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Designing a Web-Based Stock Monitoring System Using Unified Modeling Language UML): a Case Study of Toko Madu Jaya Flower

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ABSTRACT

Web-based information systems have become an effective solution for improving data and process management efficiency across various sectors. This research aims to design a stock monitoring information system at Toko Madu Jaya Flower using the Unified Modeling Language (UML) approach. UML is chosen for its ability to effectively describe both functional and non-functional requirements. The designed system includes features such as inventory management, real-time stock monitoring, purchasing and sales transactions, and reporting. This system is expected to help Toko Madu Jaya Flower minimize errors, improve operational efficiency, and support better decision-making.

1. INTRODUCTION

The rapid progress of information technology has profoundly impacted daily life and various fields. One key application is the use of information systems, which integrate data and processes automatically to improve efficiency in areas such as business, education, and public services. According to (Nofri Yudi Arifin, S.Kom, 2022), an information system is a mechanism that integrates components within an organization to produce relevant information. This is reinforced by (Kartika Sari, Dian Sri Agustina, 2022), who explained that an information system is a combination of various information technology components that work together to produce information aimed at achieving a unified communication pathway within an organization or group. According to (Wahyudi & Ridho, 2019), information systems are a set of interconnected components to achieve a specific goal in data processing. (Muhammad Zihad Prasetyo et al., 2023) also explained that an information system is a collection of interrelated components that form a system with the purpose of producing information in a particular organization.

A website is one form of information system implementation that allows quick and easy access to various services. (Asmara, 2019) explains that a website contains information made from a collection of web pages in a domain. According to (Adani, 2020), a website is a collection of pages within a domain that contains various information to be displayed and can be read by users who browse the internet via search engines. This is supported by (Yuhefizaer, 2021), who explained that a website is a method for displaying information on the internet in many forms such as images, text, videos, audio or interactive content that links (hypertext) documents together, which can be accessed through a browser. (Anggi Mustika Sari, 2023) briefly described a website as a collection of diverse media containing information within a domain that can be accessed by anyone using the internet.

Toko Madu Jaya Flower is an SME located in Madu, Cendono, Kec. Dawe, Kudus Regency. Toko Madu Jaya Flower is an SME engaged in selling ornamental plants, fertilizers, and plant seeds. In its operational activities, the store faces various challenges, such as manual record-keeping that is prone to errors, data loss, and difficulty monitoring stock efficiently. For example, sales and purchase records are kept in manual books, making stock monitoring unintegrated and time-consuming. This can significantly impact the store's sustainability. Therefore, a suitable and appropriate system is needed to address existing problems and support activities aimed at preventing errors or data loss. It will also be useful for stock monitoring to be tracked in real-time and accessed quickly, accurately, effectively, and efficiently.

In this research, the author will design the system with an object-oriented to approach using the Unified Modeling Language (UML) method, providing clear and standardized visualization for object-based information system design. (Sumiati et al., 2021) explained that Unified Modeling Language (UML) is a standardized language used for software modeling as a medium for writing blueprints of software (Pressman). (Sri Dharwiyanti & Wahono, 2003) stated that Unified Modeling Language (UML) is a language that has become a standard in the industry for providing designing, visualization, and also documenting systems of sofrware. (Nugroho, 2010) explained that UML (Unified Modeling Language) is a language used to visualizing, defining,

constructing, and documenting the artifacts (parts of information used or produced in a software development process). These artifacts encompass various elements, including models, descriptions, and software associated with both software systems such as those involved in business modeling and also other non-software systems.

Based on the above explanation, a web-based stock monitoring information system design at Toko Madu Jaya Flower using UML is necessary. The expected outcome of this system design is to form a system design that will make it easier for programmers to create websites that can be implemented by Toko Madu Jaya Flower to improve inventory management efficiency, stock monitoring, transactions, and sales reporting.

2. RESEARCH METHODOLOGY

In this research, the author will use the UML system design method which includes Use Case Diagrams and Class Diagrams.(Intern, 2021a) Explains that UML (Unified Modeling Language) A visual modeling methodology employed for the design of object-oriented systems. (Salim & Chaidir Ishaq, 2021)explains (Unified Modeling Language (UML) Unified Modeling Language (UML) is a standardized modeling language widely utilized across the globe. It serves to specify requirements, facilitate design, conduct analysis, and delineate architecture within the realm of object-oriented programming. The subsequent diagrams illustrated in UML will be instrumental in the design of this system.

