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Title

Digital Invoicing and Business Management System

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Abstract

This report presents the development and implementation of a digital invoicing system aimed at transforming traditional invoicing processes for local mid-sized family businesses. The primary goal was to enhance efficiency and accuracy in handling invoicing activities, supervising financial flows, and managing various business factors. The project focused on designing robust databases to manage products, clients, orders, and invoices, creating an intuitive invoice generator, and integrating functionalities to send invoices via email and download them in preferred formats. Additionally, a payment simulation prototype was developed to facilitate secure transactions, and analytics representation graphs were produced to provide valuable business insights.

Using a technology stack that includes HTML, CSS, JavaScript, PHP, Laravel, ReactJS, and MySQL, the project employed Agile methodology to ensure iterative development and continuous improvement. Key milestones included project setup, database design, backend API completion, function testing, webpage development, and final application testing. Despite challenges such as data privacy concerns, security issues, and handling diverse data types, the project successfully delivered a functional web application tailored for businesses like convenience stores, fabric stores, electric appliance stores, and construction supply stores.

This report delves into the theoretical background, system design, development processes, and the final outcomes of the project. It also discusses the potential for further development and provides a self-evaluation of the project. The comprehensive digital invoicing system developed in this project stands as a testament to the potential of digital transformation in enhancing business operations and offers a scalable solution for similar enterprises.

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Chapter I: Introduction

1.1. Background

In the modern business environment, digital transformation is no longer a luxury but a necessity. The adoption of digital technologies to streamline business processes can significantly enhance efficiency, reduce errors, and improve overall productivity. Among these processes, invoicing stands out as a critical operation for any business, directly impacting cash flow management, customer satisfaction, and operational efficiency. However, many local mid-sized family businesses continue to rely on traditional, manual invoicing methods. This reliance on paper-based or rudimentary digital systems poses several challenges, including inefficiency, susceptibility to human error, and difficulty in managing and analyzing financial data.

Local mid-sized family businesses, such as convenience stores, fabric stores, electric appliance stores, and construction supply stores, often operate in a fast-paced environment where generating and managing hundreds of invoices daily is commonplace. Despite their significant daily sales volumes, these businesses frequently lack the resources to develop or invest in comprehensive e-commerce platforms, which have become very popular in today's market. Unlike larger enterprises, these mid-sized businesses are not big enough to justify the cost and complexity of their own e-commerce websites. Consequently, their invoicing processes are often cumbersome and time-consuming, leading to potential delays in payments and reduced operational efficiency.

The inefficiencies of traditional invoicing methods are manifold. Manual data entry increases the occurrence of errors, such as incorrect pricing or quantities, which can result in customer dissatisfaction and potential financial losses. Additionally, the physical storage of paper invoices can lead to space constraints and difficulties in retrieving historical data for analysis or auditing purposes. In the event of disputes, the absence of a centralized, easily accessible invoicing system can further complicate resolution processes.

Recognizing these challenges, the digitalization of the invoicing process emerges as a compelling solution. By transitioning to a digital invoicing system, businesses can automate the creation, distribution, and storage of invoices, thereby reducing the manual effort required and minimizing errors. Digital invoicing systems also facilitate better financial management through real-time tracking of invoices and payments, improved data accuracy, and enhanced ability to analyze financial trends.

Furthermore, a digital invoicing system can integrate additional functionalities such as automatic alert mailing for overdue payments, customizable invoice templates, and the capability to send invoices via email in various formats. These features not only improve efficiency but also enhance the professionalism and customer service of the business. The integration of analytics representation graphs can provide valuable insights into sales patterns, customer behaviour, and financial performance, enabling businesses to make informed strategic decisions.

In the context of local mid-sized family businesses, the implementation of a digital invoicing system tailored to their specific needs can bridge the gap between traditional methods and modern technological solutions. It offers a scalable, cost-effective alternative to fully-fledged e-commerce platforms while delivering substantial benefits in terms of efficiency and accuracy. This project aims to develop such a system, addressing the unique requirements and constraints of these businesses while contributing to their sustainable growth and competitive advantage in an increasingly digital marketplace.

In summary, transition from traditional to digital invoicing is not just a technological advancement for local mid-sized family businesses but also a critical requirement for their ongoing evolution. By leveraging digital solutions, these businesses can overcome the inherent limitations of manual invoicing, streamline their operations, and position themselves for future growth and success.

1.2. Problems with Traditional Invoicing

Traditional invoicing methods pose several challenges for local mid-sized family businesses, hindering operational efficiency and impeding financial management:

Manual Errors: Manual data entry increases the likelihood of errors in invoicing processes. Employees may inadvertently input incorrect product details, quantities, or prices, leading to billing discrepancies and customer dissatisfaction.

Time Consuming: Traditional invoicing processes are inherently time-consuming, requiring manual generation, printing, and distribution of paper invoices. Additionally, manual data entry prolongs the invoicing cycle, diverting resources from other essential business activities.

Hight Costs: The manual handling of paper invoices incurs significant costs, including printing, postage, and storage expenses. These costs can accumulate over time, particularly for businesses generating hundreds of invoices daily.

Delayed Delivery: Paper-based invoicing methods often result in delayed invoice delivery and payment processing. Postal mail or fax communication channels are slower compared to electronic methods, leading to delays in payment collection and cash flow management.

Security Concerns: Traditional invoicing systems are susceptible to security breaches and unauthorized access. Paper invoices may be lost, stolen, or tampered with, compromising sensitive financial information and exposing businesses to fraud risks.

Limited Analytics: Traditional invoicing systems lack robust reporting and analytics capabilities, limiting businesses' ability to gain insights into sales trends, customer behaviour, and financial performance. Without access to comprehensive data analysis, businesses may miss opportunities for strategic decision-making and process optimization.

Environmental Impacts: The reliance on paper-based invoicing contributes to environmental degradation through deforestation, energy consumption, and waste generation. Printing and mailing paper invoices consume natural resources and contribute to carbon emissions, exacerbating the ecological footprint of businesses.

Addressing these challenges requires a transition to digital invoicing solutions tailored to the specific needs of local mid-sized family businesses. By adopting digital platforms, businesses can streamline their invoicing processes, reduce errors, improve efficiency, enhance security, and minimize environmental impact, ultimately driving sustainable growth and competitiveness in the digital age.

1.3. Aim and Objectives

Aim

The aim of this project is to digitalize the traditional invoicing process for local mid-sized family businesses, addressing the inherent inefficiencies and challenges associated with manual invoicing methods. By leveraging digital technologies, the project seeks to enhance operational efficiency, improve accuracy, and facilitate better invoicing for these businesses.

Objectives

Design Robust Databases: Develop a comprehensive database system capable of handling products, clients, orders, and invoices efficiently. Design database schemas that ensure data integrity, scalability, and ease of management.

- **Develop an Invoice Generator Page:** Create an intuitive and user-friendly interface for generating invoices. Implement features for customizing invoice templates, adding products and quantities, and calculating totals accurately.
- **Implement Functions for Sending Invoices via Mail:** Integrate functionality to send invoices via email directly from the application. Ensure compatibility with various email service providers and formats to accommodate diverse business needs.
- **Enable Downloading Invoices in Desired Formats:** Implement features to allow users to download invoices in preferred formats, such as PDF or JPEG. Ensure compatibility with common document viewers and maintain data integrity during the download process.
- **Build a Payment Simulation Prototype:** Develop a prototype for simulating payment transactions within the invoicing system. Implement secure payment

links and test functionality to ensure seamless integration with the invoicing process.

- **Produce Analytics Representation Graphs:** Implement analytics features to provide users with valuable insights into sales trends, customer behaviour, and financial performance. Generate graphical representations of data to facilitate easy interpretation and decision-making.

These objectives collectively digitalize the whole invoicing process. By achieving these objectives, the project will surely deliver a comprehensive invoicing solution tailored to the specific needs and constraints of its target audience.

Chapter II: Theoretical Background

Assessing the theoretical foundation is essential for the effective development and execution of any software system. The underlying theories and concepts that guided through the development of the digital invoicing system are explained in detail in this chapter. By exploring UI/UX principles, data modelling, email communication protocols, graphical representation theories, and the concept of invoicing for business, we can ensure sure that the system is not only functional but also dependable, user-friendly, and efficient. These theoretical understandings offer a framework for deciding on informed design decisions, maximizing user experience, safeguarding data integrity, and encouraging efficient communication. Building a solid system that satisfies user requirements and aligns with industry standards and best practices can be simplified by constructing our project on these well-established theories and principles.

2.1. UI/UX Principles

Designing effective and user-friendly systems requires a firm grasp of the fundamentals of user interface (UI) and user experience (UX). These recommendations put an emphasis on meeting user requirements while also making the system accessible and user-friendly. Maintaining consistency, seeking feedback, simplifying the design, ensuring accessibility, giving users control, and creating a clear visual hierarchy are all crucial characteristics.

Consistency: The crucial idea of consistency comes from cognitive psychology, which holds that users create mental models of systems based on their experiences with them. Users can anticipate how the interface will behave and have less cognitive pressure when design elements such as buttons, colours, and font are consistent across the design. Users can move from one area of the system to another without having to refocus their eyes on the interfaces if the visual and functional consistency is maintained. When trying to minimize errors and boost task performance efficiency, this is particularly important.

Feedback: Feedback is rooted in the principles of operant conditioning and human-computer interaction (HCI). It ensures that users receive immediate and clear responses to their actions, which reinforces learning and behavior modification. Feedback mechanisms such as visual indicators (e.g., progress bars, success or error messages) and auditory signals provide real-time information on the system's status. This immediate response is crucial for helping users understand the outcomes of their actions, which in turn improves system usability and user satisfaction.

Simplicity: The concept behind simplicity is the principle of Occam's Razor, which states that simpler solutions have a higher probability of being accurate than more complicated ones. In terms of UI/UX design, this means minimizing unnecessary complexity and designing user interfaces that are simple enough to navigate and understand easily. By displaying only essential elements, a minimalist design approach prevents information overload and improves usability. It is especially beneficial to reduce the cognitive load on novice users and enhance the overall user experience by making the interface simpler so that users can concentrate on important tasks.

Accessibility: The Social Model of Disability and universal design principles provide the foundation for accessibility, which promotes the development of products that are useable by all individuals, regardless of their ability. It aligns with regulations like the Web Content Accessibility Guidelines (WCAG) and legal frameworks like the Americans with Disabilities Act (ADA). Designing for accessibility involves ensuring that all users, including those with disabilities, can use the system effectively. This entails offering text alternatives for non-textual content, guaranteeing adequate contrast between colors, allowing keyboard navigation, and supporting screen readers. These methods increase the number of possible users while also adhering to accessibility guidelines.

User Control: User control is informed by the principle of locus of control from psychology, which indicates that users prefer systems where they feel in command of their interactions. This principle enhances user satisfaction and trust in the system. Allowing users to control their interactions with the system, including easy navigation and undo options, improves the user experience. Features such as a well-

structured menu, breadcrumbs, and call-to-action buttons facilitate clear navigation, while undo options enable users to correct mistakes without frustration, enhancing overall user autonomy.

Visual Hierarchy: Visual hierarchy is grounded in Gestalt principles of perception, which state that users perceive elements in a visual composition according to their arrangement, size, colour, and contrast. This helps in organizing information in a way that guides users' attention effectively. Organizing elements to guide users' attention to important areas of the interface improves usability and efficiency. Techniques such as size differentiation, colour contrast, and strategic positioning highlight primary actions and key information, helping users to navigate and complete tasks more efficiently.

