Edelweiss: Journal of Current Innovation in Educational Research
Vol. 03, No. 02, October 2025 pp 1-10
E-ISSN: 3021-7717
DOI: https://doi.org/ 10.62462/edelweiss.v1i1.4

BARCODE SCANNING SYSTEM FOR GOODS TRANSACTIONS USING FIRST IN FIRST OUT (FIFO) METHOD WITH THE LARAVEL FRAMEWORK

Siti Nur Azizah[1], Kharis Kurnia[2*]

Fakultas Sains dan Teknik, Program Studi Informatika, Universitas Faletehan[1] , Fakultas Ilmu Sosial dan Ilmu Politik, Program Studi Ilmu Politik, Universitas Bangka Belitung[2]

*Corresponding Author: kharis-kurnia@ubb.ac.id

Received: November, 11, 2025 Revised: December, 2, 2025 Accepted: December, 6, 2025

ABSTRACT

Inventory management is an essential aspect of retail operations that requires accuracy and efficiency, particularly in tracking product quantities and expiration dates. Effective inventory management can be achieved by implementing First In First Out (FIFO) method and a barcode scanning system to simplify recording processes and minimize manual errors. This study designs a web-based inventory management system using the Agile method and the Laravel framework as its foundation, featuring barcode scanning, automatic recording of incoming and outgoing goods, FIFO-based inventory management, and notifications for products approaching their expiration dates. Black Box testing results show that the system successfully improves transaction efficiency, inventory management accuracy, and real-time detection of products nearing expiration, thereby reducing the risk of losses at Toko Rindu Mekkah. In terms of educational implications, this research serves as a practical example of integrating inventory management theory with information technology. It can also be used as instructional material to enrich learning in the fields of information technology and information systems, particularly related to application development, the Agile method, and the implementation of the FIFO concept in digital systems.

Keywords: ***Inventory Management, FIFO, Barcode, Agile, Laravel, Black Box*****.**

Introduction

Stock inventory management is one of the most important aspects of running a store, particularly in maintaining product availability, preventing stockouts, and minimizing the risk of overstocking. Effective inventory management plays a crucial role in operational efficiency and decision-making. Toko Rindu Mekkah, which still relies on manual recording, often faces various challenges such as data inaccuracies, delays in reporting, and difficulties in monitoring product conditions. These issues can ultimately affect customer satisfaction and potentially lead to financial losses (rakhmah & devi, 2021).

As an innovative effort, this study designs a web-based barcode scanning system integrated with First In First Out (FIFO) method to ensure that products entering first are also the first to be issued. Barcode scanning helps speed up the real-time recording of incoming and outgoing goods, reduces human error, and provides accurate, easily accessible inventory data. FIFO method is crucial for maintaining product quality, especially for food items, so they are not stored for too long and do not cause financial losses for the store (Fadillah & Sutopo, 2023).

The system design was carried out using the Agile method, which allows the development process to proceed quickly, flexibly, and efficiently. With this approach, development can be conducted incrementally through iterations, enabling system features to be adjusted according to user needs. The system was built using the Laravel framework and a MySQL database, and it was implemented as a web-based application so that it can be easily accessed by administrators and cashiers (Supriyadi et al., 2024).

The purpose of this study is to design a web-based stock management system capable of automating transaction processes and stock management at Toko Rindu Mekkah. With this system, it is expected that inventory management can be carried out more efficiently, accurately, and responsively, particularly in monitoring products that are approaching their expiration dates. This will support the smooth operation of Toko Rindu Mekkah while also improving the quality of service provided to customers.

Literature Review

1. Barcode

A barcode is a set of codes used to represent letters and numbers, consisting of combinations of lines with varying spacing. This arrangement serves as a method for inputting data into a computer. The information in a barcode contains encrypted numeric digits. When the barcode is scanned using a barcode scanner, the code is automatically connected to the product data stored in the database. The scan results contain various product information such as vendor name, product name, price, and other data according to what has been entered into the database (Putu et al., 2017).

