

Business Inventory Management System for Alfudullallah Co

Ibrahim Asim¹, Nureize Arbaiy^{1*}

¹ *Fakulti Sains Komputer dan Teknologi Maklumat,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA*

*Corresponding Author: nureize@uthm.edu.my

DOI: <https://doi.org/10.30880/aitcs.2026.07.01.071>

Article Info

Received: 10 June 2025

Accepted: 18 June 2026

Available online: 30 June 2026

Keywords

Inventory Management System,
Business Management, Database

Abstract

An essential indicator of a company's inventory management system is its inventory management effectiveness. Inventory management ensures that goods are available to meet customer demand while reducing expenses associated with inventory storage, storage and disposal. Many businesses still need help implementing an effective inventory system for various reasons. Companies that rely solely on manual stock management techniques have experienced problems such as inaccurate stock levels and long replenishment delays. Therefore, this project aims to improve the effectiveness of Alfudullallah Co.'s inventory operations by building an Inventory Management System (IMS). Although the company uses a manual method to manage its inventory, it sells various products. When the number of items increases, there are difficulties in efficiently managing stock levels and meeting the demands of its clients. Hence, the new system is built to provide real-time inventory tracking and handle inventory management to reduce manual errors. The prototype method is utilised during system development. PHP and MySQL are used for programming. Several modules are provided in the newly developed system, such as inventory, warehouse, ordering, report and analysis management. Alfudullallah Co. will ensure that products are available on time and improve customer satisfaction by providing these processes.

1. Introduction

An organization is maintained through efficient inventory management. Crucial data is also supplied by it, enabling companies to stay profitable, react to trends, and prevent supply chain management failures. This is particularly true for those dealing with various products [1]. It ensures that the right things are available when needed, lowers costs, and increases overall efficiency. An inventory management system (or inventory system) tracks the goods throughout the supply chain, from purchasing to production to end sales [2]-[3]. It governs how the company approaches inventory management for the business. The primary goal of inventory management is to make ordering, stocking, storing, and using inventory for businesses more accessible and efficient [4]. Reasonable inventory control keeps expenses under control and guarantees that companies have the proper inventory [5]. It reduces the surplus inventory as well. A company's management must remain effective and preserve healthy margins with a large inventory [6]. Businesses can accomplish this goal with an efficient inventory management system. Small businesses employ basic spreadsheets or pen-and-paper systems that require human data entry.

This study observed Alfudullallah Co, a prominent store in Sudan's capital. This company sells a wide range of products, including electrical appliances, doors, ceramics, and porcelain, primarily catering to customers building or renovating homes. The company maintains strong relationships with its suppliers, ensuring a consistent supply of diverse and contemporary products. Their customer base includes individual homeowners and contractors seeking modern, high-quality products for construction and interior design projects. Alfudullallah Co still uses spreadsheets to manage its inventory data, tracking stock levels, orders, and deliveries of products imported from Malaysia and China. A primary problem is the lack of a robust inventory management system. Keeping precise track of stock levels is challenging, which might result in overstocking or stockouts. Stockouts lead to disgruntled consumers and lost sales opportunities, while overstocking requires financial resources and takes up significant storage space. The products' diversified character, which results in vast variations in size, value, and demand, exacerbates these problems and makes manual inventory management increasingly unfeasible. Inventory data must be regularly updated to reflect the flow of goods from suppliers to the store and ultimately to customers. This allows the company to efficiently manage stock levels and meet the demands of its clients.

However, the challenges of managing such a diverse inventory, ensuring stock availability, and optimizing operational efficiency have highlighted the need for a sophisticated inventory management system. One of the primary challenges in managing such a varied inventory is maintaining accurate stock levels. Overestimating demand can lead to overstocking, tying up valuable capital and storage space, while underestimating demand can result in stockouts, lost sales, and dissatisfied customers. Hence, the new Inventory Management System addresses these issues by providing real-time data on inventory levels, usage patterns, and reorder points, enabling more informed decision-making. In addition to improving stock accuracy, the system also automates critical processes such as reordering and stock allocation. This automation reduces the likelihood of human error and frees up valuable time for staff to focus on other crucial business areas. Furthermore, the system optimizes warehouse management by organizing inventory based on product turnover rates and space utilization, ensuring that high-demand items are easily accessible while maximizing storage efficiency.

This paper contains five sections. It starts with the project background. Then, the following section describes the literature review. Methodology, system analysis, and design are explained in Section 3. Section 4 then summarizes the project implementation. The last section gives the conclusion.

2. Literature Review

Alfudullallah Co., a prominent retailer based in Sudan's capital, Khartoum, operates in a market where efficient data management is crucial for maintaining competitive advantage. The company deals with various products, including electrical appliances, doors, ceramics, and porcelain imported from Malaysia and China. Despite its prominence, Alfudullallah Co. continues to rely on traditional methods for managing its data and records, including paper forms and basic spreadsheets. These manual processes are labour-intensive and prone to errors, leading to inventory management and order processing inefficiencies. For example, updating inventory levels after sales or new shipments often involves manually counting items and entering data into spreadsheets, a time-consuming process susceptible to inaccuracies. Stevenson [7] highlights that such outdated methods hinder tracking real-time inventory levels, which is critical in a fast-paced retail environment. The lack of real-time data makes it challenging for the company to maintain optimal stock levels, often resulting in overstocking or stockouts.

The company's reliance on manual data management also creates bottlenecks in processing orders and updating inventory records. These bottlenecks can lead to delays in fulfilling customer orders, especially during peak demand periods, and negatively impact on customer satisfaction. The absence of an integrated system for managing inventory data means that the company struggles to coordinate reordering processes when inventory levels are low efficiently. This increases the likelihood of delays in placing orders, receiving shipments, and updating stock records, ultimately affecting the company's ability to meet customer demand.