2.2. System Development Life Cycle

The System Development Life Cycle (SDLC) is an organized strategy used in the development of software systems. It is divided into several phases, each with unique tasks and deliverables, to ensure that the final product satisfies user requirements and is delivered on time and within budget. A solid grasp of SDLC models is necessary to reduce risks, guarantee systematic progress, and select the optimum approach for a given project. Important SDLC models are listed below along with their brief explanation:

Waterfall Model: A sequential, linear process in which each stage must be finished before moving on to the next, and no iteration is allowed in the process.

Requirements analysis, system design, implementation, integration and testing, deployment, and maintenance are the typical phases in this approach.

Prototyping Model: In order to obtain user feedback and fine-tune requirements, a prototype or early approximation of the final system is created in this approach.

Agile Methodology: Agile is a gradual, iterative process that encourages adaptability, teamwork, and feedback from clients by dividing the project into small stages.

Rapid Application Development (RAD): RAD prioritizes iterative prototype

development over meticulous planning and testing. Iterative improvements and user feedback are involved in this approach.

Chosen Methodology

Agile methodology was chosen for this project due to its adaptive and iterative nature, which is particularly well-suited for the dynamic requirements of developing a digital invoicing system for local mid-sized family businesses. Agile is built on the principle of iterative development, which divides the project into small, manageable units known as sprints. Each sprint typically lasts weeks and encompasses phases of planning, execution, testing, and review. This structure facilitates continuous assessment and refinement of the project outputs, ensuring alignment with user expectations and business needs. For this project, iterative development means regularly revisiting and improving features such as invoice generation, payment simulations, and analytics tools based on user feedback. Unlike traditional waterfall methodologies, which follow a linear path, Agile allows for adjustments throughout the development process. This flexibility is crucial for accommodating the diverse requirements of different business types, such as convenience stores, fabric stores, and construction supply stores. It is vital to ensure that the developers fully understand the needs of the business owners and employees who will be using the system. Agile fosters an environment of continuous communication between the development team and business owners through regular meetings. It also focuses on minimizing risks through early and frequent delivery of functional components. By delivering parts of the project in increments, any issues can be identified and addressed early in the development cycle, reducing the risk of major problems at later stages. Hence, Agile's adaptive approach ensures that the project remains aligned with its objectives, even as requirements evolve, making it the ideal methodology for this digitalization initiative.

2.3. Email Communication Protocol

Email protocols are rules that control how clients and servers exchange emails. The primary email protocols are SMTP for sending emails, and POP3 (Post Office Protocol version 3) and IMAP (Internet Message Access Protocol) for retrieving emails. Together, these protocols ensure efficient communication in digital environments by facilitating the smooth delivery and retrieval of electronic messages.

SMTP (Simple Mail Transfer Protocol)

Email communication protocols are essential for the reliable transmission of electronic messages over the internet. Among these protocols, SMTP (Simple Mail Transfer Protocol) stands out as the standard for sending emails. It is widely adopted due to its robustness and efficiency, ensuring that messages are delivered securely and accurately. Many renowned organizations, such as Google, Microsoft, Yahoo, Apple, and Amazon, utilize SMTP till these days.

How SMTP works

Both client-side and server-side processes are involved in sending an email via SMTP.

Client-Side: The email client (or application) connects to the SMTP server using a predetermined protocol. The client sends the email, along with the recipient's address, body, and subject, to the SMTP server.

Server-Side: The email is processed by the SMTP server, which then uses the Domain Name System (DNS) to find the email server of the recipient before forwarding it to the destination server. The SMTP server queues the email and tries delivery until it is successful if the recipient's server is temporarily unavailable.

Why SMTP is Used

SMTP is utilized for sending emails reliably in this project due to several key reasons:

Widely Accepted Standard: SMTP is a universally accepted protocol for email transmission, ensuring compatibility across different email systems and providers.

Reliability: SMTP supports mechanisms that enhance the reliability of email delivery, making it a trusted choice for critical communications.

Authentication: SMTP supports authentication methods, such as app passwords, which enhance the security of email transmissions and prevent unauthorized access.

Efficiency: SMTP efficiently handles the routing and delivery of emails, ensuring that messages reach their intended recipients promptly.

Reliable Delivery

SMTP ensures reliable email delivery through several mechanisms:

Queueing: The SMTP server queues an email and tries to send it again at regular intervals until delivery is accomplished if the recipient's server is momentarily unavailable. Emails are queued up and eventually delivered when the recipient's server becomes available thanks to this mechanism.

Error Handling: To assist in identifying and eliminating of delivery issues, SMTP provides comprehensive error messages. These error messages highlight problems such as invalid recipient addresses or unavailable servers, facilitating rapid troubleshooting.

Authentication: SMTP supports authentication methods like app passwords to ensure secure email transmission. Authentication prevents unwanted access and ensures that only authorized users can send emails from the server.

2.4. Invoicing Concept for Business

The creation, administration, and delivery of bills for goods or services depend on invoicing. Invoicing is the fundamental aspect of business operations. A well-structured invoicing system ensures smooth financial transactions, legal compliance, and efficient business processes. Understanding the key concepts of invoicing is crucial for implementing an effective digital invoicing system. These concepts include the components of an invoice, legal requirements, payment terms, automated invoicing, and financial tracking.

Invoice Components

A comprehensive record of a transaction between a seller and a buyer is called an invoice. To guarantee clarity and accuracy, it usually consists of multiple necessary elements. The seller's details are shown clearly, including the name of the business, address, and phone number. In the same way, the buyer's details are also provided in order to identify the person receiving the goods or services. There is a detailed list of all the products or services provided including their quantities, unit costs, and total costs. To guarantee adherence to tax laws, the taxes that apply to the transaction are also specified. The entire amount owed is computed, taking account of all expenses, including taxes. To enable on-time payments, the terms of payment are spelled out in detail, including deadlines and accepted methods of payment.

Legal Requirements

Invoices must adhere to specific legal requirements that can vary significantly by jurisdiction. These specifications are meant to guarantee legal compliance and transparency in commercial dealings. The invoice date, a distinct invoice number, and thorough descriptions of the products or services rendered are usually required fields. To comply with local tax laws, tax information, such as applicable tax rates and amounts, must also be included. To avoid fines and guarantee the legitimacy of the invoices for tax and legal purposes, it is imperative that they adhere to these legal requirements. Although tax calculation is not incorporated in the current version of the project, critical aspects have been pre-considered with the intention of prioritizing this functionality in future development phases.

Financial Tracking

Invoices play a crucial role in financial tracking, serving as vital records for accounting, auditing, and financial analysis. Each invoice provides a documented record of a transaction, which is essential for tracking revenue, expenses, and cash flow. Accurate invoicing records enable businesses to maintain precise financial statements, which are necessary for making informed business decisions. During audits, invoices serve as evidence of transactions, ensuring transparency and compliance with financial regulations. Additionally, detailed invoice records facilitate financial analysis, allowing businesses to identify trends, evaluate performance, and plan for future growth. By maintaining meticulous invoicing records, businesses can ensure financial accuracy and integrity.

To be summarized, a thorough understanding of the invoicing concept is essential for implementing an effective digital invoicing system. By focusing on the critical components of an invoice, adhering to legal requirements, clearly defining payment terms, leveraging automated invoicing, and ensuring robust financial tracking, businesses can enhance their invoicing processes and overall operational efficiency.

Chapter III: Project Overview and Methodology

3.1. Project Overview

Brief Overview of the Project

The digitalization of traditional invoicing processes represents a crucial improvement for local mid-sized family businesses. These businesses, while not large enough to justify their own e-commerce platforms, generate a significant number of invoices daily. This project aims to develop an extensive web application to handle invoicing tasks, monitor financial transactions, and manage business operations efficiently.

Utilizing modern web technologies and frameworks, this solution targets convenience stores, fabric stores, electric appliance stores, and construction supply stores, providing tailored functionalities to enhance their operations. The project includes database design, invoice generation, email integration, payment simulation, and analytical tools, all aimed at streamlining business processes.

Scope of the Project

The project's scope includes several key components essential for modernizing invoicing operations. The first component is designing robust databases to manage products, clients, orders, and invoices effectively. This ensures data reliability and accessibility, which are crucial for smooth business operations. The second component is the development of an invoice generator, which allows users to create, customize, and manage invoices seamlessly. This feature supports various formats for downloading invoices, such as PDF and JPEG, and includes functionality for sending invoices via email.

Additionally, the project involves creating a payment simulation prototype to facilitate the testing and validation of payment processes. This prototype will provide realistic scenarios to help businesses optimize their financial workflows. Another critical component is the development of analytics representation tools, offering businesses

valuable insights into their financial performance and enabling data-driven decision-making.

The application will integrate with SMTP email protocol to ensure secure and reliable email communications. The technology stack includes HTML, CSS, JavaScript, PHP (backend), Laravel 9.52.16, ReactJS, React Bootstrap, and MySQL. Development tools will include Visual Studio Code, MySQL Workbench, Postman, and browsers such as Firefox and Google Chrome for testing and deployment.

Limitations and Challenges

While the project aims to significantly improve the invoicing process, it is important to acknowledge its limitations and potential challenges. One primary limitation is the dependence on stable internet connectivity, as the web application will be hosted online. This could be a challenge for businesses in areas with unreliable internet access.

Another challenge is the potential resistance to change from business owners and employees who are used to traditional methods. To address this, the project will focus on creating user-friendly interfaces and providing comprehensive training materials to facilitate the transition to the new system.

Besides, ensuring data privacy and security are crucial. The system must protect sensitive business information through robust authentication and authorization mechanisms and secure email protocols. Additionally, managing various types of data, such as customer information, product details, and financial records, requires careful database design and implementation.

Technological barriers, such as differing levels of technical proficiency among users, may also pose a challenge. To overcome this, the application will adhere to best practices in UI/UX design, ensuring an intuitive and accessible user experience. The project will be developed in 2-week sprints, allowing for iterative development and continuous improvement. Each sprint will focus on specific tasks, including system design, API development, front-end and back-end integration, testing, and deployment.

In conclusion, this project aims to deliver a functional web application that digitalizes the invoicing process for local mid-sized family businesses. By addressing potential limitations and challenges proactively and leveraging modern technologies, the project seeks to provide a valuable solution tailored to the specific needs of its target audience, ultimately enhancing efficiency, accuracy, and overall business management.

3.2. Agile Methodology

Scrum approach agile methodology was selected for this project due to its structured yet flexible approach to software development, which aligns well with the dynamic nature and specific requirements of the digital invoicing system. and this is the end of process. Scrum's iterative methodology makes it easier to regularly review and adjust, enabling the project to adapt in response to ongoing stakeholder feedback and evolving business requirements. Weekly stand-ups and sprint reviews, for example, are two ways that this methodology helps team members and stakeholders collaborate and communicate better. Scrum also guarantees that value is delivered quickly and consistently, enhancing transparency and stakeholder satisfaction, by focusing on providing functional increments of the product at the conclusion of each sprint. Using Scrum helps the project manage risk better because possible problems are identified early on and fixed during each iteration. Scrum is ultimately the best option for creating a reliable, user-focused digital invoicing system because of its emphasis on incremental development and continuous improvement.

For the project, a total of eight phases are included in the system development life cycle and each one is thoroughly explained with its own section in this report.

Phase 1: Initiation and Requirements Gathering

The objective of this phase is to thoroughly understand the requirements of the digital invoicing system by engaging with stakeholders. This ensures that the developed system meets the specific needs of the users.

Key Stakeholders: Store managers, business owner, and other staff members are considered key stakeholders in this project.

Engagement: An initial meeting is firstly planned to introduce the project, discuss its objectives, and outline the benefits of the digital invoicing system to the stakeholders. And then, some interviews were made to business owner and the employees had to answer a few questionnaires to define functional and non-functional requirements.

