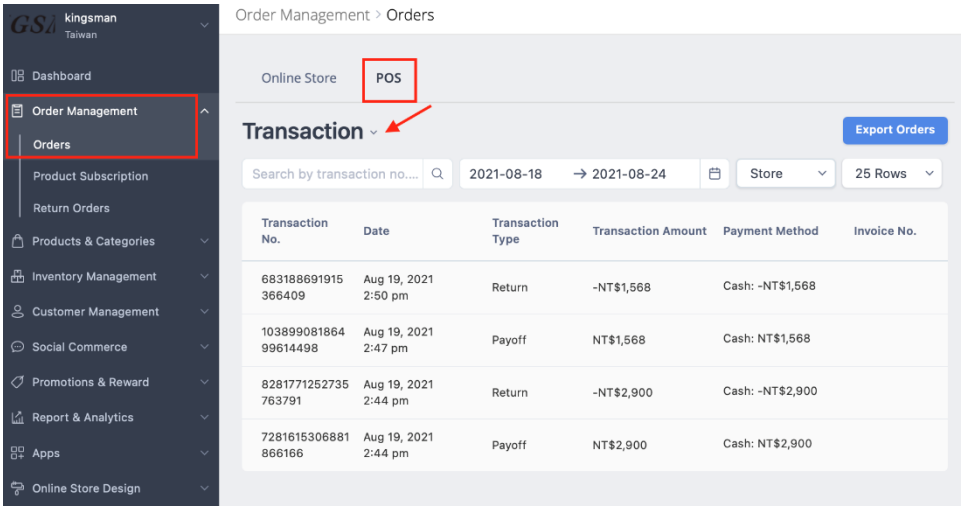

Figure 1.3.1.4 Sample of Customer Order Record Module

Staff User Access Module

Staff User Module is an essential component of the café management system, providing administrators with tools to manage staff accounts and permissions. This module facilitates the creation, modification, and deletion of staff user accounts, ensuring that access to the system is controlled and secure.

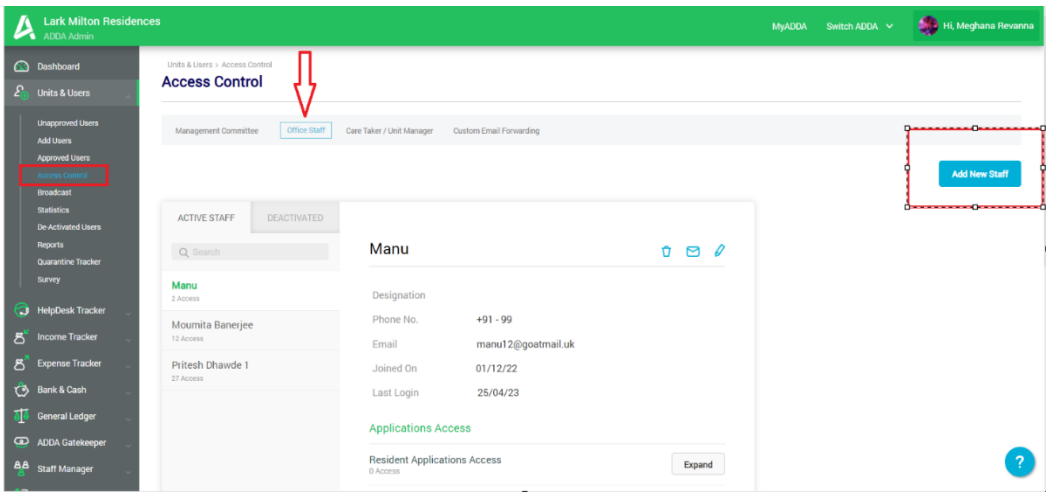

Figure 1.3.1.5 Sample of Staff User Module

Sales Reporting Module

Sales Reporting Module provides a streamlined overview of key sales data, including daily and monthly sales reports, as well as the total sales for each branch store. This allows café owners to easily track performance over time and compare sales across different locations.

Figure 1.3.1.6 Sample of Sales Reporting Module

Table Reservation Module

Table Reservation Module records essential details for each booking, including the table number, customer's name, phone number, and their selected date and time of arrival. This allows the café to manage reservations efficiently and ensure a smooth experience for both the customers and the staff.

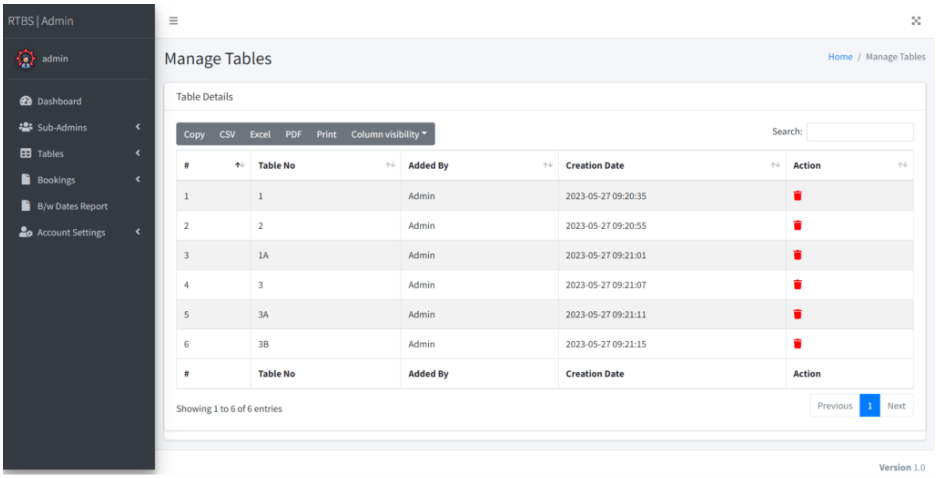

Figure 1.3.1.7 Sample of Table Reservation Module

1.4 Contributions

Improve Order Accuracy: Manual order handling like handwritten orders can lead to errors and miscommunication between front-of-house and kitchen staff, resulting in incorrect orders and customer dissatisfaction. A digital order management system ensures accurate order processing, reducing mistakes and enhancing the café's reputation for consistency and reliability.

Menu Flexibility and Updates: A Café Management System allows for easy menu customization and updates, making it simpler to introduce new items, seasonal offerings, and promotional deals. This flexibility empowers cafes to cater to customer preferences and adapt quickly to changing market demands.

Enhance the efficiency of operation*:* Running a cafe involves many tasks like taking orders and managing inventory. To make these tasks easier and faster, cafes can use technology like POS systems and inventory management software. These tools help automate tasks like processing orders and payments. For example, a POS system can send orders directly to the kitchen, saving time and reducing mistakes. Also, providing a user-friendly interface for staff helps them input orders quickly and accurately. By using technology and easy-to-use interfaces, cafes can save time and money while running more smoothly.

Business Intelligence and Decision-Making: A Café Management System equipped with business intelligence tools can provide useful insights to help in making decisions based on data. By leveraging business intelligence, café owners and managers can track trends such as peak hours, customer preferences, and sales performance. This allows for better inventory management, staff scheduling, and menu optimization. BI tools also offer predictive analytics, enabling cafes to anticipate demand, forecast sales, and adjust their strategies accordingly. With the ability to analyze large volumes of data, café operators can make informed decisions that drive profitability and enhance overall business performance.

1.5 Report Organization

The details of this project are outlined in the following chapters. Chapter 2 provides an overview of relevant software applications. Then, Chapter 3 outlines the proposed methodology and approach for developing the Café Management System. Furthermore, Chapter 4 focuses on the technical design of the Café Management System. Diagrams such as system block diagram, use case diagrams, activity diagrams, class diagrams, and entity relation diagrams for the project are illustrated in this chapter. Finally, Chapter 5 details the implementation phase, describing both hardware and software setups. It discusses the configuration settings essential to the application and provides a walkthrough of system operation with screenshots. The chapter ends with a discussion about the challenges and issues faced during the project implementation. Chapter 6 focuses on evaluating the system by using the black box testing method to assess its functionality and performance. It reviews the setup for system testing, presents the results, and discusses the challenges encountered during the project. The evaluation of the project objectives is also included to measure the success of the café management system against the initial objectives. The final chapter summarizes the findings and experiences of the project and offers a conclusion on the effectiveness and impact of the café management system. It provides recommendations for future improvements and potential areas of research that could further enhance the management and expand its capabilities.

Chapter 2

Literature Review

Literature Reviews

2.1 Overview

Before the launching of digital technology, cafes and restaurants used manual methods for managing operations such as taking orders, managing inventory, and serving customers. The earliest café management systems were basic and often involved the use of simple software applications installed on local machines. These systems primarily focused on streamlining tasks such as order taking, inventory tracking, and billing, aiming to improve efficiency and accuracy in café operations [5]. As technology advanced, café management systems have become more advanced and integrated. With the rise of the internet and cloud computing in the 21st century, café management systems transitioned to web-based platforms, offering greater accessibility, scalability, and real-time data management capabilities.

Modern café management systems now include business intelligence (BI) tools that are essential for turning raw data into valuable insights [10]. BI tools analyze data collected from various aspects of café operations, such as sales, inventory, customer behavior, and employee performance to present it in an easy-to-understand way often through dashboards and reports. By leveraging these technologies, cafes can gain deeper insights into their business, optimize operations, and better meet the needs of their customers.

2.1.1 Lavu [7]

Figure 2.1.1 Lavu

Lavu is POS system that is specially designed for businesses such as bars, restaurants, and nightclubs. It is applicable to a wide range of businesses, covering from full and quick-service, franchise restaurants, up to coffee shops, lounges, and food trucks. The users are given a choice to choose the best interface that suits their environment the most, like restaurant, quick-service and so on. Moreover, customization is also allowed, whereby the users are able to custom-make the system based on their preference, such as customizing menu item icons and layout, as well as unlimited menu modifiers. The features offered by Lavu include take-out and delivery routing, tableside ordering, and rewards and loyalty programs.

2.1.2 TouchBistro [8]

Figure 2.1.2 TouchBistro

TouchBistro is an all-in-one POS and restaurant management system that helps a restaurant manage its business easily. It assists the operators in simplifying and streamlining their operations and reduces the time used in connecting the dots manually, which allows them to spend more time connecting with their customers. The application has included several features that can help the restaurant run smoothly, such as table reservation, menu management, order and payment processing, customer management, inventory management, reporting analytics function, loyalty management, and gift cards. TouchBistro POS is easy to set up and faster but it is only available on iOS-based devices. The limitation of this application is the user cannot choose a third-party payment processor in this system.

2.1.3 Toast [9]

Figure 2.1.3 Toast

Toast POS is a comprehensive system. Toast offers online ordering, contactless delivery, and takeaway. Also, with the ‘Order and Pay’ feature, customers are allowed to view the restaurant’s menu through their own devices and place orders directly.

However, this application comes with an issue, whereby the users are unable to select the third-party payment processor on their own. This means, they must stick with Toast's payment processor, which poses a problem to the companies that have already adopted other processors and are not willing to switch.

2.2 Limitations of Previous Studies

Lavu [7]	Many of Lavu's features **depend on a stable internet connection**. For example, the order list cannot be printed in the kitchen, or the payment systems are not able to work. The application is only available on iOS devices.
TouchBistro [8]	TouchBistro is designed exclusively for iOS-based devices (iPads). This means that it is not compatible with Android tablets or other operating systems, limiting the choice of device for users. **Managing complex menus** with many items can be challenging within the system. It may require extra time and effort, especially for businesses with extensive and frequently changing menus.
Toast [9]	Toast POS typically comes with its **own integrated payment processing system**. Users may not have the flexibility to choose a third-party payment processor, potentially limiting their options or leading to higher payment processing fees.

Table 2.2.1 Table of Limitations of Previous Studies

2.3 Summary

2.3.1 Comparison of applications for Café Management System

Features	Lavu	TouchBistro	Toast	BeanTrack
Login and Register	Yes	Yes	Yes	Yes
Dashboard Module	Yes	Yes	Yes	Yes
Customer Order Record Module	Yes	Yes	Yes	Yes
Staff User Access Module	No	Yes	No	Yes
Order and Payment Module	Yes	Yes	Yes	Yes
Menu and Pricing Module	Yes	Yes	Yes	Yes
Table Reservation Module	No	Yes	No	Yes
Sales Reporting Module	Yes	Yes	Yes	Yes

Table 2.3.1 Comparison of applications for Café Management System

Chapter 3

System Methodology/Approach

3.1 System Requirement

The methodology that will be used in this project is the **Rapid Application Development (RAD)** methodology. The RAD methodology can help to develop programs fast for the user because RAD can develop prototypes to test functions and features without worry the effect on the end of product. In addition, this methodology allows the project to change design or edit functionality without affecting the product.

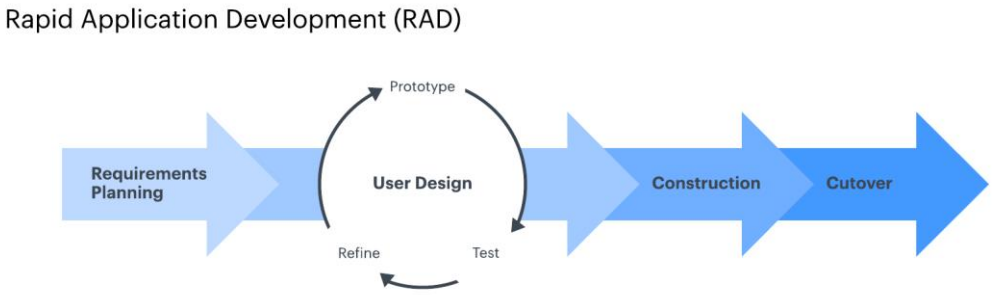

Figure 3.1.1 Rapid Application Development Methodology

i) REQUIREMENTS PLANNING PHASE

The initial phase of the RAD methodology is the requirements planning phase. In this phase, various stakeholders, including developers and clients, need to communicate to define the goal and expectations of the project. To improve the existing café management system, an extensive literature review is required to study several existing café management systems, identify problem statements, and propose solutions for improvements. In addition, the project will be clearly stated in the planning and analysis phase so that people can under the meaning of the project. The various café management systems will be compared, and the proposed system's advantages and disadvantages will be considered. In this phase, the project requirements and software are also clearly listed so that people know exactly what is needed to implement this project.

ii) USER DESIGN PHASE

During this phase, several diagrams are illustrated, including use case diagrams, activity diagrams, entity relationship diagrams, and class diagrams. Use case diagrams are used to illustrate operations performed by system users, while activity diagrams are used to model processes and workflows consisting of smaller operations. Entity relationship diagram is used for visualizing the relationships between entities in a database, while class diagrams are used in illustrating relationships between classes and interfaces of a system. For user consideration, several project prototypes will be created. Therefore, several modules will be added, such as menu and pricing module, ordering and payment module, staff user module, customer order record module, login and register module, and dashboard module. This project will also use programming languages such as PHP and MySQL to create the project. After that, the program, consisting of the primary user interface design and some functionality, will be tested repeatedly to find any improvements until the users are satisfied with the prototype's functionality.

iii) RAPID CONSTRUCTION PHASE

During this phase, most of the issues are resolved during the user design phase, where system prototypes and beta versions from the design phase are turned into a functional model. The design of the program will be continuously improved and if users have any ideas or suggestions, their feedback will be gathered to further enhance the program to meet their expectations.

iv) CUTOVER PHASE

In the final phase of development, the features, functionality, interface, and all other aspects of the project are finalized. A task checklist will be created to ensure that all work is completed and functioning properly. Once all modules are integrated, a system test will be conducted to evaluate the system. The system will be tested by the individual who tends to operate a café in the future. If any errors are found in the system, these will also be corrected.

3.2 Technology involved

3.2.1 Hardware

The hardware involved in developing a Café Management System primarily includes a computer, which serves as the main workstation for software development, testing, and deployment. Testing of the Café Management System is also performed on the computer to ensure functionality and usability across different operating systems, web browsers, and screen resolutions.

Table 3.2.1.1 Specifications of laptop

Description	Specifications
Model	Acer Nitro 5
Processor	AMD Ryzen 7 5800H
Operating System	Windows 10
Graphic	NVIDIA GeForce RTX3060
Memory	16GB DDR5 RAM
Storage	1TB SSD

3.2.2 Software

Table 3.2.2.1 Software Requirements for developing system

Component	Description
Tools	**Visual Studio Code** Visual Studio Code is an open-source code editor by Microsoft that allow developer to write and debug code. It can support many programming languages and add many extensions such as Javascript.
	MySQL MySQL is a relational DBMS that SQL language to store and manage structured data.
	Apache Apache is an open-source web server software to delivers web pages and content over the internet.

Languages, Libraries, and Framework	**Hypertext Markup Language (HTML)** HTML is used to design the structure or framework of websites and use .html as file extension.
	Cascading Style Sheets (CSS) CSS is a style sheet language used to design the appearance of the websites or the HTML elements**.**
	Javascript Javascript is a scripting language that allow websites contain functionalities so website can interact with content.
	jQuery jQuery is a Javascript library that simplify task or HTML document.
	Bootstrap Bootstrap is a framework that can provide pre-designed components so can design website easier.
	Hypertext Preprocessor (PHP) PHP is a server-side scripting language used to develop websites.

