DESIGN OF A WEB-BASED ASSET MANAGEMENT INFORMATION SYSTEM

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ABSTRACT

The development of a web-based asset management information system is essential to streamline inventory tracking and asset management processes within institutions. Organizations typically manage various inventory items, including machines, laptops, and computers, which are vital for daily operations. However, many institutions still rely on manual data processing using Microsoft Excel without a centralized database, leading to inefficiencies, errors, and limited scalability. This study aims to address these issues by developing a web- based system using the CodeIgniter framework for application development and MySQL as the database, managed through PhpMyAdmin. The development process follows a structured approach consisting of system analysis, data collection, system design, application development, testing, and implementation. The result is a functional and efficient web-based application designed to improve asset and inventory record management. The system is expected to enhance data accuracy, accessibility, and overall operational efficiency within the institution.

Keywords: *Information System, Asset Management, Inventory Management, Web-Based System, Management Information System.*

INTRODUCTION

Asset management is an important aspect of company operations to ensure that assets can be used optimally, recorded accurately, and can be tracked in real-time. Effective asset management helps improve operational efficiency, reduce the risk of asset loss, and simplify the audit and reporting process (Rainarius et al., 2022). However, in reality there are still many companies that use manual recording in the implementation of asset management, which often causes delays in recording, errors in data collection, and difficulties in monitoring assets.

With the development of technology, the application of web-based systems is an effective solution in improving the efficiency of asset management. This system allows asset recording to be done more accurately (Adrian et al., 2025). The scope of asset management is the planning process, asset design, asset use and asset write-off. Asset management information systems are developed to make it easier for an organization to manage assets so that they can provide precise, accurate, relevant and reliable information (Hasan et al., 2019). Some of the main challenges in asset management are the limitations of accurate records, as well as the lack of transparency in asset monitoring. Manual systems that are still implemented in many companies often hamper operational efficiency and increase the risk of data loss (Sapardi et al., 2023). Therefore, a web-based system is needed that can support the entire scope of asset management.

This research aims to develop a web-based asset management system to support the entire scope of asset management. This system will be developed using the *CodeIgniter* framework for the back-end which consists of *Model, View,* and *Controller* so as to make this system structured, easy and secure (Sarimuddin et al., 2024). It is hoped that in the long run, the use of this asset management website can help increase the productivity and profits of the company by optimizing asset utilization. The system is designed to feature a

user-friendly interface that enables staff to manage asset data efficiently, while also integrating filtering and reporting functions to allow quick and easy access to information. Additionally, it aims to improve the accuracy of asset recording and minimize errors commonly found in manual data entry. By providing a centralized database, the system ensures consistency, transparency, and ease of auditing. Furthermore, the availability of timely and relevant asset data is expected to support better decision-making processes. To maintain data integrity and confidentiality, the system also includes security features such as access rights management and role-based permissions.

METHODS

This research applies the waterfall method as an approach in software development, which is one of the models in the System Development Life Cycle (SDLC) and is used in the process of developing information systems. The waterfall method is a stage-based approach to system development, in the process each stage must first be completed before continuing to the next stage (Hasan et al., 2019).

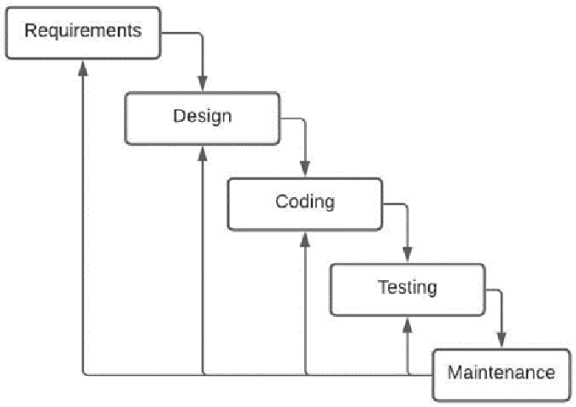

Figure 1. *Waterfall* method

The waterfall model in its development becomes simpler which consists of the stages of analysis, design, coding, testing and implementation (Sarimuddin et al., 2024). The author uses waterfall because the steps of making an organized system are neat and structured. The following stages are in the waterfall method in developing the application system made in this study including the following:

1. Requirements

   This stage is carried out by collecting information related to system requirements through observation and analysis of system requirements in the company that will use the system. Then the data obtained from the process will be used to become the basis for designing the system to be created. The The results obtained by researchers in this process are use-case diagram and class diagram.

