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Design and Implementation of Inventory Information System at Oemah Djari Restaurant

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Abstract- *This research focuses on the design and implementation of an inventory information system at Oemah Djari Restaurant, aiming to enhance operational efficiency and accuracy in inventory management. The current manual inventory system at the restaurant is prone to errors, time-consuming, and often leads to discrepancies in stock records, which negatively impacts business operations. To address these issues, a web-based inventory information system was developed using a structured approach, including requirements analysis, system design, implementation, and testing. By leveraging a user-friendly interface and a centralized database, the system ensures seamless data management and accessibility for staff. The implementation phase involved training employees to ensure smooth adoption of the new system. Post-implementation evaluation revealed significant improvements in inventory accuracy, reduction in manual errors, and enhanced decision-making capabilities for restaurant management. This study highlights the importance of adopting digital solutions in small and medium-sized enterprises (SMEs) like Oemah Djari Restaurant to streamline operations and support sustainable business growth. The findings suggest that the developed system not only addresses current challenges but also provides a scalable solution for future expansion.*

Keywords**:** *Agile; Information Systems; Inventory; Restaurant; Website.*

1. INTRODUCTION

Oemah Djari Restaurant faced obstacles in stock management, because their varied menu requires the management of various raw materials for food and beverages. Furthermore, they still use a manual stock management system. They often obstacles in monitoring the number of raw materials in real-time and recording errors that cause inaccuracies in stock procurement. The result is they are being unable to meet customer demand properly and even can cause waste because of unused raw materials will rot or expire. Therefore, a new system needs to help Oemah Djari for manage stock and monitor it better.

The purpose of this research is to bring a significant improvement for stock management of Oemah Djari, by using an Inventory Information System (IIS). It can affect to manage of raw materials used during the restaurant's operations. This information system is expected to overcome various problems of the restaurant, make a manager or staffs easily find out the amount of available stock and reduce human error cause of manual recording. It aiming to enhance the accuracy of inventory management processes and to avoid human erroneous. Because the system will be designed to make easier stocks checking and optimize stocks level.

As mentioned earlier, using IIS for stock management will be very helpful. The information that was traditionally or manually obtained can no longer be used optimally to meet the needs of restaurant because restaurant require accurate and fast information [1]. An example of this is the routine and periodic checking of food ingredients. This requires an efficient and precise method because inventory can be easily controlled if a restaurant has a good recording system of platform [2]. Because optimal materials can only by achieved if several factors are balanced, such as the quality of product, product shelf life, length of production period, storage facilities, and risks associated with inventory [3]. By implementing an integrated information system, it can accelerate the recording and reporting process that was previously done manually [4]. In the words, it can save time. If the time required to process inventory becomes faster, the restaurant can increase staff's productivity. Additionally, reducing the time needed for inventory processes can help the restaurant avoid stock shortages and overstocking [5].

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Along with the rapid advancement of information technology, information system management has become an important element business actor, including the restaurant industry must be considered. Several recent studies have shown how important it is to implement information systems that can help restaurant operations, especially in managing raw material inventory. Because technology-based information systems, can help many restaurants to manage inventory more efficiently. By using a cloud computing-based information system, the author or restaurant manager is able to access inventory data in real time, even when they are not at the restaurant.

For the example, Geographic Information System (GIS) that maps vegetarian restaurants using the Google Maps API. In this research, a combination of two methods, namely the Haversine and Dijkstra methods, will be implemented in a GIS which was built to provide recommendations for the nearest vegetarian restaurants for customers. The test results obtained concluded the Geographic Information System was effective for helping users find the location of vegetarian restaurants in Medan [6]. Then, the application of the Supply Chain Management method to the restaurant information system that was built, has been proven to be able to integrate all parts of the restaurant business well, thus preventing errors from occurring by each party working in the restaurant [7].