An Inventory Management System (IMS) is a platform that helps businesses efficiently track, control, and organize their inventory across the supply chain. It manages the flow of goods from suppliers to warehouses and finally to customers, ensuring that the right amount of stock is available at the right time [7]. The primary purpose of an IMS is to streamline inventory processes, prevent overstocking or stock shortages, and improve operational efficiency. As competition grows in today's market, IMSs have become increasingly crucial for businesses to remain agile and responsive to market demands [8]. IMS has several essential features that make it critical for modern business operations. One key characteristic is real-time inventory tracking, providing businesses with accurate, up-to-date stock levels (Stevenson, 2018). This visibility helps with informed decision-making in restocking and sales forecasting [9]. Automated stock alerts are another feature that notifies businesses when stock levels are low to avoid overstocking or stockouts [10]. Many systems also include barcode and RFID integration, simplifying stock-taking and reducing manual errors [11]. In addition, order management features allow the system to automatically generate purchase orders when inventory falls below a certain threshold [7], [12].

From a business perspective, an IMS is used to optimize stock levels and improve operational efficiency [9]. Efficient inventory management helps control costs, as holding excess stock can result in higher warehousing expenses, while stockouts can lead to missed sales opportunities and decreased customer satisfaction [13]. Additionally, an IMS helps businesses maintain the optimal amount of stock, reducing the risk of over-investing in inventory [7], [14]. By maintaining adequate stock levels, businesses can improve cash flow by avoiding tying up capital in surplus stock [11]. Overall, an IMS is vital for businesses of all sizes, modernizing inventory processes, minimizing human error, and ensuring readiness to meet customer demand [7]. Features such as real-time tracking, automated reordering, and detailed reporting improve operational efficiency and support data-driven decision-making [8]. As companies expand, IMSs provide the scalability to handle increasing inventory demands, ensuring smooth business operations and sustainable growth [10], [13].

The limitations of the current data management practices at Alfudullallah Co. are not unusual among businesses that have yet to adopt modern technological solutions. However, implementing an advanced IMS can address these challenges by automating key processes, reducing manual intervention, and offering real-time visibility into stock levels (Laudon & Laudon, 2019). Such systems, especially in retail, provide features such as automated stock tracking, low stock alerts, and demand forecasting based on historical data [7]. By adopting these systems, businesses like Alfudullallah Co. can respond quickly to fluctuations in inventory and ensure that products are always available to meet customer demands [10], [12].

Table 1 System Comparison

System	IKEA IMS	Sephora IMS	Oracle NetSuite	Proposed System
Feature				
Automated Replenishment	Automated stock replenishment when thresholds are met	Automated stock replenishment to reduce stockouts	Automated restocking based on sales and stock levels	Automated purchase orders when stock falls below a set level
SKU Management	Handles product variants and sizes efficiently	Effective for managing different shades, sizes	Comprehensive SKU management for all product types	Efficient management of product types, though fewer variations than Sephora
Supplier Management	Detailed supplier tracking and performance data	Limited supplier interaction, focused on stock	Extensive supplier integration and tracking	Tracks supplier performance and automates ordering processes
Order Management	Coordinates store and warehouse inventory.	Seamless integration with orders and stock	Full integration with order fulfilment	Ensures stock is available for customer orders
Warehouse Management	Optimises storage and product flow in warehouses	Supports stock allocation across warehouses	Comprehensive warehouse management tools	Streamlined storage and distribution in warehouses
Users	Warehouse staff, store managers, supply chain managers	Warehouse staff, store managers, and customer service	Warehouse managers, procurement teams, and executives	Warehouse staff, store managers, supply chain managers
User interface and user experience	User-friendly with real-time dashboards	Simple, mobile-friendly, colour-coded alerts	Comprehensive but steep learning curve	Simple, intuitive design with colour-coded alerts

Given the challenges associated with the current data management practices at Alfudullallah Co., implementing a modern inventory management system could offer significant improvements. The company can reduce the likelihood of errors and enhance its ability to meet customer demand by automating inventory level tracking and easing the reordering process. One of the key benefits of implementing such a system would be the ability to receive real-time notifications when inventory levels are low. This feature would allow the administrator to promptly initiate the reordering process, ensuring that stock levels are replenished before they reach critical

lows. As noted by Huang [15], this proactive approach to inventory management can prevent stockouts, which are costly in terms of lost sales and damage to customer satisfaction and brand reputation.

Furthermore, the ability to maintain accurate and up-to-date inventory records would simplify the overall management of stock. Having all inventory details readily available in the system allows the administrator to quickly update stock levels upon receiving new shipments. This ensures that the inventory data remains accurate, providing a clear picture of the company's stock. In addition to improving inventory management efficiency, adopting a modern system would enhance the company's overall decision-making capabilities. With access to detailed reports and analytics, Alfudullallah Co. can better understand its sales trends, identify high-demand products, and adjust its inventory strategy accordingly. This data-driven approach would allow the company to optimize its inventory levels, reduce holding costs, and increase profitability.

To fully appreciate the potential benefits of implementing a modern inventory management system at Alfudullallah Co., comparing the company's current practices with those of other businesses that have already adopted such systems is beneficial. Companies like IKEA and Sephora have successfully integrated advanced inventory management tools into their operations, offering valuable insights into the capabilities of these systems. Each system has its strengths and limitations, depending on the scale of operations and the business's specific needs. Table 1 provides a comparison summary based on key features, users, advantages, disadvantages, and overall performance.

3. Methodology

The development follows an iterative prototyping model to incorporate user feedback and ensure alignment with operational requirements. The cycle includes review and testing phases, where feedback is incorporated before moving to implementation and, finally, maintenance. This iterative process allows continuous refinement until the system fully meets user expectations, making it suitable for developing the Inventory Management System (IMS). Table 2 gives a summary of software development activities.

