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Asset Maintenance Monitoring Application: A Case Study of a Government Bank Branch Office

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ABSTRACT

Asset management in a company is essential to do. Asset management may include record keeping, maintenance, and management environment further. Recording information asset owned by a company is the primary and most important thing to do to record data assets owned by the company. The existence of definite information about the asset owned by a company will provide convenience for the company that is and automatically, the company will also easier to carry out the asset management process further. One of the governments in the Jakarta Branch, which has assets, should be maintained. Recording information assets in one of the government banks, Jakarta Branch, is only partially managed with a computerized system. The process of recording data assets is still done manually and also not maximum. This research developed an Asset Monitoring Application Maintenance feature that can do registration detail information about the attributes and Monitoring of existing assets and Online Work Order. The software development model used in this study is the waterfall model. This thesis will explain the activities in each development phase. With this application, all the attributes of data assets owned by the company can be well identified and inventoried so that the process of monitoring assets is more optimum and easier to do.

Keywords: *Application Maintenanc, Asset Management, Asset Monitoring*

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INTRODUCTION

Information Technology (IT) is very developed and plays an essential role for all levels of society because everything is computerized. Information technology can produce fast, precise, accurate information that meets the needs of the wider community (Lei dkk., 2020). With the application of information technology, all company activities

are expected to run well ands be controlled (Yakub, 2012). In addition, the development of information technology, which is now multiplying, makes it easier for us to carry out business activities. At this time, information technology has provided various conveniences (Roy dkk., 2019). The computer is one of the modern electronic media capable of processing raw data automatically to produce a series of reports that we want, according to several programs contained in the computer (Khawaja dkk., 2019). With a fast, precise, and accurate way of working, computers have become the primary tool in company activities (Boje dkk., 2020). However, errors in the program will be fatal to the resulting output. Likewise, with internet services now increasingly used by the public, the internet can provide information in real-time wherever we are, anytime, and anyone in the world (Balia dkk., 2021). Almost everyone can access updated information via the internet, one of which is the website circulating in cyberspace. The website will make it easier to search for the needed information and speed up the work when uploading data/information online.

Fast, precise, and accurate information greatly supports management in decision-making to achieve the goals and objectives set (Sutabri, 2012). Computerized data management is a suitable medium for all levels of society because it can speed up getting the data/information needed (Bao dkk., 2019). The information presented through the website greatly supports the process from the beginning to the end of the work; it can also provide efficiency in labor, time, and operational costs that run within a company that uses it. With today's technological advances (Zhang dkk., 2020), everyone is trying to create a sound information system that is also easy to use to help humans work. The existence of a broad and easily accessible network is also one of the steps to get fast and precise information (W. Chen dkk., 2019). With this development, every company wants to change the old system to a new system so as not to be left behind by others. The world of banking has used a computerized system by utilizing website media to help speed up all work and also, at the same time, produce helpful information for those who use it (Fathansyah, 2012). The progress of every company, especially banking, will not be separated from the importance of assets owned because it also affects the bank's development. Assets owned are usually in the form of goods, work equipment, and facilities (Zamora-Izquierdo dkk., 2019). Company assets have an enormous capital value and significantly support the company's business processes, ranging from tables, chairs, computers, laptops, printers, money-counting machines, dollar detection machines, and others.

The availability of these assets is expected to provide economic benefits for banking companies (Qi dkk., 2019). The existence of these assets dramatically affects the performance and performance of the branch in carrying out its activities to serve every customer who comes to the branch (Messina dkk., 2021). These assets must be identified, managed, and maintained correctly to ensure optimal condition (Lei dkk., 2020). The reality in the field shows that many cases start from mismanaging these assets, resulting in significant losses (Gibb dkk., 2019). For example, resource optimization cannot be done optimally because it is not identified, making it difficult to

know whether an asset is a time to be repaired or even replaced (Hidayat, 2012). The assets owned, in reality, make the operational and maintenance costs quite large (S. Wang dkk., 2020). At the same time, the condition is often uncontrolled due to the need for neat scheduling for the maintenance period of all existing assets, which will cause inefficiency for the branch. As the central resource of the bank to carry out all activities in the branch, the management and maintenance of assets must be considered.