And finally, this research provides broader knowledge, understanding and insight to young people, especially students and employees related to accounting. It is enabling participants to understand the definition of accounting, the history of accounting, the purpose of accounting itself, and have a good understanding of the contents of financial statements. So that this knowledge can become a provision in the future when these young people enter the world of work or the world of investment or even become an expert in accounting later. This activity is carried out online through the Google Meet application. The target of this activity is young people aged 17 to 20 years who are in Pontianak, West Kalimantan. The number of participants in this activity was 66 participants. This activity took place on Saturday, March 4th 2023 and went very well due to good cooperation and coordination from the various parties involved. This activity is expected to be able to contribute and have a positive impact on increasing the knowledge and understanding of participants regarding accounting and can provide broader views and insights for participants [8].

2. RESEARCH METHODOLOGY

In this research method for Oemah Djari inventory information system is using Waterfall model. Waterfall model is a traditional and structured approach that follows a systematic and sequential process in the development of system or software [9]. Waterfall model is a software development methodology, also referred to as the Software Development Life Cycle (SDLC). It called “waterfall” because the process is compared to a waterfall, where each phase is completed in order, moving from the top down [5]. The waterfall method is used for system development as a guide for the software development process from beginning to end [10]. By using the stages of requirements analysis, system design, software design, implementation and unit testing, system integration and testing, as well as operations and maintenance, this method produces more valid information or output [9]

In this context, this model will be applied to develop an information system that can efficiently manage the inventory of food and beverages. It starts with the planning and requirements analysis stage, where the system's issues and needs are identified. Next, the system design is created by designing the database structure, user interface, and clear business process flows. After that, the system development is carried out, where coding and programming are done to create an application that can manage the inventory. The next stage is testing, where the built system is then tested to ensure its functionality and reliability. Finally, implementation and maintenance are carried out to ensure the system runs smoothly and can be fixed if any issues arise. By using the Waterfall model, each stage is carried out step by step and in sequence, making it easier to manage the project and minimizing the risk of errors in system development.

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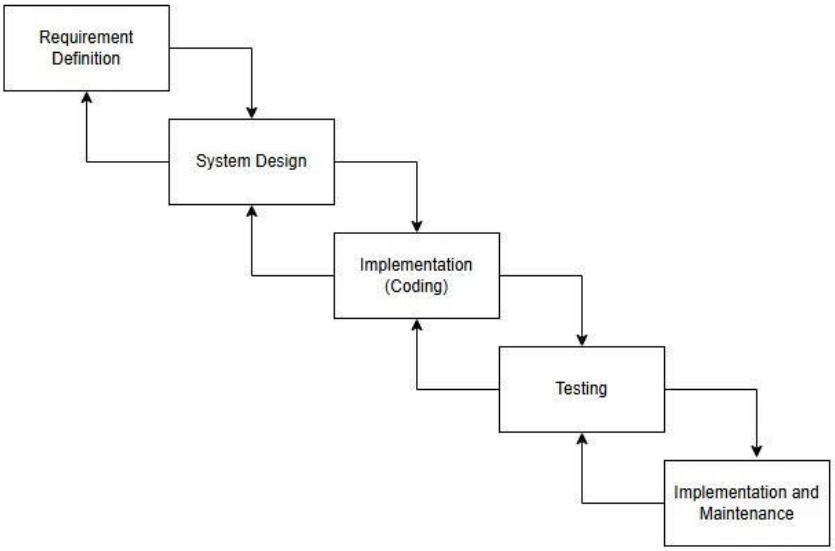

Figure 1. Waterfall model [11].

Figure 1 explains how the inventory information system design method for Oemah Djari Restaurant is carried out using the Waterfall Model with the following stages. First is requirements gathering. In this stage, an analysis will be conducted to identify the system's needs, such as the types of inventories to be managed and the necessary reports. Next, system design will be performed, which includes planning the system architecture, creating the inventory database, and designing the user interface that will be used by the restaurant staff. After the system design, the process continues with implementation (coding). In this stage, the system is developed by programming the application to manage the inventory in real-time. The next stage is testing, where the built system is tested to ensure all functions are working properly, such as monitoring inventory levels. Finally, after testing is complete, the system will be implemented for use by the restaurant and maintained to address any issues that may arise, as well as to update the system in the future.