Table 2 *Software development activities and their task*

Phase	Task	Output
Planning	Proposed the project	Project proposal
	Determine the project schedule, activities and output	Gantt chart
Analysis	Analyze the current system and gather user requirements	System requirements
	Identify the limitations of the current methods	Data flow diagram (DFD)
	Review potential risks	Entity relationship diagram (ERD)
		Flowchart
Design	Design the system architecture and user interface.	System architecture
	Develop the database structure	Database schema and data dictionary
	Design functional modules for inventory tracking, reporting	User interface design
		Module design documentation
Implementation	Develop the system based on the prototype	Functional inventory management system
	Code the different modules (inventory, supplier, etc.)	Working software components
Testing	Conduct unit testing, integration testing, and user testing	Bug reports
	Gather user feedback and adjust	Updated system
Deployment	Install the system in a live environment	Deployed IMS
	Train users on how to use the new system	User training manuals

Table 3 *System's Functional Modules*

Modules	Function	User
1. Registration and Login Module	The system allows administrators to create new user accounts for employees. Once registered, employees can access the system.	Administrator Staff
2. Inventory Management Module	This module allows users (staff) to manage inventory, search for specific items, monitor real-time inventory levels, and notify administrators to initiate reorders.	Staff
3. Supplier Management Module	This module enables the administrator to manage supplier information, track supplier details, and manage orders.	Administrator
4. Order Management Module	The module allows administrators and staff to manage product orders to maintain sufficient inventory levels.	Administrator Staff
5. Reporting	This module generates reports on sales, stock levels, purchase orders, invoices, etc.	Administrator

3.1 System Requirements Analysis

This section analyses the system requirements for the new system. The system is designed to improve inventory management efficiency by automating stock tracking and supplier management and simplifying order processing. The functional modules are outlined in Table 4.

Table 4 *Functional requirements.*

Module	Description
1. Registration and Login Module	- The system should allow the administrator to register employees (users) into the system. - The system should permit users to log in using their registered credentials (email and password). - The system should generate an error message if a duplicate email is entered during registration. - The system should display an error notification when a required field is blank. - The system should notify users if the provided input is incorrect or does not meet the required criteria.
2. Inventory Management Module	- The system should enable users to add, modify, remove, and search for products in the inventory. - The system should provide real-time updates on inventory levels and alert users when stock is low or depleted. - The system should notify the administrator (manager) to initiate a reorder from the supplier when a product's quantity reaches a limit. - The system should allow staff to update inventory upon receiving the new stock.
3. Supplier Management Module	- The system should allow the administrator to manage suppliers' information. - The system should allow administrators to record order history.
4. Order Management Module	- The system should allow the administrator to update inventory levels when new stock orders arrive. - The system will notify the administrator when a product's quantity is low or zero. - The administrator, upon receiving the notification, will manage the ordering process in the system. - Once the new stock arrives, the administrator should update the inventory levels in the system
5. Generates report	Generate reports such as sales, stock level, purchase order, invoice, etc.

Table 5 *Non-functional requirements.*

Requirement	Description
1. Performance	The system should always be usable.
2. Operational	The loading time required for a website is no more than 1 minute.
3. Security	The system should be user-friendly.
4. Compatibility	The system should function effectively on all modern web browsers, including Chrome, Firefox, and Edge.

The new system is designed to meet the specific needs of its users, ensuring smooth operation and efficient management of inventory processes. The key users of the system include the manager (administrator) and employees. Table 6 lists user requirements essential for the system's successful functioning. Table 7 lists the hardware and software requirements of the developed system.

Table 6 *User requirements.*

No	Requirement
1.	All users (employees) must have an account with a valid email and password to access the system.
2.	Employees should be able to view and manage inventory records as part of their daily tasks.
3.	Employees should be able to update inventory levels when products are added or removed.
4.	Employees should be able to view real-time inventory data.
5.	The manager (administrator) should be able to register new employees into the system.
6.	The manager should be able to monitor inventory levels and stock reordering.

Table 7 *Hardware and software requirement*

Aspect	Requirement
Operating system	Window 7 or above
CPU	Minimum 2GHz
Memory	Minimum 4GB RAM
Internet connection	Wi-Fi or hotspot connection
Web browser	Google chrome, Internet explorer or Microsoft Edge
Server Software	XAMPP (MySQL)
Programming Language	PHP
Database	MySQL
Text Editor	Visual Studio Code

3.2 System Analysis

The system analysis results, which are a data flow diagram and an entity relationship diagram, are defined in this sub-section. A structured approach is used to perform system analysis. Figure 1 shows the context diagram of the developed system. The context diagram shows interactions between the Administrator, Employee, and Supplier. The Administrator manages authentication, generates reports, and receives products, suppliers, and order updates. Employees authenticate to access and update product, order, and supplier details, while Suppliers provide information for system updates. Figure 2 depicts the new system's Level 0 Data Flow Diagram (DFD 0).