2. Design

   After the system needs are analyzed, the next stage is the design stage. Researchers will design according to the needs that have been done in the needs analysis process. The system design uses UML (Unified Modeling Language) modeling. The design includes activity diagrams, and entity relationship diagram (ERD), which will be used as a reference in system implementation.

3. Coding

   The implementation stage is the programming phase in making an asset management system. This software development uses the PHP programming language

and the CodeIgniter 3 Framework and Bootstrap then uses the visual studio code editor text and the system will be run using XAMPP as a local server and using MySQL as a database.

4. Testing

After the implementation stage has been carried out, the next step is to test the asset management system application that has been made. The function of this test is to determine whether the system can work as desired. At the system testing stage, the tester uses the black box testing method. Where testing is only done only on functionality without paying attention to the internal structure or program code.

5. Maintenance

The last stage in the waterfall method, is in the development of an asset management system that has been operated and maintained by users. Maintenance allows developers to find bugs or changes in needs, so that improvements and updates can be made to the system so that it can run according to its function.

RESULT AND DISSCUSSION

1. Result of requirements

In the system design process, several Unified Modeling Language (UML) diagrams were used to describe the structure and workflow of the system more clearly, which are presented in the following diagrams.

1. Use-case Diagram

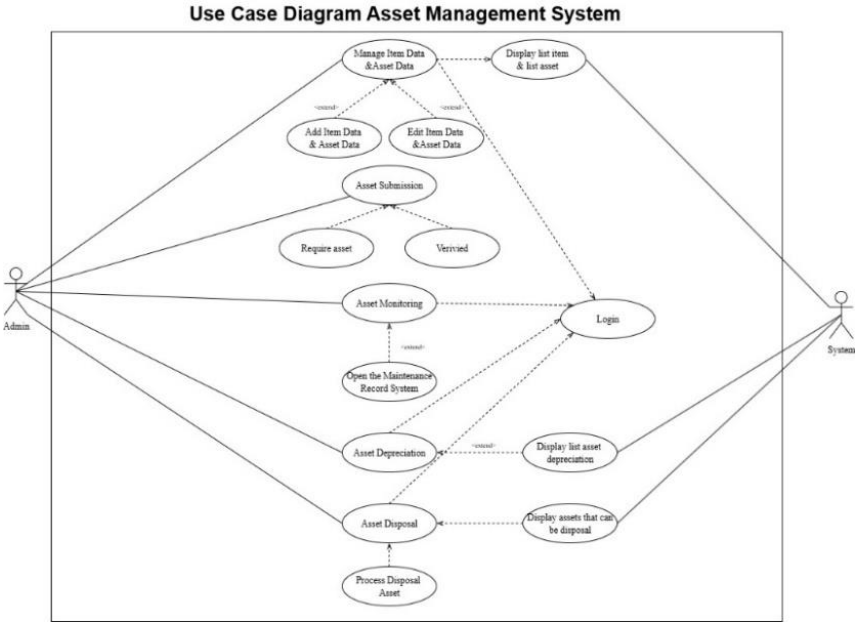

Figure 2. Use-case diagram

In the use-case diagram of the Asset Management System web system, it can be seen that the user who logs into the system as an admin. As an admin user can access the Item and Asset menu where admin can add, edit and delete data. Furthermore, the admin can also add assets by accessing the *asset submission* menu. Admins can view maintenance record data through the *asset monitoring* menu which is connected to the *Maintenance Record System*. Admins can see a list of assets that are depreciated in the *Asset Depreciation* menu. Then the last admin can propose and dispose of assets whose list of asset disposals will be displayed in the system.