3. RESULTS AND DISCUSSION

3.1 System Design

Design and development is the process of building a system to create a new system or to replace or improve an existing system, either as a whole or partially [12]. Oemah Djari has an inventory management system designed to simplify the management of raw materials required for daily operations. In this system, access can be granted to multiple accounts. When a user first accesses the application, they must go through a login process to ensure that only authorized individuals can access it. After successfully logging in, users can perform various tasks according to their roles. Once the user is finished, they can log out to end the session. This feature is related to the login use case. Meanwhile, supplier management is a key feature of this system that allows users to control supplier information related to raw materials by adding, modifying, or deleting information about suppliers. Additionally, there is a use case for managing raw materials, which enables the management of raw material stock, including the recording of stock in and out. In this context, there is a use case for recording raw materials received and issued from the warehouse. Finally, the system also has a use case for user management. This use case is responsible for managing access rights and user accounts within the system, including settings such as adding or removing users, as well as assigning roles according to operational needs. With these features in place, it is expected that Oemah Djari will have an inventory management system that improves efficiency in management and provides better control over the stock and suppliers of raw materials used.

In the system created for Oemah Djari, there are two roles: owner and staff. The owner has full access to monitor the application's functions. All roles are required to log in in order to access the available dashboard.

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The owner's access includes tasks such as checking raw materials (monitoring the flow of raw materials in and out), managing raw material suppliers, and managing accounts (limiting which users can access the application). By implementing these provisions, the owner can directly monitor and reduce mistakes made by the staff.

Unlike the owner role, warehouse or staff members do not have access to all features available in the application. However, they are still required to log in to access the application. Their access is limited to managing raw materials (including stock and stock movement) and managing suppliers (to ensure the availability of raw materials). On the other hand, they have another important role, which is maintaining the quality of raw materials to be used by inspecting them. This is done to minimize the use of unsuitable raw materials and avoid potential losses. To make it easier to understand, we can refer to the diagram in Figure 2.

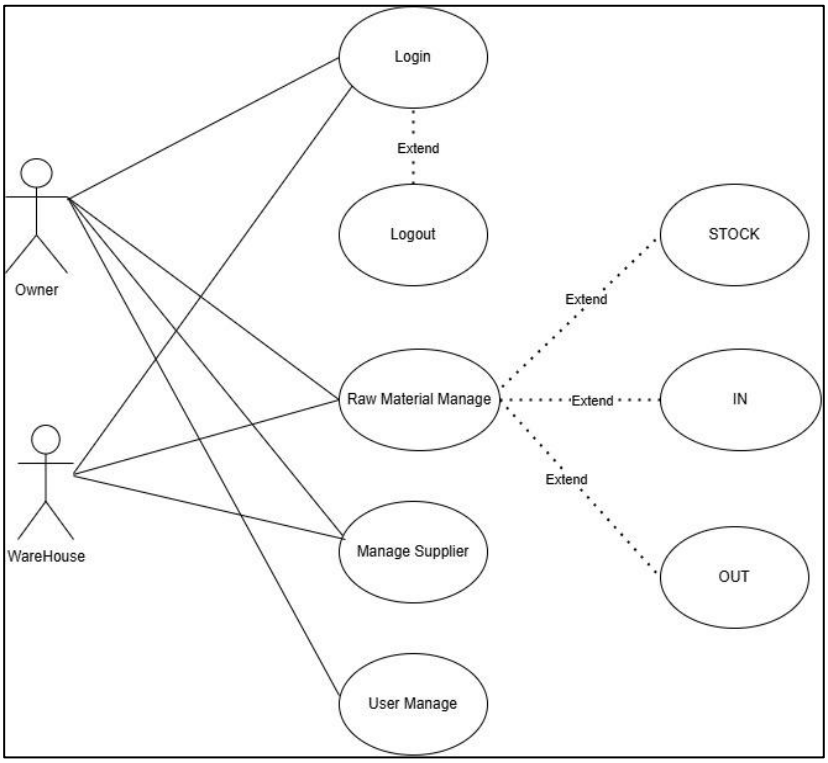

Figure 2. Use case diagram.