2. Stock Management

Stock management is one of the critical activities for trading companies, as it is directly related to inventory. Inventory is a key element in commerce, and the information available about inventory is extremely important. Errors in inputting data regarding incoming and outgoing goods can lead to serious problems, such as warehouse overstocking or stockouts. Companies require technological support in the form of information systems that can facilitate and accelerate the provision of information regarding stock management (Alfianti, 2021). Such systems utilize technology to monitor, calculate, and optimize inventory so that customer needs can be met efficiently (Malik, 2024).

3. First In First Out (FIFO) Method

First In First Out (FIFO) is an inventory management method that uses warehouse stock according to the order in which it was received. The stock that enters the warehouse first must be the first to be issued (Ruslan Maulani et al., 2023).

In the FIFO method, items that are purchased earlier are sold first; in other words, the goods that enter the warehouse first are the ones that will be used or sold first. Consequently, the cost of the earliest purchased goods is considered the cost of goods sold first (Bahat Nauli, 2024).

FIFO is a system design based on the principle that the earliest inventory will be sold first. Using this method, the purchase price of the first-acquired items is recorded as the cost of goods sold. Therefore, by adhering to FIFO, the actual flow of costs can be maintained, and the oldest stock can be liquidated first. Because product issuance from the warehouse usually depends on stock arrangement, the FIFO approach is sometimes clearer in cost calculations than the physical flow of goods.

This is due to the fact that the distribution of goods from the warehouse typically depends on their arrangement. When using the FIFO approach, the initial purchase price becomes the cost of goods sold, and the selling price of previous transactions is used in pricing calculations (Fadillah & Sutopo, 2023).

4. Agile Method

Agile is an approach in the software development life cycle (SDLC) that emphasizes rapid iterations, team collaboration, and the ability to adapt to changing user requirements. This methodology enables continuous product development while maintaining control over scope, schedule, cost, quality,

and project risks. Agile also prioritizes active user involvement throughout the development process and places user satisfaction as the top priority, making it highly suitable for dynamic and fast-changing project environments (Singh, 2021).

5. Laravel Framework

Laravel is an open-source PHP framework released under the MIT license and built on the MVC (Model-View-Controller) concept. Laravel is an MVC-based web development framework written in PHP, designed to improve software quality while reducing maintenance costs. It is one of the best PHP frameworks, developed by Taylor Otwell.

As a PHP framework, Laravel serves as an open-source web development platform. Its use of elegant syntax is also very appealing, as it is specifically designed to simplify and accelerate the web development process.

The Laravel framework is one of the most popular and powerful web application development frameworks in the PHP ecosystem. Designed to simplify the application development process, Laravel offers a wide range of features and tools that enable developers to create efficient, secure, and easily maintainable web applications. With its expressive syntax, comprehensive documentation, and strong community support, Laravel has become a preferred choice for many developers seeking to accelerate web application development. Laravel provides key features such as a flexible routing system, integrated authentication management, and database migration capabilities that simplify database schema management. One of the most notable features of Laravel is Eloquent, its built-in ORM, which allows developers to interact with databases using clean and intuitive PHP syntax.

In addition, Blade, Laravel's templating engine, simplifies view development with easy-to-understand syntax. The framework also provides tools for queue management, notification systems, and caching, all designed to accelerate and optimize web application performance. With a robust ecosystem of additional packages and continuous support from an active developer community, Laravel is an excellent choice for anyone looking to develop web applications quickly and efficiently (Saefudin et al., 2023).

6. Black Box Testing

Black Box Testing is a type of testing that verifies the results of an application's execution based on the provided input (test data) to ensure that the application's functionality meets the requirements. Black Box Testing focuses on the application's interface and functional testing, as well as the conformity of the functional flow required by the user. Black Box Testing does not examine the program's source code (Mintarsih, 2023).

Methods

Research methods are systematic steps undertaken by researchers to collect and review relevant information and data. In this study, a descriptive technique was used, which is a method employed to describe the research object based on its actual conditions.