2. Class Diagram

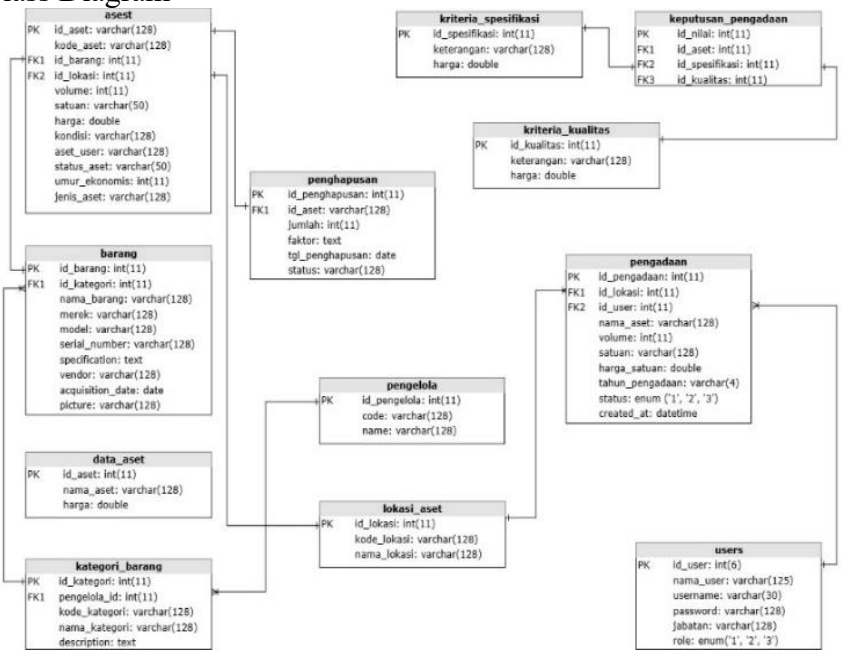

Figure 3. Class Diagram

2. Result of Design

The following are some examples of activity diagrams and entity relationship diagram that have been designed according to the needs of the Asset Management System.