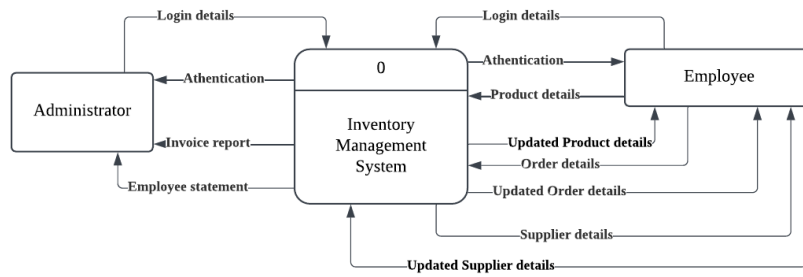


Fig. 1 Context Diagram

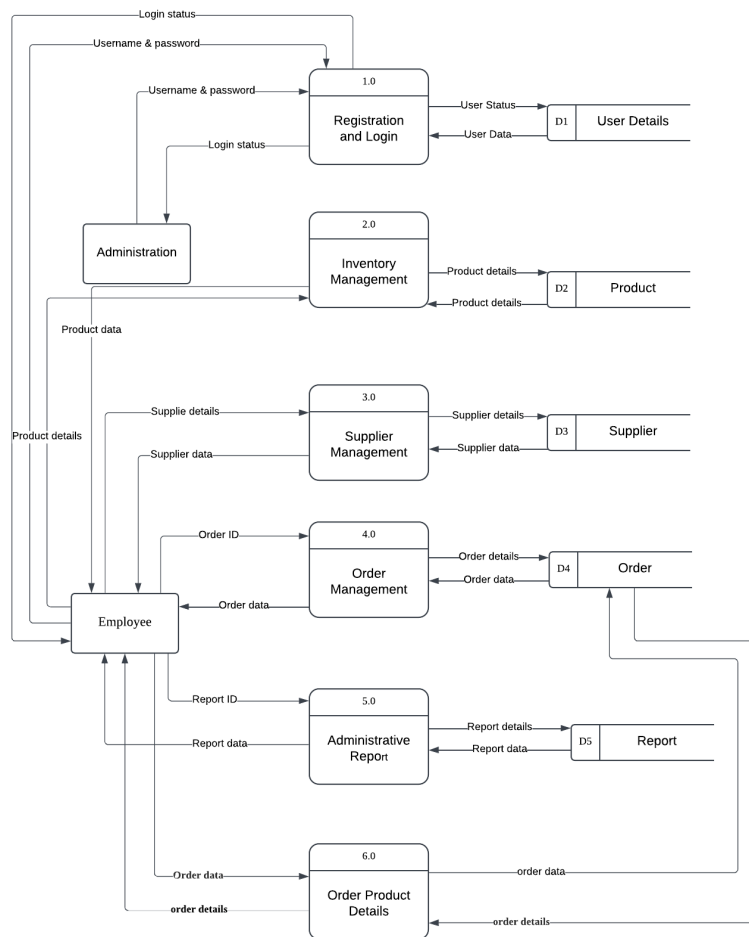


Fig. 2 Data Flow Diagram Level 0

The Entity Relationship Diagram (ERD) in Figure 3 outlines the system's key data entities and relationships, defining the database's structure. The main entities are Employee, Administrator, Product, Supplier, Report, and Order, each with specific attributes. Administrators can add Employees, manage Reports, add Products, oversee Suppliers, and create Orders.

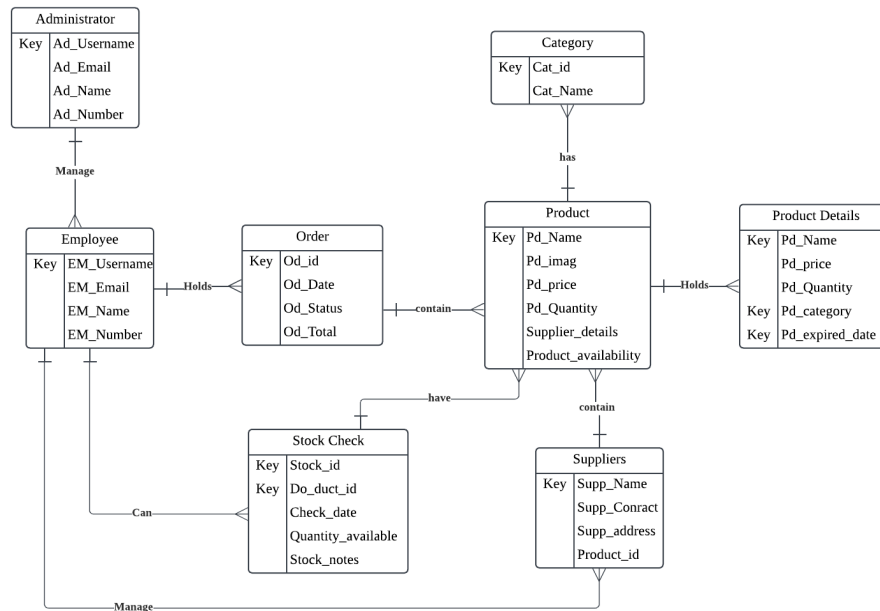


Fig. 3 Entity Relationship Diagram

The flowchart in Figure 4 illustrates the workflow of a system, starting with registration and login. Upon successful login, the user can access modules for Products, Orders, Suppliers, and Reports. After using the modules, the user can end the session, which leads to the end of the process. If registration or login fails, the process loops back. Similarly, after managing Products, Orders, Suppliers or Reports, the process loops back to the option to select any of the four modules again.

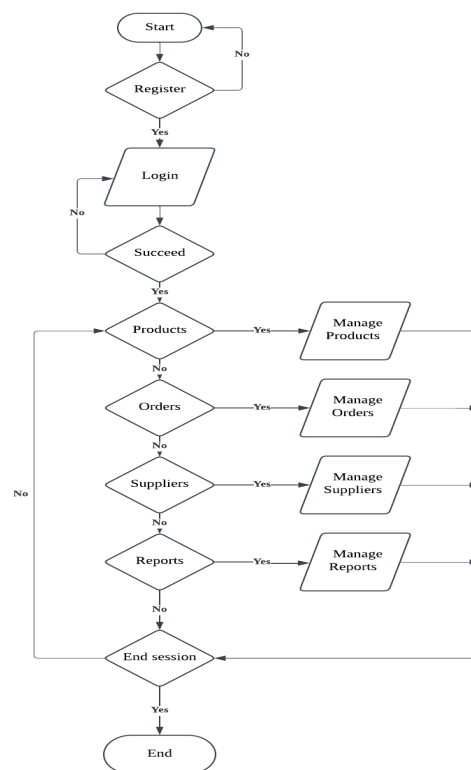


Fig. 4 System's Flowchart

3.3 System Design

In this phase, the interface and database were designed to help visualize the system before proceeding with the system's coding. Figure 5 illustrates the overall architecture of the Alfudullallah Inventory Management System. The system architecture depicts an Inventory Management System with interactions between different components. Both Admin and Staff interact directly with the Inventory Management System interface. The Inventory Management System communicates with a Web Server. The Web Server then sends requests to and receives responses from a Database.

