**CASE STUDY**

**IN**

**ADVANCE**

**DATABASE**

Submitted by:

**ALIMURUNG, Marco M.**

**SANTOS, Stephen Kyle**

**VILLANUEVA, Joanna B.**

*Bachelor of Science in Computer Science Students*

Section C

Submitted to:  
  
**Mr. Arjay D. Balberan***Instructor*

**Table of Contents**

**1. Introduction ----------------------------------------------------------------------------------------** Page 4

* 1. Background of the store **--------------------------------------------------------------------** Page 4
  2. Importance of an Inventory Management System **--------------------------------------** Page 5
  3. Objectives of the System **-------------------------------------------------------------------** Page 6
     1. General objective **--------------------------------------------------------------------** Page 6
     2. Specific objectives **------------------------------------------------------------------** Page 6

1. **Literature Review --------------------------------------------------------------------------------** Page #
   1. Existing Inventory Management Systems in Restaurants **------------------------------** Page #
   2. Best Practices in Inventory Management **-------------------------------------------------** Page #
   3. Relevant Technologies **----------------------------------------------------------------------** Page #

**3. System Requirements and Design -------------------------------------------------------------** Page 9

3.1 System Requirements **------------------------------------------------------------------------** Page 9

3.1.1 Hardware Requirements **--------------------------------------------------------------** Page 9

3.1.2 Software Requirements **---------------------------------------------------------------** Page 9

3.1.3 Network Requirements **---------------------------------------------------------------** Page 9

3.2 Functional Requirements **--------------------------------------------------------------------** Page 9

3.3 Database Design **----------------------------------------------------------------------------** Page 10

3.3.1 Entity-Relationship Diagram (ERD) **----------------------------------------------** Page 10

3.3.2 Data Flow Diagram (DFD) **---------------------------------------------------------** Page 10

3.4 Database Tables **-----------------------------------------------------------------------------** Page 10

3.5 System Architecture **------------------------------------------------------------------------** Page 10

**4. Development Process -----------------------------------------------------------------------------** Page

4.1 Planning **----------------------------------------------------------------------------------------** Page #

4.2 Analysis **----------------------------------------------------------------------------------------** Page #

4.3 Design **------------------------------------------------------------------------------------------** Page #

4.4 Implementation **--------------------------------------------------------------------------------** Page #

4.5 Testing **------------------------------------------------------------------------------------------** Page #

4.6 Deployment **------------------------------------------------------------------------------------** Page #

**5. User Testing and Feedback ----------------------------------------------------------------------** Page #

5.1 Testing Procedures **----------------------------------------------------------------------------** Page #

5.2 Issues Identified **-------------------------------------------------------------------------------** Page #

5.3 Solutions Implemented **-----------------------------------------------------------------------** Page #

5.4 Feedback from Users **-------------------------------------------------------------------------** Page #

5.5 Final Adjustments **-----------------------------------------------------------------------------** Page #

**6. Grades** **-----------------------------------------------------------------------------------------------** Page #

**7. References** ------------------------------------------------------------------------------------------- Page #

**Introduction**

***Background of Andok’s Concepcion Branch***

Andok's Concepcion Tarlac branch located in 8MF3+QFR, L. Cortez St, Concepcion, Tarlac is part of the well-known Andok's chain, famous for its Filipino grilled dishes. Like other restaurants, it needs to carefully manage its supply of fresh ingredients, making a good system for tracking inventory essential.

The branch currently uses a manual inventory system, where staff track stock levels and expiration dates on paper. They write down when supplies are received and when they expire in physical logs. Although this method is straightforward, it comes with issues like data entry mistakes, no real-time tracking, and no automatic alerts when stock is low or items are near expiration.

**Issues faced with the current system:**

**Innacurate Inventory Levels :** Due to the reliance on manual tracking, there may be discrepancies between actual stock and recorded inventory, leading to shortages or overstock situations.

**Inefficient Use of Staff Resources:** Employees spend a significant amount of time on manual inventory tasks instead of focusing on customer service and other essential operations.

**Delayed Restocking:** Without timely access to inventory data, there can be delays in restocking essential items, affecting service quality and customer satisfaction.

**Difficulty in Tracking Trends:** The absence of automated analytics makes it challenging to identify sales trends and adjust inventory levels accordingly, potentially resulting in lost sales opportunities.

#### *Importance of an Inventory Management System*

General Overview of Inventory Management: Inventory management is an important part of running a business, especially in restaurants. It includes keeping track of stock levels, managing orders, and making sure items are available when needed. A good inventory management system helps businesses find the right balance between having enough products to meet customer demand and avoiding too much stock that could spoil or not be used.