1. Data Collection Methods
   a. Observation
      The observation stage involves directly collecting data by observing the processes occurring in stock management, transaction procedures, and the arrival of goods from suppliers.
   b. Interview
      In the interview method, the researcher interviewed employees of Toko Rindu Mekkah by asking questions related to existing problems. The data obtained from these interviews helped identify the required system in terms of application architecture, technology used, and the processes for using the designed system.
   c. Literature Study
      This involves collecting information and documents related to the research, with sources including journals, scientific papers, and books that support the research topic.
2. System Development Method

The system development method chosen by the researcher is the Agile method. Agile is a group of software development methodologies that follow the same principles or short-term system development that requires rapid adaptation to change and iteration in any form. The Agile model consists of six stages: Planning, Design, Development, Testing, Deployment, and Review.

Figure 1. Agile Method Cycle

a. Planning Stage
At this stage, the system requirements are planned. This involves identifying user needs, such as goods management, the application of the FIFO method, and barcode scanning integration. These requirements are identified based on literature studies and interviews with the admin or cashier of Toko Rindu Mekkah.
b. Modeling Stage
After the requirements are identified, the system design is created. The design includes the system workflow, flowchart creation, and user interface (UI) design. It also covers the database schema to support the implementation of FIFO and transaction management.
c. Design or Development Stage
The development stage is carried out iteratively, starting from database creation, user interface design, to the implementation of main features such as barcode scanning, automatic stock recording, application of First In First Out (FIFO) method, and real-time stock updates. Each feature is tested after completion to ensure it works according to requirements. If any issues are found, they are immediately corrected before moving on to the next stage, allowing the system to develop in a structured way with minimal errors.
d. Testing Stage
The designed system is tested using the Black Box testing method. The testing is conducted to ensure that barcode scanning and the FIFO method operate as planned.
e. Evaluation (Review) Stage
The system is evaluated before implementation, and feedback is obtained from the admin and cashier users. If deficiencies or additional requirements are found, the system is improved to better meet user needs.
f. Launch (Implementation) Stage
The final stage is the launch, where the designed system is implemented at Toko Rindu Mekkah. At this stage, the admin and cashier begin using the system to process incoming goods, scan barcodes, and manage stock.

Result and Discussion

1. System Design

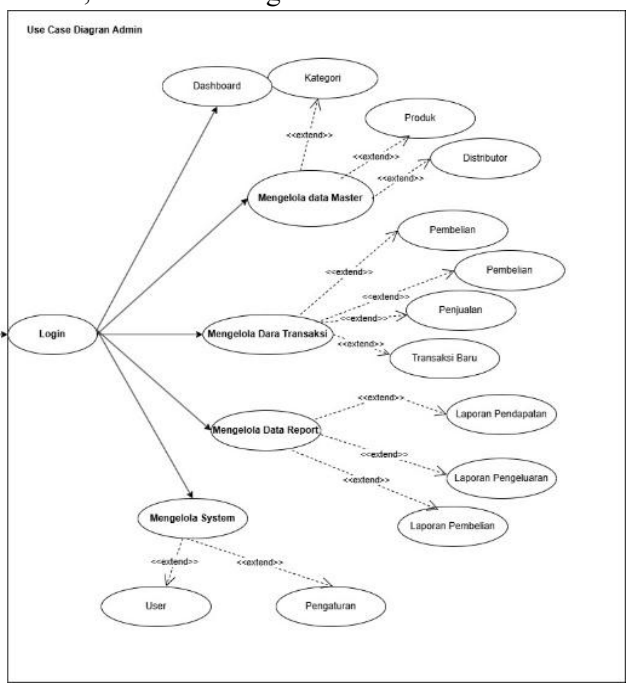
At this stage, all user requirements, namely those of the Admin and Cashier, need to be collected. This involves conducting direct interviews with the Admin and Cashier of Toko Rindu Mekkah, who are involved in stock management and the handling of goods at the store.

a. Use Case Diagram

For information security and ease of application use, access permissions are required for each menu and feature according to the user's needs. Therefore, the system will restrict usage based on the use case diagram. The following is a use case diagram illustrating the interaction between actors and the system in the sales application:

Figure 2. Admin Use Case

The use case diagram of the stock and goods transaction management system involves two actors: the Admin and the Cashier, who can manage store data. The admin is the primary actor with full



access to all system features. The process begins with login, after which the admin can access the dashboard to monitor stock and transactions in real-time. The admin can also manage master data such as categories, products, and distributors, as well as handle transactions, including purchases and sales. Additionally, the Admin can generate reports on income, expenses, and purchases, and manage the system, including user settings and system configurations. This diagram illustrates a structured workflow to facilitate efficient stock and transaction management.