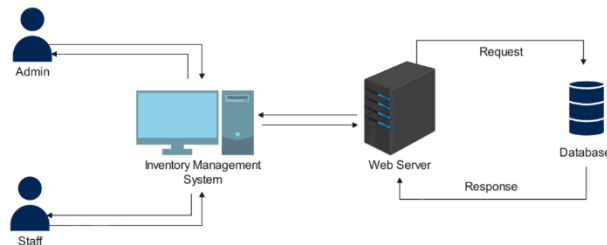


Fig. 5 System Architecture

The system has the following relational schema of database tables:

- i. Tbl_administrators (Ad_Username, Ad_Email, Ad_Name, Ad_Number)
- ii. Tbl_employees (EM_Username, EM_Email, EM_Name, EM_Number)
- iii. Tbl_categories (Cg_Name, Cg_Description, Cg_Colour)
- iv. Tbl_products (Pd_Name, Pd_Image, Pd_Price, Pd_Quantity, Product_Availability, Supplier_Details)
- v. Tbl_orders (Od_ID, Customer_Name, Od_Date, Od_Status, Od_Total)
- vi. Tbl_stock_check (Stock_ID, Do_duct_id, Check_Date, Quantity_Available, Stock_Notes)
- vii. Tbl_suppliers (Supp_Name, Supp_Contact, Supp_Address)
- viii. Tbl_product_details (Pd_Name, Pd_Price, Pd_Quantity, Pd_Category, Pd_Expired_Date)
- ix. Report Table (report_id, report_date_report_id)

The following interfaces illustrated from Figure 6 to Figure 10 were designed based on each key process identified in the system analysis.

Fig. 6 Login Interface Design

Products	Imag	Name	Quantl	Supplier	Price	Availabl	Action
							EditDel

Fig. 7 Manage Product Interface Design

Orders	Order Id	Customer Name	Order Date	Status	Total	Actions
						View/Edit/Delete

Fig. 8 Manage Order to Supplier Interface Design

Suppliers	Supplier Name	Contact Info	Address	Actions
				Edit/Delete

Fig. 9 Manage Suppliers Interface Design

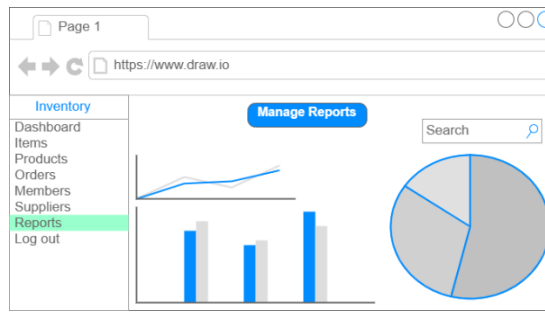


Fig. 10 Report Management Interface Design

Each design decision aligns with user requirements gathered in earlier phases, ensuring the system is functional and user-friendly. These designs are the foundation for the next development phase, providing a structured plan for implementing and testing each system component to meet Alfudullallah Co.'s operational needs.

4. Implementation

In this phase, the system was implemented and tested to ensure it met the operational needs of Alfudullallah Co. Software tools were used, including Adobe Dreamweaver for web development, XAMPP for server and database management, and Microsoft Visual Studio for developing the facial recognition system.

4.1 System Implementation

There are two main aspects of implementation for this project: the website and the database. The system is developed as a web-based application to facilitate inventory tracking, warehouse management, and order processing.

a. User Registration and Login

Only the administrator can add new members to the system. Unlike traditional self-registration systems, employees cannot create their own accounts. The administrator must manually input the user's username, email, full name, phone number, and password, then assign a role as either Admin or Employee using a dropdown menu. Once the details are entered, clicking the "Add Member" button triggers a SQL INSERT query, storing the new user's credentials in the MySQL database. If the query executes successfully, the system grants the newly added staff member the ability to log in with the credentials assigned by the administrator.

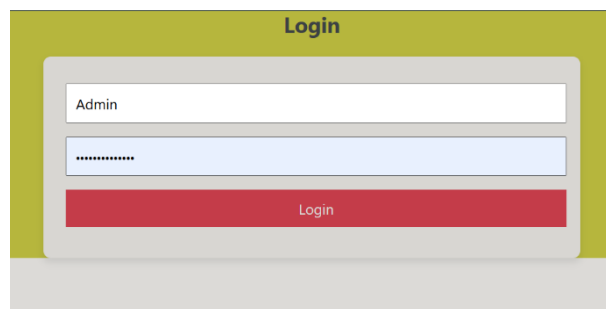


Fig. 11 Login Interface Page

Figure 11 demonstrates the login interface. The password is securely hashed using `password_hash()` to enhance security and prevent unauthorized access. This implementation secures account management by restricting access, protecting credentials, and ensuring only verified employees can log in. The use of password encryption and prepared statements further enhances system security and data integrity.

b. Product Management Module

The Product Management Module is a key component of the inventory system that enables administrators to view, add, edit, and delete products. It provides a structured table displaying product details such as name, price, quantity, supplier information, and availability status. The system also includes interactive features such as edit and delete buttons, as well as export options for inventory reports. Figure 12 shows the Manage Products interface, where administrators can efficiently view and organize inventory items. The interface consists of a structured table displaying essential product details such as Product Image, Product Name, Price, Stock Quantity,

Supplier Details, and Availability Status. The availability status is visually represented using a color-coded tag for easy identification. The interface also includes edit and delete buttons for modifying product details, along with a search bar and export options (CSV, Excel, Print) to streamline inventory tracking. Additionally, the "Add Product" button provides a quick way to expand the inventory database by adding new products to the system.