Functional Requirements

Functional requirements define the specific behaviour or functions of the system. For the digital invoicing system, these include:

- Invoice Generation: Ability to create new invoices with detailed product and client information.
- Support for downloading invoices in multiple formats (PDF, PNG).
- Track invoice status and history.
- Invoice management.
- Client and Product Management: Features to add, update, delete, and view client and product information, Search functionality to find clients and products by search bar.
- Email Integration: Functionality to send invoices directly via email, Email templates for standard communication.
- Payment Simulation: Prototype to simulate payment processes, validate and record simulated payments.
- Analytics: Visual representation of sales data.

Non-functional Requirements

Non-functional requirements specify criteria that can be used to judge the operation of the system, rather than specific behaviors.

Performance:

- The system should handle the generation of at least 100 invoices per minute.
- Response time for database queries should be less than 2 seconds.

- Mailing time for invoices should not be more than 10 seconds.

Scalability:

- The system should be able to scale to accommodate an increasing number of clients and products without performance degradation.

Security:

- Implement robust authentication and authorization mechanisms.
- Ensure data encryption for sensitive information during storage and transmission.

Usability:

- The system should have an intuitive user interface that requires minimal training.
- Provide user documentation and help resources.

Maintainability:

- Code should follow standard conventions and be well-documented.
- The system should allow easy updates and modifications.

Compatibility:

- The system should be compatible with major web browsers (e.g., Chrome, Firefox, Safari).

Requirements Prioritization

Prioritization of requirements ensures that the most critical features are developed first. Using the MoSCoW method (Must have, Should have, Could have, Won't have), the requirements are prioritized as follows:

Requirement	Must Have (M)	Should Have (S)	Could Have (C)	Won't Have (W)
Functional Requirements				
Invoice Generation (PDF)	X			

Client Management	X			
Product Management	X			
Email Integration	X			
Authentication and Authorization	X			
Analytics and Reporting		X		
Payment Simulation Prototype		X		
Additional Invoice Formats (JPEG)			X	
Advanced Search Functionalities		X		
Customizable Invoice Templates				X
Real-Time Inventory Alerts				X
Multi-Language Support				X
Non-Functional Requirements				
Performance (100 invoices/min)	X			
Response Time (< 2 seconds)	X			
Mailing Time (<10 seconds)	X			
Scalability	X			
Security (Encryption)	X			
Usability (Intuitive UI)	X			
Reliability (99.9% uptime)	X			
Maintainability (Code Documentation)	X			
Compatibility (Major Browsers)	X			
User Documentation		X		

Phase 2: System Design

The objective of this phase is to develop a comprehensive design for the digital invoicing system that outlines the system architecture, database structure, user interface, and interactions between components. The system design phase involves several critical steps to ensure that the digital invoicing system is robust, scalable, and user-friendly. The primary focus is on creating detailed designs for both the backend and frontend components, ensuring that they work together seamlessly to meet the system's requirements.

To comprehensively explain the system, the following diagrams will be used:

Use case Diagram: Illustrates the functional requirements of the system, depicting interactions between users (actors) and the system's functionalities. Helps identify all the use cases (e.g., creating invoices, managing clients, generating invoices) and their relationships with different actors.

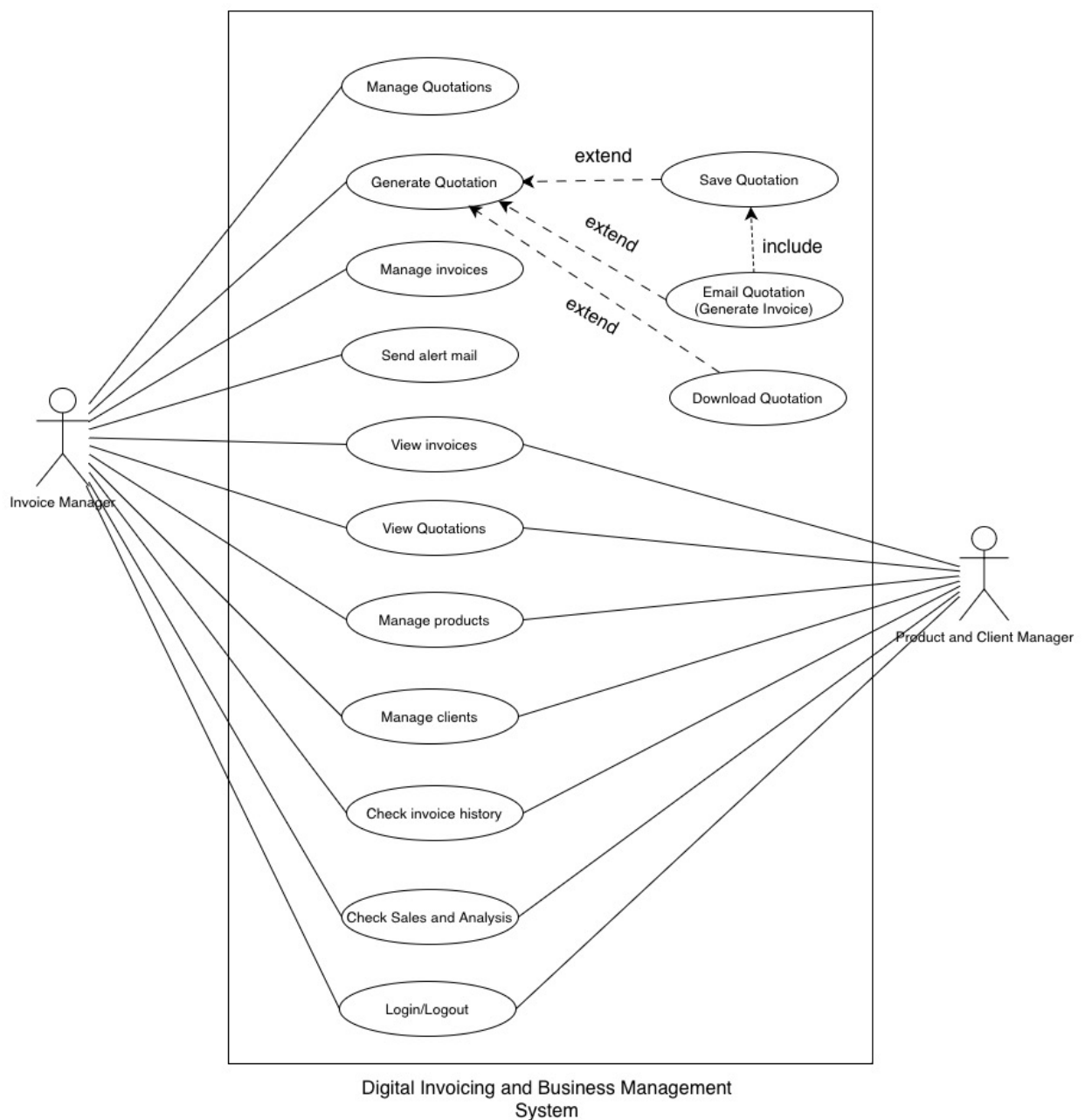


Figure 1: Figure of Use Case Diagram

Explanation: There will be two user types which are 'Invoice Manager' and 'Product and Client Manager'. Both of the user types will have to be authenticated to get access to the website. 'Product and Client Manager' type has less privilege than 'Invoice Manager' type as this type of user can only manage products and clients, and has no permission to manage or handle anything related to invoices and orders. When performing 'Generate Quotation', a preview documentation will be displayed in real-time and the user can choose what to do with it from three different options which are 'Save Quotation', 'Mail Quotation' and 'Download Quotation'. When 'Save Quotation' is selected, the generated documentation will be saved as a ready-to-send quotation in the database. When 'Mail Quotation' is selected, the generated documentation will be sent to the respective customer email and saved as a ready-to-send invoice in the database after saving it as a quotation first. When 'Download Quotation' is selected, the system will simply download the document into the machine.

Site Map: Represents the structure of the web application, showing how different pages and sections are organized and linked. Provides a clear overview of the application's navigation and structure, ensuring intuitive user experience.

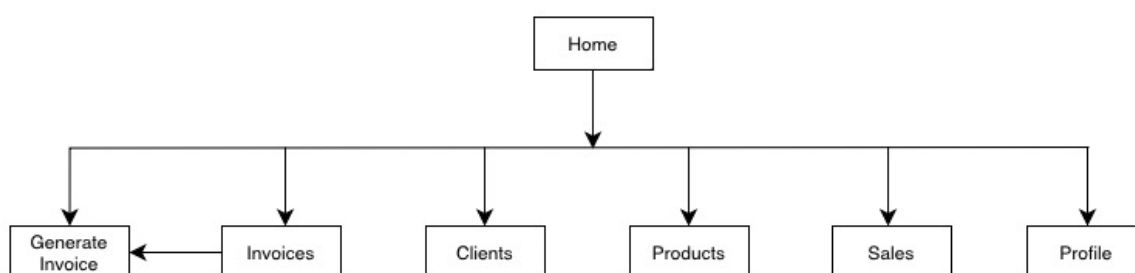


Figure 2: Figure of Site Map

Explanation: There is a 'Home' page and it simply has a navigation bar that contains the respective links to each web page of the system. Since generation invoice is the key operation of the system, it will also be included in the 'Invoices' page which is related with that function.

ER Diagram (Entity-Relationship Diagram): Visualizes the database schema, showing entities (tables), their attributes, and relationships between them. Helps design a normalized and efficient database, ensuring data integrity and optimizing query performance.

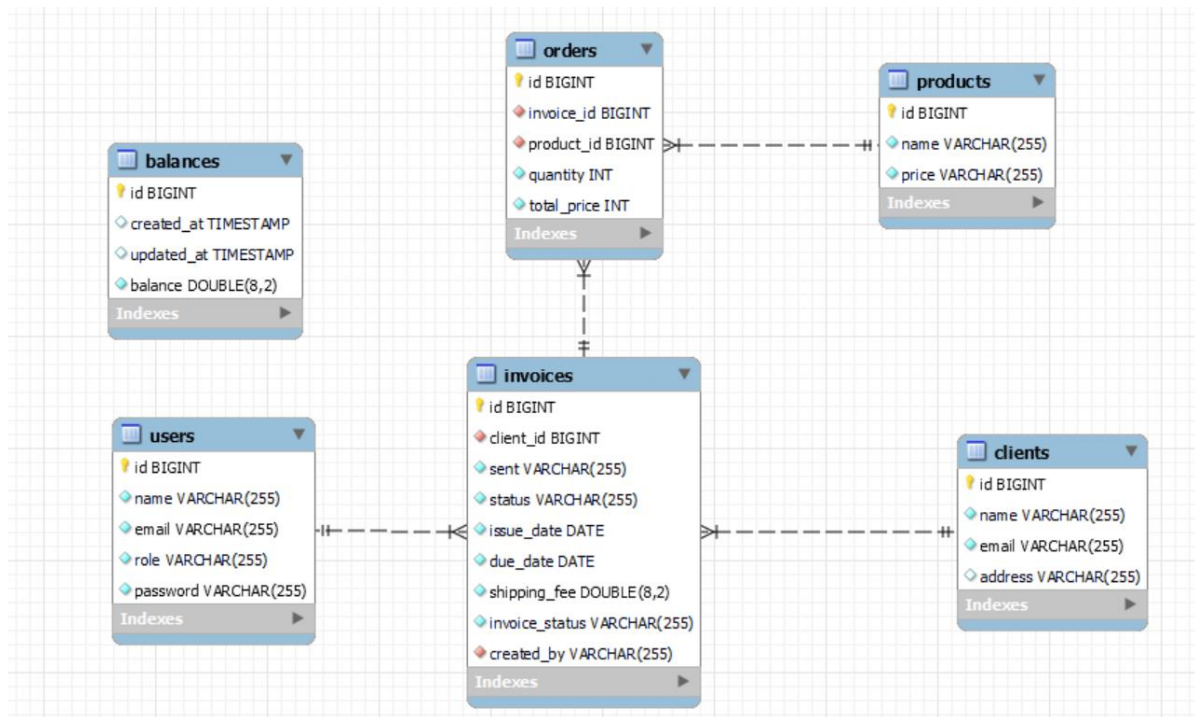


Figure 3: Figure of ER Diagram

Explanation: The main tables in the system database are 'invoices' and 'orders' tables. 'invoices' table contains client data and 'orders' table connects those data with the 'products' table. 'users' table is for authentication, authorization and is connected with 'invoices' table for the information of invoice creator. 'balance' table is the table used to record data for payment simulation prototype.