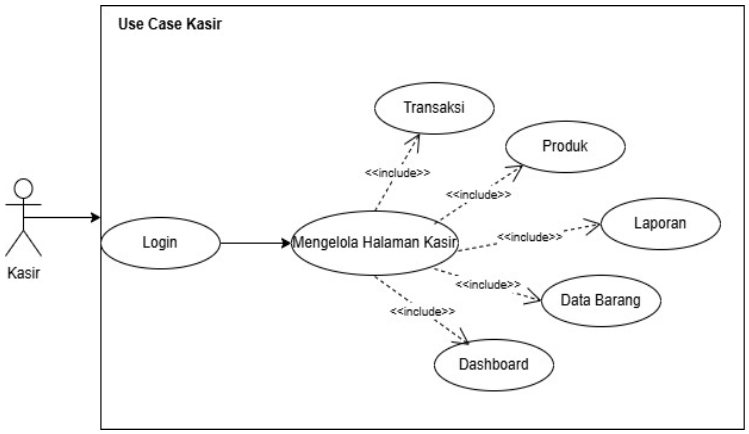


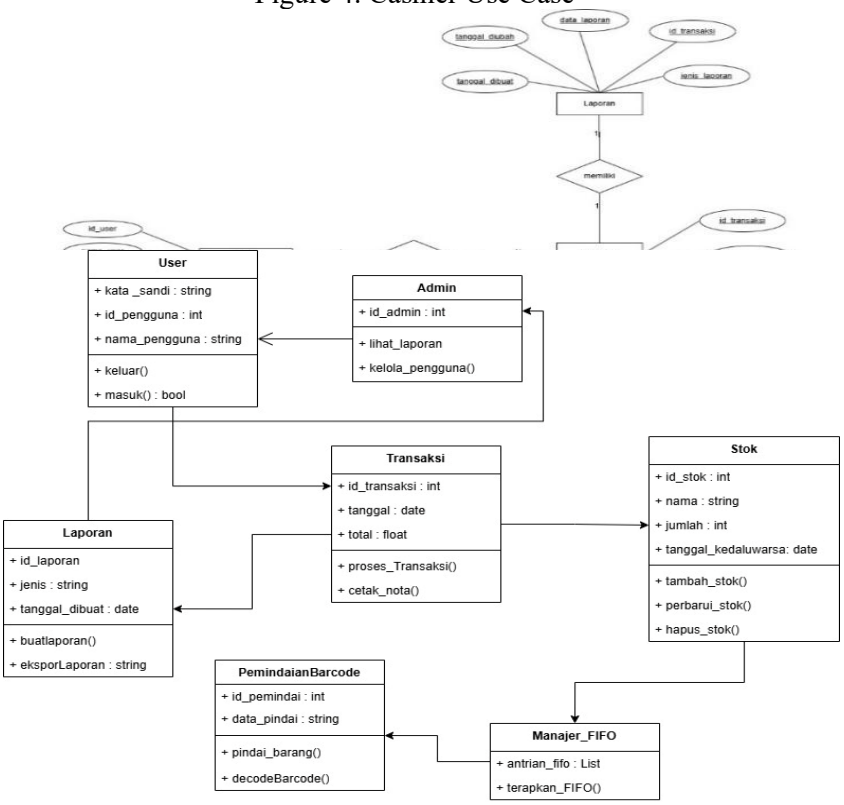
Figure 3. Cashier Use Case

Cashier Use Case Diagram, the process begins with login, after which the cashier can access the cashier page to scan barcodes, process payments, and automatically update stock. In addition, the cashier can view product data, access the dashboard to monitor sales in real-time, and review transaction reports. This system helps the cashier work more quickly, accurately, and efficiently.

b. Database Design

At this stage, the researcher uses an ERD (Entity Relationship Diagram) and Class Diagram to design the database.