3.3 Project Timeline

Figure 3.3.1 FYP 1 Timeline

Task	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Introduction														
Problem Statement & Objective														
Scope														
Impact, Significance & Contribution														
Literature Review														
Review on similar application														
Compare on similar application														
Proposed Method/ Approach														
System Design														
Future Development Plan														
Conclusion														
Design Prototype														
Finalize FYP 1 Report														

Figure 3.3.2 FYP 2 Timeline

Task	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Development Phase														
Develop each module														
Fix errors and bugs														
Implementation Phase														
Deliver to user														
Collect Feedback														
Enhance System														
System Testing														
Evaluation Phase														
System Evaluation														
Future Enhancement														
Conclusion														
Finalize FYP 2 Report														

Chapter 4

System Design

4.1 System Block Diagram

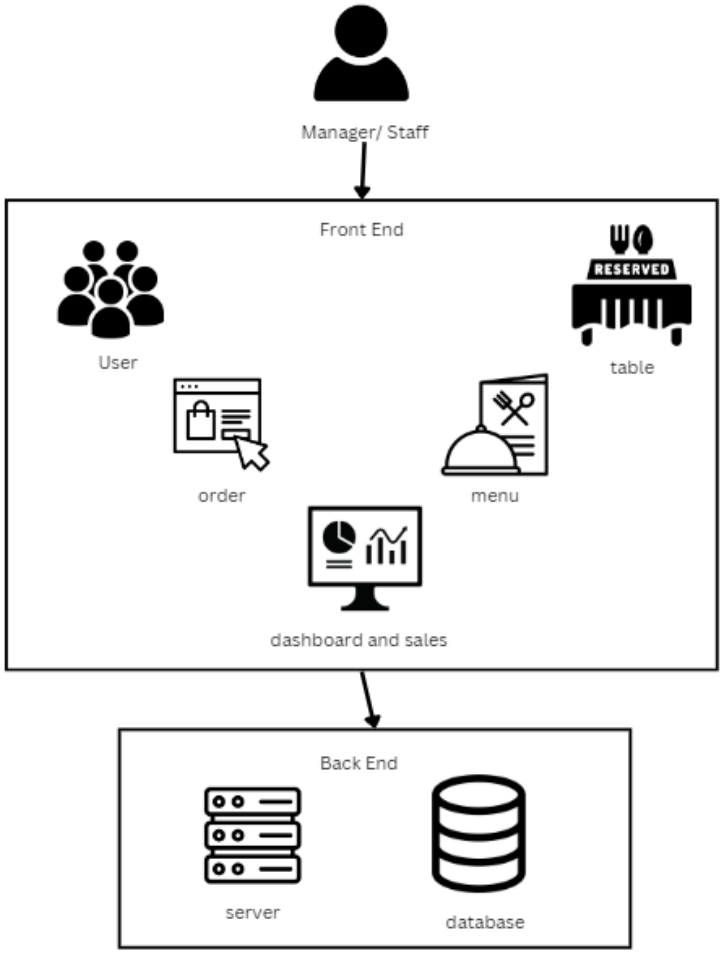

Figure 4.1.1 System Block Diagram

The diagram illustrates the System Architecture Diagram of Café Management System designed exclusively for café employees, including managers and staff. The system is divided into two main layers: the front end and back end. The front end is the user interface where staff interact with various components, including order management, menu creation and updates, table reservations, and dashboard views for monitoring sales and business performance. Managers and staff use these components to manage daily operations efficiently. The back end, consisting of a server and database, handles the core processing and data management. The server processes requests from the front end, executing command and ensuring smooth operation, while the database stores all relevant data, such as orders, menu items, user

information, tables, and sales reports. This architecture facilitates a seamless workflow for managing café operations, providing an intuitive interface for staff and robust back-end support for data processing and storage.

4.2 Use Case Diagram and Description

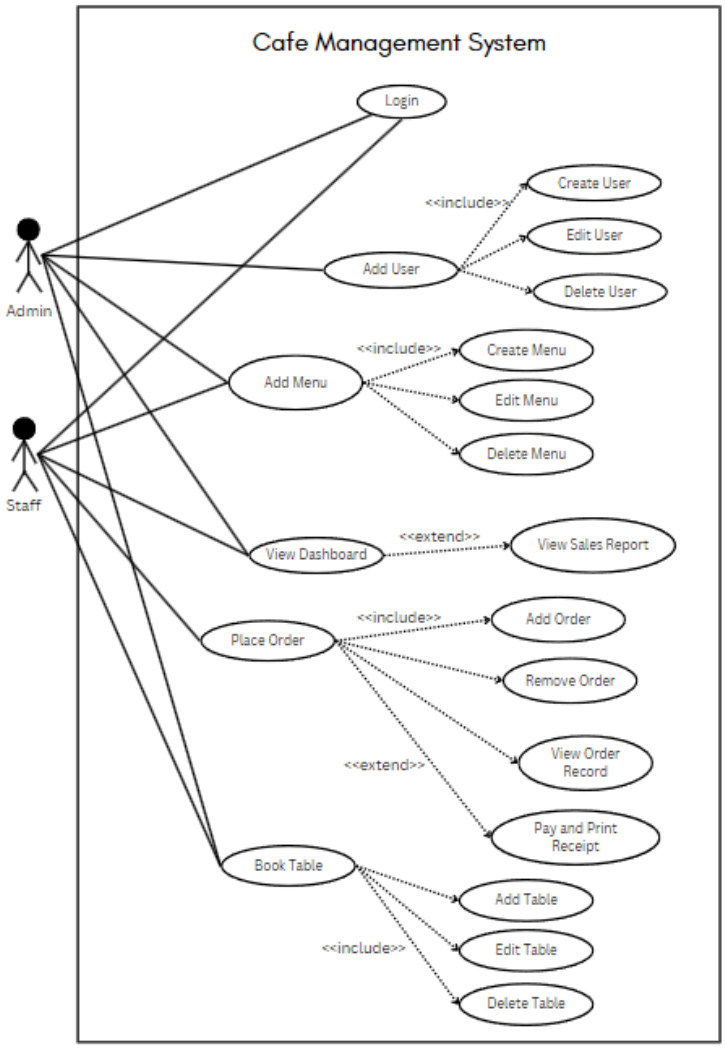

Table 4.2.1 Login Use Case Description

Use Case ID	0001
Use Case Name	Login
Brief Description	Administrator and Staff can access the main page
Actor	Staff, Administrator
Trigger	Click “Login” Button at login page
Precondition	Haven’t login and require an account

Normal flow of events	1. Staff or Administrator enter registered username and password. 2. The system will check if the account exists or if the password does not match the email. 3. The system will navigate the user to the main page of the management system
Sub flows	-
Alternate flows	When the system finds that the account does not exist or the password does not match the registered username, the login will fail, and the user will be asked to re-enter the username and password or register an account.

Table 4.2.2 Create Product Use Case Description

Use Case ID	0002
Use Case Name	Create Product
Brief Description	Staff and Administrator can create product
Actor	Staff, Administrator
Trigger	Click “Add Menus” Button at Main Page
Precondition	Want to create a food or drink that does not exist in the menu
Normal flow of events	1. Staff and Administrator enter product information such as code, name, categories, and price per unit of the product to create a product record. 2. For information such as price per unit, only figures should be filled in.
Sub flows	-
Alternate flows	The system will check if there are any information blanks and ask the staff to fill in the field.

Table 4.2.3 Update Product Use Case Description

Use Case ID	0003

Use Case Name	Update Product
Brief Description	Staff and Administrator can update product
Actor	Staff, Administrator
Trigger	Click Update Button at the Add Menu Page
Precondition	Want to update product record at inventory table
Normal flow of events	1. Staff and Administrator can update product information such as code, name, categories, and price per unit of the product that was created. 2. For information such as price per unit, only figures should be filled in.
Sub flows	-
Alternate flows	The system will check if there are any information blanks and ask the staff to fill in the field.

Table 4.2.4 Delete Product Use Case Description

Use Case ID	0004
Use Case Name	Delete Product
Brief Description	Staff and Administrator can delete product
Actor	Staff, Administrator
Trigger	Click Delete Button at the Add Menu Page
Precondition	Want to delete product record at inventory table
Normal flow of events	1. Staff and Administrator can delete product information that consists of code, name, categories, and price per unit of the product that created. 2. The system will send a confirmation message to staff and administrators so that they can confirm that they want to delete the product.
Sub flows	-
Alternate flows	The system will check if the product was created from the database and if so, the product cannot be deleted.

Table 4.2.5 Create Staff Use Case Description

Use Case ID	0005
Use Case Name	Create Staff
Brief Description	Administrator can create staff
Actor	Administrator
Trigger	Click “Add Staff” Button at the Main Page
Precondition	Want to create staff for accessing the system
Normal flow of events	1. Administrators fill in staff username, password, and import photo of staff. 2. For role, it can choose admin or cashier. For status, it can choose active, inactive, or approval.
Sub flows	-
Alternate flows	-

Table 4.2.6 Update Staff Use Case Description

Use Case ID	0006
Use Case Name	Update Staff
Brief Description	Administrator can update staff
Actor	Administrator
Trigger	Click “Update” Button at the Main Page
Precondition	Want to update staff for accessing the system
Normal flow of events	Administrator can update the staff information such as username, password, and import photo of staff.
Sub flows	-
Alternate flows	-

Table 4.2.7 Delete Staff Use Case Description

Use Case ID	0007
Use Case Name	Delete Staff
Brief Description	Administrator can update staff

Actor	Administrator
Trigger	Click “Delete” Button at the Main Page
Precondition	Want to delete staff at the staff table
Normal flow of events	1. Administrator can delete the staff information such as username, password, and photo of staff. 2. The system will send a confirmation message to staff and administrators so that they can confirm that they want to delete that staff record.
Sub flows	-
Alternate flows	The system will check if the staff was created from the database and if so, the staff cannot be deleted.

Table 4.2.8 View Customer Order Record Use Case Description

Use Case ID	0008
Use Case Name	View Dashboard
Brief Description	Administrator and Staff can view the dashboard
Actor	Administrator, Staff
Trigger	Click “Dashboard” Button at the Main Page
Precondition	Want to view all the details of cafe
Normal flow of events	Staff and Administrator can view the café information such as the total number of food products, total sales, total orders, total users, etc.
Sub flows	-
Alternate flows	-

Table 4.2.9 Add Order Use Case Description

Use Case ID	0009
Use Case Name	Add Order
Brief Description	Staff can add order
Actor	Staff
Trigger	Click “Order” Button at Main Page

Precondition	Want to order food and drinks for customer
Normal flow of events	Staff can choose the type of menu (meal or drink), and select the Product ID. Then set the quantity of the meal or drink.
Sub flows	-
Alternate flows	The system will check if there are any information blanks and ask the staff to fill in the field.

Table 4.2.10 Remove Order Use Case Description

Use Case ID	0010
Use Case Name	Remove Order
Brief Description	Staff can remove order
Actor	Staff
Trigger	Click “Remove” Button at Order Page
Precondition	Want to remove the order that wrongly added
Normal flow of events	Staff can select the added order record on the order page and click the “Remove” button.
Sub flows	-
Alternate flows	-

Table 4.2.11 Pay and Print Receipt Use Case Description

Use Case ID	0011
Use Case Name	Pay and Print Receipt
Brief Description	Staff can pay and print the receipt for customer
Actor	Staff
Trigger	Click “Pay” and “Print” Button at Order Page
Precondition	Want to pay the order and print the receipt
Normal flow of events	1. Staff can select the order record at the order page and click the “Pay” button. 2. Then Staff click “Receipt” button, the receipt will be generated.

Sub flows	-
Alternate flows	-

Table 4.2.12 Create Table Use Case Description

Use Case ID	0012
Use Case Name	Create Table
Brief Description	Administrator and Staff can create table
Actor	Administrator, Staff
Trigger	Click “Add Table” Button at the Main Page
Precondition	Want to create table for the customer
Normal flow of events	Administrators fill in table number, seating capacity
Sub flows	-
Alternate flows	-

Table 4.2.13 Book Table Use Case Description

Use Case ID	0013
Use Case Name	Book Table
Brief Description	Administrator and Staff can book table
Actor	Administrator, Staff
Trigger	Click “Update” Button at the Main Page
Precondition	Want to book table for customer
Normal flow of events	Administrator and Staff can fill in customer name and phone number, and select date and time.
Sub flows	-
Alternate flows	-

Table 4.2.14 Delete Table Use Case Description

Use Case ID	0014
Use Case Name	Delete Table
Brief Description	Administrator and Staff can delete table

Actor	Administrator, Staff
Trigger	Click “Delete” Button at the Main Page
Precondition	Want to delete table
Normal flow of events	Administrator and Staff delete the table
Sub flows	-
Alternate flows	The system will check if the table was created from the database and if so, the table cannot be deleted.