Image	Product	Price	Qty	Supplier Details	Availability	Action
	Tiles for Homes	\$100.00	13	Ibrahim Asim	Active	Edit Delete
	window	\$150.00	16	Omar	Active	Edit Delete
	Chair	\$220.00	32	Mohamed	Active	Edit Delete
	Table	\$110.00	55	Ahmed	Active	Edit Delete

Fig. 12 *Manage Products Interface*

c. Order Management Module

Figure 13 illustrates the Manage Orders interface, a user-friendly platform designed to streamline order management for administrators. The interface presents a structured table displaying key order details, including Order ID, Customer Name, Order Date, Status (Completed, Pending, or Cancelled), and Total Amount. This allows administrators to easily monitor the progress of each transaction. A search bar facilitates quick filtering of orders, while export options (CSV, Excel, Print) enable efficient record-keeping and data analysis. The system dynamically retrieves order data from the database and displays it in real-time using a foreach loop to iterate through the order list, ensuring data accuracy. Interactive controls, such as View, Edit, and Delete options, provide administrators with the ability to modify or remove orders as needed. Furthermore, the "Add Order" button redirects administrators to the order entry form. This function enables them to quickly create new customer orders and ensures a smooth, well-organised order management process.

Order ID	Customer Name	Order Date	Status	Total	Actions
25	Ibrahim Asim	2025-01-10	Completed	\$670.00	View Edit Delete
26	Ahmed	2025-01-15	Pending	\$110.00	View Edit Delete
27	Ali	2025-01-15	Cancelled	\$450220.00	View Edit Delete
28	Ali	2025-02-23	Completed	\$150.00	View Edit Delete
29	Mohamed	2025-03-09	Completed	\$220.00	View Edit Delete
30	Ah37	2025-03-09	Completed	\$440.00	View Edit Delete
31	Ali	2025-03-09	Completed	\$110.00	View Edit Delete

Showing 1 to 7 of 7 entries

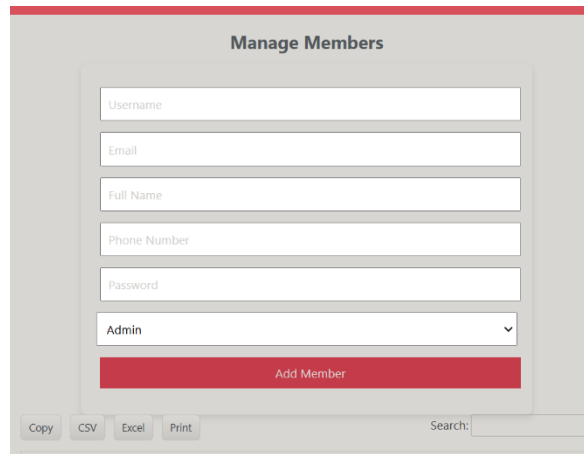
[Previous](#) [Next](#)

Fig. 13 *Manage Orders Interface*

d. User Management Module

Figure 14 illustrates the Manage Members interface, designed for efficient system user management. Through a streamlined process, administrators can easily add, update, or remove user accounts. The interface features clearly labelled input fields for essential user details: username, email, full name, phone number, and password. A user role selection dropdown (Admin or Employee) simplifies permission assignment. For quick reference, a structured table provides a comprehensive overview of all registered users, enabling administrators to quickly identify and modify or delete accounts as needed. To further enhance efficiency, a search bar allows rapid user filtering, and export options (CSV, Excel, Print) facilitate report generation. User security is paramount: the system

automatically hashes passwords using `password_hash()` before storing them in the database when adding new users. When editing existing users, the system updates credentials while maintaining password security, leaving the existing password unchanged if a new one is not provided. The "Add Member" button provides immediate access to the user registration form, and the system also includes functionality to delete user accounts, ensuring comprehensive and secure management of system members.

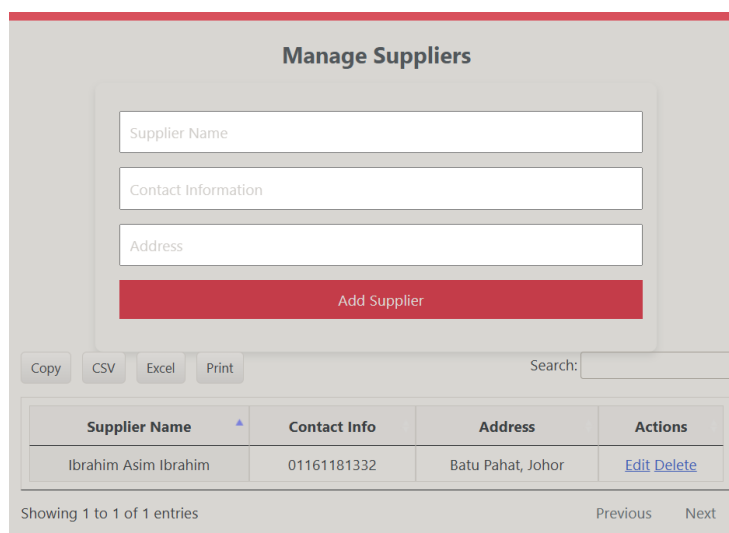


The "Manage Members" interface features a central form with the following fields: Username, Email, Full Name, Phone Number, Password, and a dropdown menu for Role (currently set to "Admin"). A prominent red "Add Member" button is located below the form. At the bottom of the interface, there are buttons for "Copy", "CSV", "Excel", and "Print", along with a "Search:" input field.