Why Accurate Inventory Tracking is Vital for Restaurant Operations: For restaurants like Andok’s Concepcion Branch, keeping track of inventory accurately is essential for several reasons:

**Reduces Waste:** By monitoring expiration dates and stock levels, the restaurant can minimize waste from spoiled items.

**Guarantees Stock Availability:** It ensures that key ingredients are always on hand, preventing popular menu items from running out.

**Enhances Financial Efficiency:** Effective inventory management prevents overstocking or understocking, which helps control costs and reduces unnecessary expenses.

**Optimizes Operations**: Automated inventory systems cut down the time spent on manual stock counts, enabling staff to concentrate on other important tasks.

***Objectives of the System***

**General Objective:**

The main goal of this project is to develop an inventory control system for Andok's Concepcion branch. This system will help track stock levels and expiration dates more efficiently and reduce the need for manual methods.

**Specific Objectives:**

**Achieve Accurate Inventory Levels:** Implement an automated tracking system to ensure that recorded inventory matches actual stock levels, reducing discrepancies and preventing shortages or overstock situations.

**Enhance Staff Efficiency:** Streamline inventory management tasks through automation, allowing employees to dedicate more time to customer service and other important operations.

**Ensure Timely Restocking:** Provide real-time access to inventory data to facilitate prompt restocking of essential items, improving service quality and customer satisfaction.

**Facilitate Trend Analysis:** Implement automated analytics tools to track sales trends effectively, enabling adjustments to inventory levels and maximizing sales opportunities.

***Literature Review***

In their 2021 study titled "The Inventory Control System’s Weaknesses Based on the Accounting Postgraduate Students’ Perspectives," Ahmed, Essia Ries, Alabdullah, Tariq Tawfeeq Yousif, Ardhani, Lutfi, and Putri, Eskasari highlight the significance of accurate inventory recording in management decision-making. They emphasize that the decisions made by management regarding the recording of selling inventory from the previous year are as critical as defining the economic order size within the inventory management system. However, existing studies on accounting management, accounting education, and operational management have not adequately addressed these procedures, raising concerns about potential manipulations, fraud, or errors by management.

The recent qualitative study involved interviews with 32 accounting postgraduate students to gather their insights on perceived weaknesses in inventory management. Findings indicated that inventory management practices were inadequately executed, revealing several issues and violations attributed to sales managers. It was noted that these managers manipulated inventory management to align with their interests, exhibiting earning management behavior. Importantly, while such actions were not classified as fraud, they were identified as manipulation behaviors that undermine the integrity of inventory management.

In their 2020 study titled "Demand Forecasting Tool For Inventory Control Smart Systems," Fatima Zohra Benhamida, Ouahiba Kaddouri, Tahar Ouhrouche, Mohammed Benaichouche, Diego Casado-Mansilla, and Diego Lopez-de-Ipina highlight the critical role of accurate demand forecasting in enhancing inventory control systems. The researchers emphasize that effective inventory management is vital for maintaining optimal product availability while minimizing storage costs.

The study introduces an advanced demand forecasting tool integrated within smart inventory control systems, which leverages predictive algorithms to forecast product demand more accurately. This tool helps optimize order quantities and inventory levels, reducing excess stock and associated costs. By comparing various forecasting models, the study assesses their contribution to improving inventory control processes and identifies gaps in current methodologies, offering insights for future research to develop more efficient and intelligent inventory systems.

In their 2019 study titled "Comparison Study about Inventory Control System from Some Papers in Indonesian Case Study," Shelinsca Hoswari, Lina Gozali, Iveline Anne Marie, and I Wayan Sukania emphasize the importance of inventory management in production. They argue that controlling raw material inventory is crucial to optimizing order quantities for production processes, preventing slow-moving inventory, and addressing the high costs associated with production.

The researchers explore various inventory control methods to identify the most effective approach for minimizing total inventory costs. Their study highlights the importance of choosing the right method to determine the optimal order quantity, which can enhance the overall efficiency of inventory management. The aim of the paper is to analyze gaps in existing studies on inventory control, quantity optimization, and cost management, offering a comparative study that could provide a foundation for future research in improving inventory systems.

***System Requirements and Design***

**System Requirements**

**Hardware Requirements:**

The essential devices for the inventory control system include barcode scanners, which are used for accurate tracking of inventory items. Desktop computers are necessary for managing inventory tasks and analyzing data. Additionally, mobile devices are needed for on-the-go access to inventory information.