4.3 Activity Diagram

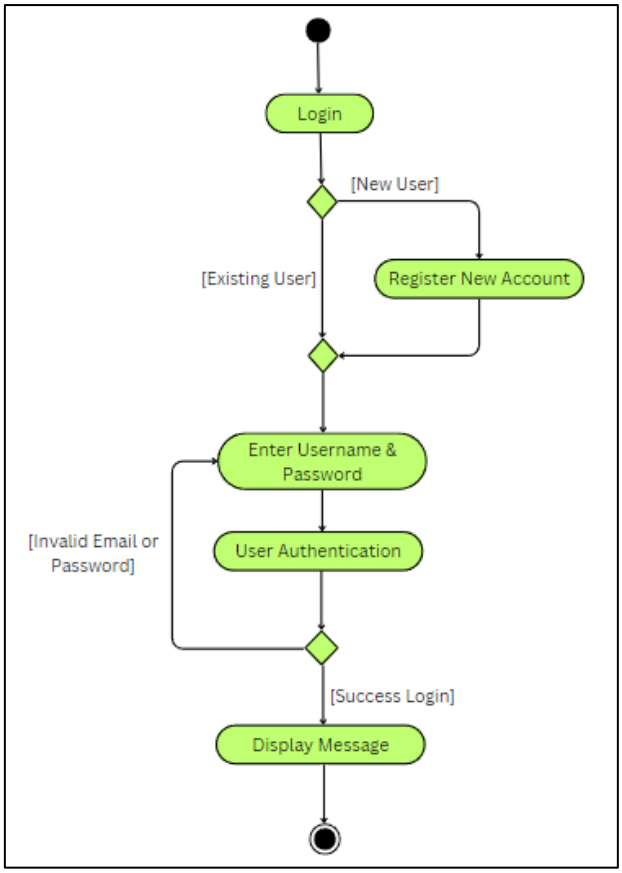

Figure 4.3.1 Activity Diagram for Login and Register Module

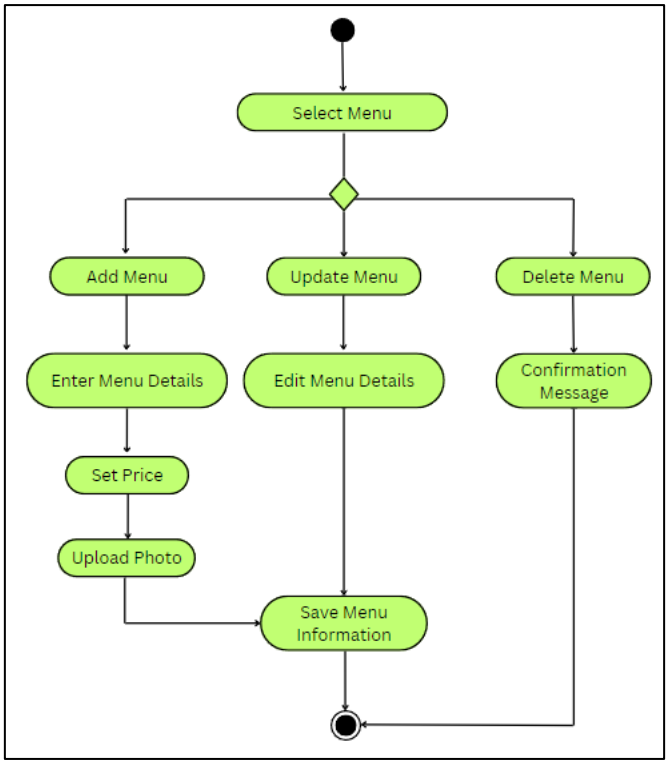

Figure 4.3.2 Activity Diagram for Menu and Pricing Module

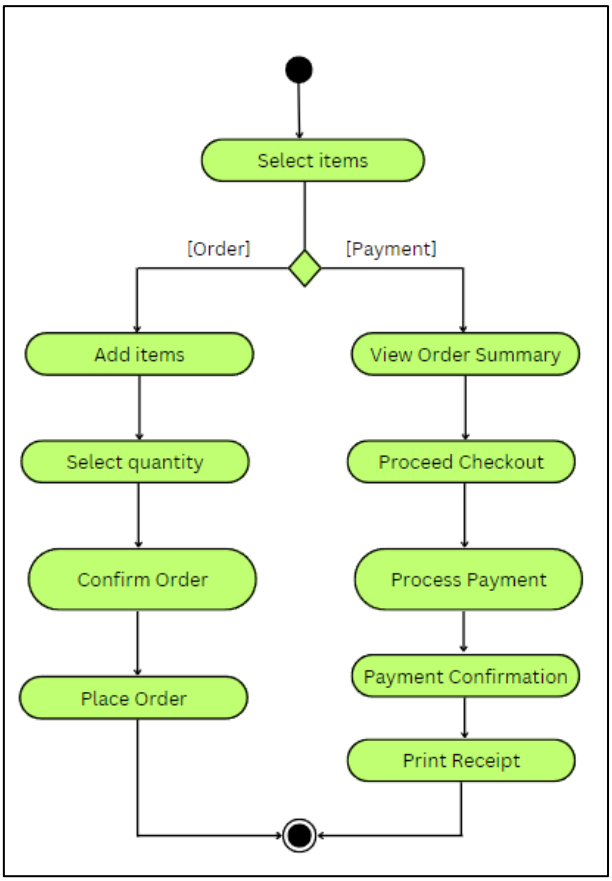

Figure 4.3.3 Activity Diagram for Order and Payment Module

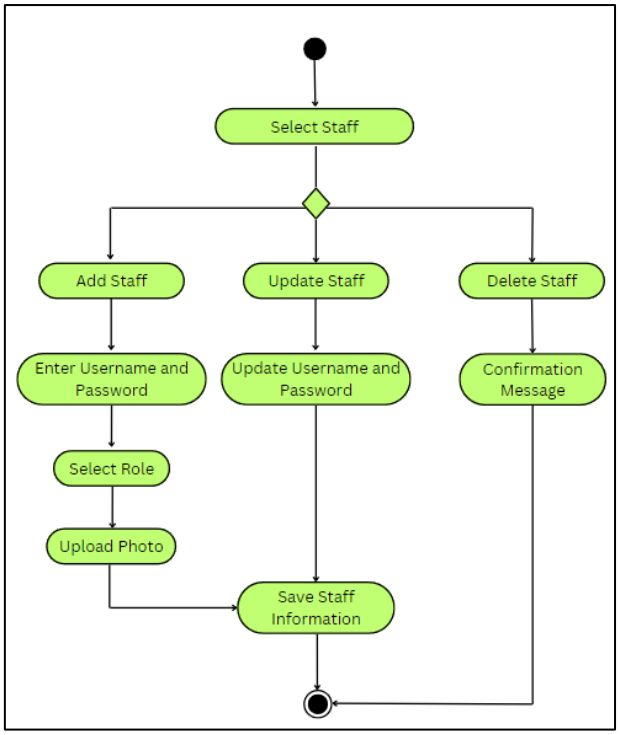

Figure 4.3.4 Activity Diagram for Staff User Access Module

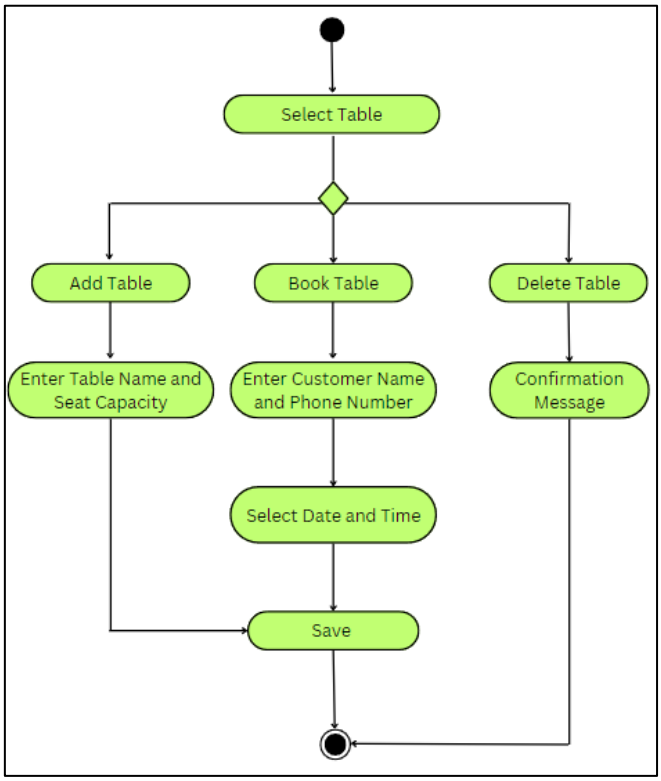

Figure 4.3.5 Activity Diagram for Staff User Access Module

4.4 Entity Relationship Diagram

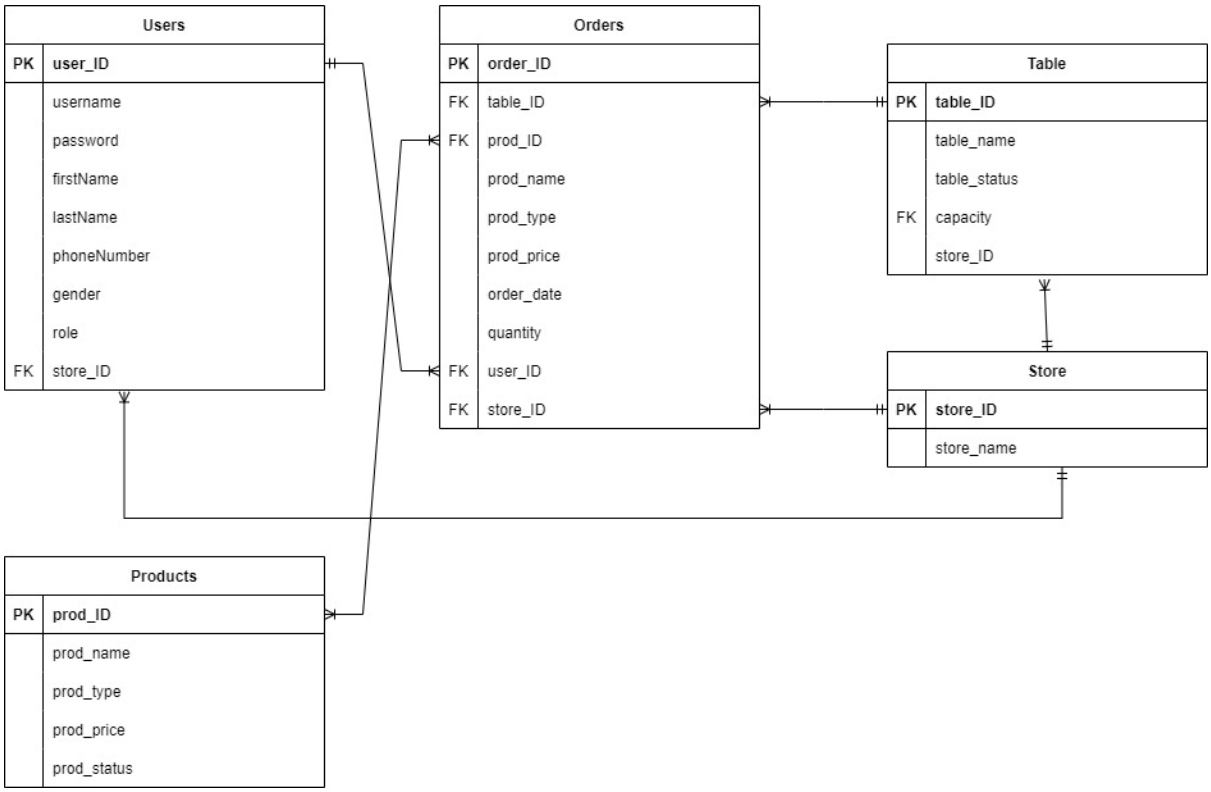

Figure 4.4.1 Entity Relationship Diagram for Café Management System

Figure 4.4.1 illustrates the Entity Relationship Diagram (ERD) of the Café Management System, comprising four key entities which are users, products, orders, store, and table. The "User" entity represents individuals using the system and includes attributes such as User ID, username, password, first name, last name, phone number, gender, role and store ID (as a foreign key). The "Product" entity contains details like product ID, name, type, price, and status. The "Order" entity encompasses attributes including order ID, table ID (as a foreign key), product details such as product ID (as a foreign key), name, type, price, and order date, as well as the quantity of the product, user ID and store ID (as a foreign key). The "Store" entity records the store name. The “Table” entity records table name, seat capacity, and store ID (as a foreign key). Each user can place many orders, and each order is made by a user. Each store can have multiple users and tables, but each user and each table belongs to only one store. A product can be contained in many orders, while an order can consist of many products. Each table can have many orders, but each order is linked to only one table.

4.5 Class Diagram

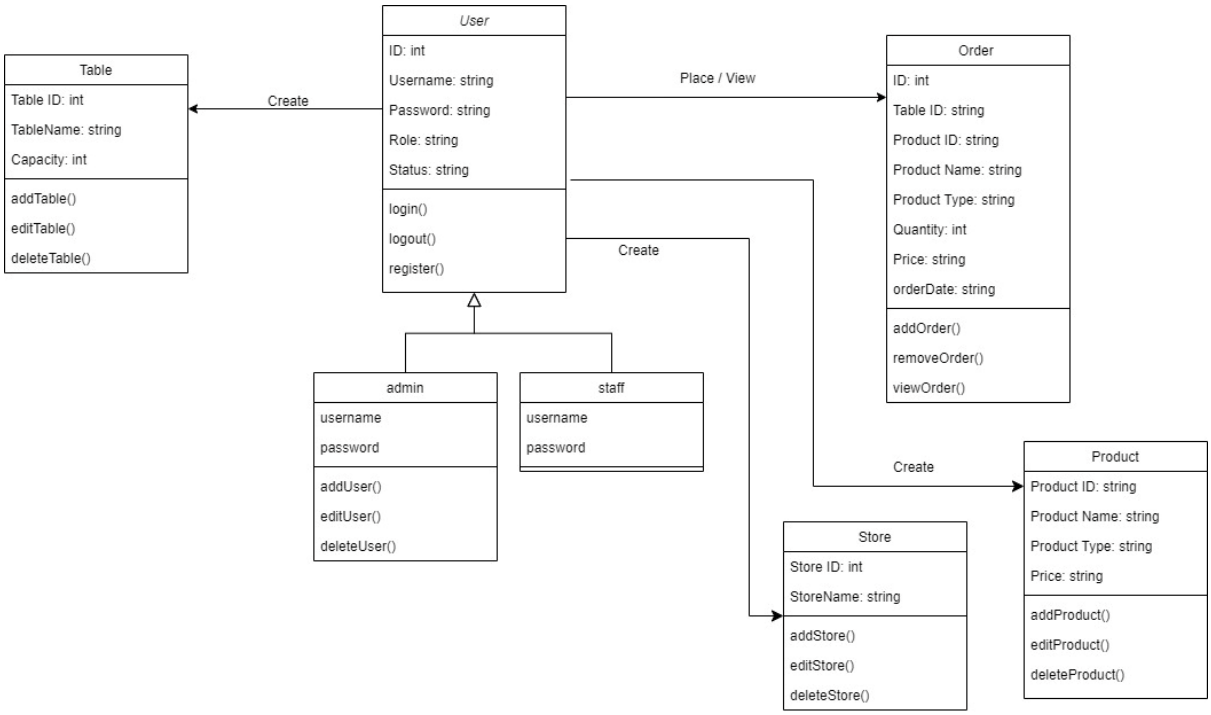

Figure 4.5.1 Class Diagram for Café Management System

Figure 4.5.1 indicates the Class Diagram of Café Management System, including four main classes which are users, products, orders, stores and tables. User represents all users of the system, including admin and staff. Each user has a unique ID, username, password, role, status, and register date. User can register, login, and logout. Admin and staff are the subclass of users, the users can be added, updated, and deleted by admin. Product represents items available for sale at the café. Each product has a unique ID, name, category (food or drink), and price. Admin or staff can manipulate product data by adding, updating, or deleting items. Order represents a customer's order. Each order has unique ID, table ID linking it to the customer who sits the specific table, product ID linking it to which meal that customer ordered, name, category, order quantity, and price. Users can add or remove the order, and also view the order transactions. Store records the store details, including Store ID and the store name. User can add, edit, and delete the store. Table records the table details which included table ID, table name, and seat capacity.

Chapter 5

System Implementation

5.1 Hardware Setup

To ensure optimal performance and functionality of Café Management System (BeanTrack), certain hardware specifications are recommended for users' devices. The following are the minimum hardware requirements:

1. Processor: 64-bit Microsoft Windows 8/10/11, Linux, macOS or ChromeOS.
   These processors are capable of performing the computational tasks required by the application's functionality. While modern processors are recommended for performance, these older processors meet the minimum requirements.

2. Random Access Memory (RAM): 8GB of RAM or more.
   Adequate RAM is essential for smooth navigation and interaction with the application. Users should have at least 8GB of RAM to ensure that the virtual device runs effectively without lag.

3. Hard Disk Space: 8GB of available disk space minimum
   Users will need enough disk space to install the necessary software.

4. Display: 1280 x 800 display with 16-bit graphics card
   A display resolution of 1280 x 800 pixels with a 16-bit graphics adapter is recommended for optimal viewing of the application's content and graphics.

5.2 Software Setup

To ensure that users can seamlessly access and interact with BeanTrack, it is important to set up the necessary software components. The following software components and configurations are required:

Integrated Development Environment (IDE):

An integrated development environment is a software application that provides comprehensive facilities for software development. This project was developed by using Visual Studio Code as it is a development environment used by programmers to create websites, web applications, and mobile applications.

Source Code:
Download the provided BeanTrack source code zip file from the specified location. The source code includes all the files and scripts that need to run the application.

XAMPP Control Panel:
To view a PHP page that is stored on your PC in your web browser, your PC needs to be running a piece of software called a web server that support PHP.

5.3 Setting and Configuration

5.3.1 Download and Install XAMPP:

1. To install XAMPP, go to apache website: https://apachefriends.org and click on the download button based on the version needed.

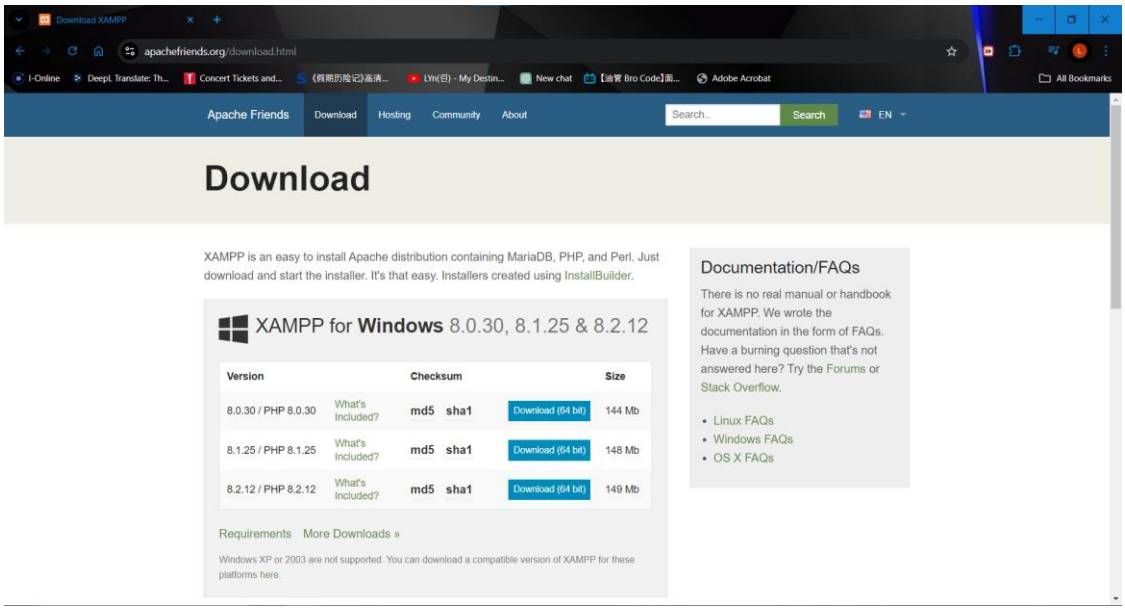

Figure 5.3.1.1 Download XAMPP Control Panel

2. After downloading, go to **Downloads** folder and select the installer to start the installation.

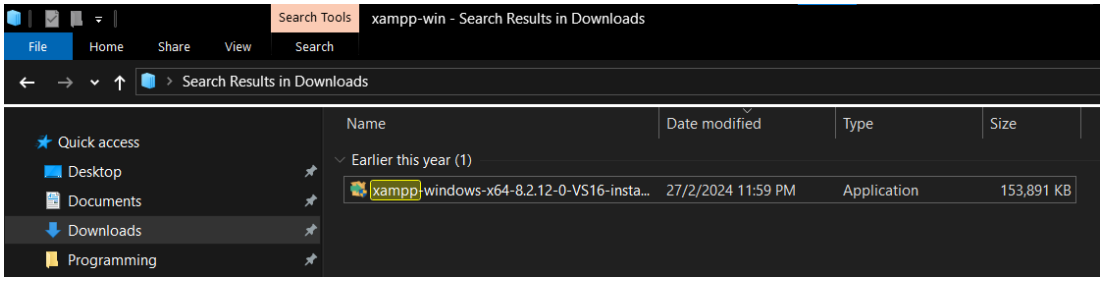

Figure 5.3.1.2 Open the installer

3. Follow the instructions to install XAMPP.

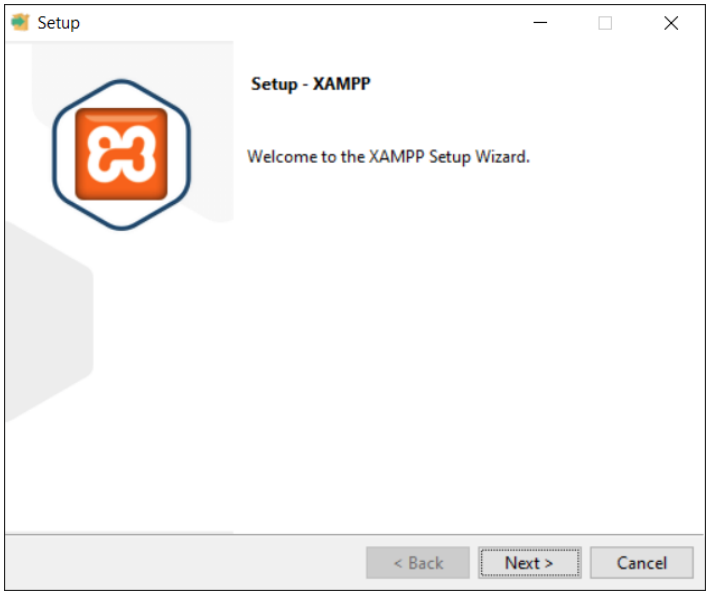

Figure 5.3.1.3 Install XAMPP

4. To launch XAMPP, input **"XAMPP"** in the search bar and open the **XAMPP Control Panel** to start it.

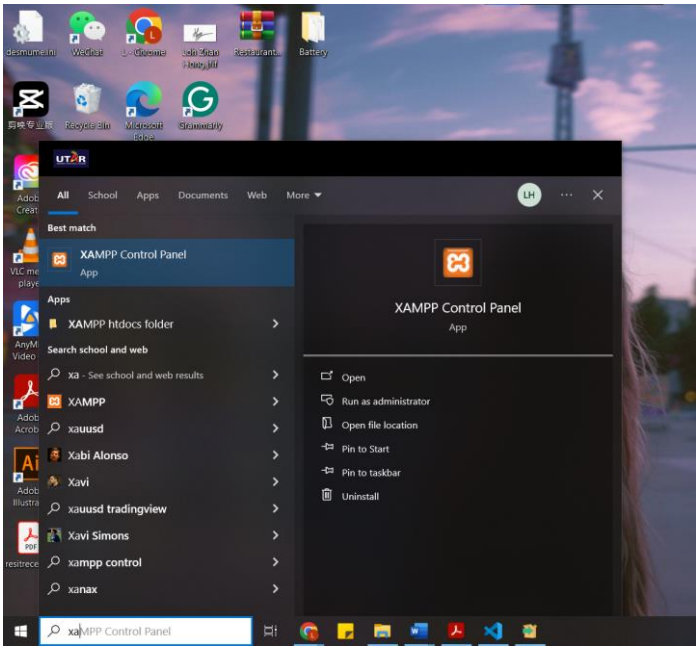

Figure 5.3.1.4 Open XAMPP

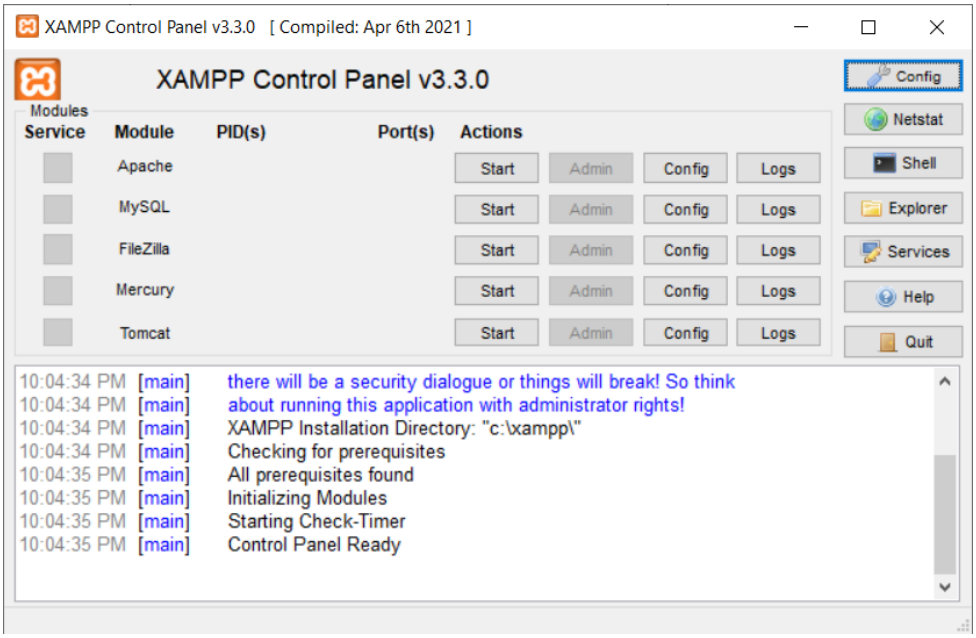

Figure 5.3.1.5 XAMPP Control Panel

5.3.2 Application and Source Code setup

1. Download and Extract the Source Code:

Download the provided source code zip file for BeanTrack.