In 'invoices' table, all ready-to-send documents are stored as rows and 'sent' column defines the documentation type of each row which is quotation or invoice. Quotation is the order confirmation documentation and invoice is the payment successful receipt documentation. Although there are two types of documentations in the system, it was decided to use only one table to store both of them in the purpose of reducing data redundancy since they have exactly the same data components. If a

row is set 'no' in 'sent' column, it can be defined as a ready-to-send quotation and if 'yes', the data becomes a ready-to-send invoice.

Data Flow Diagram: Shows how data flows through the system, including sources, destinations, data stores, and processes. Illustrates how data is processed and transferred, ensuring all data handling processes are identified and optimized.

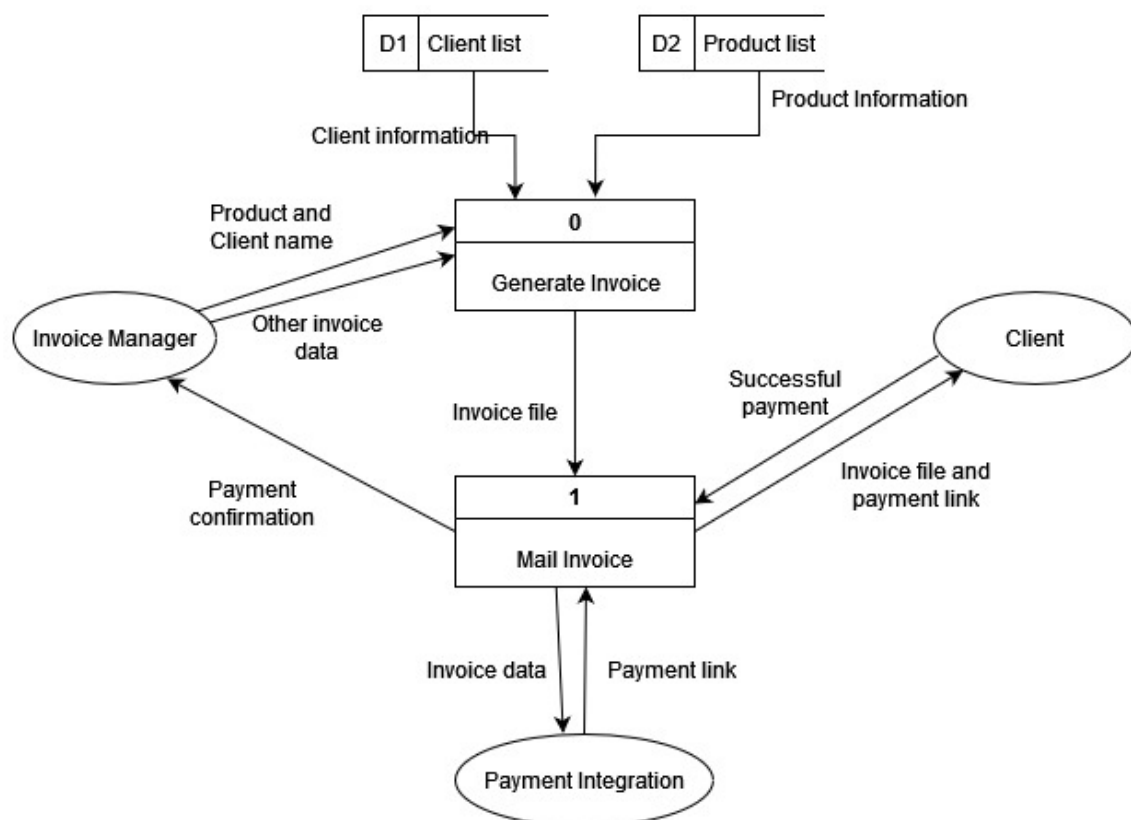


Figure 4: Figure of Data Flow Diagram for Invoice Generating Process

Explanation: The process and data flow of how the system operates with payment integration is described in the diagram although the system currently uses simulation prototype for payment due to some limitations.

Sequence Diagram: Details the sequence of operations for the main process of generating an invoice, showing interactions between different system components over time. Provides a step-by-step view of the invoice generation process, ensuring that all necessary operations are accounted for and correctly sequenced.

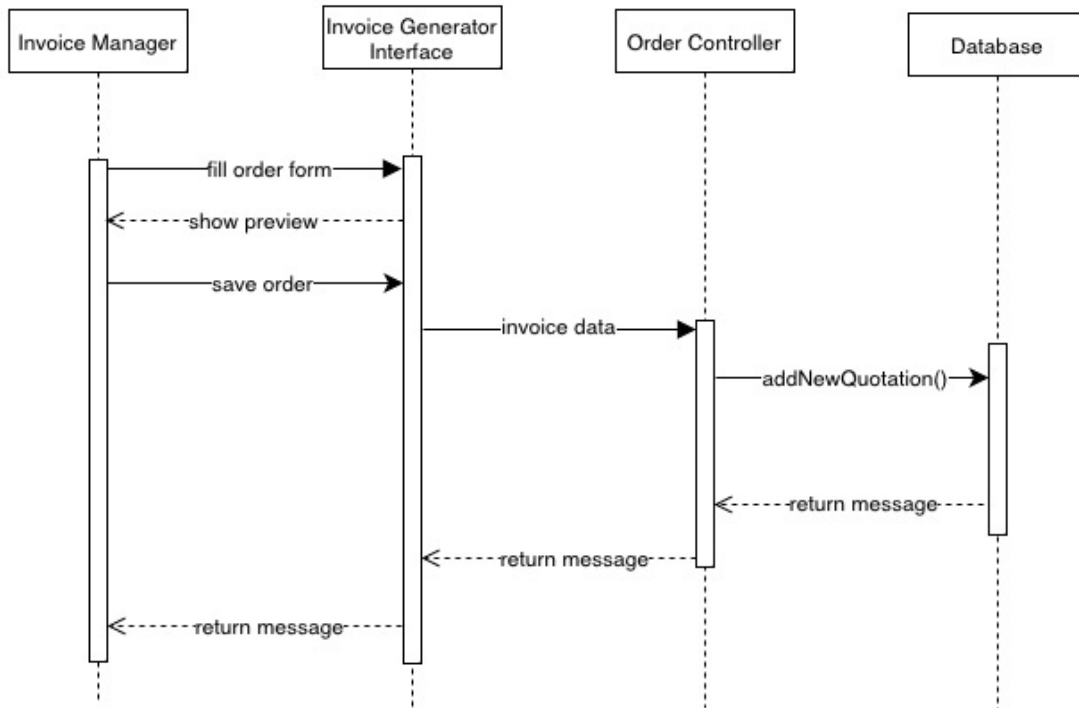


Figure 5: Figure of Sequence Diagram for Saving Order Process

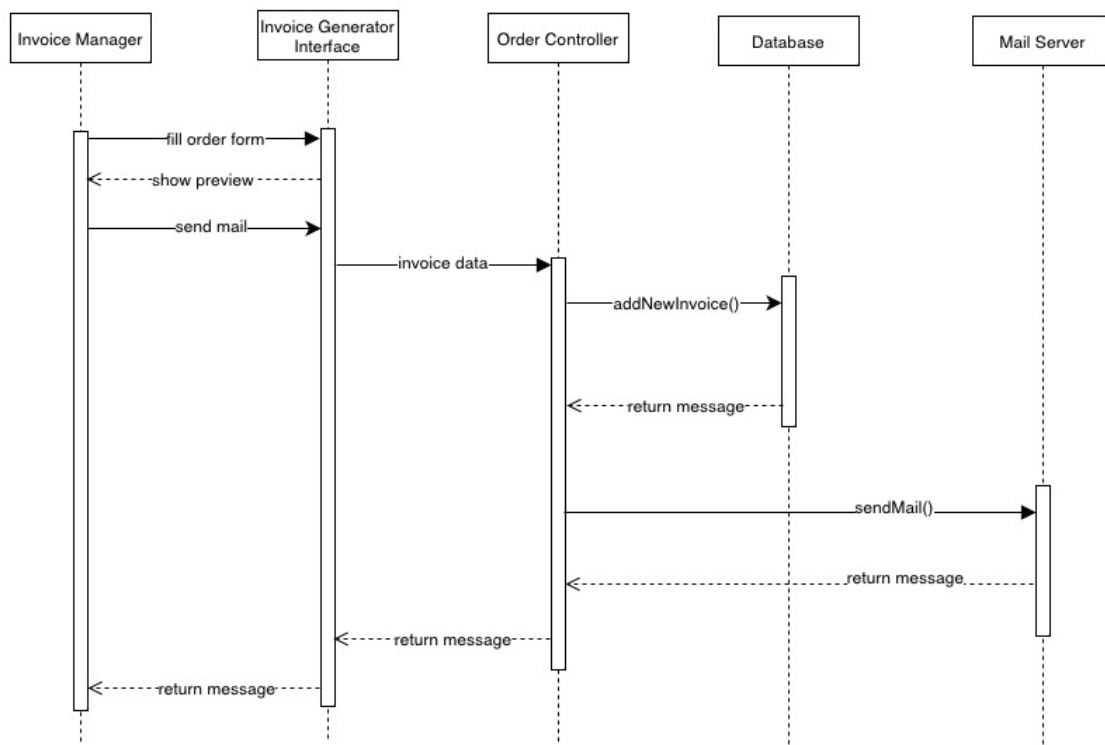


Figure 6: Figure of Sequence Diagram for Sending Mail Process

Explanation: When sending mail, the system has to save the documentation in the database first, which is the same process as saving order process with different value in 'sent' column, before sending the mail. This is why there is 'include' relationship between the two functions in the use case diagram.

Phase 3: Sprint Planning

During this phase, the project development phase is divided into multiple sprints, each typically lasting two to four weeks. The initial sprint involves setting up the development environment and designing the database schema. Subsequent sprints focus on developing specific features, such as product and client management. Key sprints include the development of the invoice generation feature and the integration of email functionality. After every few sprints, comprehensive review sessions are conducted with stakeholders to demonstrate progress, gather feedback, and make necessary adjustments. This iterative process ensures continuous improvement and alignment with stakeholder requirements, allowing for flexibility and responsiveness to evolving business needs.

Phase 4: Development and Iteration

The objective of this phase is to develop the system incrementally, ensuring that each part of the system is functional and meets the specified requirements. This phase involves coding, testing, and refining features through multiple sprints defined in phase 2, maintaining continuous collaboration with stakeholders.

Sprint 1: Set Up the Development Environment and Initial Database Design

Set Up Development Environment:

- MySQL: MySQL was installed and configured for database management.

- Laravel PHP: Laravel framework was installed for backend development. Routing, controllers, and basic models were set up.
- Frontend Tools: HTML, CSS, and React were set up for building the user interface.

Initial Database Design:

- Defining Database Schema: Necessary tables (e.g., products, clients, orders, invoices) and relationships were identified.
- Creating ER Diagrams: MySQL Workbench was used to create Entity-Relationship diagrams.
- Implementing Database: Create the initial database structure in MySQL and Laravel migration was done.