**Software Requirements:**

**Operating Systems:** Support for Windows or Linux.

**Web Servers:** Apache for hosting the application for web access.

**Database Management Systems:** MySQL for structured data storage; PHP for backend scripting.

**Network Requirements:**

A stable internet connection is needed for online features.

A local network setup is required to connect devices within the store.

Cloud storage can be used for data backup and remote access.

**Functional Requirements**

**User Access Control:** Secure login for users with permissions based on their roles.

**Real-Time Inventory Tracking and Reporting:** Instant updates on inventory status and the ability to generate analytical reports.

**Low Stock Level Notifications:** Notifications sent when stock falls below set thresholds.

**Supplier and Order Processing:** Tools for managing supplier details and efficiently handling orders.

**3.3 Database Design**

**3.3.1 Entity-Relationship Diagram (ERD):** This diagram shows how different entities, such as products, suppliers, orders, and transactions, are connected to each other, helping to clarify their data relationships.

**3.3.2 Data Flow Diagram (DFD):** It demonstrates the flow of data within the system, emphasizing the inputs, processes, and outputs..

**3.4 Database Tables:**

Food\_items, inventory, users

Food\_items table Includes fields such as id, name, image\_url, price. Inventory table includes id, item\_name, amount, expiration\_date, category, image\_url. User table includes id, email, password, role, firstname, lastname.

**3.5 System Architecture**

**Frontend:** The frontend of the inventory control system is designed to be simple and intuitive, making it easy for staff to manage inventory through a web interface. It features a dashboard that displays real-time updates on stock levels and alerts for low inventory, helping users make quick decisions.

**Backend:** The backend consists of a MySQL database that securely stores all inventory data and an Apache server that handles incoming requests using PHP scripts. This setup ensures efficient data processing and supports the business logic required for smooth inventory management.

**Development Process**

**4.1 Planning**

**Define Goals, Timeline, and Scope:** The objective is to design an inventory control system that effectively monitors stock levels across various areas, such as the chiller, freezer, and storage room. The system will include two user roles: the manager, responsible for adding and managing products, and the staff, who can view available inventory. A timeline for development has been established, with key milestones identified to ensure the project progresses smoothly and is completed on time.

**Initial Research on Andok’s Concepcion Branch Requirements:** Research is performed to understand what Andok's Concepcion branch needs for its inventory control system. This includes examining the problems with the current manual tracking methods, identifying the types of products managed, and figuring out the important reports and alerts needed for smooth operations. This step ensures the system is tailored to meet the specific needs of Andok's.

**4.2 Analysis**

**Examine the Current System:** The manual inventory process at Andok's Concepcion branch is reviewed to find problems like data entry mistakes, lack of real-time updates, and difficulties in tracking stock levels and expiration dates.

**Discussions with Stakeholders:** Meetings are held with store managers, staff, and other key people to gather specific needs for the inventory control system. These talks highlight important features for the system's success, such as real-time updates, alerts for low stock, and simple reporting tools.

**4.3 Design**

**System Diagrams and User Interface Prototypes:** Diagrams such as Entity-Relationship Diagrams (ERD) and Data Flow Diagrams (DFD) are created to show how data will move through the inventory control system for Andok's Concepcion branch. User interface prototypes are also developed to demonstrate how managers and customers will use the system.

**Data Structure and Feature Development:** The database is set up to capture all the important data needed for the inventory control system. Tables for products, suppliers, transactions, and users are created to ensure the system can handle large amounts of data effectively. Features like real-time updates and low-stock alerts are carefully planned to meet the branch's needs.

**4.4 Implementation**

**System Implementation:** The inventory control system for Andok's Concepcion branch is built using chosen technologies such as CSS, HTML, MySQL, PHP, and JavaScript. The backend is configured to manage data processing, while the frontend is designed to create an intuitive and user-friendly interface.

**Functionality Development:** Important functionalities like real-time inventory updates, low-stock alerts, product expiration tracking, and automated report generation are programmed into the system. Each feature is tested step by step to ensure it functions correctly.

**4.5 Testing**

**Unit Testing:** Every element of the system, such as user login, product management, and reporting tools, is tested to ensure they operate properly. This process looks at each part individually to identify and address any issues.

**System Testing:** The complete system is evaluated to confirm that all components function together smoothly. In this phase, testers mimic real-life situations, like adding new products, creating reports, and activating stock alerts.

**User Feedback:** Classmates role-playing as users, such as staff and managers at Andok's, share their opinions on how easy the inventory control system is to use and how well it functions during testing. Their feedback helps enhance features, resolve issues, and improve the overall user experience.