Type **htdocs** into the search bar and open it. Then drag the source code file into the **htdocs** folder.

Figure 5.3.2.1 Open htdocs folder

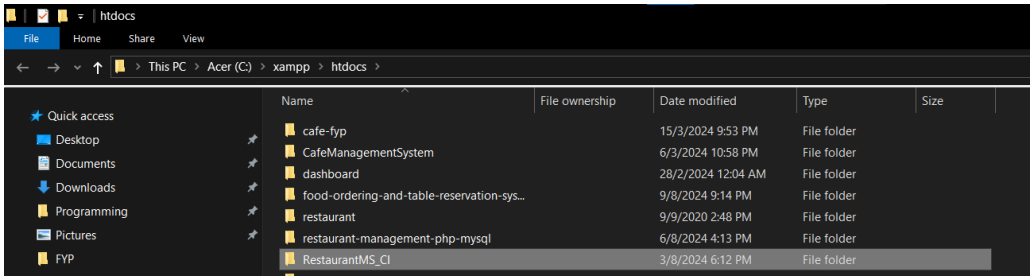

Figure 5.3.2.2 Drag the file into htdocs folder

2. Download Visual Studio Code

Download Visual Studio Code from the official website.

https://code.visualstudio.com/download

Double click the downloaded exe file to start installing.

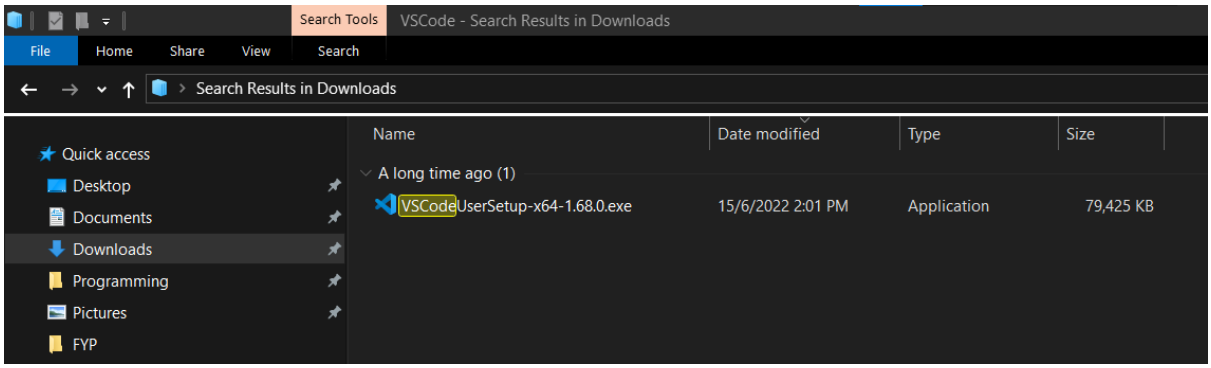

Figure 5.3.2.3 Open the VS Code installer

Follow the instructions to install Visual Studio Code

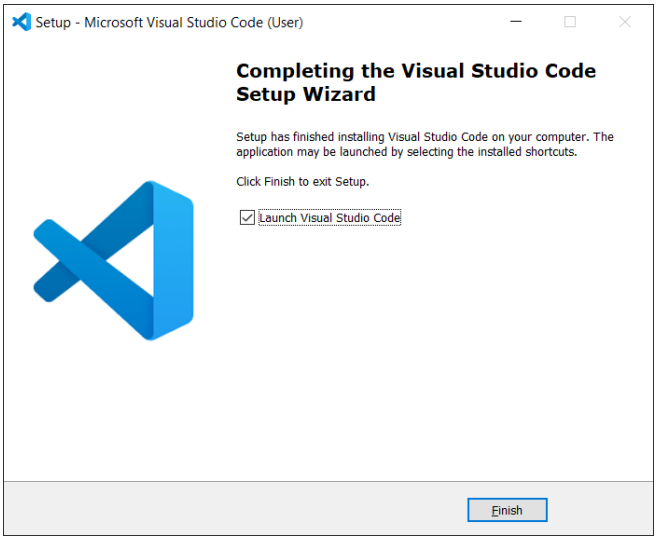

Figure 5.3.2.4 Installation complete

After opened Visual Studio Code, click on “Add Folder to Workspace” to import the source code. Select the source code file and click on add button.

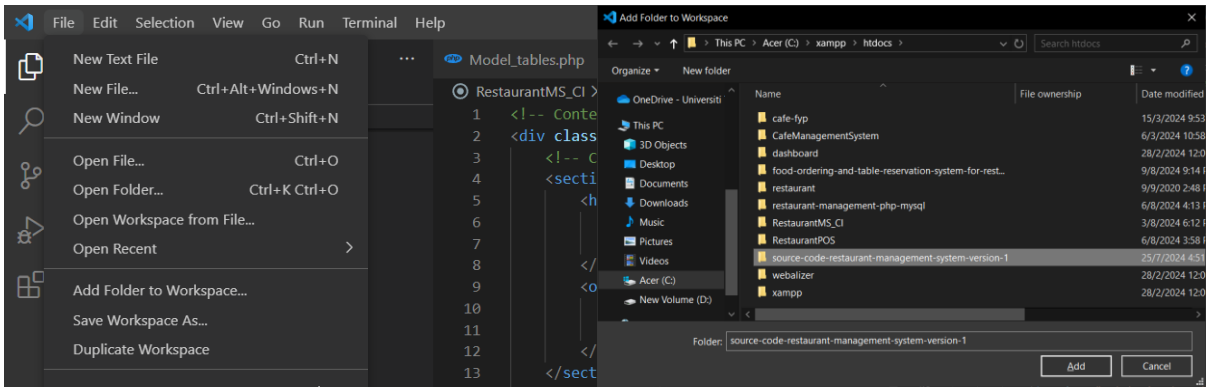

Figure 5.3.2.5 Add source code file into workspace

Open the browser and type “localhost/source code file name”. Then the web page will be opened.

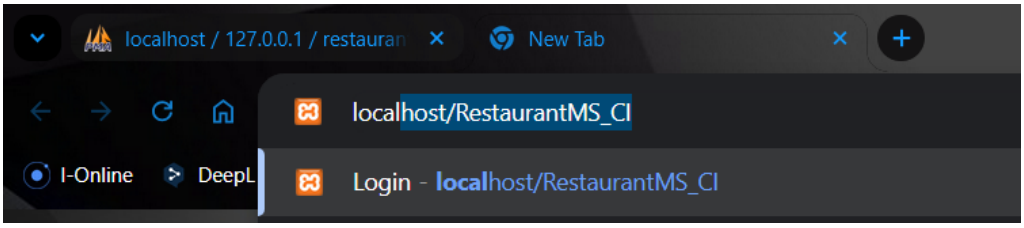

Figure 5.3.2.6 Type source code file name in the browser

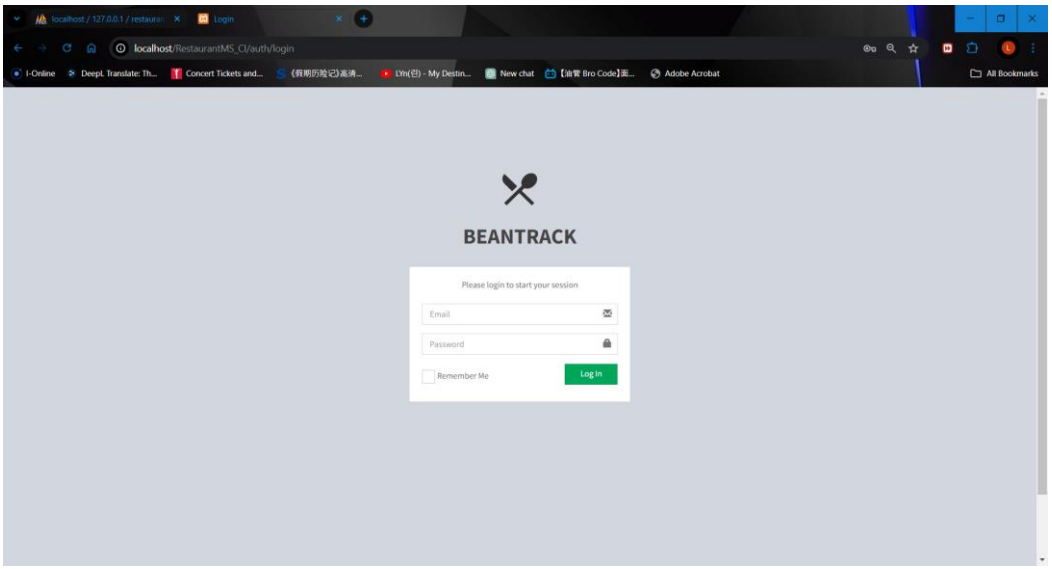

Figure 5.3.2.7 Web page is opened

5.3.3 Database Setup

Open XAMPP and click on the start button of Apache and MySQL.

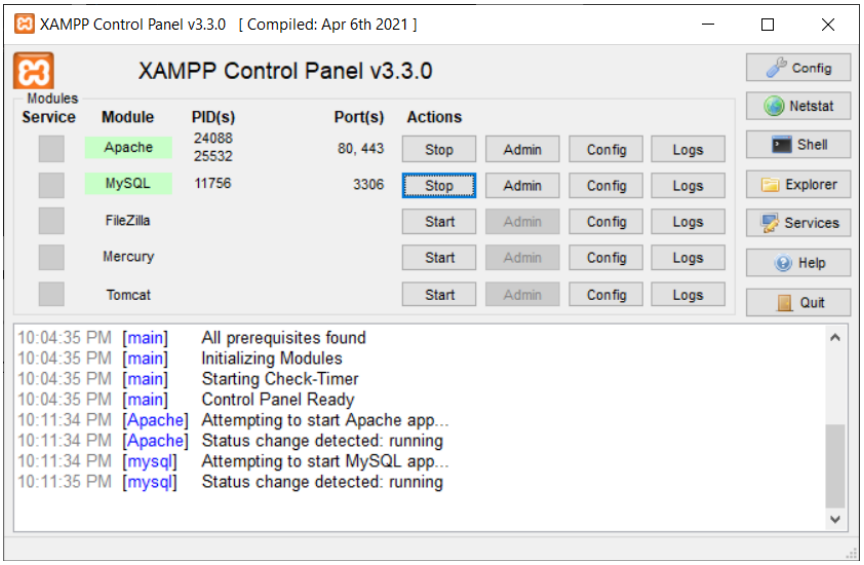

Figure 5.3.3.1 Click Start button

Click on the Admin button of MySQL

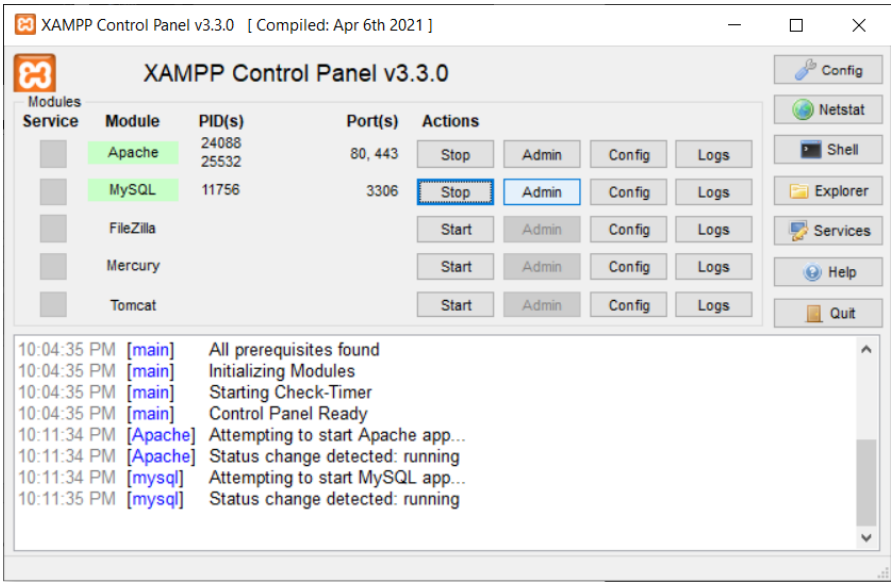

Figure 5.3.3.2 Click Admin button

Click on import button and choose file. Select the SQL file and import it.

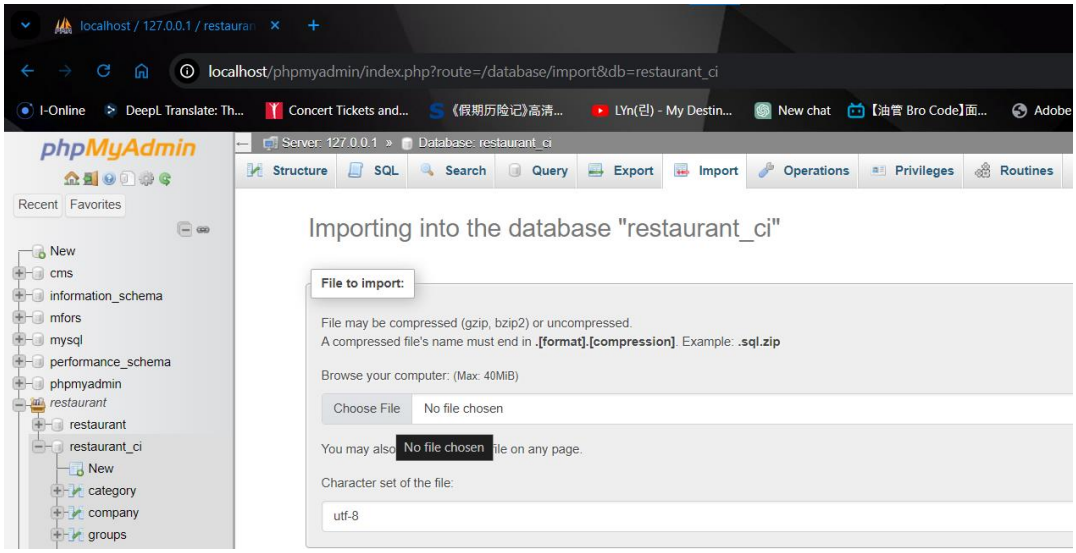

Figure 5.3.3.3 Import the SQL file

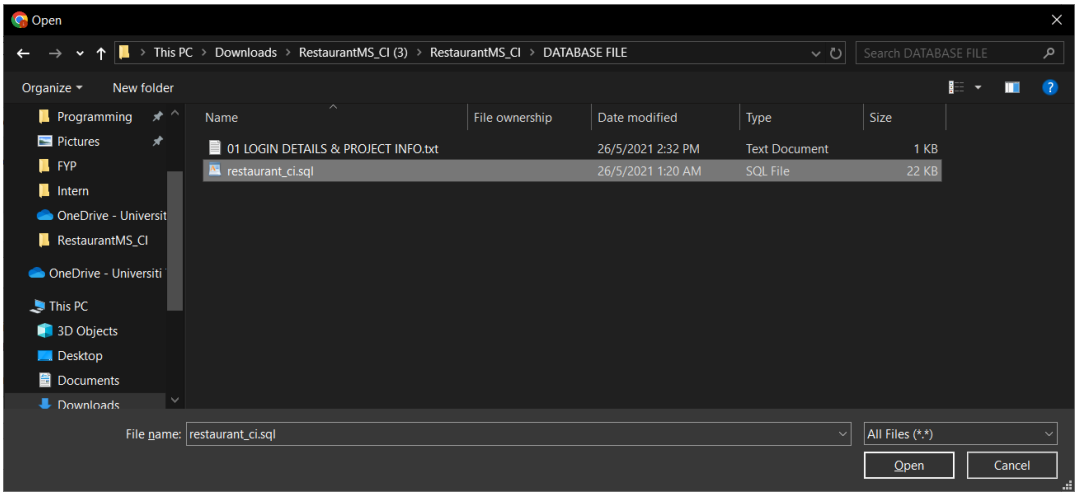

Figure 5.3.3.4 Select the SQL file

The SQL file has been imported.