One of the state banks is a company engaged in financial services, a case study in the research (Al-Fraihat dkk., 2020). Financial services is a term used to refer to services provided by the financial industry (Giudicessi dkk., 2020). Financial services are also used to refer to organizations that handle fund management. Banks, investment banks, insurance companies, credit card companies, consumer finance companies, and securities are examples of companies in this industry that provide various services related to money and investment (Naparstek & Cohen, 2019). In carrying out its business processes, one of the Jakarta Branch government Bank offices has used IT equipment, including hardware, software, and networks. One of the Jakarta Branch government Bank Offices needs an integrated system in asset management. Request activities, data collection, monitoring asset maintenance (Verdoliva, 2020), and others still use documents that must be signed by management, and asset data is still stored in the form of Microsoft Excel files (M. Wang & Deng, 2021). This is felt to be less accommodating to the company's interests because tracking an asset is more complicated, the response time to user complaints is relatively high, high costs because handling interference is more corrective and not preventive, loss of assets due to not being adequately inventoried and the difficulty of knowing the value of immovable assets at one of the Jakarta Branch government bank offices periodically (Fitri dkk., 2019). The web application that will be created is a system that can monitor and be used as a reminder for the maintenance of each asset under their respective schedules. This web application was created using the PHP program and also the MYSQL database, with the hope that this application will be able to provide solutions in solving asset management problems that have been present at one of the Jakarta Branch government Bank Offices.

Asset management is formed from two vocabularies, namely management and assets. Management is a direct translation of the word management, which comes from English and means management (Salminen dkk., 2020). The formation of the word management comes from the verb to manage, which means to take care of, organize, carry out, treat, or manage (Lyu dkk., 2019). As for what is meant by Asset, it generally means goods (thing) or something (anything) that has economic, commercial, and exchange value. Assets are goods, which in the legal sense are called objects, consisting of immovable and movable objects, both tangible and intangible, which are included in the assets or assets of an agency, organization, business entity, or individual (Jarvis dkk., 2019). Asset Management is a process for managing requests and guidelines for acquiring, using, and disposing of assets to make the most of their delivery service potential and manage the risks and costs of asset lifetime.

This Immovable Asset Maintenance Monitoring application is made using the PHP programming language. PHP is one of the web programming languages that many users have widely used in making web applications, both individuals and companies. PHP (Hypertext Preprocessor) is a scripting language that can be embedded or inserted into HTML. PHP is widely used to program dynamic websites (H. Chen dkk., 2021). PHP can be used to build a CMS.PHP was originally short for Personal Home Page. PHP was first created by Rasmus Lerdorf (FI) as a script used to process web form data (Lange, 2011) (Mathers, 2020).According to (Anhar, 2010), PHP stands for PHP Hypertext Preprocessor, a server-side web programming language that is open source. PHP is a script integrated with HTML and is on the server (server-side HTML embedded scripting). PHP is a script used to create dynamic web pages. Dynamic means that the page to be displayed is created when the client requests the page.

Software testing is the process of manually or automatically running and evaluating a piece of software manually or automatically to test whether the software meets the requirements (Clune & Rood, 2011) and (Nakagawa & Maldonado, 2011). In short, testing is an activity to find and determine the differences between expected and actual results. A software test can be conducted after the engineer has implemented an abstract software concept. Software testing means "unpacking" the software that has been built.