Testing Tools:

- Postman: Initial test cases for API endpoints were created.
- Browser Testing: Compatibility with Firefox and Google Chrome was ensured.

Successfully Delivered:

- Fully configured development environment with MySQL, Laravel, HTML, CSS, and React.
- Initial database schema designed and implemented, including ER diagrams and Laravel migration scripts.
- Basic frontend setup with HTML, CSS, and React.
- Initial API endpoints created and tested using Postman.
- Compatibility with Firefox and Google Chrome ensured.

After completing sprint 1, a solid foundation was established for subsequent sprints allowing the process to focus on developing specific features.

Sprint 2: Navigation Bar and Data Entry

- Data collection was done by discussing with the business owner to insert data into the database.
- A navigation bar was developed and made stick to the top of every page.

Outcomes:



Figure 7: Figure of Navigation Bar

Applied Principles to 'Navigation Bar':

Consistency and Standards (Jakob Nielsen) - The navigation bar uses a consistent format and styling across different tabs (Clients, Products, Sales, Invoices, Profile), which helps users quickly learn and predict the interface's behavior. This consistency aids in reducing cognitive load and improves usability.

User Control and Freedom (Ben Shneiderman) - The navigation bar provides straightforward access to various sections of the application, allowing users to freely navigate without feeling restricted or lost. This design offers users control over their actions within the system.

Successfully Delivered:

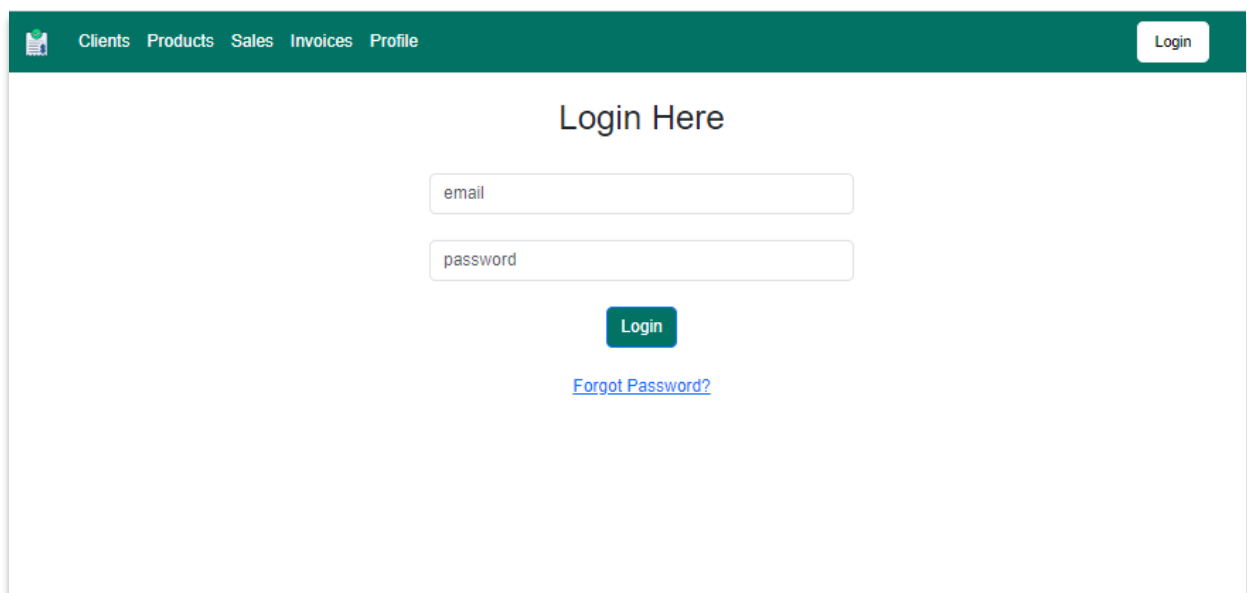
- A database with a testable amount of real-life accurate data.
- A sticky navigation bar that includes links to major sections of the application.

The succession of this sprint makes the system ready for the testing of authentication and authorization in the next sprint.

Sprint 3: Authentication and Authorization

- Robust authentication and authorization functionalities were implemented in this sprint to ensure secure access to the system for data privacy.
- A login system that authenticates users using email and password was developed for authentication.
- Hashing was implemented for secured password handling.
- User roles with specific permissions were defined.
- Protected routes were implemented to redirect unauthorized accesses to 'Login' page.
- Exclusive features were protected from unauthorized user types by checking the encrypted role extracted from the local storage of the browser.
- 'Home' page was developed to navigate users successful login.
- Integration tests were conducted to verify that the frontend and backend components interact correctly and securely.

Outcomes:



The screenshot displays a web application's login interface. At the top, a dark green navigation bar contains a menu with links: 'Clients', 'Products', 'Sales', 'Invoices', and 'Profile'. A 'Login' button is positioned in the top right corner of this bar. The main content area has a white background with the heading 'Login Here' centered at the top. Below the heading are two input fields: the first is labeled 'email' and the second is labeled 'password'. A green 'Login' button is centered below these fields. At the bottom of the form, there is a blue hyperlink labeled 'Forgot Password?'.

Figure 8: Figure of 'Login' Page

Applied Principles to 'Login' page:

Simplicity (Steve Krug's "Don't Make Me Think") - The design keeps cognitive load minimal by focusing solely on the essentials required for login: email and password fields along with a login button. This simplicity ensures users are not overwhelmed with unnecessary information or choices.

Error Prevention (Jakob Nielsen) - Placeholder text within each field clarifies what information is required, reducing user errors. Adding inline validation can provide instant feedback if the entered data is incorrect, further preventing errors before form submission.

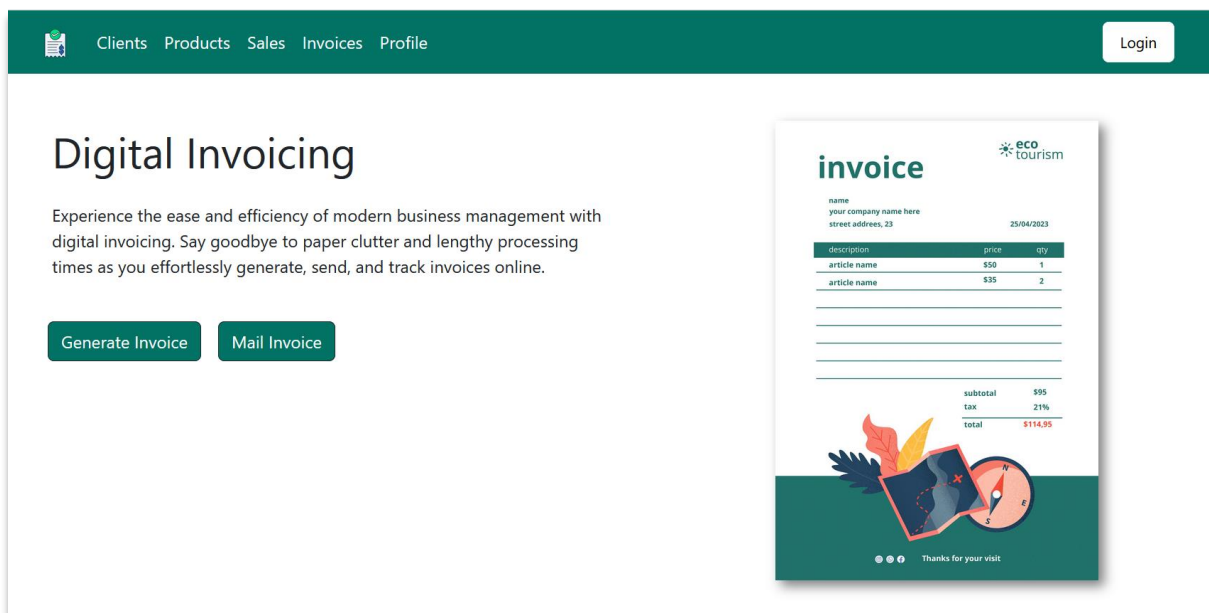


Figure 9: Figure of 'Home' Page

Applied principles to 'Home' page:

Visibility of System Status - The web page provides clear indications of what can be done via prominent buttons like "Generate Invoice" and "Mail Invoice" which are easily distinguishable from other components. This application of Donald Norman's principle ensures that users are well-informed of the actions they can take at any moment.

Match between System and the Real World - The invoice preview on the right side of the screen uses familiar terminology and a format that mimics a physical invoice. This supports the principle by using language and concepts familiar to the user, making the digital transition intuitive.

Aesthetic and Minimalist Design - The design uses a clean layout with a lot of white space and limited use of color, focusing the user's attention on the most important tasks. This adherence to minimalist design principles ensures the user is not overwhelmed by unnecessary information or elements.

Successfully Delivered:

- User Login and Logout functionalities with password hashing.
- Role-based access control for authorizing purposes.
- 'Home' page.

Sprint 4: Product and Client Management Modules

- CRUD operations (Create, Read, Update, Delete) for product and client were implemented and tested by using Postman.
- 'Products' and 'Clients' web pages were developed and integrated with backend APIs.

Outcomes:

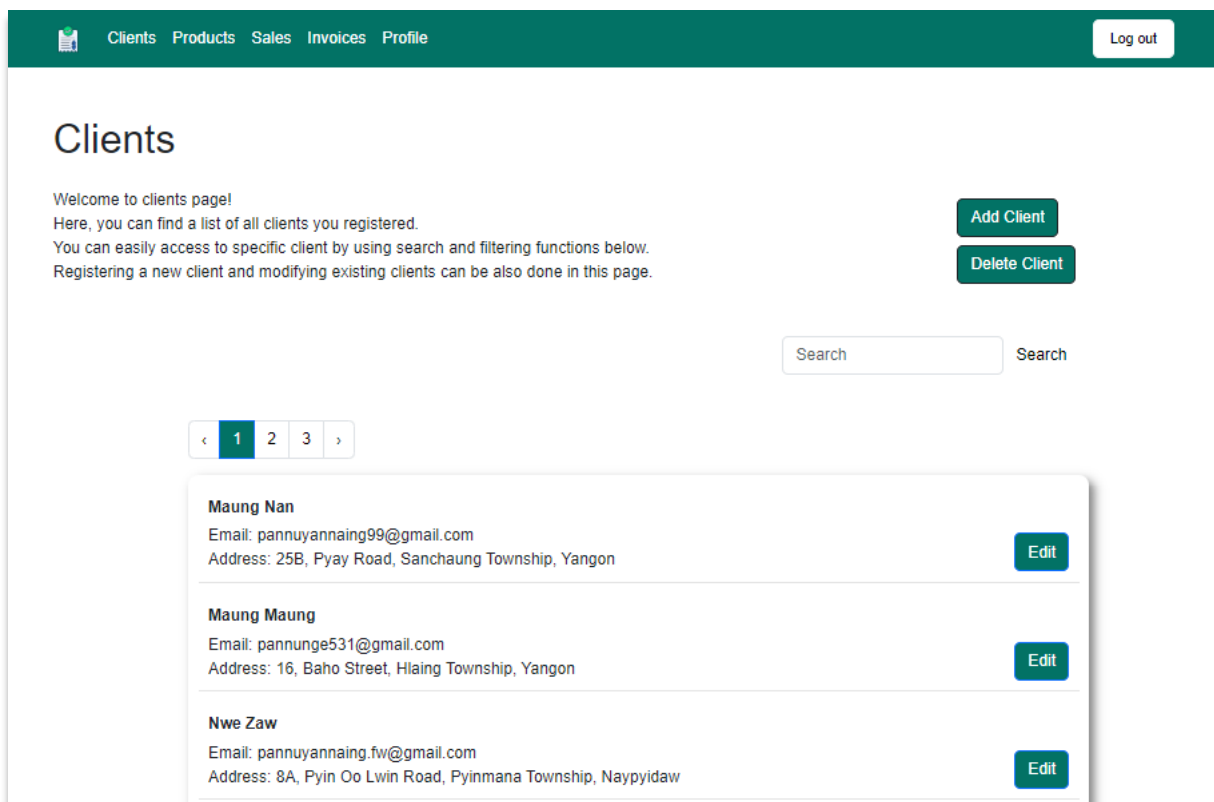


Figure 10: Figure of 'Clients' Page

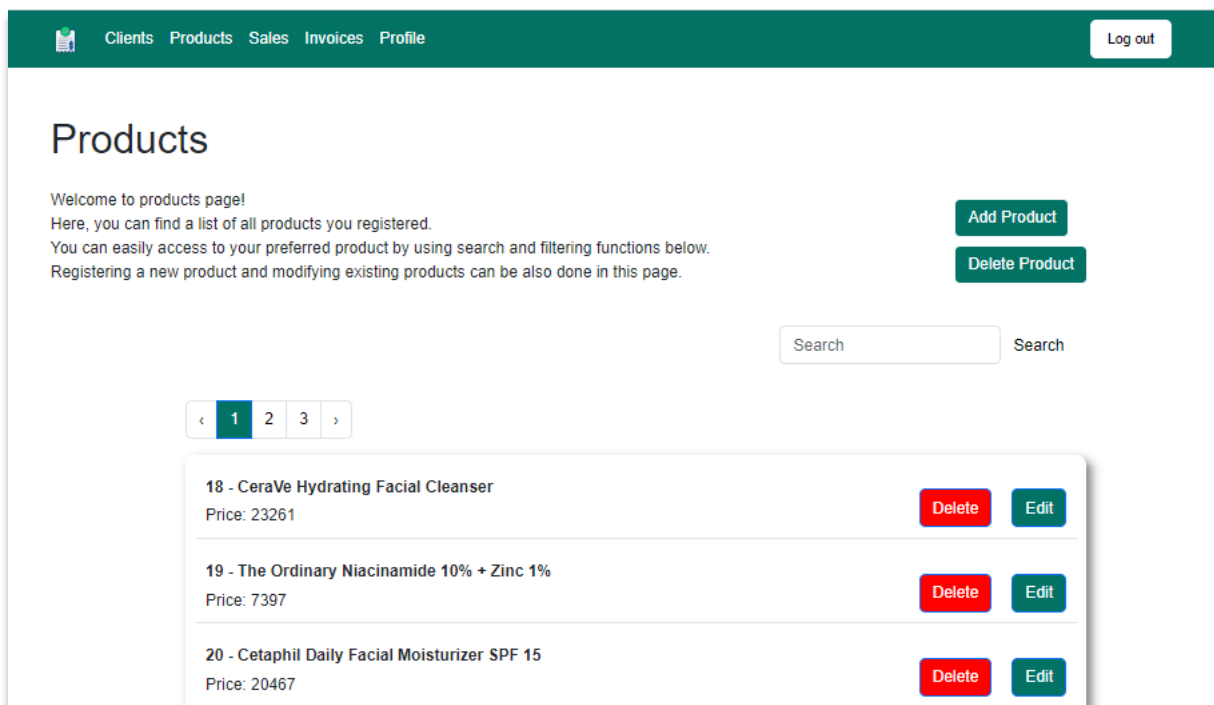


Figure 11: Figure of 'Products' Page after Clicking 'Delete Product' Button

Applied principles to 'Products' page and 'Clients' page:

Error Prevention - Each product entry is equipped with both "Edit" and "Delete" buttons, potentially reducing the risk of accidental deletions by offering a separate, distinct action for modifications. Implementing confirmations for deletions could further prevent errors. Hiding potentially dangerous controls like the delete buttons until 'Delete Product' button is clicked also prevents users from accidental deletions.

Flexibility and Efficiency of Use – Benefit from straightforward controls like search and pagination, which help in quickly accessing products. These features can speed up the interaction for all users.

Aesthetic and Minimalist Design (Steve Krug) – Keeping the UI clean and free of potentially dangerous controls like delete buttons until needed adheres to the minimalist design principle. This avoids cluttering the interface with controls that are not frequently used, thus focusing the user's attention on primary tasks.

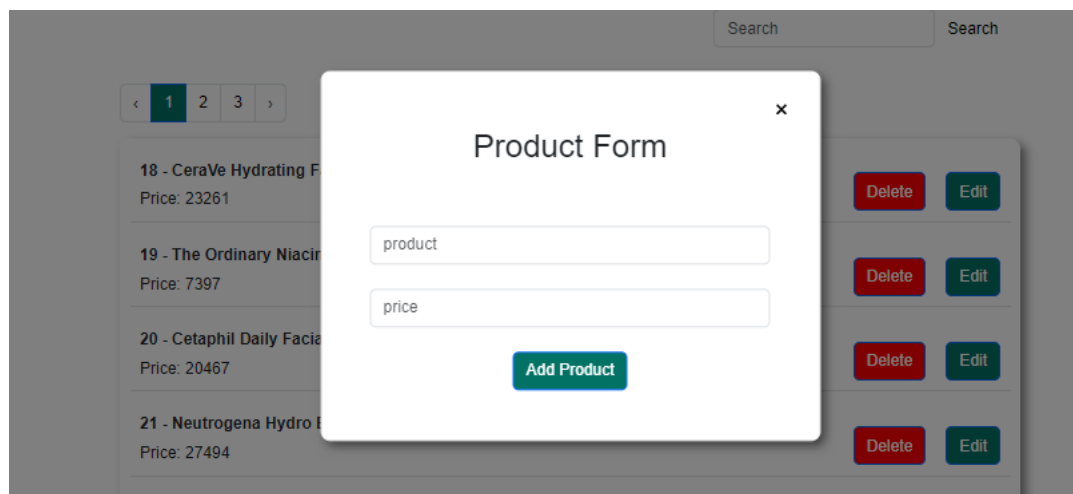


Figure 12: Figure of 'Product Form'

Applied principles to 'Product Form':

Match between System and the Real World (Jakob Nielsen) - The form uses familiar labels such as "product" and "price," which are terms that users would expect in a product management context. This aligns with real-world conventions, making the interface easier to understand.

Recognition Rather Than Recall - Keeping interactions simple and within the users' current context allows them to recognize what they need to do next, rather than having to recall information from elsewhere. This is achieved by the modal's focused task and simple interface.

Successfully Delivered:

- Fully functional product management and client management modules with complete CRUD operations.
- Comprehensive testing of both backend and frontend components.

Review Session:

For this sprint, a review session with the store managers was taken to get feedbacks upon the features and make adjustments if necessary. After the review session, it was decided to add pagination to every page with lists for higher convenience.

The successful development of Sprint 2 enables the system to handle essential business data effectively, setting the stage for subsequent sprint to be ready for implementing invoice generation feature.

Sprint 5: Implementing the invoice generation feature

Before this sprint, a brief interview was made with the store managers to confirm the information aspects included in a standard invoice.

- CRUD operations for invoices were implemented.
- Research was done in order to take references to design a professional invoice template.
- React components for 'Generate Invoice' page (Order Form, Preview) were developed and integrated with backend APIs.
- Functions to export and download invoices as PDF and PNG files were developed. 'html2canvas' and 'jspdf' libraries were used to download the desired contents.

Outcomes:

ClientsProductsSalesInvoicesProfile

Log out

Generate Invoice

Fill in the order form to generate an order confirmation or an invoice

Order Form

Choose Client

Hla Hla - pannunge531@gmail.com

Issue Date - Due Date

05/18/2024 - 05/31/2024

Laneige Lip Sleeping Mask

Laneige Lip Sleeping Mask 1

Add this product to order

Shipping Fee: 2000

Description	Quantity	Unit Price	
Glossier Cloud Paint	32000	2	Delete
Laneige Lip Sleeping Mask	28750	1	Delete

Show Preview

Preview

Order Confirmation

Savannah. Clothing

Yangon, Myanmar

09-837253889

savannahclothing.mm@hotmail.com

Billed to:

Hla Hla

14, Parami Road, Yankin Township, Yangon

pannunge531@gmail.com

Invoice No:

Date: 2024-05-18

Due: 2024-05-31

No	Product	Price	Quantity	Amount
1	Glossier Cloud Paint	32000	2	64000
2	Laneige Lip Sleeping Mask	28750	1	28750
Total				92750
Shipping Fee				2000

Grand Total: 94750 Ks

Save Order

Send Mail

Download ~

Download PDF

Download Image

Figure 13: Figure of ‘Generate Invoice’ Page

Applied principles to ‘Generate Invoice’ page:

Visibility of System Status (Donald Norman) - The page displays an immediate preview of the order confirmation as users add products, which constantly informs them of the state of their invoice creation. This real-time feedback is critical for users to understand the impact of their inputs without delay.

Match between System and the Real World (Jakob Nielsen) - The interface uses familiar business terminology like "Choose Client," "Issue Date," "Due Date," and straightforward invoice previews that mimic traditional invoice documents. This familiarity helps users navigate the form more intuitively.

User Control and Freedom - The interface offers significant control over invoice management with options to edit details, delete products, save orders, send mail,

and download the invoice. This range of options caters to different user needs and gives them the freedom to interact with the system on their terms.

Consistency and Standards - The design is consistent with other parts of the application in terms of button styles, color schemes, and the general layout, which helps reduce the learning curve and enhances user confidence.

Error Prevention - The deletion of products from the order list is direct and presumably accompanied by confirmation dialogs to prevent accidental deletions, which are essential for avoiding costly mistakes. Additionally, allowing the user to only add customer and products that have already existed in the database can provide high data consistency preventing data conflicting errors.

Successfully Delivered:

- Fully functional backend CRUD operations for managing invoices.
- User-friendly frontend interface for creating invoices and dynamic form fields for adding line items, products, and client details.
- Professional invoice template with PDF and PNG generation and download capability.

Review Session:

During the review session after the sprint, there was a discussion whether the feature to add a new client(customer) directly from invoice generation process should be allowed or not based on some employee feedbacks. At the end, it was decided to not implement the feature and only let the user choose existing customers from the database because of the cruciality of consistency to this system.

Sprint 6: Integrate email functionality for sending invoices

In this sprint, feature for the 'Send Mail' button in 'Preview' component of 'Generate Invoice' page was developed. For the sake of better mail deliverability and faster processing, blade templates were used to create mails.

- Implement backend API mail sending feature.
- Email configuration environment is set up. SMTP is used here for mail sending protocol. '.env' file was updated with SMTP settings and Google app password of the host account that will be used as company mail to send invoices.
- A payment link to the payment simulation with specific amount was generated.
- Blade templates were created to define the structure of mail which include order confirmation along with respectively generated payment link or invoice.
- A model and a controller were created to handle mail sending by using blade templates.
- API was integrated with frontend.
- A payment simulation prototype was developed to showcase the system work flow.