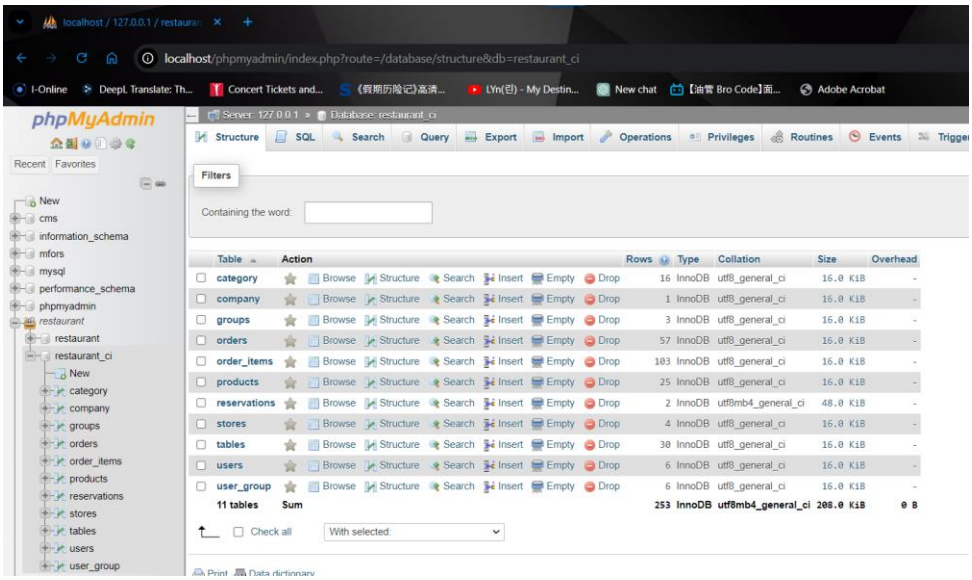

Figure 5.3.3.5 Imported SQL file

5.4 System Operation (with Screenshot)

5.4.1 Login Module

When reaching the login page, users are presented with a login form to access their accounts. They must enter their username (email) and password to proceed. Additionally, there is a “Remember Me” checkbox, allowing users to save their login credentials on the device for future sessions, eliminating the need to enter their details each time.

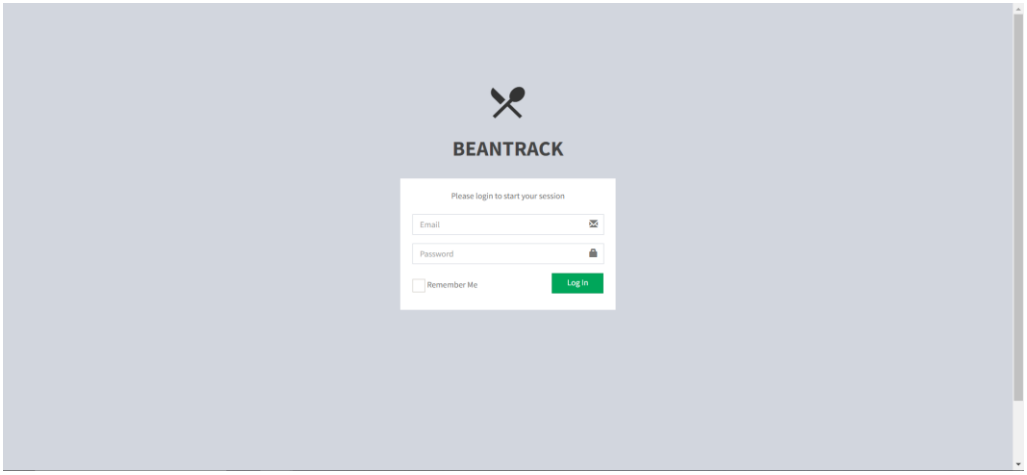

Figure 5.4.1.1 Login Page

5.4.2 Dashboard Module

Upon user login, the system navigates to the Dashboard page, which provides a comprehensive overview of key metrics in the Café system. The Dashboard shows the total number of food products, showing how many food items available in the cafe. Food Category indicates the number of different categories of food available. System users represent the total number of employees or staff users who have access to the system. It also displays the total number of customer paid orders, indicating how many transactions have been made. Unpaid Orders indicates the number of orders that have not yet been paid for. Additionally, it presents the total income earned for the current day and month, showing how much money has been made so far. Finally, it includes the total income earned from the beginning until now, giving a complete view of the system’s financial performance over time. Besides that, the dashboard also displayed the total number of tables available in the café. It is also showing the total number of branches or stores available in the system.

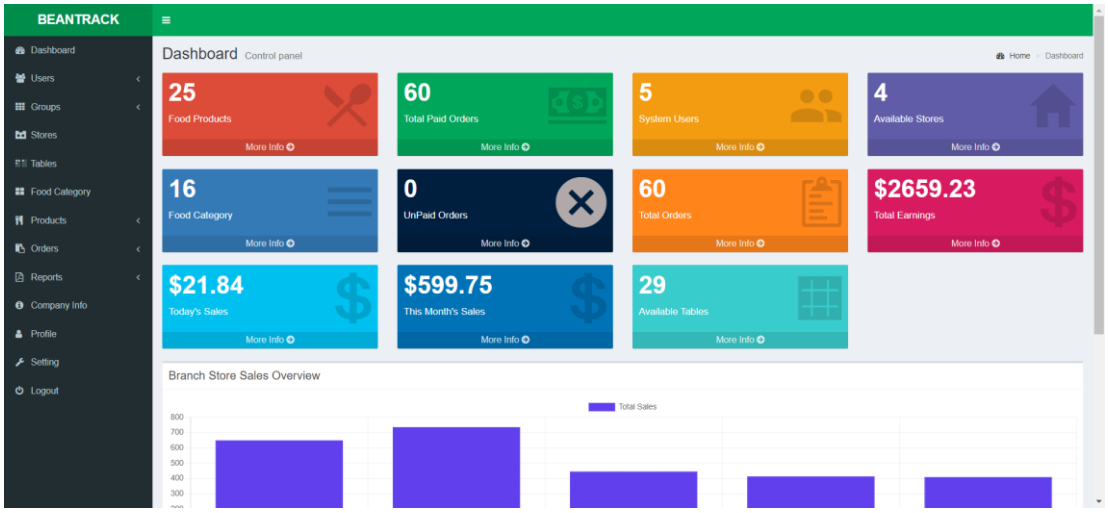

Figure 5.4.2.1 Dashboard Page

5.4.3 Staff User Access Module

- Users can access the Staff User Access page by selecting the “User” option from the side menu bar. This page enables administrators to effectively manage their staff member’s access to the system. In addition to adding new staff, administrators can update and delete existing staff records. When adding a new staff user, administrators must input the username and password, and specify the staff’s role and status within the system. Furthermore, administrators can make adjustments to staff information by modifying details such as username, password, role, or status. This feature enables administrators to efficiently oversee and maintain staff access, ensuring effective management of user roles and permissions. Role-based access control improves operational control and security by ensuring that staff users can only access the functions associated with their specific role.

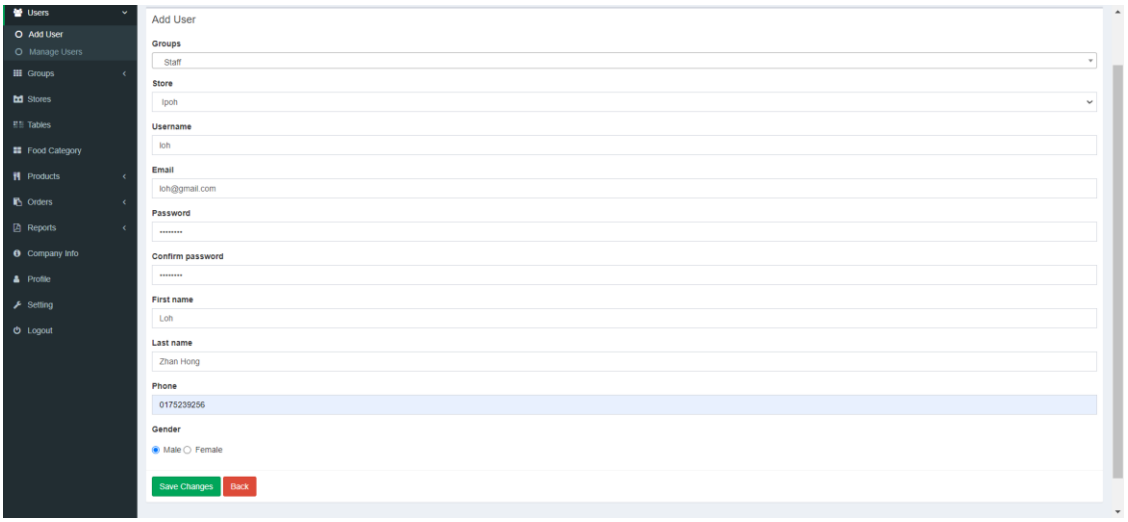

Figure 5.4.3.1 Add User

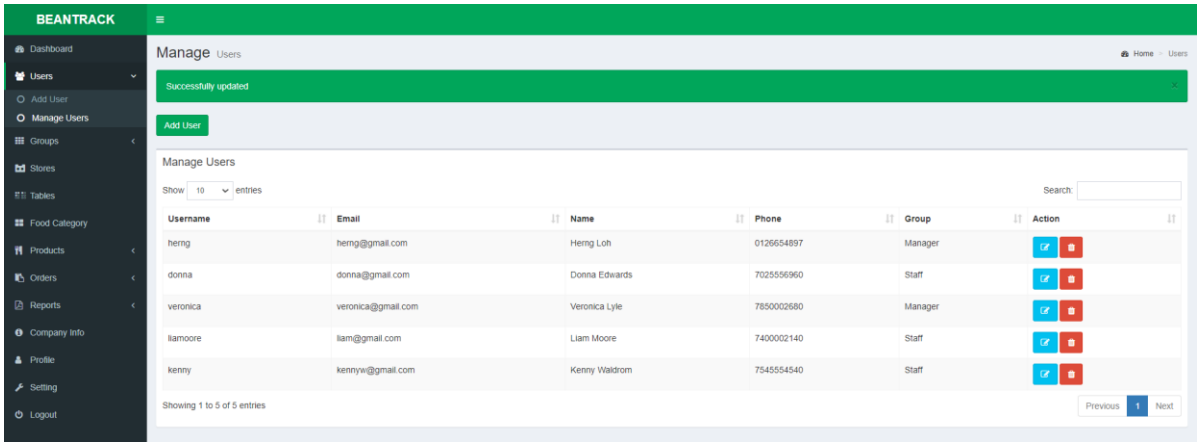

Figure 5.4.3.2 User Data Table

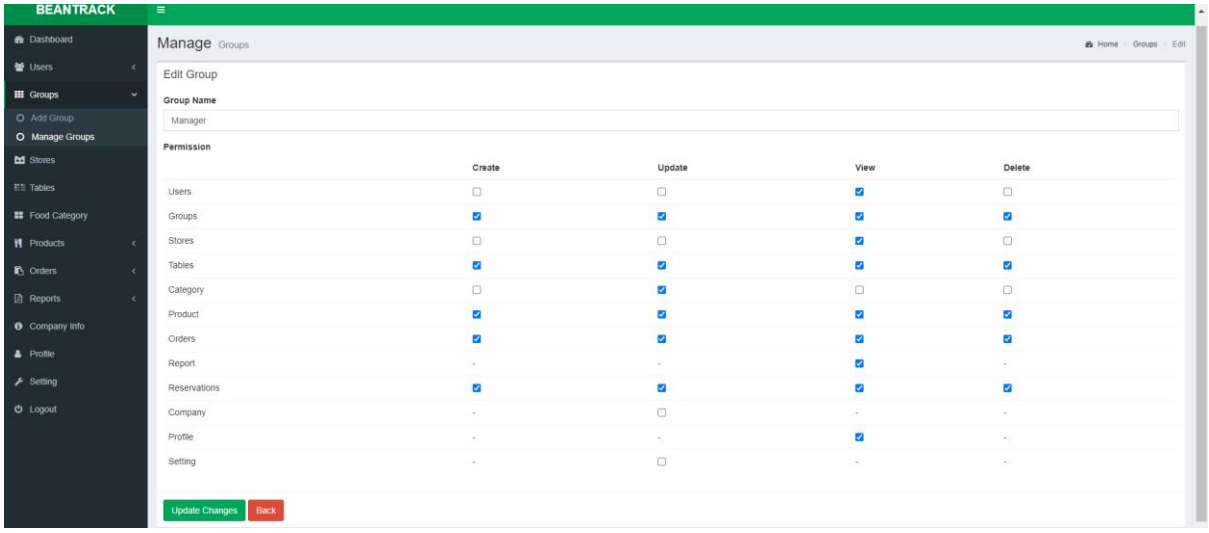

Figure 5.4.3.3 Role-Based Access Control

5.4.4 Menu and Pricing Module

Both administrators and staff members can manage the menu within the Product module page. This page serves as a platform for users to add new food and drink items to the menu by inputting product details. These details are then recorded and displayed in the data table for easy reference. Users are required to provide information such as item name, item category (breakfast, drink, pasta), price, description, store, and the option to upload a photo of the item. Additionally, users can update the price of a menu item by selecting the respective product, adjusting the price, and clicking on the edit button. Users can update the availability of the menu. Furthermore, users can also delete menu items as needed, allowing for efficient management of the menu offerings.

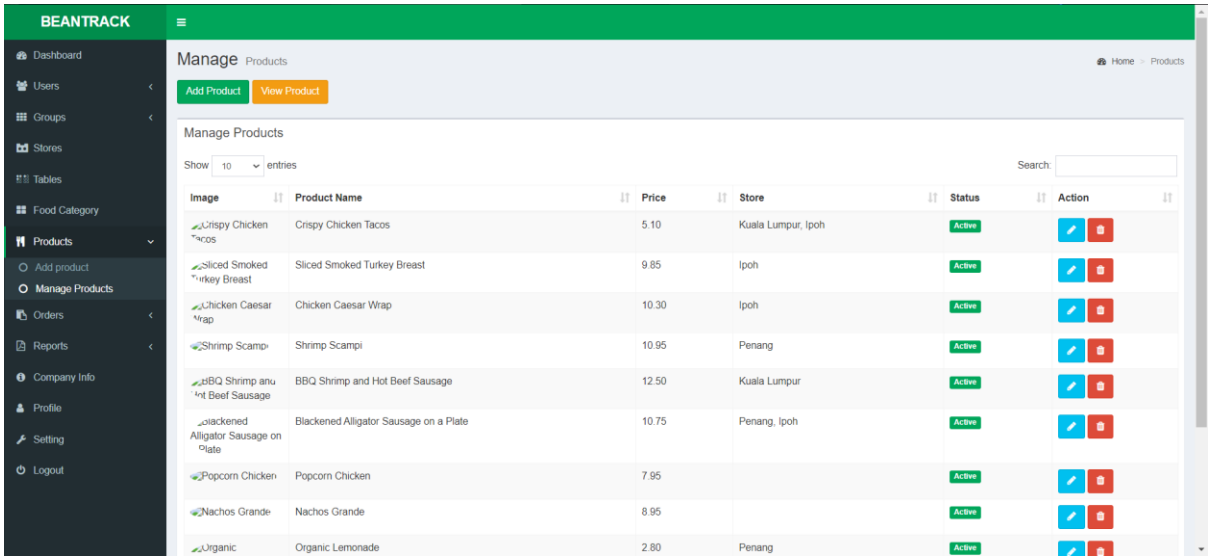

Figure 5.4.4.1 Menu Product Page

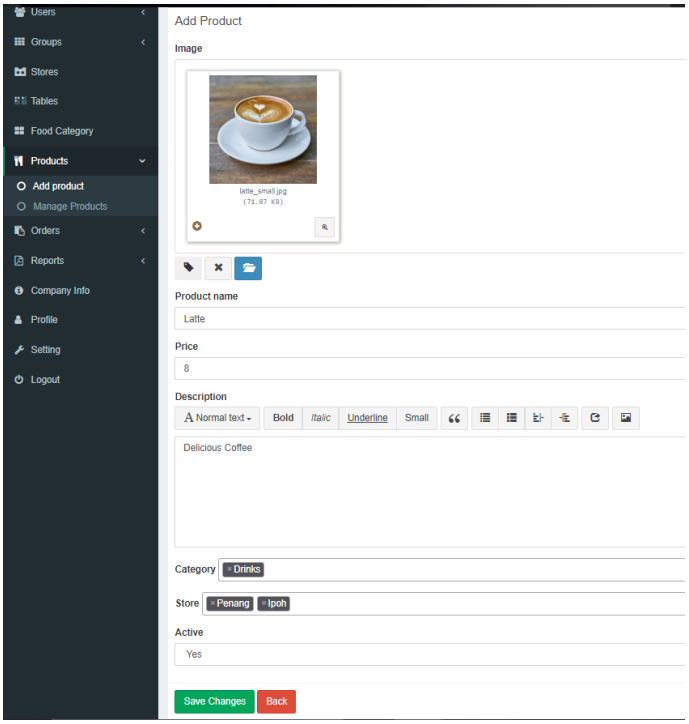

Figure 5.4.4.2 Add Menu Product

5.4.5 Order and Payment Module

When a staff member needs to place an order for a customer, they must click on the order button located in the side menu bar. Staff can then choose the table number, food or drink. Following this, they set the desired quantity of the selected meal or drink. User can fill in the discount amount if needed. After the staff makes an order, the "Unpaid Orders" section in dashboard page will be added. There are two payment methods, which are pay by cash or Touch

n Go e-wallet. If the customer is ready to pay, staff are required to enter the amount paid by the customer, and the system will display the change amount. If the customer wants to pay by Touch n' Go e-wallet or DuitNow payment, click the "QR Payment" button, and a payment code will pop out and allow for customer scan it and pay. Additionally, the system is capable of printing a receipt for the customer.