Fig. 14 *Manage Members interface*

e. Supplier Management Module

Figure 15 illustrates the Manage Suppliers interface, designed for efficient supplier record management. Administrators can easily add, update, or remove supplier information through a streamlined process. The interface features clearly labeled input fields for supplier name, contact information, and address. A structured table provides a comprehensive overview of existing suppliers, with each entry displaying key details and a convenient action button for deleting suppliers as needed. The "Add Supplier" button allows for quick registration of new suppliers. To ensure data integrity, the system displays an error message if the address field is undefined, indicating a missing data issue. This module enhances supplier management by maintaining accurate records, ensuring seamless integration with inventory tracking and procurement processes. The system prioritizes security by using prepared SQL statements to insert supplier data into the database, effectively preventing SQL injection risks. In addition, the system dynamically displays all stored suppliers on the interface, and provides functionality to delete existing suppliers, ensuring effective supplier list management.



The "Manage Suppliers" interface includes a form with fields for "Supplier Name", "Contact Information", and "Address", followed by a red "Add Supplier" button. Below the form is a table listing existing suppliers. The table has columns for "Supplier Name", "Contact Info", "Address", and "Actions". A single entry is shown for "Ibrahim Asim Ibrahim" with contact number "01161181332" and address "Batu Pahat, Johor". The "Actions" column contains links for "Edit" and "Delete". At the bottom, it indicates "Showing 1 to 1 of 1 entries" and includes "Previous" and "Next" navigation links. The interface also features "Copy", "CSV", "Excel", and "Print" buttons, and a "Search:" field.

Supplier Name	Contact Info	Address	Actions
Ibrahim Asim Ibrahim	01161181332	Batu Pahat, Johor	Edit Delete

Fig. 15 *Manage Suppliers interface*

f. Reports Module

The Reports Module provides a comprehensive overview of key business metrics, including total orders, products, and sales, empowering informed decision-making and business trend analysis. The module presents these metrics through both numerical summaries and interactive charts. Figure 16, the Manage Reports interface, displays three key statistics in summary cards: Total Orders (the number of completed transactions), Total Products (the number of unique products in the inventory), and Total Sales (the total revenue generated). The Top-Selling Products chart visualizes the most frequently purchased products, while the Sales Over Time chart depicts monthly revenue trends. To generate these insights, the system efficiently fetches key sales and product-related metrics from the database. SQL queries leverage aggregation functions such as COUNT() and SUM() to compute total orders, products, and sales. The system also identifies top-selling products by joining the order_items and products tables, ranking product performance based on the highest quantity sold.

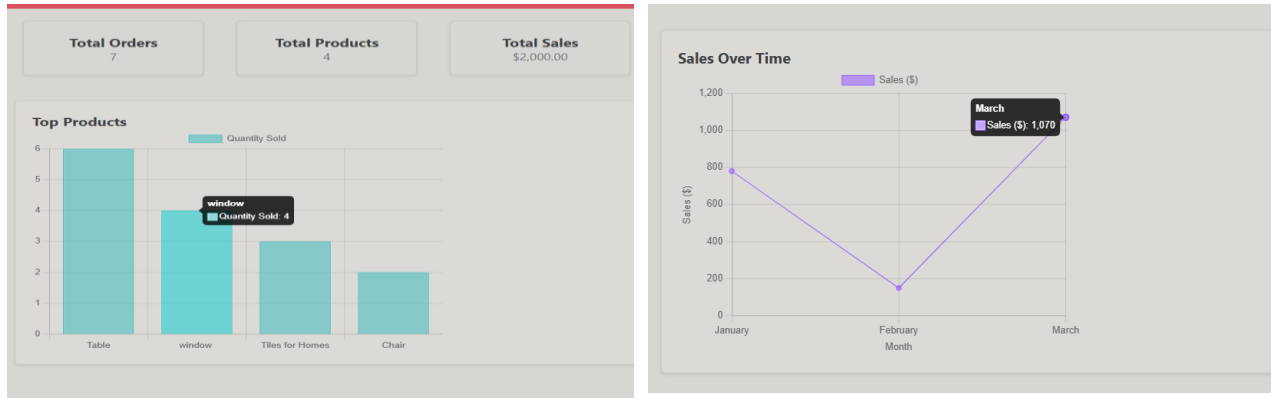


Fig 16 the Manage Reports interface

4.2 System Testing

In this section, a test will be carried out to assess the functionality of each module. A User Acceptance Test (UAT) method is utilized to perform testing. Functional testing verifies that the software system operates as expected and meets specified requirements. This involves providing inputs, analyzing outputs, and confirming correct system function. Table 7 presents the functional test results for the developed system.