To effectively manage raw material inventory, the activity diagram of the Oemah Djari raw material inventory information system illustrates the interaction flow between users and the system. The process begins with the login activity, where users enter their credentials to access the system. The system then verifies the entered information to ensure its accuracy. Once logged in, users can access various sections related to raw material inventory on the dashboard. The first section is supplier management, which enables users to manage supplier data (add, edit, or delete). The next section, raw material management, allows users to manage raw material data by adding, updating, or deleting information. This section also displays the flow of raw materials (in and out), which are key processes in raw material operations. To ensure inventory is always sufficient, the "raw material in" activity records the arrival of new raw materials from suppliers, while the "raw material out" activity tracks the expenditure of raw materials used in production or other activities. Additionally, the raw material stock activity enables users to monitor real-time stock availability. The system also includes a user management function, allowing administrators (owners) to manage user data, such as adding, editing, or deleting user accounts. After completing their tasks, users can log out to end their session, securing any managed data. This activity diagram ensures the smooth operation of the raw material inventory system at Oemah Djari, making raw material management more structured and accessible. Figure 3 presents the system's activity diagram.

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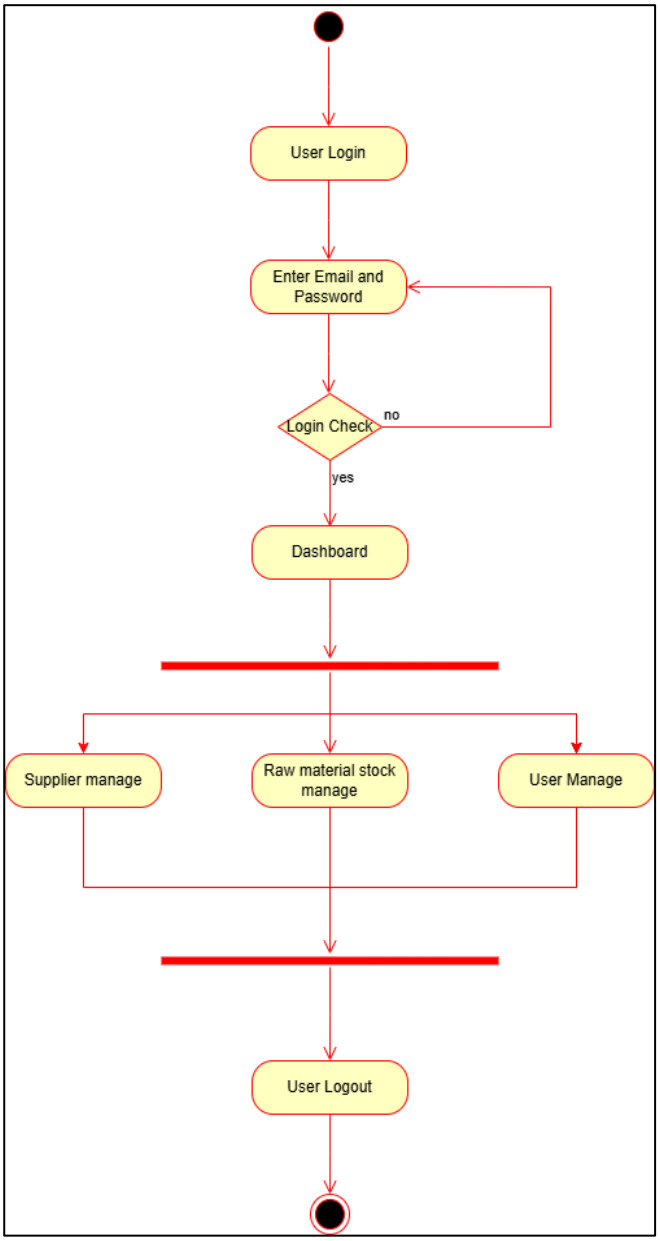

Figure 3. Activity diagram.

The relationship between the three main classes in Oemah Djari's raw material inventory information system is illustrated in the class diagram. The raw material class stores data about the types of raw materials used in the production process, including the material's name, quantity, price per unit, and availability status. The supplier class holds information about raw material suppliers, such as their name, address, contact details, and transaction history. This class also manages user access rights, enabling actions like adding, modifying, or deleting raw material and supplier data. The relationships between these classes are defined through associations that represent interactions, such as raw materials being linked to one or more suppliers, and users having the authority to manage system data. Overall, this class diagram offers a clear structural view of how the raw material inventory information system at Oemah Djari is organized and operates. The class diagram is shown in Figure 4.