Figure 4. Cashier Use Case



The image of the Entity Relationship Diagram illustrates the relationships between entities in the barcode scanning system for goods transactions with the implementation of First In First Out (FIFO) method. The main entities in this system include users, products, notifications, transactions, and reports.

Figure 5. Cashier Use Case

This diagram includes several important entities, namely:

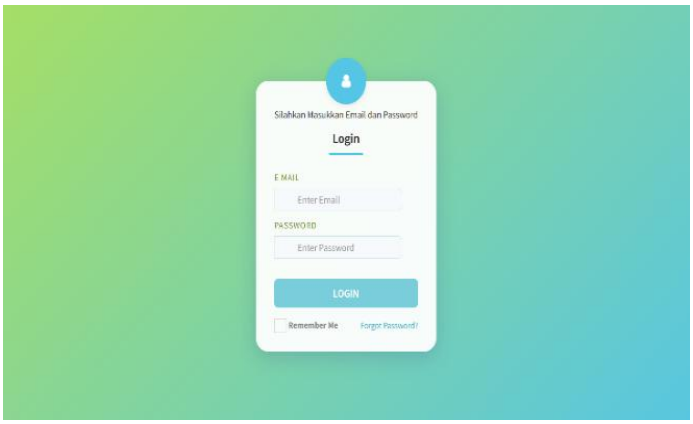
1. User Entity
   Stores system user data, including the Admin (who has full access to manage products, stock, and reports).
2. Product Entity
   Used to store information about products sold in the store, such as product name, product category, stock quantity, and expiration date.
3. Transaction Entity
   Functions to store data on transactions carried out by customers, including information on purchased products, quantity, total price, and transaction date.
4. Stock Entity
   Used to store data on the store's inventory, including the management of incoming and outgoing stock.
5. Barcode Entity
   Functions to store data from barcode scans of products to be transacted.
6. Report Entity
   Functions to store data on reports generated, including both stock reports and transaction reports conducted over a specific period.

2. User Interface Design

a. Login Page

The Login Page in the barcode scanning system at Toko Rindu Mekkah is designed to display the login interface when users, either Admin or Cashier, want to start the application. On this page, users are required to enter information such as username and password to access the next page. The interface is designed to be simple and easy to understand, making it user-friendly.

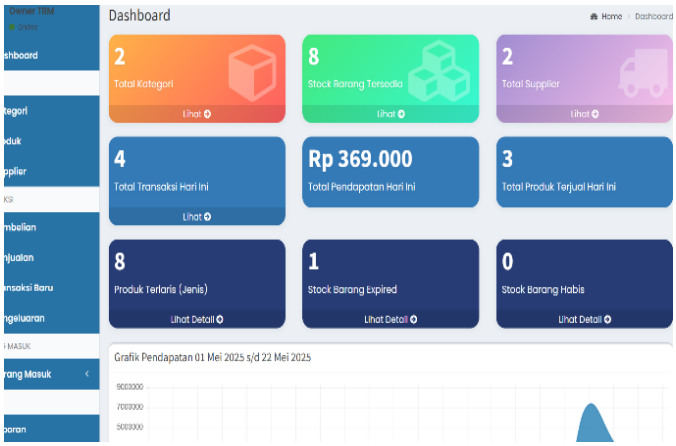
Figure 6. Login Page



b. Dashboard Page

The main page in the barcode scanning system with First In First Out (FIFO) method serves as a control center that provides users with a summary of important information in real-time. On this page, users can view the total number of categories, available stock, total transactions for the day, income charts, top-selling products (over 30 days), and expired stock (over 30 days).

Figure 7. Dashboard Page



c. Incoming Goods Page

This page is used to record newly received goods in the system. Users can scan the barcode using a webcam, then enter data such as the product name, entry date, expiration date, and quantity.

Once all the data is entered, users can click the "Save Incoming Goods" button to store it in the database.