**4.6 Deployment**

**Final Launch:** The inventory control system is officially launched, making all features available for efficient management of stock.

**Classmate Testing:** Classmates tested the system while taking on the roles of staff and managers. This allowed for evaluating the system's functionality in a controlled setting, focusing on its effectiveness and ease of use.

**User Testing and Feedback**

**5.1 Description of User Testing Stages:**

**Alpha Testing:** In this stage the development team checks the inventory control system for any early problems. They make sure that managers can log in and add products and verify that customers see the correct information.

**Beta Testing:** Classmates act as testers using the inventory control system to give feedback on how easy it is to use and how well it works in real-life situations.

**Testing Criteria:**

**Usability:** This assessed how easy it was for both managers and customers to navigate the inventory control system.

**Correctness of Inventory Updates:** This ensured that the system displayed the correct quantities and expiration dates after new products were added to the inventory.

**Report Effectiveness:** This evaluated how well the reports generated reflected the inventory status for effective management.

**5.2 Issues Identified**

**Inconsistent Stock Alerts:** Some classmates noted that alerts for low inventory levels were not triggered consistently in the inventory control system.

**Slow Performance:** The system lagged when displaying a large number of products, affecting usability.

**Report Inaccuracies:** Reports generated by the system did not always accurately reflect the current inventory status, leading to confusion.

**5.3 Solutions Implemented**

**Change in Stock Alerts:** The alert settings were adjusted to ensure timely notifications for low inventory and products that are close to their expiration dates.

**Performance Optimization:** The database queries were improved to speed up loading times when displaying inventory information.

**Report Updates:** The process for generating reports was revised to ensure more accurate summaries of stock levels and expiration dates in the inventory control system.

5.4 **Feedback from Users**

**Classmate Feedback:** "The interface is easy to use, and adding products is simple. However, the alerts should be more reliable."

**User Experience Observations:** Some testers appreciated the clear layout of the inventory control system but recommended enhancements for quicker access to important information.

**5.5 Final Adjustments**

**User Interface Updates:** Adjusted the inventory control system's interface to improve navigation.

**Finalizing Stock Alerts:** Updated the stock alert settings based on user feedback to ensure they work reliably.

**Grades**

**Day 1:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Alimurung | Santos | Villanueva |
| Alimurung | **100%** | **100%** | **100%** |
| Santos | **100%** | **100%** | **100%** |
| Villanueva | **100%** | **100%** | **100%** |
| TOTAL: | **100%** | **100%** | **100%** |

**Day 2:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Alimurung | Santos | Villanueva |
| Alimurung | **100%** | **100%** | **100%** |
| Santos | **100%** | **100%** | **100%** |
| Villanueva | **100%** | **100%** | **100%** |
| TOTAL: | **100%** | **100%** | **100%** |

**Day 3:**

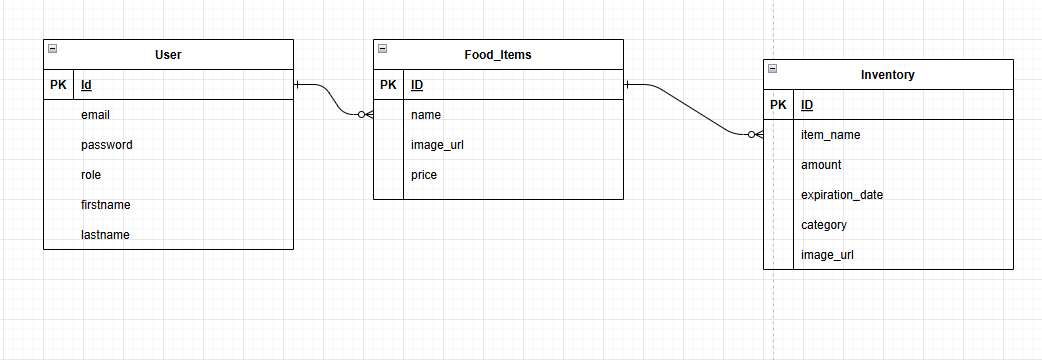
|  |  |  |  |
| --- | --- | --- | --- |
|  | Alimurung | Santos | Villanueva |
| Alimurung | **100%** | **100%** | **100%** |
| Santos | **100%** | **100%** | **100%** |
| Villanueva | **100%** | **100%** | **100%** |
| TOTAL: | **100%** | **100%** | **100%** |

**References**

http://repository.uin-malang.ac.id/8139/

<https://hrcak.srce.hr/259827>

https://iopscience.iop.org/article/10.1088/1757-899X/852/1/012110/meta

****