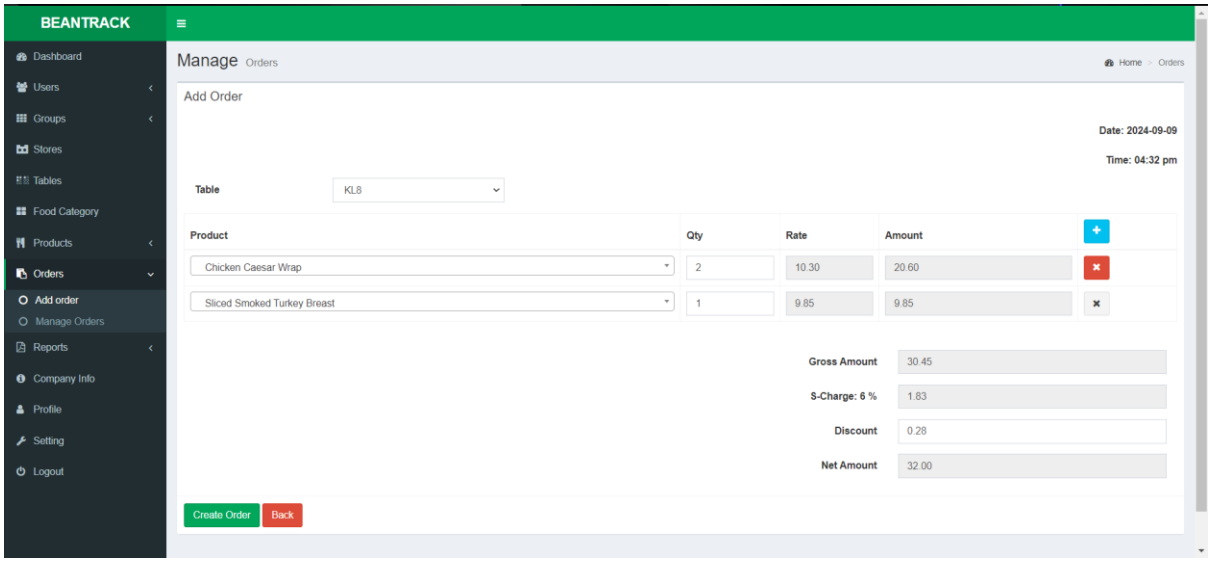

Figure 5.4.5.1 Make an order

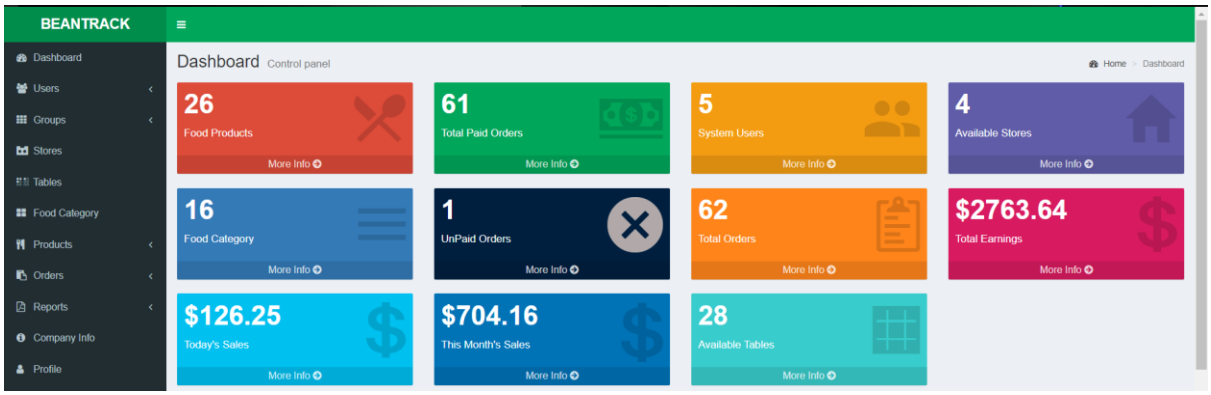

Figure 5.4.5.2 Unpaid Orders added

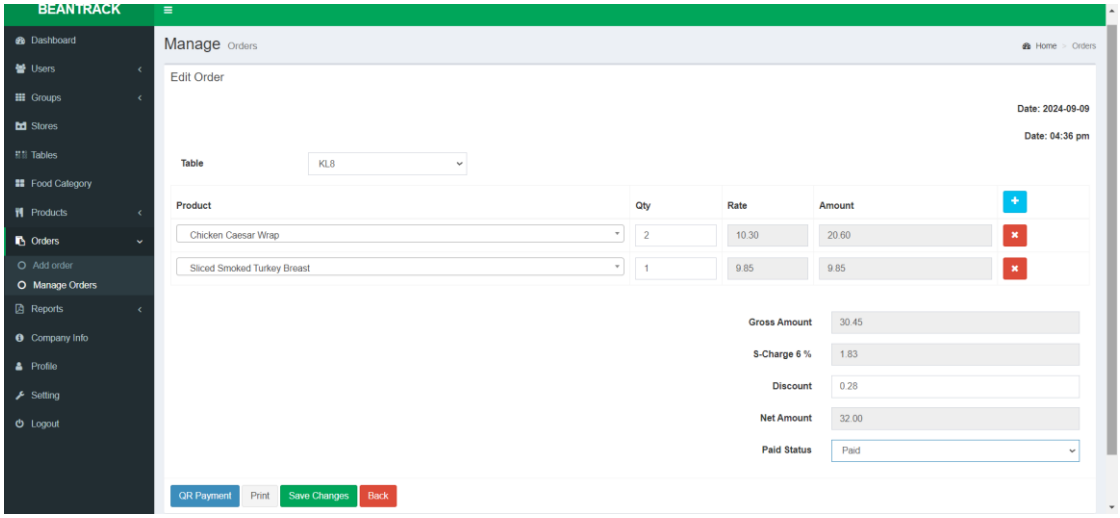

Figure 5.4.5.3 Making payment

Figure 5.4.5.4 Sample QR Payment Code

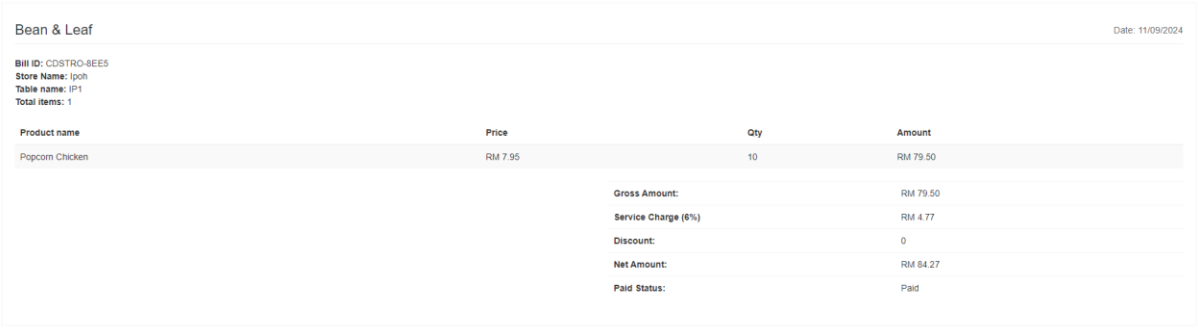

Figure 5.4.5.5 Generated Receipt

5.4.6 Sales Reporting Module

When user want to view the total sales of café, they can access the Reports via the side menu bar. In this section, there are multiple options available, including Daily Reports, Monthly Reports, and Store-wise Reports. These sub-selections allow users to filter and view detailed sales performance over different timeframes or specific stores. The section includes graphs displaying daily sales, monthly sales, and total sales for different stores, with corresponding table that provide detailed sales data. User can sort the report by year, month, or stores.

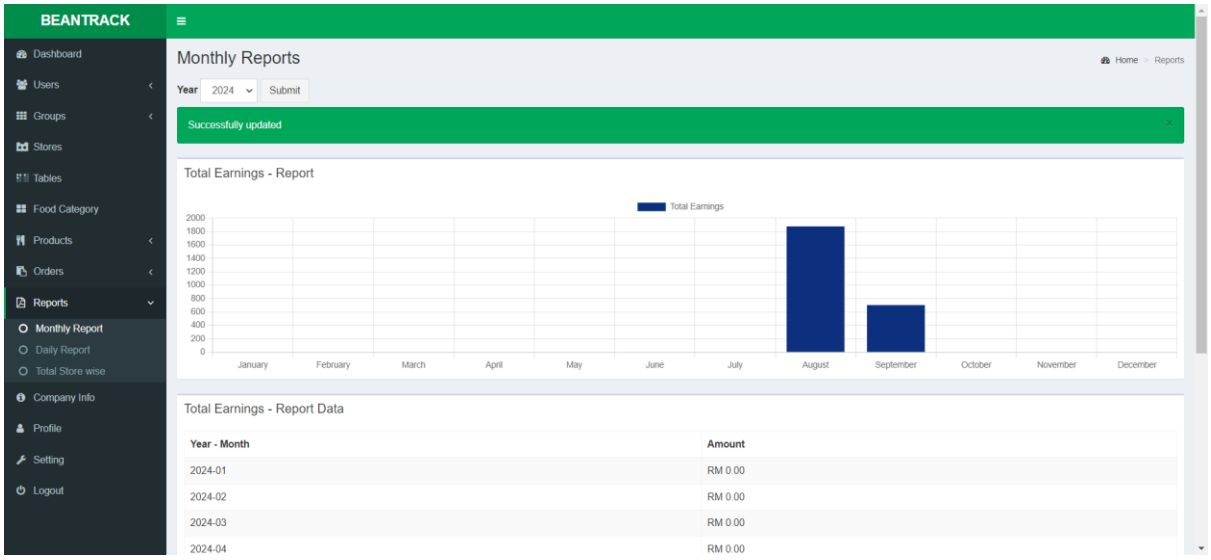

Figure 5.4.6.1 Monthly Total Sales Report

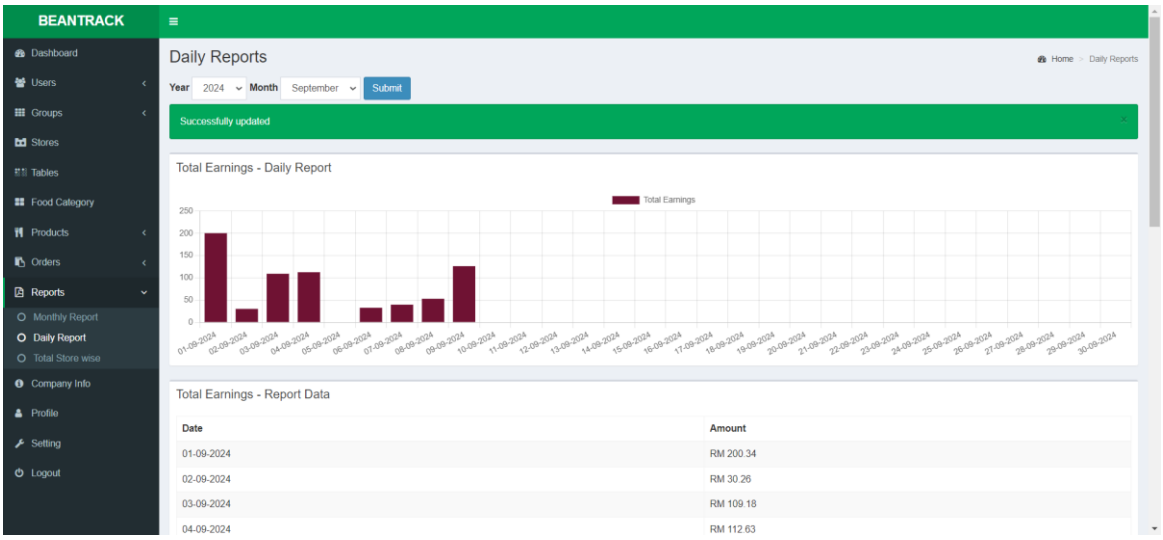

Figure 5.4.6.2 Daily Total Sales Report

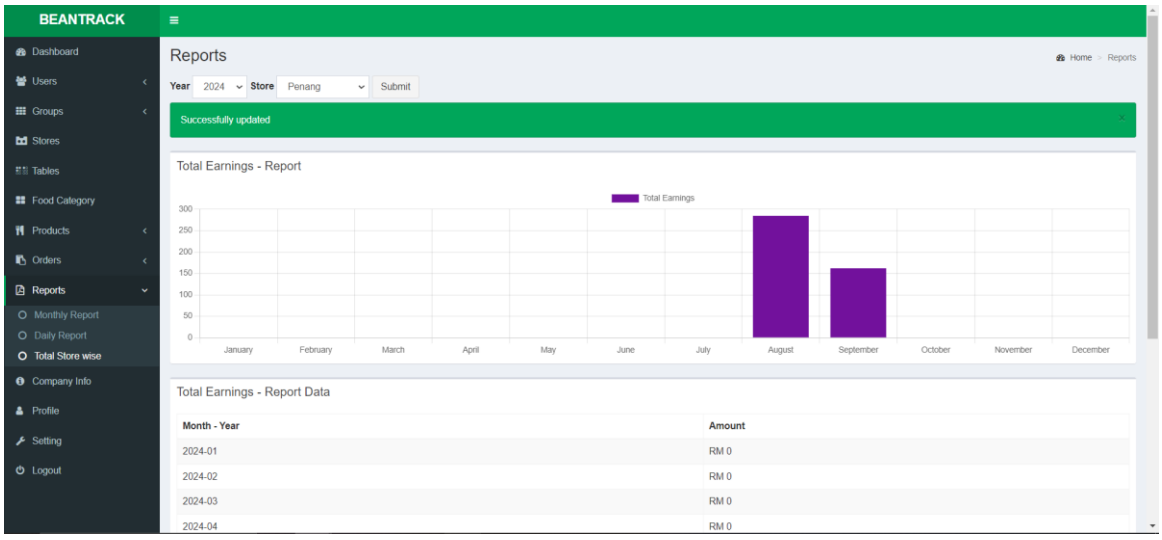

Figure 5.4.6.3 Different Store Total Sales Report (Monthly)

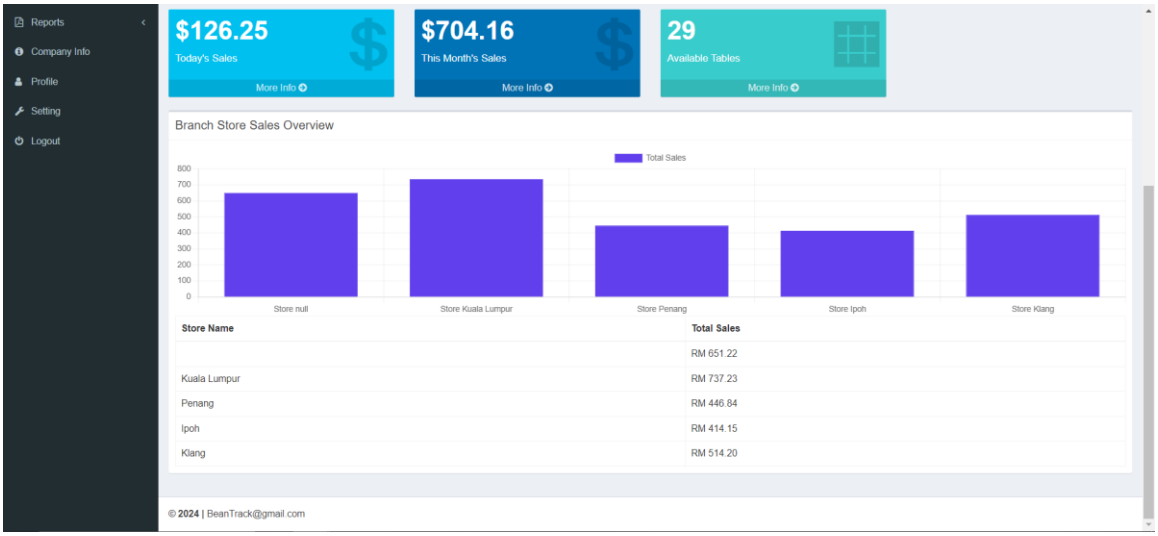

Figure 5.4.6.4 Different Store Total Sales Report

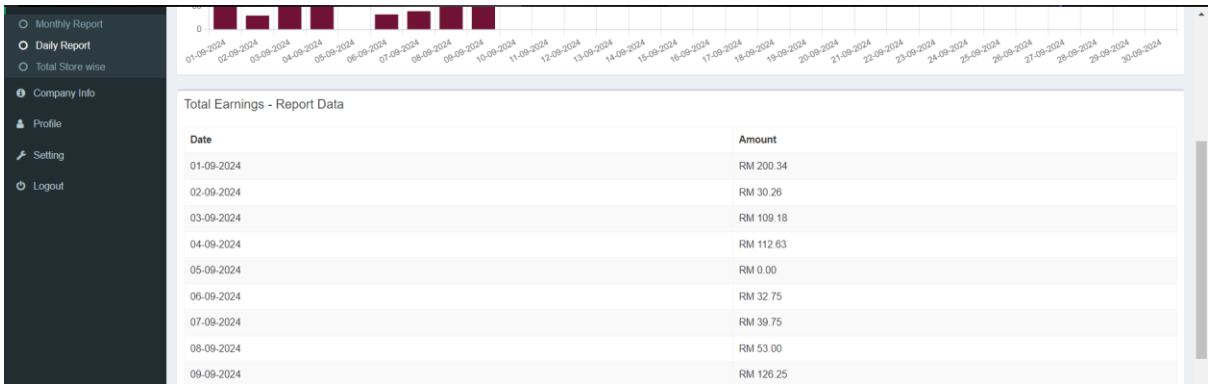

Figure 5.4.6.5 Sales Data Table

5.4.7 Table Reservation Module

Users can navigate to the page by selecting “Table” from the side menu. They have the option to add, edit, delete, or book tables. When adding a table, users are required to input details such as table number, seating capacity, and store location. To book a table, users click on the “Manage Reservations” button. User needs to input customer’s name, phone number, table number, and the date and time of the reservation. After the reservation added, the data will be showing in the table. Users can mark the reservation as completed when the customer came, otherwise cancel or delete the reservation.