Outcomes:

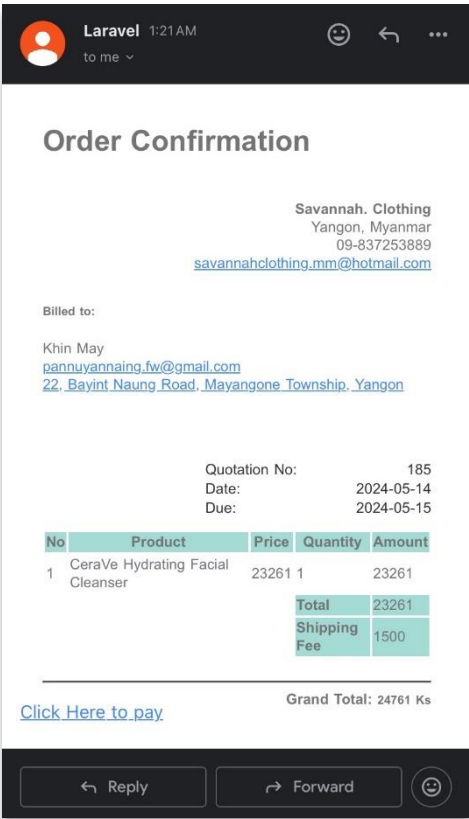


Figure 14: Figure of Sent Mail

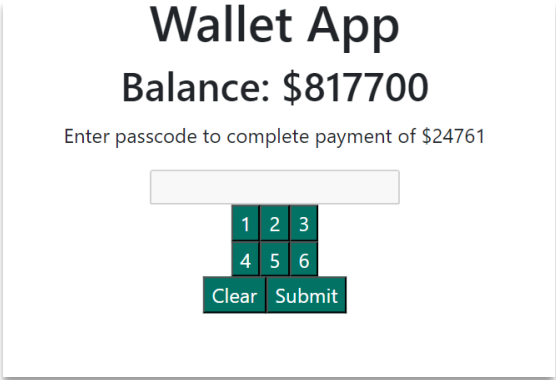


Figure 15: Figure of Payment Simulation Page

Applied principle to 'Order Confirmation' mail:

Clarity and Readability - The email layout is clear and well-organized, with headings and sections neatly delineated to ensure that the recipient can easily parse and understand the information presented. This is crucial for critical information like order details and totals.

Successfully Delivered:

- Fully functional Email sending feature.
- Payment simulation prototype.

Sprint 7: Invoice and Quotation Management with Multiple Mails Handling

- API endpoints for managing invoices and sending multiple mails were implemented and Postman was used to test them.
- A tabbed interface with three tabs: "All", "Quotations", and "Invoices" was created.
- All Tab: Displays all documents.
- Quotations Tab: Displays all order confirmation documents that are still not sent to clients.
- Invoices Tab: Displays all documents that have been sent to clients and upgraded to invoices.
- Status Indicators were added beside each invoice to show if it is sent or if the payment is done.
- Buttons required to handle invoices were added.
- Select Mail Button: Reveals checkboxes for each invoice.
- Action Buttons: "Mail Invoice", "Mail Alert", and "Delete" buttons handle selected invoices.
- An "Orders and Details" button that triggers a modal to display detailed information about the invoice was developed.

- Frontend testing to ensure proper functionality and user experience across all tabs was performed.

Outcomes:

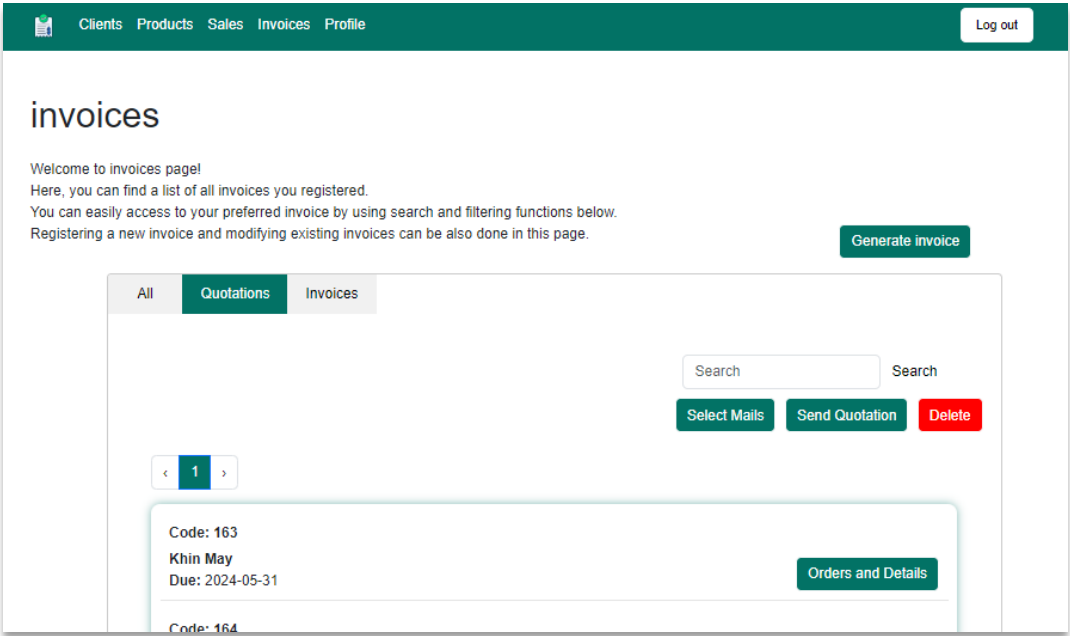


Figure 16: Figure of 'Quotations' Tab

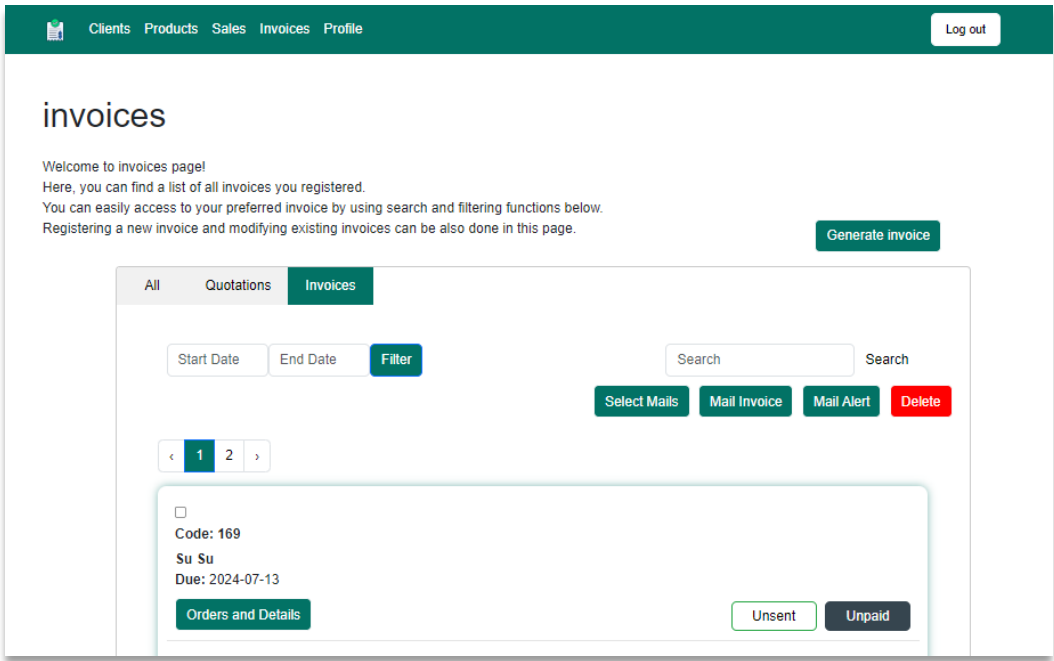


Figure 17: Figure of 'Invoices' Tab after Clicking 'Select Mails' Button

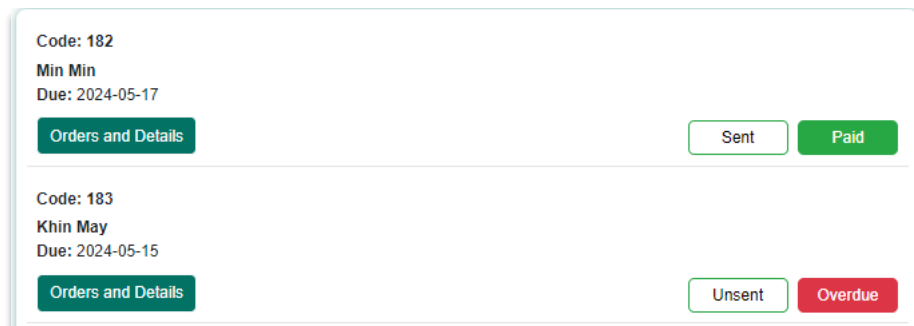


Figure 18: Figure of Status Indicators

Applied principles to 'Invoices' page:

Visibility of System Status - The pages clearly show the status of invoices with labels such as "Unsent," "Sent," "Paid," and "Overdue." This immediate feedback is crucial for users to understand the current state of each invoice at a glance.

User Control and Freedom - Users have the ability to perform multiple actions like "Select Mails," "Send Quotation," "Mail Invoice," "Delete," and more. This level of control is essential for allowing users to manage invoices according to their specific needs.

Error Prevention - The use of filters and search functions helps users in avoiding errors by allowing them to view only the invoices they are interested in or need to manage, reducing the chance of interacting with the wrong data.

Aesthetic and Minimalist Design - The interfaces are made relatively clean and straightforward, focusing on essential functionalities which helps in reducing cognitive load and enhancing usability.

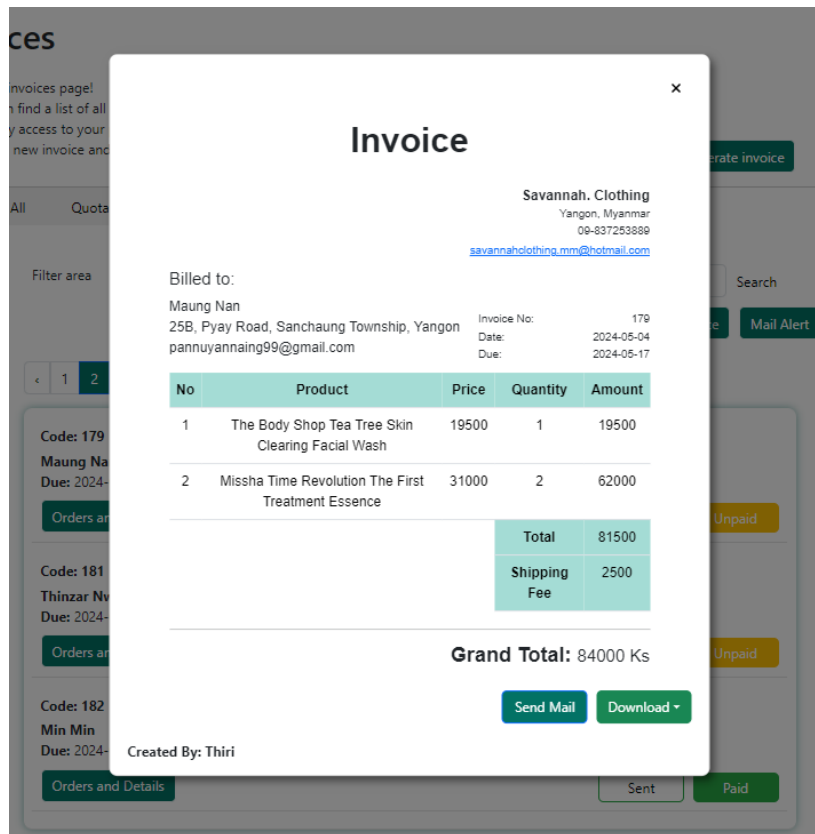


Figure 19: Figure of 'Orders and Details' Modal

Applied principles to 'Orders and Details' modal:

Match between System and the Real World - The format of the invoice closely mimics traditional paper invoices, using familiar terms and layouts that users are likely to recognize. This familiarity helps reduce the cognitive load and makes the digital interface intuitive to use.

Flexibility and Efficiency of Use (Jakob Nielsen) - For users who are reviewing details and may decide immediately that they want to send or resend the invoice, having the "Send Mail" option readily available saves steps.

Accountability - Showing who created the invoice establishes a clear line of responsibility. This is particularly important in environments where errors need to be traced or clarifications required. Users can see at a glance who to contact if there are any discrepancies or questions, thus improving overall communication and efficiency.