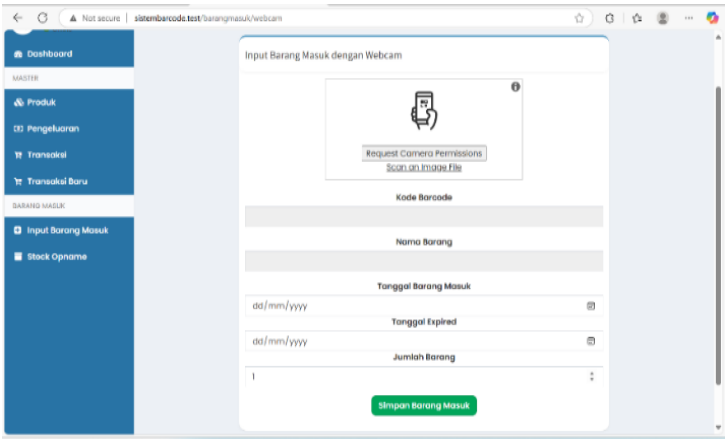
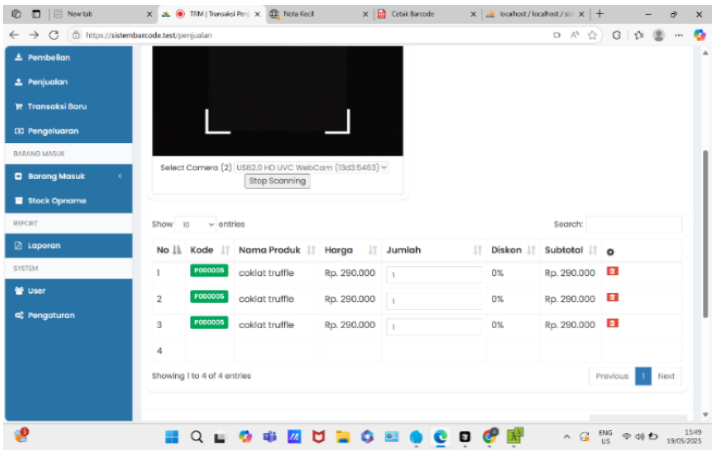


Figure 8. Incoming Goods Page

d. Transaction Page

This page is used by the cashier to process product sales. Products can be scanned using a barcode scanner camera or entered manually via the product code. Once the items are detected, the data will appear in a table. The system also automatically calculates the total purchase, cash received, and change. This interface facilitates fast, accurate transactions that are fully integrated with the stock inventory.

Figure 9. Transaction Page



3. Testing

System testing is conducted to ensure that all features of the application function as intended. In this study, the researcher used the Black Box Testing method, which focuses on testing the system's functionality without examining the program's source code directly. Testing was carried out on each main system feature, with the results as follows:

Table 1. Testing

No	Kelas Uji	Butir Uji	Jenis Pengujian	Status Pengujian
1.	Login	Pengguna berhasil login dengan email dan password	Black Box	Berhasil

2.	Halaman Produk	Menampilkan Daftar Produk yang tersedia di toko rindu mekkah		Berhasil
3.	Halaman Barang Masuk	Menampilkan webcam untuk scan barcode produk lalu simpan data ke sistem		Berhasil
4.	Halaman Transaksi	Menampilkan Webcam untuk input kode barcode dan tampil kode produk nama dan juga sub total		Berhasil

Conclusion

The manual stock management at Toko Rindu Mekkah often leads to data inconsistencies, recording errors, and losses due to expired products. This study developed a web-based system with barcode scanning and First In First Out (FIFO) method to improve transaction efficiency and stock management accuracy. The system was built using Laravel and MySQL, with key features such as barcode scanning, real-time stock updates, transaction history recording, and stock management based on the order of incoming goods. The Agile method was used for flexible and structured development. Implementation results show that the system functions well, helps reduce recording errors, monitors products approaching expiration, and improves operational efficiency. In the future, the system can be enhanced with attendance features, iSeller integration, an Android mobile version, and tested in stores of different scales.

In terms of implications for education in general, this study highlights the importance of technological literacy in improving operational efficiency across various sectors. The integration of information technology in business processes can serve as a learning example for educational institutions, encouraging students to understand the practical application of information systems in solving real-world industrial problems. This study can also be used as teaching material related to inventory management implementation, process digitalization, and the importance of technological innovation in supporting productivity.