2.1 Use Case Diagram

A use case diagram is a graphical representation that illustrates the relationship between users and the associated system. According to (BINUS, 2019a) A use case diagram serves as a modeling tool to elucidate the behavior of the system under development. It delineates the interactions between one or more actors and the proposed system, thereby providing a clear representation of these engagements. (Intern, 2021b) A use case diagram represents one of the several types of Unified Modeling Language (UML) diagrams that elucidate the interaction relationships between actors and systems. This diagram is essential for understanding the functional requirements of a system.

2.2 Class Diagram

According to (Ramdany, 2024) A class diagram represents the relationships among classes and provides a comprehensive description of each class within the design model of a system. It delineates the rules and responsibilities of the entities that govern the system's behavior. Supported by the opinion (BINUS, 2019b) a class diagram is categorized as a structural diagram in Unified Modeling Language (UML) that articulates the composition and features of classes, along with their attributes, methods, and interrelations. It is important to note that a class diagram is static in nature, meaning it does not illustrate the dynamics that occur when classes interact, but rather explains what relationships occur. In addition to using the UML design method, in this study the author uses Adobe applications as a tool that focuses on input output design.

3. RESULTS AND DISCUSSION

3.1 Business Use Case

A business use case refers to a series of actions undertaken within an organization that generates observable value and is specifically aimed at a particular business stakeholder. Each business use case must represent a business process. The following is a description and flow of the Business Use Case is shown in figure 1.

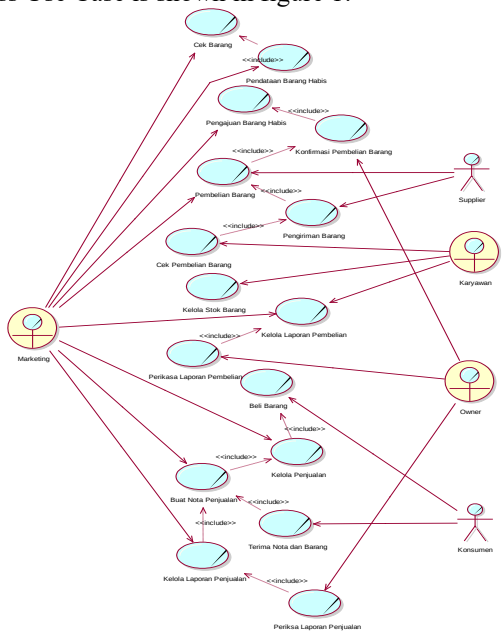

Figure 1. Business Use Case

3.2 System Use Case

System Use Case diagram is a Figure that describes an interaction between one or more actors with an information system that will be created or has been computerized. System Use Case Diagram explains which actors are involved in the system and what processes are carried out in the system. The following is a Figure of the System Use Case diagram is shown in figure 2.

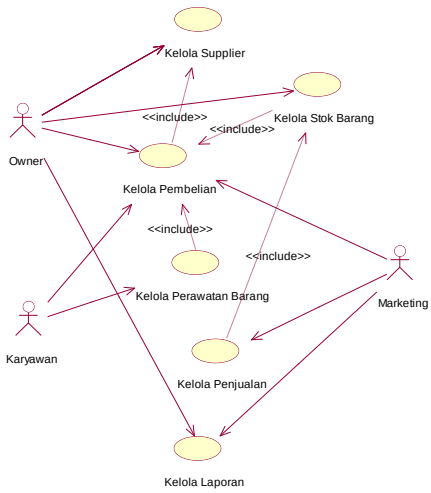

Figure 1. System Use Case

3.3 Class Diagram

A class diagram serves as a critical tool for illustrating the various classes within a system or software under development. These diagrams provide a comprehensive

representation of the system, highlighting the relationships among the different classes. Class diagrams detail the structural components of the system, including the classes, methods, their attributes, and the interconnections between these classes. By delineating operations, attributes, classes, and relationships among objects, class diagrams effectively map out the system's architecture is shown in figuer 3.

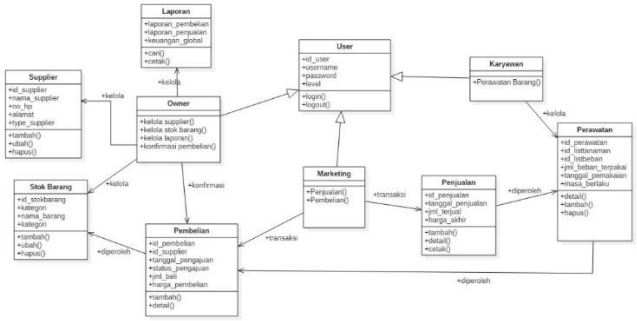

Figure 3. Class Diagram

3.4 System Design

3.4.1 Login Page

The following is the first page when we access the website, namely the login page that can be accessed by the owner, marketing and employees to enter the system is shown in figure 4.

Figure 2. Login Page

3.4.2 Owner Page.

3.4.2.1 Supplier Page

This page is specifically designed to simplify supplier data management. Users can add, change, or delete supplier-related information, such as name, address, contact, and the products they supply is shown in figure 5.

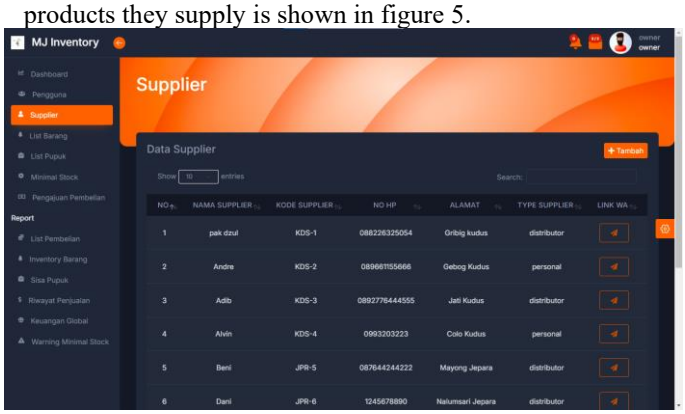

Figure 3. Supplier Page

3.4.2.2 Item List Page

The item listing page provides access to manage the entire inventory of items in the store. This feature includes recording new items, updating item data, and deleting items that are no longer for sale is shown in figure 6.

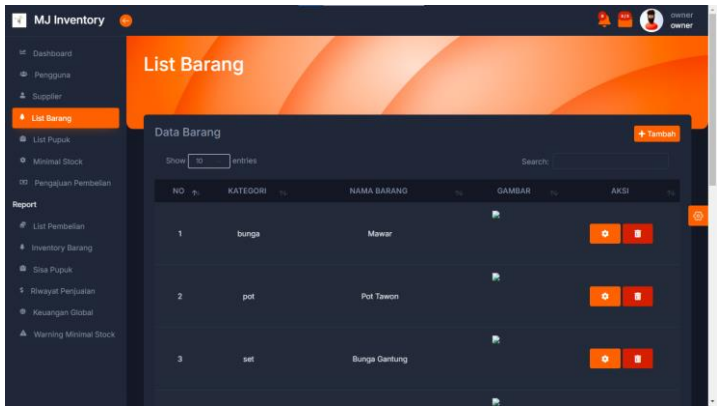

Figure 4. Item List Page

3.4.2.3 Fertilizer List Page

This page is specifically used to monitor and manage fertilizer data. All information related to fertilizer types, quantities, and other descriptions can be accessed and updated through this page, so that users can more easily manage the available fertilizer stock is shown in figure 7.

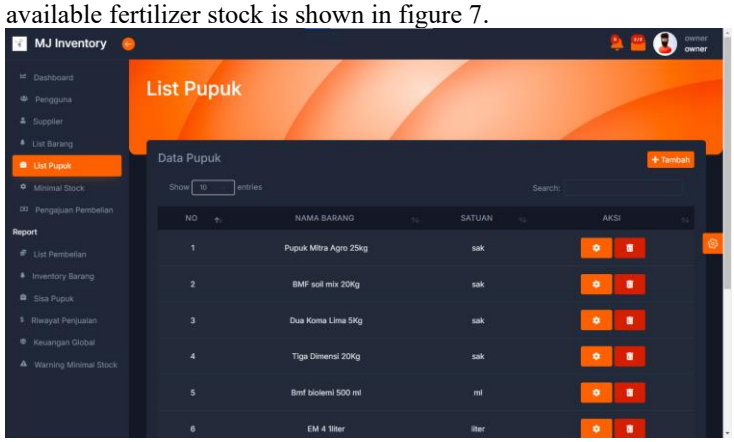

Figure 5. Fertilizer List Page

3.4.2.4 Purchase Report Page

This page displays data on purchasing reports from suppliers. The reports generated help users evaluate the frequency of purchases, the number of items purchased, and the history of store spending is shown in figure 8.

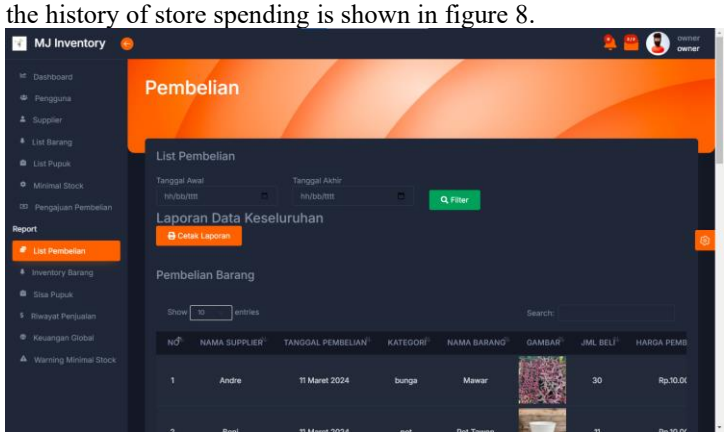

Figure 8. Purchase Report Page

3.4.2.5 Inventory Report Page

Inventory reports are presented on this page to provide information on stock items that are available, out of stock, or nearly out of stock. Organized data makes it easy for users to monitor stock availability in the store in real-time is shown in figure 9.

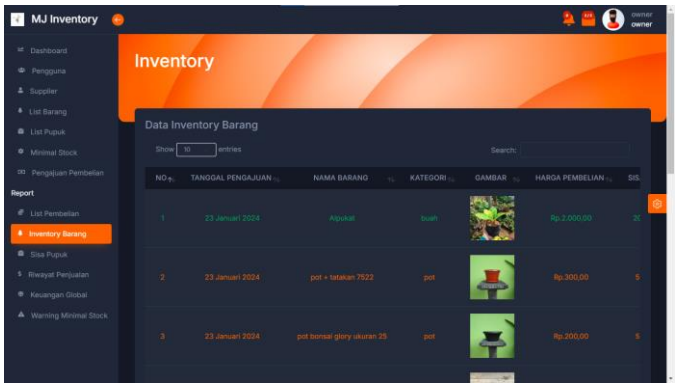

Figure 9. Inventory Report Page

3.4.2.6 Fertilizer Remainder Report Page

This report page is used to provide an overview of the remaining fertilizer stock in the store. Detailed information regarding the type of fertilizer and the amount available allows users to plan stock procurement better is shown in figure 10.

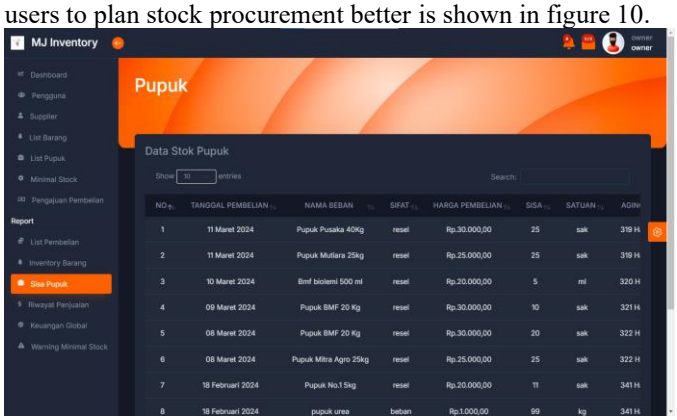

Figure 6. Fertilizer Remainder Report Page

3.4.2.7 Minimum Stock Report Page

The minimum stock report page provides warnings about items or fertilizers that are approaching the minimum stock limit. This page contains a list of items with almost depleted stock, so users can immediately take action to restock before running out of items is shown in figure 11.

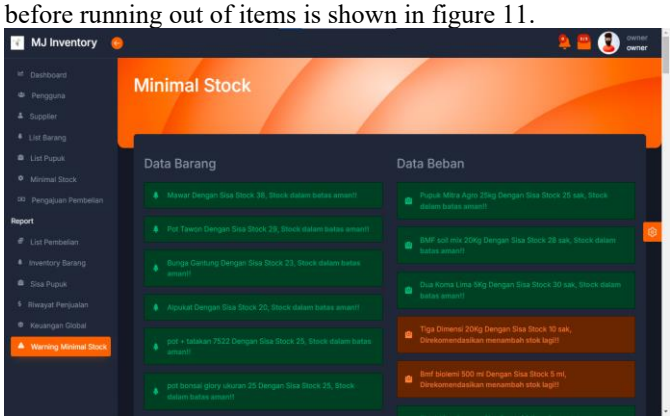

Figure 7. Minimum Stock Report Page

3.4.3 Marketing Page

3.4.3.1 Purchase Item Page

This page makes it easy for users to record and manage purchase transactions from suppliers. Users can enter data on purchased goods, quantity, price, and supplier name is shown in figure 12.

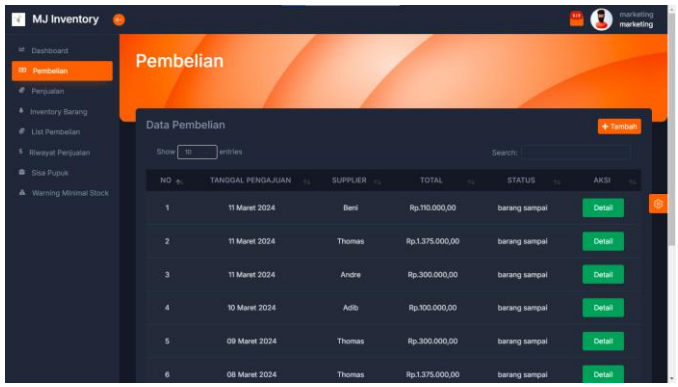

Figure 8. Purchase Item Page

3.4.3.2 Item Sales Page

This page allows users to record sales transactions of goods to customers. This system includes features for recording goods sold, quantity, and price is shown in figure 13.

Figure 13. Item Sales Page

3.4.4 Employee Page

3.4.4.1 Care Detail Page

The following is a maintenance detail page used to record maintenance activities for items in the store is shown in figure 14.

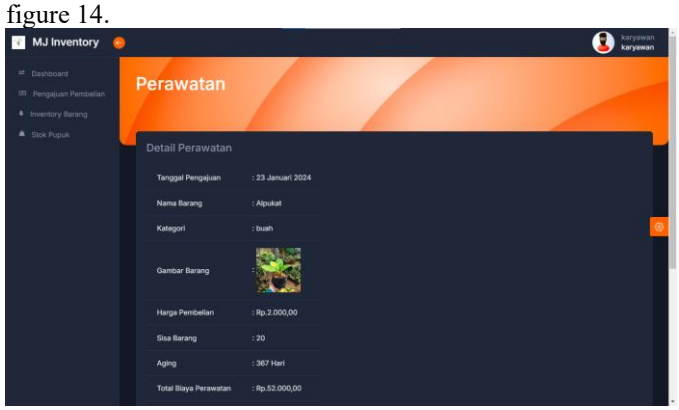

Figure 9. Care Detail Page

4. CONCLUSIONS

The advancement of information technology has opened up great opportunities in creating efficiency in various fields, including the management of small and medium businesses such as Toko Madu Jaya Flower. By using a web-based information system, the process of inventory management, stock monitoring, and transactions can be carried out in a more structured, fast, and accurate manner. The design methodology leveraging the Unified Modeling Language (UML) establishes definitive visualization standards that cater to the requirements of object-oriented system development. The anticipated

implementation of this system is projected to enhance competitive positioning and deliver more efficient services to customers.

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