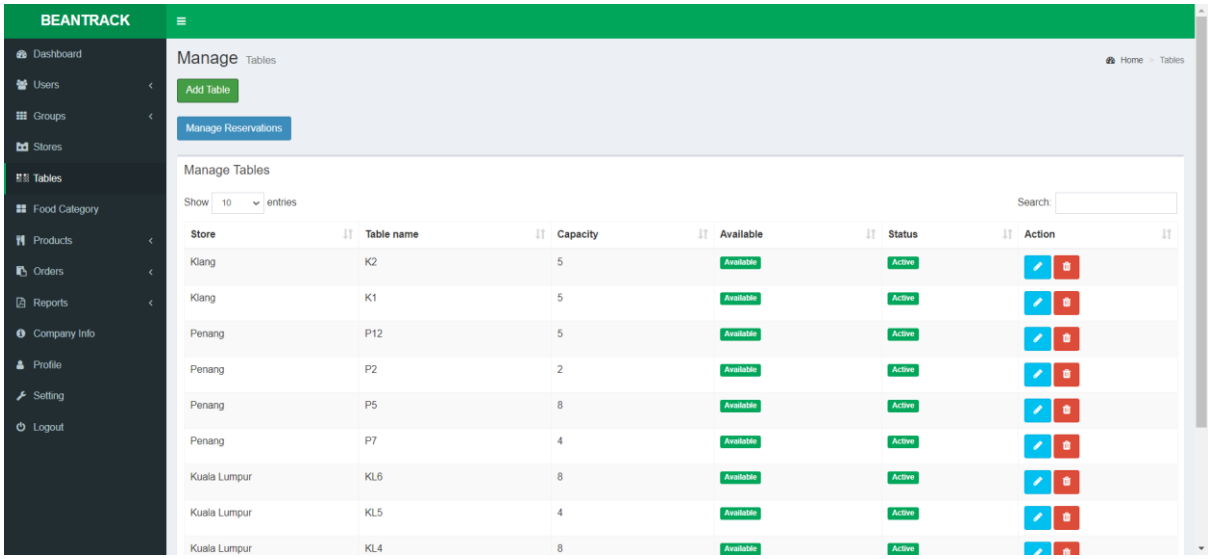

Figure 5.4.7.1 Table Page

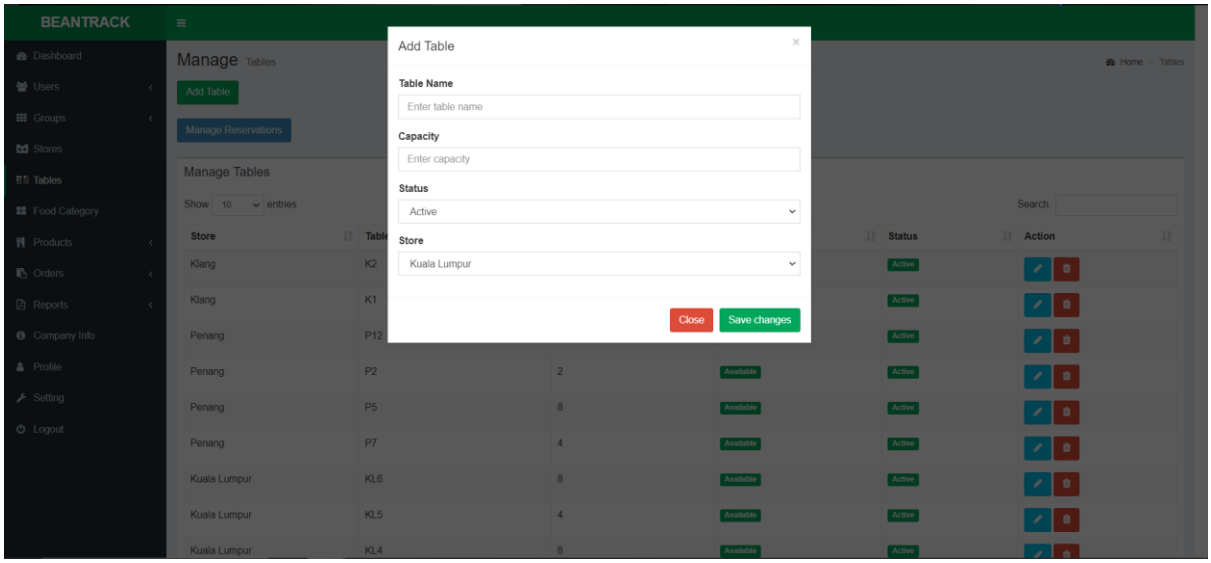

Figure 5.4.7.2 Add Table

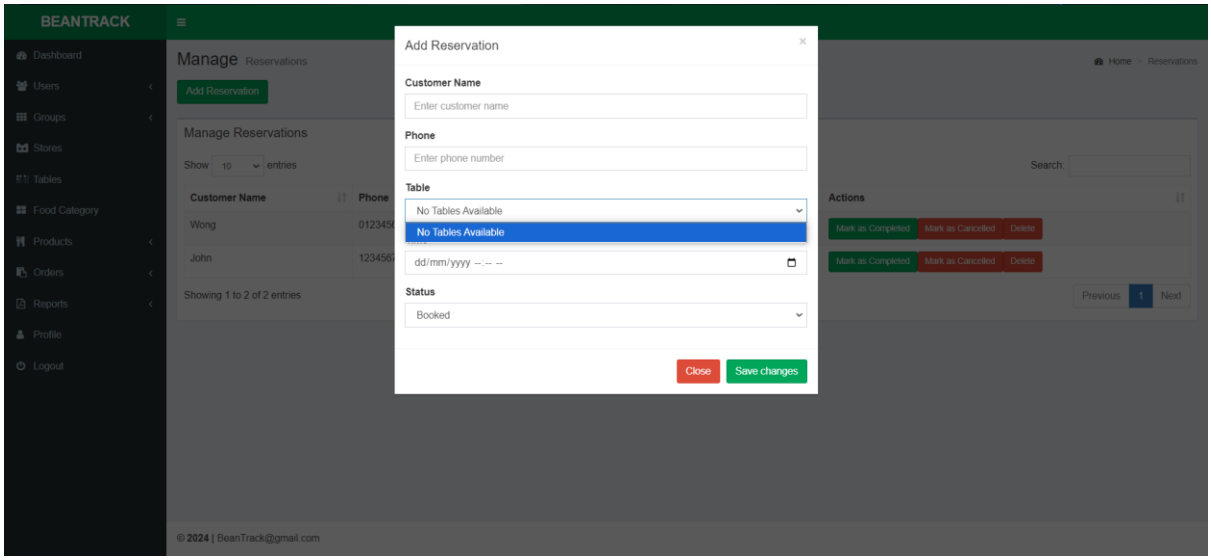

Figure 5.4.7.3 Add Reservation

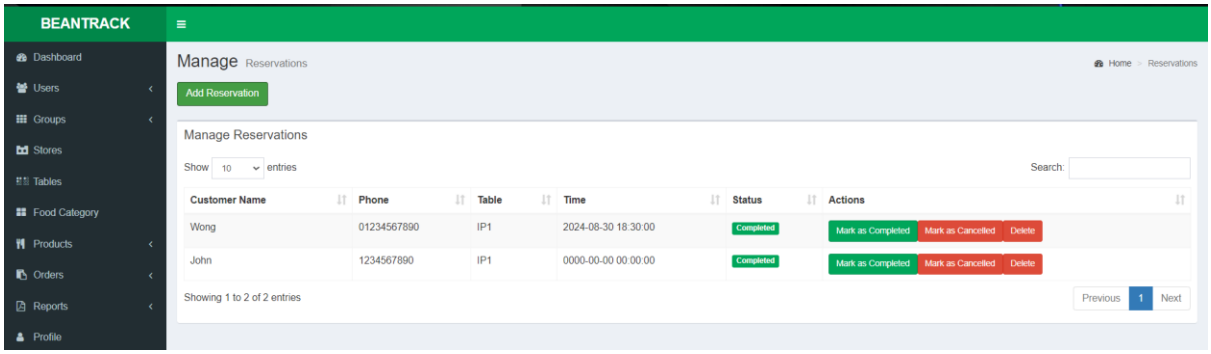

Figure 5.4.7.4 Reservation Table Data

5.5 Implementation Issues and Challenges

A well-designed user experience (UX) will significantly enhance the usability of the Café Management System, making it efficient and user-friendly for staff. One of the main challenges is creating a user interface that is both intuitive and accessible for a diverse range of employees with varying technical skills. While the system will not be used by customers directly, it must still be easy for staff to navigate with minimal training. The interface should focus on simplifying navigation and streamlining tasks such as order management, menu updates, and sales tracking. Key features like real-time order tracking and menu management need to be seamlessly integrated into the system to reduce the number of steps required for staff to complete their tasks, thereby improving efficiency.

A significant challenge is managing the data storage and retrieval required for orders, payments, and inventory tracking as the café's operations expand. Utilizing a cloud-based

MySQL database in combination with phpMyAdmin for real-time data management ensures that staff can collaborate seamlessly across shifts and locations. MySQL provides a robust and scalable solution for handling transactions and updates. However, continuously relying on cloud access for every data operation can lead to increased operational costs and potential performance slowdowns as the system scales. To address this, an optimal approach would involve using MySQL for centralized data management while caching frequently accessed data locally on staff devices. This reduces network dependency and improves data retrieval speeds. The local data cache can periodically synchronize with the central MySQL database, ensuring data consistency while optimizing performance and keeping operational costs under control.

Ensuring robust data security within the system is another critical challenge. As the system manages sensitive information, including staff credentials and payment transactions, it's essential to implement strong security measures to prevent unauthorized access and data breaches. This includes role-based access control, whereby staff can only access the functions and data associated with their specific roles, and security authentication methods such as password encryption and multi-factor authentication. Regular security audits and system updates are necessary to maintain the system's integrity and safeguard sensitive data from external threats.

Another key challenge is ensuring the system can handle increasing operational loads as the café grows. The system architecture must be designed to scale efficiently, supporting more users, orders, and data without a drop in performance. This may require the use of cloud-based infrastructure, load balancing, and caching mechanisms to ensure smooth operation even during peak hours. Additionally, maintaining real-time inventory management and sales tracking without slowing down other system functions will require careful optimization of the system's resources.

Finally, the management interface for administrators presents its own set of challenges. Admins need the ability to quickly add, edit, or delete menu items, update staff schedules, and manage inventory levels in real-time. The interface should be designed to allow for rapid updates to ensure operational efficiency and reduce the time spent on administrative tasks. Additionally, the management module should support secure login protocols to ensure that only approved persons can access critical data and perform key functions.

5.6 Concluding Remark

In summary, the implementation of Café Management System represents a significant advancement in the way café operations are managed and streamlined. Through careful software design and the integration of modern technologies, this project not only improves operational efficiency for café managers and staff but also ensures a more seamless, organized workflow across various operational areas. Key challenges, such as data security, system scalability, and user interface design for staff, have been comprehensively addressed to ensure that the system is both functional and secure across multiple devices and locations.

Efforts to overcome these implementation challenges have resulted in a practical tool that enhances day-to-day operations, from order management to sales tracking and staff management. The system has also provided valuable insights into best practices in developing management software for the hospitality industry. This project demonstrates how digital solutions can streamline traditional processes and provides a model for future innovations in the café industry. By leveraging advanced technologies and thoughtful design, the Café Management System sets a new standard for operational efficiency, ensuring improved staff engagement and optimized business performance.

Chapter 6

System Evaluation and Discussion

6.1 System Testing and Performance Metrics

Black Box Testing

In this section, we will conduct a comprehensive evaluation of the functionalities of the system using black box testing. This technique requires examining the system deprived of any knowledge of its internal mechanics, focusing solely on the outputs generated by various inputs. Black box testing accurately simulates real-world user interactions, allowing us to observe how the system handles both expected and unexpected user actions. This includes examining the system's response times, usability and reliability.

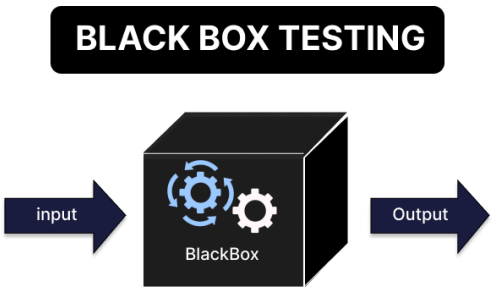

Figure 6.1.1 Black Box Testing

Black box testing is an essential method as it provides an end-to-end evaluation of the system, similar to how end users experience it. Because end users are generally unaware of the underlying code or architecture, they expect the system to respond appropriately to their input. Black box testing mimics this user behavior to ensure that the system meets its functional objectives. This approach includes all critical subsystems such as the UI/UX, servers (web or application), databases, dependencies and any integrated systems. The testing process is organized to evaluate the user-side functionality. This designed approach ensures a complete examination of all aspects of the system, highlighting strengths and finding potential improvements.

6.2 Testing Result

6.2.1 Functionality Testing

Table 6.2.1.1 Test Scenario: Check Account Login Functionality

No	Test Case	Value	Expected Result	Actual Result
1	Login with valid username and password	Username: admin@gmail.com (valid email) Password: admin123 (valid password)	User is login successfully	Same as expected result
2	Login with invalid username	Username: admin1@gmail.com (invalid email) Password: admin123 (valid password)	Show 'Email doesn't exist. Please try again.' message	Same as expected result
3	Login with invalid password	Username: admin@gmail.com (valid email) Password: admin1234 (invalid password)	Show 'Incorrect password' message	Same as expected result
4	Attempt to login without entering a username and password.	Username: Blank Password: Blank	Show 'Email is required and Password is required' message	Same as expected result

Table 6.2.1.2 Test Scenario: Check Staff User Access Functionality

No	Test Case	Value	Expected Result	Actual Result
1	Add a new staff user with valid data	Email: lee@gmail.com (valid email) Password: lee123 (valid password) Role: Manager	New staff user is added successfully and appears in the staff list	Same as expected result
2	Add a new staff user with missing data	Email: Blank Password: lee123 Role: Manager	Show 'Username field is required' message	Same as expected result
3	Edit staff user with valid data	Email: lee@gmail.com (existing user) Edit Role: Staff	Staff user role is updated successfully	Same as expected result
4	Edit staff user with invalid data	Email: lee@gmail.com (existing user) Edit Role: Blank	Show 'Role field is required' message	Same as expected result
5	Delete an existing staff user	Email: lee@gmail.com (existing user)	Staff user is deleted successfully and no longer	Same as expected result

			appears in the staff list	

Table 6.2.1.3 Test Scenario: Check Menu and Pricing Functionality

No	Test Case	Value	Expected Result	Actual Result
1	Add a new menu item with valid data	Item Name: Cappuccino Price: RM7.50 Category: Drinks	New menu item is added successfully and appears in the menu list	Same as expected result
2	Add a new menu item with missing data	Item Name: Blank Price: RM7.50 Category: Drinks	Show 'Item name is required' message	Same as expected result
3	Edit menu item with valid data	Item Name: Cappuccino Update Price: RM8.00	Menu item is updated successfully	Same as expected result
4	Edit menu item with invalid data	Item Name: Cappuccino Update Price: Blank	Show 'Price field is required' message	Same as expected result
5	Delete an existing menu item	Item Name: Cappuccino (existing item)	Menu item is deleted successfully and no longer appears in the menu list.	Same as expected result

Table 6.2.1.4 Test Scenario: Check Order and Payment Functionality

No	Test Case	Value	Expected Result	Actual Result
1	Place a new order with valid data	Order Item: Cappuccino Quantity: 2 Total Price: RM15.00	Order is placed successfully and appears in the order list	Same as expected result
2	Place a new order with missing data	Order Item: Blank Quantity: 2 Total Price: RM15.00	Show 'Please select an item is the list' message	Same as expected result
3	Edit an order with valid data	Order Item: Cappuccino Update Quantity: 3 Update Price: RM22.50	Order is updated successfully and reflects the new quantity and price	Same as expected result
4	Edit an order with invalid data	Order Item: Cappuccino Update Quantity: Blank	Show 'Quantity field is required' message	Same as expected result
5	Delete an existing order	Order Item: Cappuccino (existing item)	Order is deleted successfully and	Same as expected result

			no longer appears in the order list.	
6	Complete a payment with valid details	Order Item: Cappuccino Payment Method: Cash Amount: RM15.00	Payment is completed successfully and the receipt is generated.	Same as expected result
7	Show the QR Payment Code	Image: Touch n' Go QR Code (Sample)	A pop-out window will show the code image.	Same as expected result

Table 6.2.1.5 Test Scenario: Check Table Reservation Functionality

No	Test Case	Value	Expected Result	Actual Result
1	Add a new table with valid data	Table Number: K5 Seat Capacity Store: Klang	New table is added successfully and appears in the table list	Same as expected result
2	Add a new table with missing data	Table Number: K5 Seat Capacity Store: Blank	Show 'Store is required' message	Same as expected result
3	Book a table with valid data	Customer Name: Jerry Phone Number: 0123456789 Table Number: K5 Date and Time: 10/9/2024 7.00pm	Table is booked successfully and the reservation appears in the reservation list	Same as expected result
4	Book a table with missing data	Customer Name: Jerry Phone Number: Blank Table Number: K5 Date and Time: 10/9/2024 7.00pm	Show 'Phone number field is required' message	Same as expected result
5	Delete an existing table reservation	Reservation: Jerry (existing reservation)	Reservation is deleted successfully and no longer appears in the list	Same as expected result

Table 6.2.1.6 Test Scenario: Check Sales Reporting Functionality

No	Test Case	Value	Expected Result	Actual Result
1	View Monthly Sales Report	Year: 2024 Month: August	Monthly sales chart and table is generated and appears in the page	Same as expected result

2	View Daily Sales Report	Year: 2024 Month: August	Daily sales chart and table is generated and appears in the page	Same as expected result
3	View Store Sales Report	Year: 2024 Month: August Store: Penang	Store sales chart and table is generated and appears in the page	Same as expected result
4	Sort Store Sales Report with different store	Year: 2024 Month: August Store: Ipoh (Example)	Sales chart and table of Ipoh store is generated and appears in the page	Same as expected result
5	Sort Monthly and Daily Sales Report with year	Year: 2023 Month: July	Monthly and daily sales chart and table is generated and appears in the page	Same as expected result

6.3 Project Challenges

Developing a Café Management System involves overcoming several critical challenges to ensure its successful deployment and functionality. One of the key challenges is creating an intuitive and user-friendly interface tailored for staff members. The interface must accommodate varying technical skill levels, offering streamlined navigation, responsive layouts, and features like real-time order tracking and easy menu management to improve staff efficiency and enhance overall operational workflow.

Another challenge is data management and storage. As the café expands and operations grow, it becomes critical to handle increasing amounts of data related to orders, staff, products, and sales records. Implementing a scalable database solution, such as cloud-based storage or using local storage solutions like phpMyAdmin, will help reduce reliance on constant network transfers, improve data retrieval speeds, and minimize operational costs. Ensuring smooth synchronization between local and cloud storage is also vital to avoid data loss or discrepancies.

Maintaining robust security is another significant challenge, especially when managing sensitive information such as staff info and financial transactions. Strict user authentication, role-based access control, and regular security audits are necessary to safeguard the system from unauthorized access and data breaches.