1. Activity Diagram

a. Activity Diagram for Adding Asset Data

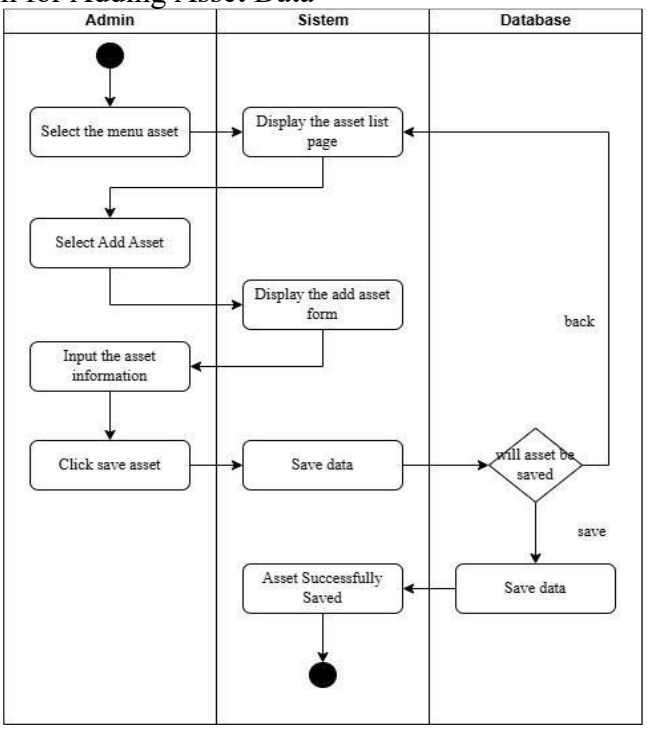

Figure 4. Activity Diagram for Adding Asset Data

2. Entity Relationship Diagram (ERD)

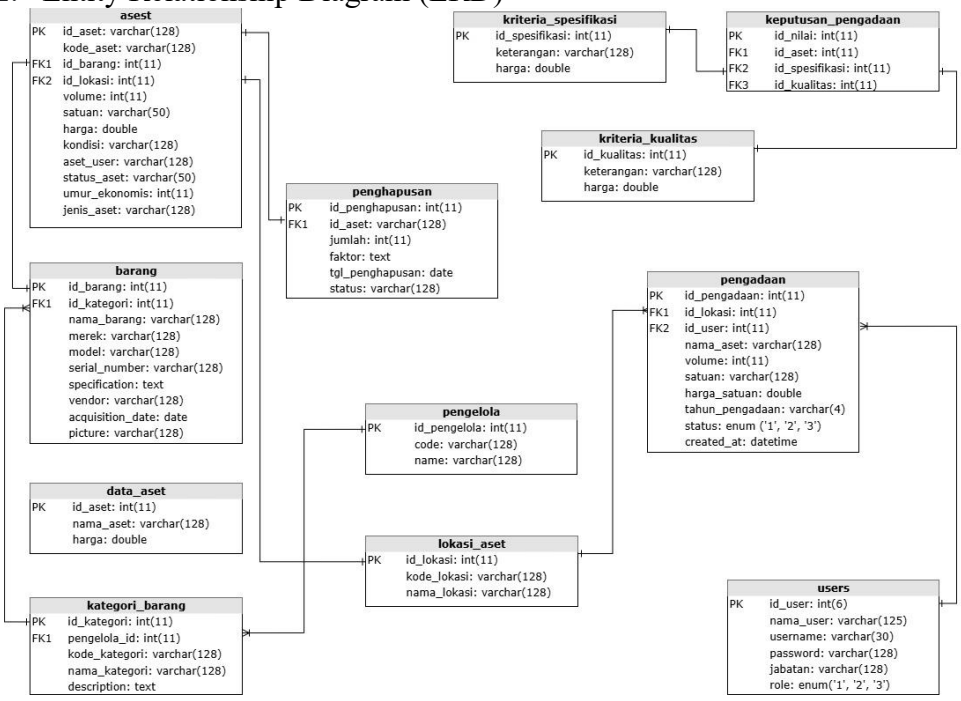

Figure 6. Entity Relationship Diagram (ERD)

3. Result of Implementation

Furthermore, from all the existing diagrams, the result achieved from this research is a web-based Asset Management System application. The following is the implementation of the Asset Management System display.

1) Dashboard page view (main page)

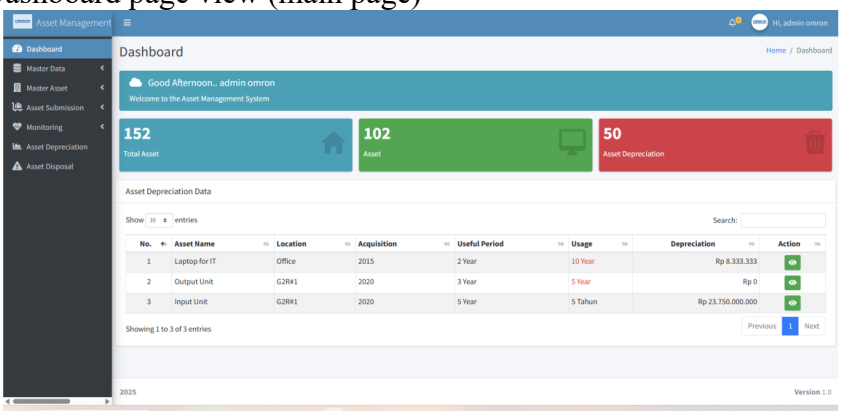

Figure 7. Dashboard page view (main page)

The following is a view of the main page (dashboard) of the Asset management System web-based system. On this page, users who have logged in to the system will see the number of assets owned (both assets that can still be used and assets that have been written off). Below it there is a list that shows the name of the asset, the location of the asset, the year of acquisition of the asset, the period of use of the asset, and the depreciation value of the asset.

2) Master Data Item page view

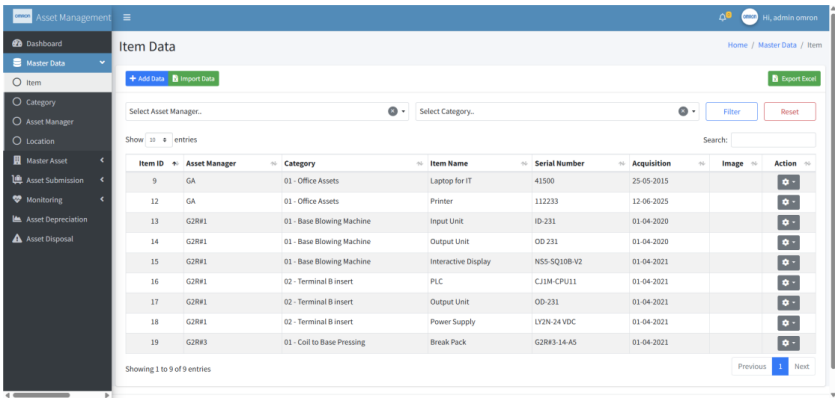

Figure 8. Master Data Item page view

The following is a view of the Master Data Item menu on the Asset Management System web-based system. On this page users can view, add, edit, and delete item data owned by the company. This item data can then turn into asset data when it has been submitted through the asset submission menu.

3) Master Asset List Asset page view

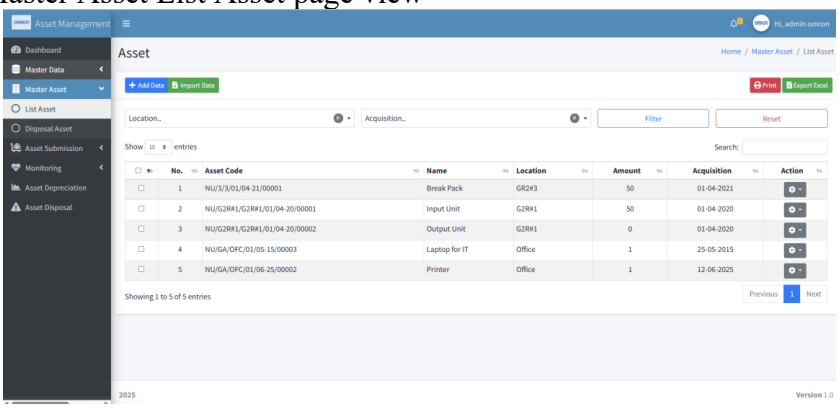

Figure 9. Master Asset List Asset page view

The following is a view of the Master Asset List Asset menu on the Asset Management System web-based system. On this page users can view, add, edit, and delete asset data owned. Assets that can be added here are assets that have been submitted on the *Asset Submission* menu.

4) Asset Depreciation page view

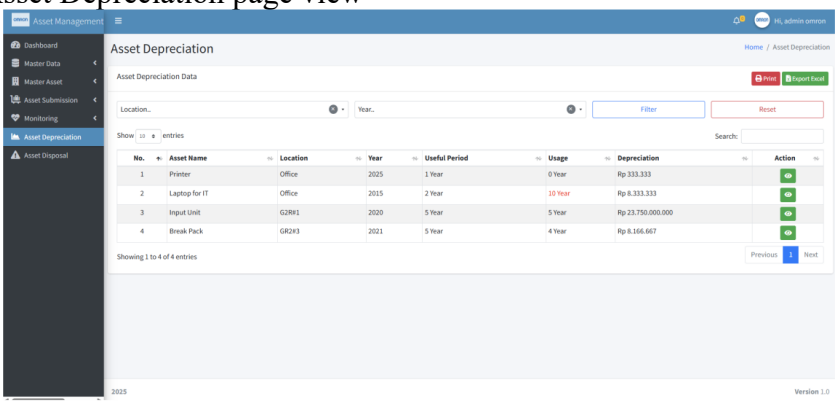

Figure 10. Asset Depreciation page view

The following is a view of the Asset Depreciation menu on the Asset Management System web-based system. On this page users can see a list of assets that are depreciated.

Depreciation uses the straight line method.

4. Result of Testing

Next, the researchers tested the results of the system implementation. Researchers use the Blackbox Testing method which is a software testing method that focuses on the functionality of the system without looking at its internal structure or source code. This test is carried out by providing input and observing the resulting output to ensure that the system is functioning according to predetermined specifications.

This technique is often used to test the validation of inputs, outputs, and user interface interactions without knowing how the internal processes work. The following are the results of testing the Asset management System using the Blackbox Testing method.

Table 1. Blackbox Testing

Menu/features tested	Test scenario	Expected results	Test results
Login menu	Input correct username and password	Enter the main page (dashboard).	Success
	Input incorrect username and password	Restart the login page.	Success
Master Data Item Menu	Add item data	The newly added item will appear in the item data list.	Success
	Edit item data	Changes to item data can be seen in the item data list.	Success
	Delete item data	Deleted items disappear from the item data list.	Success
Master Asset Menu	Add asset data	The newly added asset will appear in the asset list.	Success
	Edit asset data	Changes to asset data can be seen in the asset list.	Success
	Delete asset data	Deleted assets disappear from the asset data list.	Success
Asset Depreciation Menu	Opens the depreciable assets menu.	Displays a list of assets and their depreciation values.	Success
Print feature	The user presses the print file button.	Open the selected data and ready to print or save as pdf.	Success
Download to excel feature	The user presses the export to excel button.	The selected data will be directly saved in excel.	Success

CONCLUSION

Based on the results of research and development that has been carried out, it can be concluded that the web-based asset management information system developed using the

CodeIgniter framework and MySQL has succeeded in helping to manage assets more effectively and efficiently. This system is designed to overcome various problems in manual asset management, such as delays in recording, data input errors, and difficulties in monitoring assets.

The implementation of this system provides various benefits, including increased data accuracy, ease of access to information, transparency in asset tracking, and support for the audit and decision-making process. Features such as asset recording, asset submission, maintenance monitoring, depreciation, and asset write-off have been implemented well and have been tested using the Blackbox Testing method with satisfactory results. With a user-friendly interface. It is expected that this system can continue to be developed and adapted according to the needs of the organization in the future to achieve optimal and integrated asset management.

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