Table 8 Functionality Test Result

Function	Description	Expected Result	Actual	Result
Account Registration and Login	Verify if the administrator can register for an account	The user should be able to create an account	The user has successfully created an account	Pass
	Verify if the administrator can log in to the system	The user should be able to log in to the system	The user has successfully logged into the system	Pass
	To check whether the system will restrict login whenever a wrong credential is entered	The system should restrict login when incorrect credentials have been entered	The system restricted the login when an incorrect or no credentials have been entered	Pass
Product Management	Verify if an administrator can add a new product	The system should allow the addition of a new product	The product was successfully added to the inventory	Pass
	Verify if an administrator can edit product details	The system should allow modifying existing product details	The product details were successfully updated	Pass
	Verify if an administrator can delete a product	The system should remove the selected product from the inventory	The product was successfully deleted	Pass
	Verify if the system displays all stored products correctly	The system should retrieve and display all products dynamically	The system successfully displayed all products	Pass

Table 8: (Cont)

Function	Description	Expected Result	Actual	Result
Order Management	Verify if an administrator can place a new order	The system should allow placing a new order	The order was successfully created and stored in the system	Pass
	Verify if an administrator can update order details	The system should allow modifying existing order details	The order details were successfully updated	Pass
	Verify if an administrator can delete an order	The system should allow the removal of an order from the system	The order was successfully deleted	Pass
	Verify if the system displays all stored orders correctly	The system should retrieve and display all orders dynamically	The system successfully displayed all orders	Pass
User Management	Verify if an administrator can add a new user	The system should allow adding a new user account	The user account was successfully created and stored in the system	Pass
	Verify if an administrator can update user details	The system should allow modifying existing user details	The user details were successfully updated	Pass
	Verify if an administrator can delete a user account	The system should allow the removal of a user from the system	The user account was successfully deleted	Pass
	Verify if the system displays all registered users correctly	The system should retrieve and display all user accounts dynamically	The system successfully displayed all users	Pass
Supplier Management	Verify if an administrator can add a new supplier	The system should allow adding a new supplier record	The supplier was successfully added to the system	Pass
	Verify if an administrator can update supplier details	The system should allow modifying supplier details	The supplier details were successfully updated	Pass
	Verify if an administrator can delete a supplier	The system should allow the removal of a supplier from the system	The supplier was successfully deleted	Pass
	Verify if the system displays all suppliers correctly	The system should retrieve and display all stored suppliers dynamically	The system successfully displayed all supplier records	Pass
Report Management	Verify if the system retrieves and displays total orders, total products, and total sales correctly	The system should fetch and present the correct data on total orders, products, and sales	The system successfully retrieved and displayed the correct values	Pass
	Verify if the system generates and displays top-selling products dynamically	The system should retrieve sales data and generate a bar chart of top-selling products	The system successfully displayed the top-selling products chart	Pass
	Verify if the system generates and displays sales trends over time	The system should retrieve order data and generate a line chart representing sales over time	The system successfully displayed the sales trends chart	Pass

5. Conclusion

In conclusion, the IMS developed for Alfudullallah Co. effectively addresses the critical challenges associated with manual inventory management. By providing automated tracking, comprehensive reporting, and optimized warehouse operations, this system is projected to significantly enhance operational efficiency. This enhancement is expected to translate into measurable benefits. This includes a reduction in inventory holding costs, minimised stockouts, and improved order fulfilment times. Ultimately, these improvements will contribute to increased customer satisfaction and a stronger competitive position for Alfudullallah Co. in the market.

Acknowledgment

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Ibrahim Asim, Nureize Arbaiy; **data collection:** Ibrahim Asim, Nureize Arbaiy; **analysis and interpretation of results:** Ibrahim Asim, Nureize Arbaiy; **draft manuscript preparation:** Ibrahim Asim. All authors reviewed the results and approved the final version of the manuscript.*

References

- [1] Muller, M. (2019). Essentials of inventory management. HarperCollins Leadership.
- [2] Aro-Gordon, S., & Gupte, J. (2016). Review of modern inventory management techniques. Global Journal of Business & Management, 1(2), 1-22.
- [3] Niaz, M. (2022). Revolutionizing Inventory Planning: Harnessing Digital Supply Data through Digitization to Optimize Storage Efficiency Pre-and Post-Pandemic. BULLET: Jurnal Multidisiplin Ilmu, 1(03).
- [4] Inegbedion, H., Eze, S. C., Asaleye, A. J., & Lawal, A. I. (2019). Inventory management and organisational efficiency. The Journal of Social Sciences Research, 5(3), 756-763.
- [5] Macas, C. V. M., Aguirre, J. A. E., Arcentales-Carrión, R., & Peña, M. (2021, March). Inventory management for retail companies: A literature review and current trends. In 2021 Second International Conference on Information Systems and Software Technologies (ICI2ST) (pp. 71-78). IEEE.
- [6] Almrdo, F., & Attia, A. (2021). The effect of inventory management practices on productivity. PalArch's Journal of Archaeology of Egypt/Egyptology, 18(15), 256-265.
- [7] Stevenson, W. J. (2018). Operations Management (13th ed.). McGraw-Hill Education.
- [8] Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2020). How 'big data' can make big impact: Findings from a systematic review and a longitudinal case study. International Journal of Production Economics, 165, 234-246.
- [9] Laudon, K. C., and Laudon, J. P. (2019). Management Information Systems: Managing the Digital Firm (16th ed.). Pearson.
- [10] Zhou, J., Wang, J., & Luo, Y. (2021). Real-time inventory tracking in smart manufacturing: A framework for small to medium enterprises. Journal of Manufacturing Systems, 58, 76-88.
- [11] Azuma, R. T. (2001). A Survey of Augmented Reality. IEEE Computer Graphics and Applications, 21(6), 34-47.
- [12] Sharda, R., Delen, D., & Turban, E. (2021). Business Intelligence, Analytics, and Data Science: A Managerial Perspective (5th ed.). Pearson.
- [13] Choi, S., and Yi, M. (2018). The Application of Augmented Reality in Retail. Journal of Retailing and Consumer Services, 43, 100-108.
- [14] Slack, N., Chambers, S., & Johnston, R. (2019). Operations Management (8th ed.). Pearson Education.
- [15] Huang, T. (2019). The Evolution and Future of Retail Technologies: Applications of Augmented Reality in Customer Experience. Journal of Retail Innovation, 7(3), 45-58.