Specifically for the field of Information Technology, this study demonstrates the practical application of core IT concepts such as system modeling, database design, framework-based application development, Agile methodology implementation, and Black Box testing. The results of this study can be used as a learning reference in courses such as Software Engineering, Information Systems, Databases, and Web Programming. Additionally, this project can serve as an example of relevant technology implementation for industrial application development, while also strengthening students' competencies in building IT solutions that are effective, efficient, and aligned with user needs.

References

Alfianti, H., Kunci-Sistem, K., Informasi, M., & Stok, W. (2021). Sistem Informasi Manajemen Stok Berbasis Web (Studi Kasus : CV. Citra). *Journal Informatics and Electronics Engineering*, *01*(01).

Bahat Nauli, S. (2024). Perancangan Aplikasi Persediaan Barang Menggunakan Barcode Quick Response Dengan Metode First-In First-Out Berbasis Mobile (Studi Kasus: PT Kopi Kenangan). In *Jurnal Riset Ilmiah* (Vol. 3, Issue 4).

Fadillah, N. S., & Sutopo, J. (2023). Implementasi Metode First In First Out (FIFO) Dalam Rancang Bangun Sistem Informasi Inventory Pada Toko Channel Computer Berbasis

Website. *Indonesian Journal on Software Engineering (IJSE)*, *9*(1), 39–45. http://ejournal.bsi.ac.id/ejurnal/index.php/ijse39

Malik, A. (2024). Application of The Rapid Application Development Model in The Inventory Information System Using The Web-based FIFO Method Penerapan Model Rapid Application Development Pada Sistem Informasi Persediaan Barang Dengan Metode FIFO Berbasis WEB. *Journal of Scientech Research and Development*, *6*(1). https://idm.or.id/JSCR/inde

Mintarsih, M. (2023). Pengujian Black Box Dengan Teknik Transition Pada Sistem Informasi Perpustakaan Berbasis Web Dengan Metode Waterfall Pada SMC Foundation. *Jurnal Teknologi Dan Sistem Informasi Bisnis*, *5*(1), 33–35. https://doi.org/10.47233/jteksis.v5i1.727

Putu, I., Putra Yudha, A., & Mertasana, P. A. (2017). Perancangan Aplikasi Sistem Inventory Barang Menggunakan Barcode Scanner Berbasis Android. *E-Journal SPEKTRUM*, vol. 4, no. 2, pp. 72–80, [Online]. Available: https://ojs.unud.ac.id/index.php/spektrum/article/download/36415/21990/.

Rakhmah,S.N & Devi, P.A.R. (2021). *357168-sistem-informasi-persediaan-stok-barang-e0c17911*.

Ruslan Maulani, M., Rahmatuloh, M., Triapriliani, I., Fauzan JITTER, H., & Fauzan, H. (2023). *Implementasi Algoritma FIFO (First In First Out) Pada Sistem Pergudangan Di Bagian Furniture Production*.

Saefudin, M., Megawaty, D. A., Alita, D., Arundaa, R., & Tenda, E. (2023). Penerapan Framework Laravel Pada Sistem Informasi Posyandu Berbasis Website. *Jurnal Informatika Dan Rekayasa Perangkat Lunak*, *4*(2), 213–220. https://doi.org/10.33365/jatika.v4i2.2600

Singh, K. (2021). Agile Methodology for Product Development A Conceptual Study. *International Journal of Recent Technology and Engineering (IJRTE)*, *10*(1), 209–215. https://doi.org/10.35940/ijrte.A5899.0510121

Supriyadi, A., Noe'man, D., Informasi, S., Bahan, P., Pada, R., Menggunakan, P. B., Supriyadi, A., & Noe'man, A. (2024). Sistem Informasi Persediaan Bahan Roti Pada Papibun Bakery Menggunakan Metode FIFO (First In First Out) Dan LIFO (Last In First Out). In *Jejaring Penelitian dan Pengabdian Masyarakat (JPPM)* (Vol. 1, Issue 3).

.