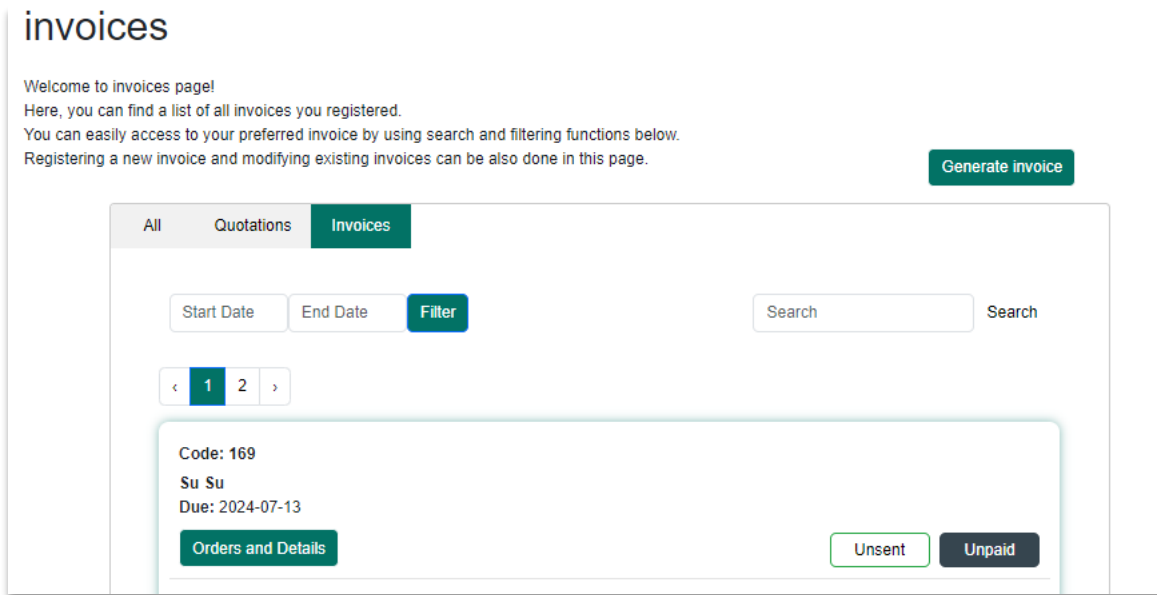


Figure 20: Figure of 'Invoices' Page from Product and Client Manager's View

In this view, there are no buttons to manage invoices because this user type has no permission to manage anything that contains financial handling like invoices and is only allowed to check data and information.

Successfully Delivered:

- Comprehensive invoice management module with tabs for "All", "Quotations", and "Invoices".
- Implemented status indicators and actions for invoices.
- Enhanced Mail controller for batch email sending.
- A user-friendly interface for managing and sending multiple invoices.

Review session:

A review session was made after this sprint. Filtering feature was added to the invoices tab for better user experience based on the feedbacks from the session.

The successful implementation of this sprint significantly enhances the system's capabilities, allowing users to efficiently manage invoices and perform batch operations, thus improving overall usability and efficiency.

Sprint 8: Graphical Representation of Analytics

- Logic to collect and aggregate data from various parts of the system (e.g., invoices, orders) was implemented.
- APIs to fetch analytics data, such as total sales, top clients, top products and performance of employees were created.
- React components to display the analytics dashboard were developed.
- Charting library (Chart.js) was integrated to visualize data through graphs and charts.

Chart Types:

- Bar charts showing total sales over time, the most buying customers and the most selling products
- Pie chart to show the performance of employees

Outcomes:

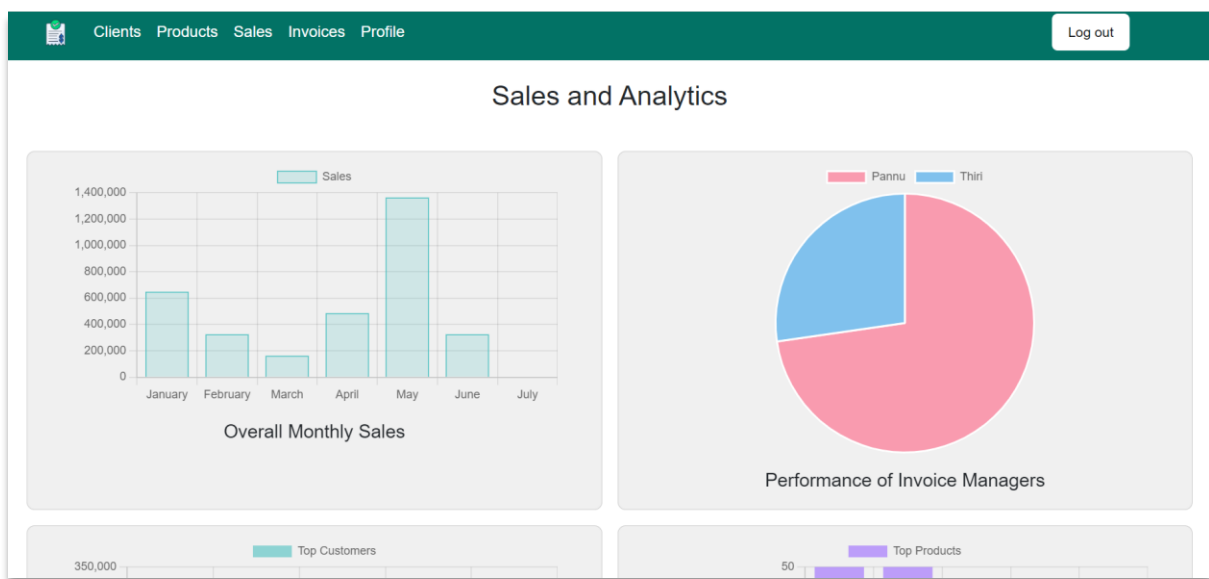


Figure 21: Figure of 'Sales' Page

Applied principles:

Visual Consistency: A page's appearance and user experience are guaranteed when the same colours, fonts, and styles are used throughout. For instance, the charts and graphs use a single colour scheme that complements the overall layout.

Successfully Delivered:

- Completely functional web page that show business data analytics with different types of charts

The successful development of the analytics module in Sprint 8 gives users helpful insights into their operational and financial data, improving their capacity to make accountable decisions and boost business performance. With the completion of this part of the digital invoicing system, a strong tool for data-driven decision-making is provided.

Phase 5: Integration and Testing

This phase's main goal is to make sure that every system component functions alongside one another and satisfies the established specifications. This entails verifying that the system functions as a whole and validating the integration of various modules.

The following steps were done to ensure the successful delivery of the development phase.

System Integration Testing: System integration testing involves combining all the individual modules and components of the digital invoicing system and testing them as a whole. This process verifies that the interactions between different parts of the system are functioning correctly.

User Acceptance Testing (UAT): In order to confirm that the system satisfies stakeholders' needs and expectations, user acceptance testing involves engaging stakeholders. This is an essential step to make sure that the finished product satisfies user needs and business requirements.

Defect Management: To guarantee the system's dependability and functionality, any flaws or problems found during the integration and UAT stages must be fixed.

The digital invoicing system is ensured to be stable, dependable, and prepared for deployment by thoroughly carrying out system integration testing, managing any

defects that surface during this phase, and conducting user acceptance testing with stakeholders.

Chapter IV: Conclusion

4.1. Conclusion

The digital invoicing system project successfully demonstrates the potential for streamlining the invoicing process for local mid-sized family businesses. By integrating modern web technologies and adhering to robust design principles, the system enhances efficiency, accuracy, and user experience in managing invoices. Key features such as invoice generation, email functionality, and analytics have been implemented to meet the immediate needs of the target users. The system design and development phases have ensured a scalable and maintainable architecture, laying a strong foundation for future enhancements. Through rigorous testing and validation, the project has achieved its primary objectives, providing a functional prototype that addresses the core requirements of digital invoicing.

4.2. Further Development

To further enhance the system's capabilities and meet evolving business needs, several key areas for future development have been identified:

Tax Calculation System

Objective: Integrate a comprehensive tax calculation system to automatically compute applicable taxes for each invoice based on the jurisdiction and specific tax laws.

Benefits: Ensuring compliance with tax regulations, reducing manual errors, and simplifying the invoicing process for users.

Invoice Template Customization

Objective: Allow users to customize invoice templates to better reflect their brand identity and specific invoicing requirements.

Benefits: Enhancing user satisfaction by providing flexibility in invoice design and ensuring that invoices are professional and personalized.

More Formats for Download Function

Objective: Expand the download options to include additional formats such as Excel, CSV, and XML, alongside existing PDF and JPEG formats.

Benefits: Offering greater flexibility to users in handling invoice data and facilitating integration with various business tools and systems.

Product Types

Objective: Support a wider range of product types, including services, subscriptions, and physical goods, each with their own specific attributes and handling requirements.

Benefits: Broadening the system's applicability to different business models and ensuring comprehensive invoicing capabilities and big impact upon data analysis field if customer consent is given.

Actual Payment Integration

Objective: Integrate payment gateways to enable direct invoice payments through the system, supporting various payment methods such as credit cards, PayPal, and bank transfers.

Benefits: Streamlining the payment process, reducing the time between invoicing and payment receipt, and enhancing overall cash flow management for businesses.

By focusing on these areas, the digital invoicing system can evolve to meet the growing and changing demands of its users. Each of these enhancements aims to improve functionality, user experience, and operational efficiency, ensuring that the system remains a valuable tool for managing business finances. Through continuous development and adaptation, the system can maintain its relevance and effectiveness in a dynamic business environment.

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Appendix

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 31/1/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Domain study is completed.- Literature review is done.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Background study- Project proposal

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 14/2/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Proposed project is confirmed.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- System design- Database design

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 28/2/2024

Description: comment on the work achieved and how much effort was involved

- Architectural diagrams, database design
- Completed and confirmed description of project work flow

Reflection: comment on how and why you did the work, what was learned and any problems

Actions: identify actions for next week, actions longer term and any changes to the overall plan

- Wireframes

Supervisor Signature:

Student Signature:



6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 6/3/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Wireframes
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- UX principles applied to UI design- Enhance Use Case diagram

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 13/3/2024

Description: comment on the work achieved and how much effort was involved

- UX principles are applied to UI design
- Authentication and authorization is done
- Use Case diagram is enhanced

Reflection: comment on how and why you did the work, what was learned and any problems

Actions: identify actions for next week, actions longer term and any changes to the overall plan

- Automatic mailing
- Sent mail acknowledgement

Supervisor Signature:

Student Signature:



6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 26/3/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Mailing function is completed.- Product and client management is developed.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Invoice generation- Payment simulation

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 3/4/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Invoice generation function is completed.- Payment simulation is developed.- Payment acknowledgement is done.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Download function (in PDF, PNG formats)- Invoice management

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 24/4/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Download function is done.- Invoice management is developed.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Multiple mailing- Sales and analytics charts

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 1/5/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- Sending multiple mails at the same time is successfully functioned.- Displaying charts for 'Sales' page is finishes.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Slides preparation for final defence- Project final report

Supervisor Signature:

Student Signature: 

6500CSMM Final Year Project Weekly Report

Name: Pan Nu Yan Naing..... Date / Week no: 19/5/2024

Description: comment on the work achieved and how much effort was involved
<ul style="list-style-type: none">- PowerPoint slides has been prepared for final defenced.- Pre-defence is done.- Project final report is finished.
Reflection: comment on how and why you did the work, what was learned and any problems
Actions: identify actions for next week, actions longer term and any changes to the overall plan
<ul style="list-style-type: none">- Automatic mailing- Sent mail acknowledgement

Supervisor Signature:

Student Signature:



