

Design of a Clothing Sales Information System Based on Java NetBeans Using the Waterfall Method

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ABSTRACT

Objective: This study aims to develop an efficient and integrated information system to optimize the management of clothing sales within Micro, Small, and Medium Enterprises (MSMEs) in the retail sector, particularly those still operating with manual processes that are time-consuming and prone to errors. **Method:** The research employs the Waterfall model as a systematic software development approach, encompassing stages of requirements analysis, system design, implementation, testing, and maintenance. The system was developed using Java programming language with NetBeans IDE as the development environment and MySQL as the database management system. **Results:** The resulting Java-based Clothing Sales Information System successfully automates key business processes, including inventory management, transaction recording, and sales reporting, thereby improving data accuracy and operational efficiency. **Novelty:** The study contributes by presenting a practical and scalable information system model tailored to the needs of MSMEs in the retail clothing industry, demonstrating how digital transformation can enhance competitiveness and streamline business management in the era of globalization.

INTRODUCTION

The development of information technology has brought significant changes to various aspects of life, including the business world. The retail sector, particularly in clothing sales, has also felt the positive impact of these technological advances. Clothing is a primary need for humans in general. The development of the times has also led to the development of clothing. There are various types of clothing models produced today according to the size of the human population. This makes clothing businesses a common occurrence. Clothing businesses can be small, medium, or even large. One of the initial steps in determining the software image in developing a project is needs analysis. In general, sales is one of the business processes that occur in trading companies. Despite the rapid development of information technology, there are still many retail businesses or even companies that have not implemented information technology to compete in the future [1].

In this cashier program application, it consists of an analysis of the owner's needs, which includes the owner being able to process item data [2]. The database is used as a storage medium and is expected to reduce the risk of damage to storage media and previous transaction data that uses written recording media. It makes it easier for admins to improve the service information system [3]. The clothing business will develop well,

assisted by the role of resellers. The role of resellers includes promoting clothing, recording buyers, and making sales [4]. Technological advances in the sales sector are very useful for the advancement of the system used in a store. A computerized sales system can help employees' work become more effective and efficient in the transaction process and item data collection [5].

However, behind this development, there are often problems faced by micro, small, and medium enterprises (MSMEs) in the retail sector, especially those still using manual methods in sales management. This manual system is completely inefficient, time-consuming, and often involves human error, which can lead to discrepancies between stock data and the actual number of items available in the warehouse. This can certainly be detrimental to the company and reduce customer satisfaction levels. The category of businesses that fall into the MSME category is based on annual revenue, number of employees, and assets owned. The law that regulates the management of MSMEs is Law Number 20 of 2008 concerning Micro, Small, and Medium Enterprises. MSMEs are said to be the nation's saviors from a dark situation where MSMEs have contributed to GDP every year [6].

All transactions and sales reports are recorded manually using books. Sometimes, sales records cannot always be checked to see who made the purchase and how much the customers who came to the store spent. Due to the problems in manual sales transaction reporting, a sales application is needed that can help with automatic transactions and has reports that can be checked daily or monthly [7].

A system is a collection of several elements and has a close relationship with each other [8]. A clothing sales management system is a system that will be useful for managing clothing sales to be more effective and efficient than using a manual management system. The system was built using the waterfall development method. According to the research results of Sari, et al. (2023), the development of a system using the waterfall method for the Java-based Sales Information System application at the Bobo Mini Clothing Store was successful. The application ran well, making it easier for admins to manage clothing store sales, which were initially conventional to computerized [9]. According to research by Efendi and Annisa (2022), system development using the waterfall method was also successful in building a desktop-based clothing sales application that is useful for making it easier for owners or users of the application to manage data on goods or clothes and also transactions [10].

The system was built using the Java programming language. Java is an object-oriented, multi-platform programming language used to develop software. There are also issues of integrity, ownership, and deadlocks caused by multiple processors updating the same data. The software used to create Java-based applications is Netbeans. This software is an IDE (Integrated Development Environment) that is used to create Java, PHP, C, C++, and HTML applications. Netbeans is an IDE that runs or operates using Swing, a Java technology that can develop desktop applications that can operate on various platforms [11].

Database storage uses MySQL. MySQL is a SQL-based data management system developed and researched by Oracle Corporation. MySQL manages highly structured data sets. MySQL has the advantage of being open source, in other words, it is free and available for everyone to use [12].

RESEARCH METHOD

Waterfall is a mechanism in system balancing. The stages in the waterfall mechanism must be carried out sequentially and systematically.

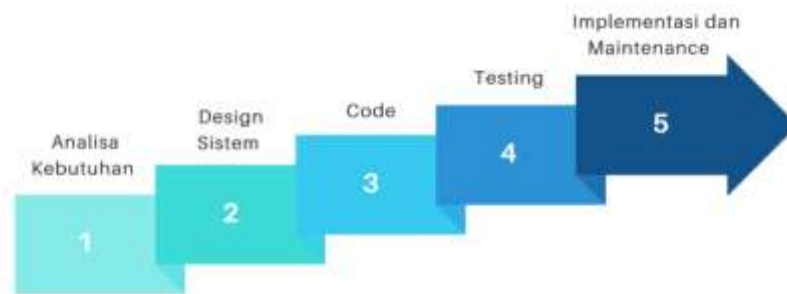


Figure 1. Waterfall Methodology [1]

This is an explanation of the waterfall stages in balancing or balancing a Java-based clothing sales system.

1. Productivity Analysis

Productivity analysis is the initial stage where data collection and information are collected to intuitively balance the system. At this stage, information and data are collected through observation and interviews with clothing sales personnel. The results obtained are the productivity of the system.

A. Hardware Device Analysis

There is a minimum hardware device that can be used to balance the Java-based clothing sales system.

- a) Processor: intel(R)Corei(TM) i7-8565Ui CPUi @1.80GHz 1.99GHz
- b) Ram: 8.00 GB
- c) System Type: 64-bit operating system, x64-baseid processor
- d) Keyboard and mouse

B. Luinask Device Analysis (Softwarei)

There are minimal software tools that are used intuitively to balance and run the system.

- a) MySQL intuitively stores data
- b) XAMPP v3.2.4 intuitive weib seirveir
- c) NeiatBeians IDEi

2. Design System

System design is the stage where the system is designed before it is built. At this stage, an identification of the features needed by the system being built or balanced must

be carried out. The clothing sales system will be designed using UIML modeling, database design, and interface design.

3. Code

At this stage, the system that has been designed will be realized or implemented in the Java programming language with the help of the Network Development IDE application.

4. Testing

Once the system is successfully built, the system cannot be used directly and must be tested first. The test is carried out using the black box method. This black box test is a test that is carried out by seeing whether the system is already functioning functionally or not.

5. Maintenance

In this research, the system balancing stage with the waterfall method is only carried out until testing. The maintenance stage is the stage where the system that has been created has been used and is monitored and maintained periodically to avoid if there is an error or buig.

RESULTS AND DISCUSSION

1. Software Modeling

Software modeling is the modeling performed before a system is implemented using the Java programming language. There are three types of software modeling: UIML modeling, database design, and interface design.

1. Modeling with UIML

UIML Modeling Language (UIML) has become the de facto standard for intuitive software modeling. UIML models, when used, can intuitively visualize, understand, and communicate the structure of a system [13].

a. UISEICH Diagram

UISEICH Diagrams are descriptions or depictions of system functions from a system's English perspective [14]. Figure 2 is a diagram of a clothing sales system.

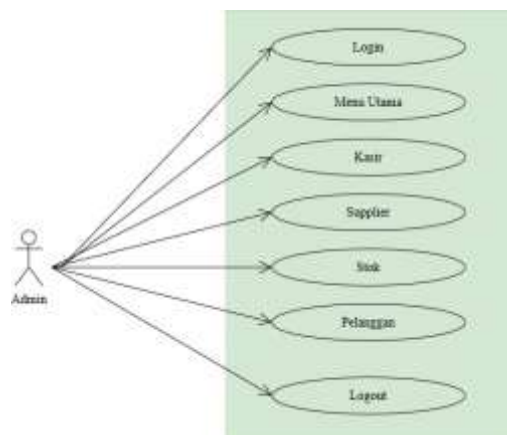


Figure 2. Uiseicasei Diagram of the Clothing Jualing System

b. Activity Diagram

An activity diagram is a diagram that shows the processes that occur in a cashier system.

1) Cashier Activity Diagram

The activities that occur at the cashier interface include entering purchased items. The system then generates the total purchase if the admin clicks the "total" button. The admin then clicks the "pay" button if the buyer makes payment for the purchase. Figure 3 illustrates the activity diagram of the cashier interface.

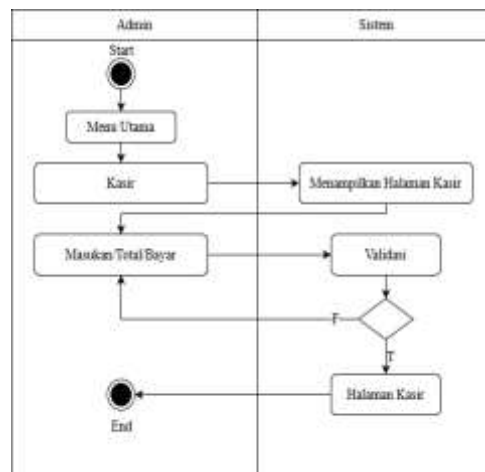


Figure 3. Cashier Activity Diagram

2) Support Activity Diagram

The support process includes viewing data, adding, editing, deleting, and printing support data. The support activity diagram can be seen in Figure 4.

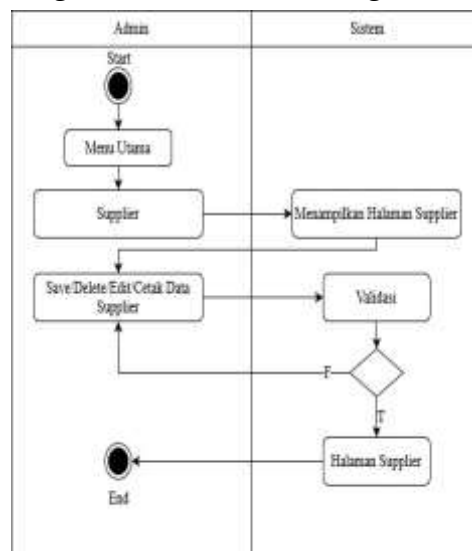


Figure 4. Supply Activity Diagram

3) Stock Activity Diagram

The stock management process includes viewing stock data, adding, updating, deleting, and checking inventory data. The following is an activity diagram for stock management.

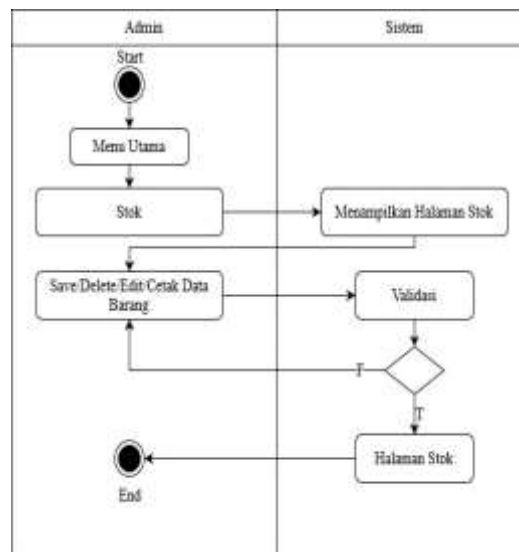


Figure 5. Stock Activity Diagram

4) Class Diagram

A class diagram is a diagram that intuitively displays the relationships or relationships between tables in a Java-based clothing sales database. The following is a class diagram of a clothing sales system.

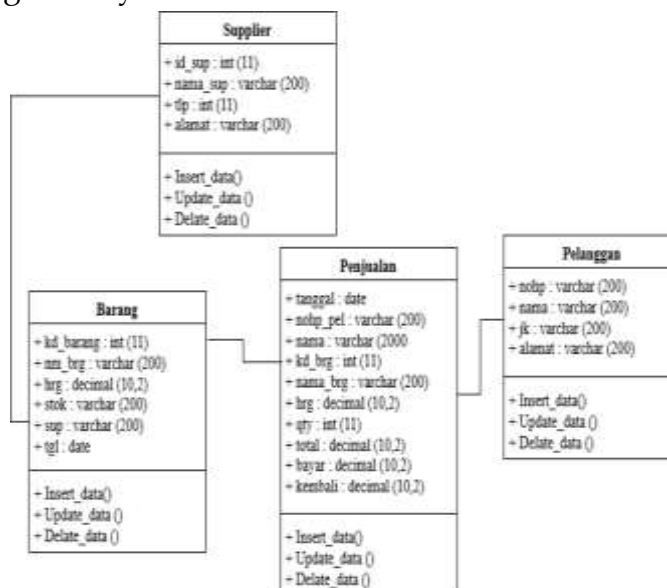


Figure 6. Class Diagram of the Clothing Resale System

2. Implementation/Appearance of Clothing Sales System

This section discusses the appearance of a Java-based clothing sales system utilizing the waterfall balancing model.

a. Login Screen

The login form is the page that appears when accessing the Clothing Sales System. To successfully log in, you must enter your username and password on this page. Upon successful login, you will receive a success notification. This is the login screen.



Figure 7. Login Screen

b. Main Menu

The main menu displays four menus: Cashier, Supplier, Stock, and Customer. If the admin wishes to log out, there is a Logout button in the bottom right corner. This is the main menu in the clothing sales system.



Figure 8. Main Menu

c. Cashier Menu

On the 'Cashier' screen, a page will appear where the admin can enter information regarding the purchase of items such as clothing. This page is intuitively designed to allow the admin to enter data such as the date, phone number, purchase name, item code, item name, item price, item quantity, and total. Enter the payment and return amount. The following is the display of the cashier screen.



Figure 9. Cashier Menu

d. Supplier Menu

In the supplier menu, the admin must input supplier data such as Supplier ID, Supplier Name, Phone Number, and Address. After that, the admin saves the inputted data. Actions that can be performed include deleting, editing, and checking supplier data. The following is the display of the supplier menu:



Figure 10. Stock Menu

3. Testing

System testing is testing that is carried out with functional testing using the black box method. This method is a software testing without the need to display detailed results from the software [15]. Functional system testing is carried out to ensure that each function in the system runs as it should. This testing involves evaluating the various features and intuitive operations of the system to ensure that the system functions according to its stated specifications. The following is a table of results from functional black-box system testing, which shows how the system performs its expected functional features.

CONCLUSION

Fundamental Finding : The study concludes that the implementation of a Java-based Clothing Sales Information System significantly enhances the efficiency and accuracy of sales transactions and inventory management within MSMEs. The system effectively minimizes manual errors, accelerates transaction processing, and ensures more reliable data management compared to traditional methods. **Implication :** These findings imply that the digitalization of business operations through customized information systems can serve as a strategic step toward improving competitiveness and operational sustainability in the retail sector. **Limitation :** However, the current system is limited by its lack of integration with advanced business features such as reseller management and online payment systems, which restricts its scalability in a broader digital business environment. **Future Research :** Further research is recommended to develop and evaluate an expanded version of the system incorporating these additional

features, along with real-time analytics and cloud-based data synchronization, to enhance performance and user experience across various retail contexts.

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