As the café expands and the system scales, it must efficiently handle an increasing number of transactions, staff, and data without compromising performance. To address this, the system's architecture should incorporate techniques such as cloud-based infrastructure, load balancing, and caching to maintain peak performance during high usage. The system should be able to accommodate a growing number of orders and sales records, ensuring seamless operations as the business grows.

In conclusion, the success of a Café Management System depends on overcoming these challenges through strategic planning, advanced technical solutions, and continuous monitoring and adaptation. Addressing these issues comprehensively will ensure that the platform is not only functional and user-friendly, but also secure and scalable, leading to a nice user experience and sustainable market success.

6.4 Objective Evaluation

To manage user access, ensure only authorized personnel can access the system.

- The login system provides role-based access controls that ensure only authorized staff can login and use the system. The addition of features like password encryption and auto-login for frequent users further enhanced both security and convenience.

To enable the efficient management of the café's menu, ensuring that offerings are up-to-date and accurate.

- The menu pricing module has been effectively developed, allowing administrators or managers to easily add, edit, or remove menu items in real-time. This ensures that the café's offerings are always current, with the ability to update prices and descriptions promptly.

To facilitate the management of staff users, ensuring appropriate access and control over user roles within the system.

- The staff user access module was successfully implemented, providing administrators with the ability to assign and manage user roles. Role-based access control improves operational control and security by ensuring that staff users can only access the functions associated with their specific role.

To streamline the order and payment process to enhance customer service and improve operational efficiency.

- The order and payment module has been fully integrated, allowing for efficient order placement, real-time tracking, and support for multiple payment methods. This has streamlined the workflow for staff and improved the overall speed and accuracy of order processing.

To provide real-time insights into key business metrics, helping managers make informed decisions.

- The dashboard module successfully provides real-time insights into critical business metrics such as menu item count, sales performance, staff user count, and total revenue. This enables managers to make data-driven decisions that enhance operational efficiency and profitability.

To monitor and analyze revenue, helping to optimize business performance and profitability.

- The sales reporting system has provided real-time tracking of revenue across different periods and branches. The system enables managers to identify trends and analyze performance metrics. This data-driven approach has led to better decision-making, allowing for better financial planning and the optimization of profitability. The system's ability to segment sales by time or location ensures a detailed understanding of revenue streams, helping to fine-tune business strategies.

6.5 Concluding Remark

In conclusion, the development and evaluation of the Café Management System BeanTrack has shown promising results in various test scenarios and user feedback. The successful implementation of user-centric features such as the dashboard module, order and payment module, sales reporting module has significantly improved the overall user experience. The positive feedback from user testing confirms the usability and effectiveness of the application, while also highlighting areas for potential improvement to meet evolving user needs. As we move forward, it will be important to address these areas, continually refining the application and ensuring it remains scalable, secure and user friendly. Commitment to overcoming these

challenges will be crucial to the continued success of the system and its ability to provide a seamless and management experience for café staff.

Chapter 7
Conclusion and Recommendation

7.1 Conclusion

In summary, our development efforts have led to significant improvements in operational efficiency and customer experience through the creation of a highly intuitive and user-centric Café Management System. We have effectively implemented a staff user access module that ensures secure access for staff with features such as account creation, login, password recovery, and user profile management. Of particular note is auto-login feature, which recognizes users on the same device, eliminating the need for repeated login and enhancing staff convenience. Additionally, our system includes role-based access permission, ensuring that staff users can only access the functions associated with their role, resulting in improved both security and usability.

The order and payment module has been significantly enhancing the streamlining the ordering process. It supports advanced features such as real-time order tracking, enabling staff to place and manage customer orders efficiently. The system integrates with multiple payment methods, including e-wallet and cash, providing flexibility and security for managing customer transactions. Additionally, the system also can generate a receipt to allow staff to quickly generate and print the receipts, improving service speed and accuracy.

The development of menu management module allows for add, remove, and modify the menu items by staff or managers. This includes the ability to update prices and descriptions in real-time, ensuring that the café's offerings are always up to date. The dashboard module provides staff and managers with a comprehensive overview of the café's performance. It displays key metrics such as the total staff users, total sales, total paid orders, helping the team make data-driven decisions. The sales tracking module allows management to monitor revenue across daily, monthly, or different branch stores, analyze trends that assist with decision making.

These enhancements not only enhance the system's functionality and usability, but also ensure that it remains flexible and responsive to the changing needs of staff and administrators. Our ongoing commitment to refining these features and introducing new innovations will continue to position our platform as a leader in the café industry, providing an unrivalled user experience and operational excellence.

7.2 Recommendation

Based on proactive analysis and industry trends, several key enhancements are recommended to improve the Café Management System and address evolving market demands. These enhancements are designed to streamline operations, improve customer experiences, and ensure long-term business success.

A significant focus is placed on providing more diverse payment methods. By integrating digital wallets such as Apple Pay, Grab Pay, and credit card payments. The café can offer customers greater flexibility and convenience when completing transactions. This would broaden accessibility and enhance the overall customer experience by catering to a wider range of payment preferences.

In addition, the implementation of inventory and stock management system will enable real-time tracking of stock levels, automating the process of restocking and reducing the risk of over-ordering ingredients. This feature is essential for optimizing operational efficiency, reducing waste, and ensuring the café runs smoothly without inventory shortages during peak hours. Staff payroll management is another important enhancement that would streamline HR operations. Automating payroll calculations based on employee work hours, tips, and overtime would save time for management and reduce the likelihood of errors. This feature would also provide transparency for employees, allowing them to view their work schedules and pay details easily.

A customer user interface for mobile or web platforms could also be developed to enhance the customer experience. This feature would allow customers to easily view the menu, place orders, and make reservations remotely. An intuitive and user-friendly design would improve engagement and offer greater convenience, encouraging customers to order more frequently. Further enhancements could include the development of a personalized menu recommendation system that uses machine learning algorithms to analyze customer preferences and order history, offering tailored menu suggestions. This would increase customer engagement and drive higher sales by encouraging customers to explore new menu items they are likely to enjoy.

These strategic enhancements will ensure that the Café Management System remains competitive by streamlining internal processes and delivering improved customer service. By proactively adopting advanced features such as inventory management system, customer-facing interface, more payment methods, and staff payroll automation, the café will stay ahead

of market trends, improve operational efficiency, and enhance both staff and customer satisfaction.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 2**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review

2. WORK TO BE DONE

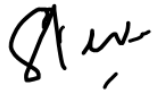
- **Coding**
- **Implementation**
- **Evaluation**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **Good**



Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 4**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review

2. WORK TO BE DONE

- **Coding**
- **Implementation**
- **Evaluation**
- **Full Report**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **Good**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 6**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review
- Coding

2. WORK TO BE DONE

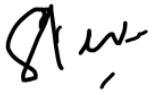
- **Implementation**
- **Evaluation**
- **Full Report**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **Good**



Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 8**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review
- Coding
- Implementation
- Evaluation

2. WORK TO BE DONE

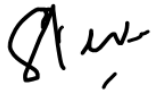
- **Evaluation**
- **Full report**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **Good**



Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 10**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review
- Coding
- Implementation
- Evaluation

2. WORK TO BE DONE

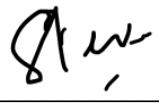
- **Full report**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **So far so good**



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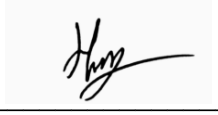


Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 11**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review
- Coding
- Implementation
- Evaluation
- Full Report

2. WORK TO BE DONE

- **Presentation**

3. PROBLEMS ENCOUNTERED

- **No**

4. SELF EVALUATION OF THE PROGRESS

- **Good**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T3, Y3	**Study week no.: 12**
Student Name & ID: Loh Zhan Hong, 2001930	
Supervisor: Ts Phan Koo Yuen	
Project Title: Design and Development of Café Management System	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Problem statement, objectives
- Scope
- Literature review
- Coding
- Implementation
- Evaluation

2. WORK TO BE DONE

- **Presentation**

3. PROBLEMS ENCOUNTERED

- **No**

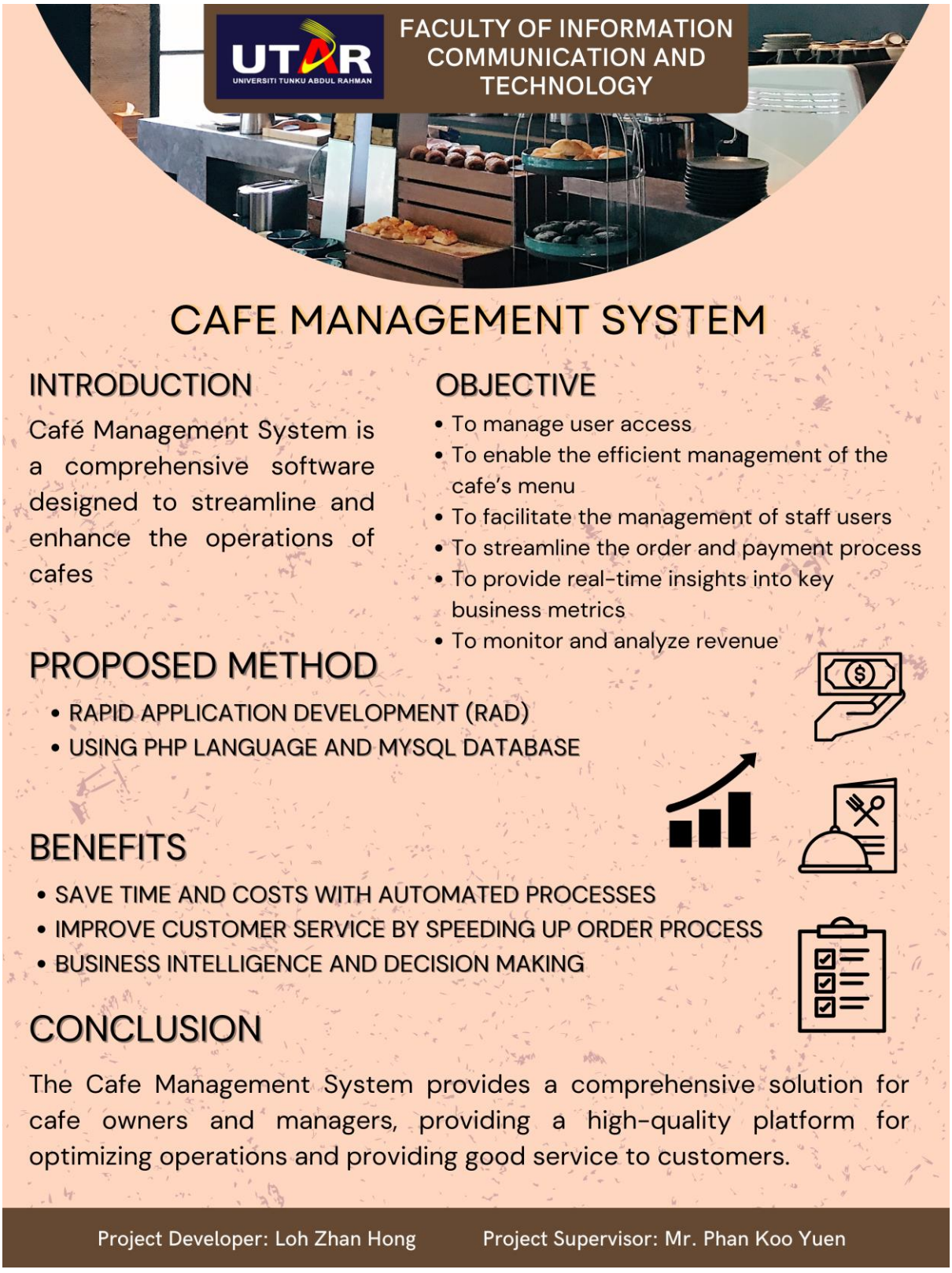
4. SELF EVALUATION OF THE PROGRESS

- **Good**

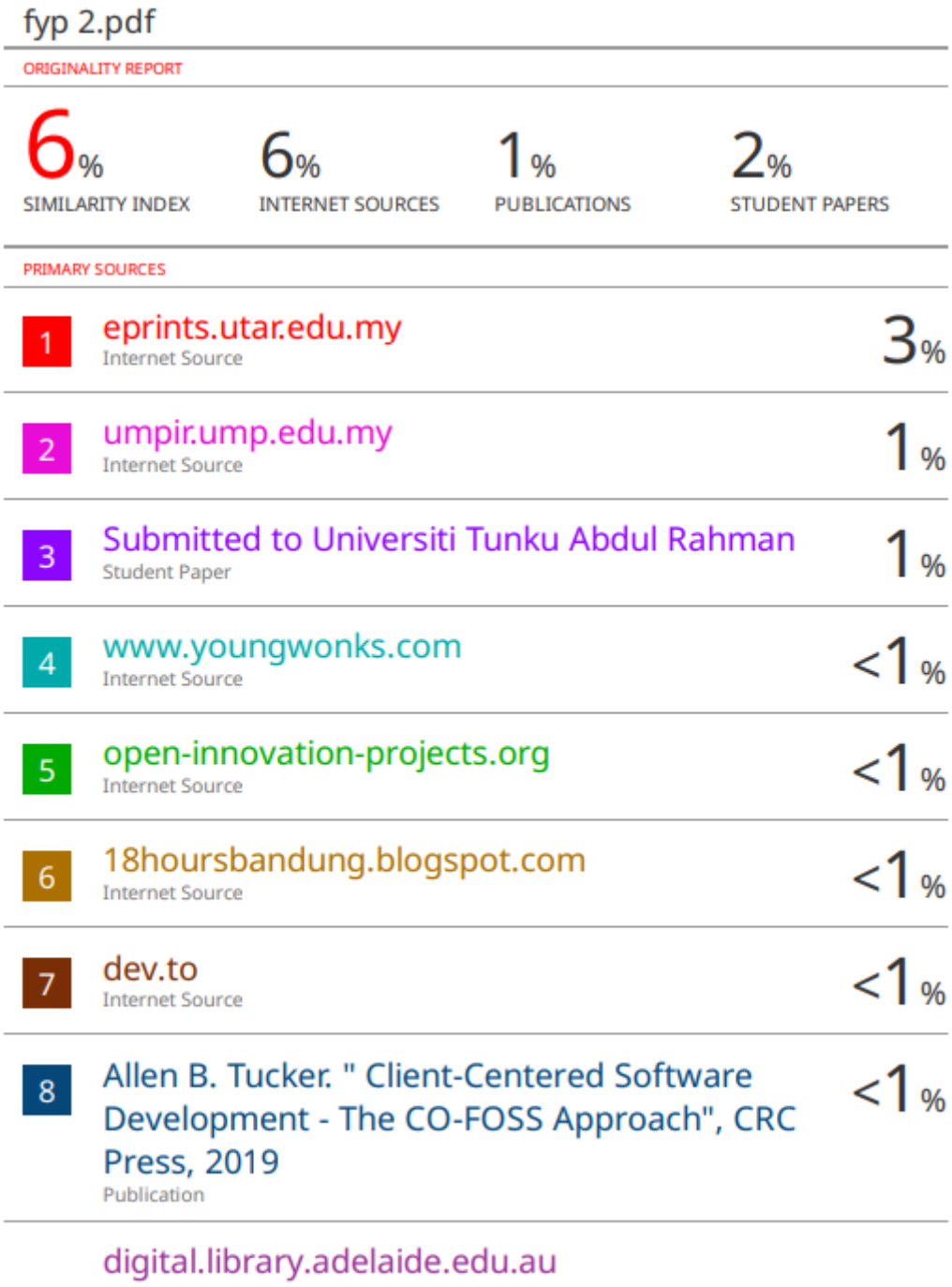
Supervisor's signature

Student's signature

POSTER


UTAR
UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF INFORMATION COMMUNICATION AND TECHNOLOGY
CAFE MANAGEMENT SYSTEM
INTRODUCTION
Café Management System is a comprehensive software designed to streamline and enhance the operations of cafes
OBJECTIVE
• To manage user access
• To enable the efficient management of the cafe's menu
• To facilitate the management of staff users
• To streamline the order and payment process
• To provide real-time insights into key business metrics
• To monitor and analyze revenue
PROPOSED METHOD
• RAPID APPLICATION DEVELOPMENT (RAD)
• USING PHP LANGUAGE AND MYSQL DATABASE
BENEFITS
• SAVE TIME AND COSTS WITH AUTOMATED PROCESSES
• IMPROVE CUSTOMER SERVICE BY SPEEDING UP ORDER PROCESS
• BUSINESS INTELLIGENCE AND DECISION MAKING
CONCLUSION
The Cafe Management System provides a comprehensive solution for cafe owners and managers, providing a high-quality platform for optimizing operations and providing good service to customers.
Project Developer: Loh Zhan Hong
Project Supervisor: Mr. Phan Koo Yuen

PLAGIARISM CHECK RESULT



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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s) of Candidate(s)	Loh Zhan Hong
ID Number(s)	20ACB01930
Programme / Course	IB
Title of Final Year Project	Design and Development of Café Management System

Similarity	**Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)**
Overall similarity index: 6 % **Similarity by source** Internet Sources: 6 % Publications: 1 % Student Papers: 2 %	
Number of individual sources listed of more than 3% similarity: 0	

Parameters of originality required and limits approved by UTAR are as Follows:

(i) Overall similarity index is 20% and below, and

(ii) Matching of individual sources listed must be less than 3% each, and

(iii) Matching texts in continuous block must not exceed 8 words

Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Name: Phan Koo Yuen

Date: 12/9/2024

Signature of Co-Supervisor

Name: _____

Date: _____

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY
(KAMPAR CAMPUS)

CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	20ACB01930
Student Name	Loh Zhan Hong
Supervisor Name	Dr. Phan Koo Yuen

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√	Signed Report Status Declaration Form
√	Signed FYP Thesis Submission Form
√	Signed form of the Declaration of Originality
√	Acknowledgement
√	Abstract
√	Table of Contents
√	List of Figures (if applicable)
√	List of Tables (if applicable)
√	List of Symbols (if applicable)
√	List of Abbreviations (if applicable)
√	Chapters / Content
√	Bibliography (or References)
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√	Appendices (if applicable)
√	Weekly Log
√	Poster
√	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)
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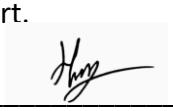

_____

(Signature of Student)
Date: 11/9/2024