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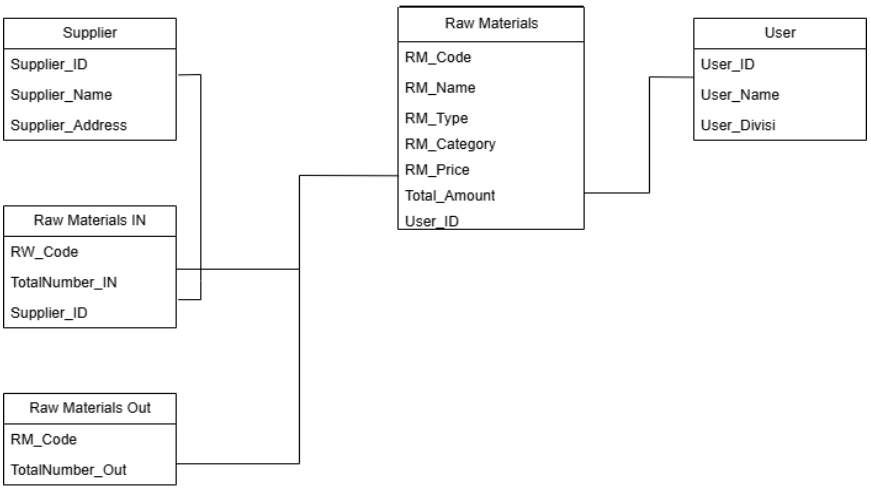

Figure 4. Class diagram

3.2 System Implementation

The login page, as shown in Figure 5, is the first display that users will encounter when accessing an application or website. On this page, users are asked to enter account information, i.e., email and password, to access the available features. Users simply type the registered email address in the top column and the appropriate password in the bottom column. There are also buttons to facilitate the login process, such as the "Sign In" button. It will direct users to the next page if the data entered is correct. The login page design is generally simple, emphasizing ease of use so that the login process runs quickly and smoothly.

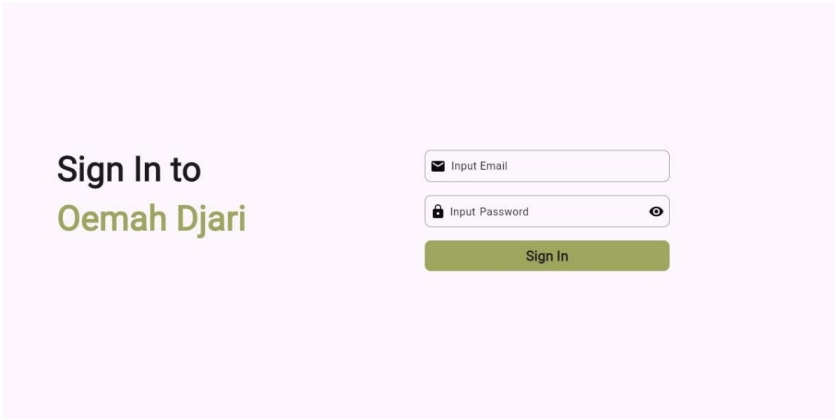

Figure 5. Login page.

Figure 6. Dashboard page.

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The Dashboard page in Figure 6 is designed to provide ease and efficiency of access in managing various aspects of products and suppliers. On the main menu, there is a List Product, which displays a list of all available products so that users can monitor and review product-related information quickly. Furthermore, users can manage various existing products on the Product Management menu, either editing, deleting, or adding new products. On this menu, there is also Management Supplier, which groups two important sub-menus, namely Supplier Data, which displays a list of all suppliers along with detailed related information, and Add Supplier, which allows users to add new suppliers to the system. In addition, on the product menu, there are two sub-menus that help manage the flow of goods, namely the Incoming Goods, which records all goods received from suppliers, and Outgoing Goods, which records the delivery or sale of goods. These features are designed to ease managing products and suppliers and monitoring the flow of existing goods.

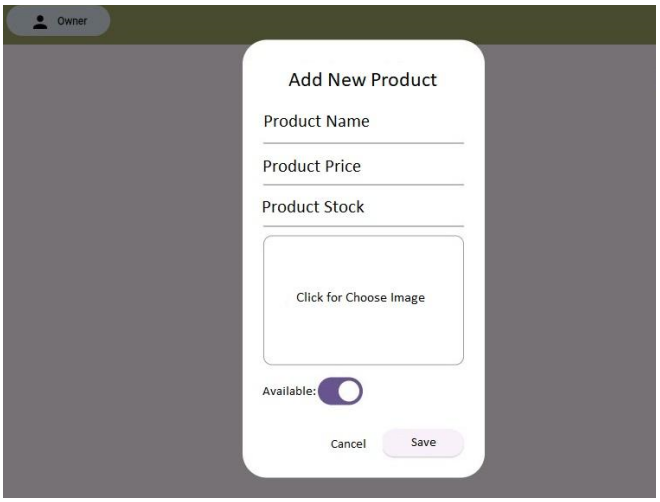

Figure 7. Add stock page.

The Add Product Stock page in Figure 7 is designed to facilitate product stock management in the system. On this page, there are several columns that must be filled in to add or update product stock. First, there is a Product Name column that functions to enter the full name of the product to be added. Below it, there is a Product Price column that functions to fill in the buying price of the product. Furthermore, the Product Stock column functions to determine the amount of stock available or that you want to add to the product. Finally, there is a Product Photo column that functions to upload product images as a visual reference. By filling in all these columns, product managers can ensure data accuracy and update stock easily.

In creating this application, experiments have been conducted using the Black Box Testing method. Black Box Testing is a software testing method that focuses on the functional requirements of the software [13]. This method allows a software engineer and tester to obtain a set of input conditions that fully utilize all the functional requirements for a program. In other words, this method can measure the functionality or performance of the application. The goal of this testing is to produce an application with good quality and reduce the risk of errors in functionality [14]. Therefore, it can be said that The Black Box testing method used in the inventory information system of Oemah Djari Restaurant is focusing on testing the functionality of the system without considering its internal structure or source code. Testing is carried out by identifying various inputs received by the system, such as food inventory data and sales transactions, and checking whether the output produced meets user expectations and needs. This testing aims to ensure that the system can record, manage, and update inventory data correctly. In addition, testing also involves checking the user interface, such as the accuracy of inventory reports generated by the system and the speed of response when data changes occur. This testing is carried out with various scenarios too. It is including input validation testing to prevent input errors that can affect inventory management results and testing the integration between system modules to ensure smooth and consistent data flow. By using the black box method, this testing can provide a comprehensive picture of the performance of the inventory information system in the restaurant without needing to know the underlying technical implementation. Testing was conducted on system users, namely the Owner and the Warehouse. Table 1 shows the testing of the information system built.

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Table 1. System testing.

No.	Testing Components	Trial Results
1.	Login	Valid
2.	Main course	Valid
3.	Product list	Valid
4.	Supplier data	Valid
5.	Add supplier	Valid
6.	Add product	Valid
7.	Product management	Valid
8.	Logout	Valid

4. CONCLUSION

Oemah Djari Restaurant has weaknesses in its raw material inventory system. Therefore, a system has been created using an Inventory Information System (IIS) that can improve and streamline the raw material data management process. The main goal of this system development is to reduce human error caused by mistakes in raw material data entry. The system was developed using the Waterfall Model as a guide for the software development process. This model was chosen because it produces more valid information or output. The application consists of three sections: supplier, product, and user accounts. To access this application, users are required to log in first. After logging in, users can use the available sections according to their needs and can log out once they are done. This application has been tested using Black Box Testing, which can demonstrate the functionality of a system. It can record, manage, and update inventory data accurately and produce inventory reports that meet restaurant management's needs. All input entered, both in the form of food ingredient data and sales transactions, are received and processed correctly without any errors. The user interface also runs smoothly, with a fast and smooth response. Testing of input validation and integration between system modules shows that the system can avoid errors that have the potential to affect inventory results and ensure smooth data flow. Overall, the inventory information system implemented has proven effective, efficient, and reliable in supporting restaurant operations. Therefore, this application and system are safe to use by Oemah Djari Restaurant and will significantly improve inventory data management.

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