According to (Jin & Xue, 2011) and (Kumamoto dkk., 2010), testing intends to find as many errors as possible in the program and evaluate its quality (Guerrini-Rousseau dkk., 2019). The purpose of software testing, according to (Xie dkk., 2011), is to assess whether the software developed has met the needs of users, assess whether the software development stage is under the methodology used, and create test result documentation that informs the conformity of the tested software with predetermined specifications. The data collected during testing will indicate the reliability and quality of the software as a whole. In general, the pattern of testing on software is as follows:- Testing starts from the component level to integration between components into a system.- Testing techniques vary according to the various sides or test units at different times depending on which part of the test is needed.- The software developer does testing, and if it is for a large project, testing can be done by a test team unrelated to the software development team (independent test group (ITG)).Testing and debugging are different activities, but debugging should be accommodated in any testing strategy. Testing is more focused on finding errors either from a general person's point of view or from a developer's point of view without having to locate errors in the program code. Debugging is the process of locating errors in the program code so that they can be fixed immediately by the programmer.

RESEARCH METHODOLOGY

In conducting research, the method used in this study is the Field Research method (Nazir, 2005) by using research within the environment of one of the Jakarta branch offices of a government bank. The method applied in this research is based on

analyzing data, namely qualitative methods, by studying all respondents in the Jakarta Branch, which is used as the object of research so that it can be analyzed.

In explaining the results of this research using descriptive methods, this research looks for elements, characteristics, and properties of a phenomenon related to monitoring maintenance activities of immovable assets in one of the Jakarta branch offices of government banks. This method begins with data collection at the Branch, analyzing data, and developing the system to be created.

Data Collection Technique

To get the results of a discussion, accurate data or information is needed, so in this study, the following data collection methods are used.

Observation

Data collection through observation and recording of data by data collectors on the events investigated in the object of research, namely focusing on maintaining branch assets. In making this observation, direct observation is made of the daily activities of the system that runs for monitoring the maintenance of existing immovable assets and processing asset data at the Jakarta Branch.

Interview

In this study, interviews were conducted by asking questions to CSA (Customer Service Administrator), CSO (Customer Service Officer), Telko (Teller Coordinator), Verifier, and BM (Branch Manager). All questions related to the problem can be seen in the attachment.

Documentation

The documents studied to obtain data and information in this study use the Asset List obtained from one of the Jakarta branch offices of government banks, the asset maintenance report, and the results of interviews conducted in this study.

System Development Method

The waterfall method has the following steps:

A. Communication

The communication stage in the project initiation and requirements gathering for this research is a direct interview with the asset management user at one of the Jakarta branch government bank offices regarding the application needs needed.

B. Planning

Planning consists of estimating, scheduling, and tracking. At this stage, making the application takes ± 6 months until the research is completed at one of the Jakarta branch government bank offices.

C. Modeling

The modeling stage consists of analysis and design. To identify problems in monitoring maintenance assets at one of the Jakarta branch offices of government banks, the System Analysis method used is "PIECES." Where analysis is carried out on performance (performance), information (information), economy (economy), control (control), efficiency (efficiency), and service (service).

The design stage used is the UML (Unified Modeling Language) approach (Yasin, 2012) to pour the thinking of the application to be built and to get solutions to asset

maintenance problems in one of the Jakarta branch offices of government banks. The diagrams used in the design of this application are Use Case Diagram, Activity Diagram, Class Diagram, and Sequence Diagram.

D. Deployment

This stage consists of delivery, support, and feedback. At this stage, the application provides functions and features of asset management that follow the needs of one of the Jakarta branch offices of a government bank. This research also provides documentation in the form of UML designs for all features and functions. However, there is no feedback from the application because this asset maintenance monitoring application has yet to be implemented directly in the Jakarta branch.

E. Construction

This stage consists of code and tests. At the code stage, the programming language used is PHP, and at the test stage, the tool used to test the website uses the Google Chrome browser, and the database used is MYSQL (Kadir, 2010).

Use Case Design of the proposed system

The following is the Use Case Design of the proposed system that should run in one of the Jakarta branch offices of a government bank:

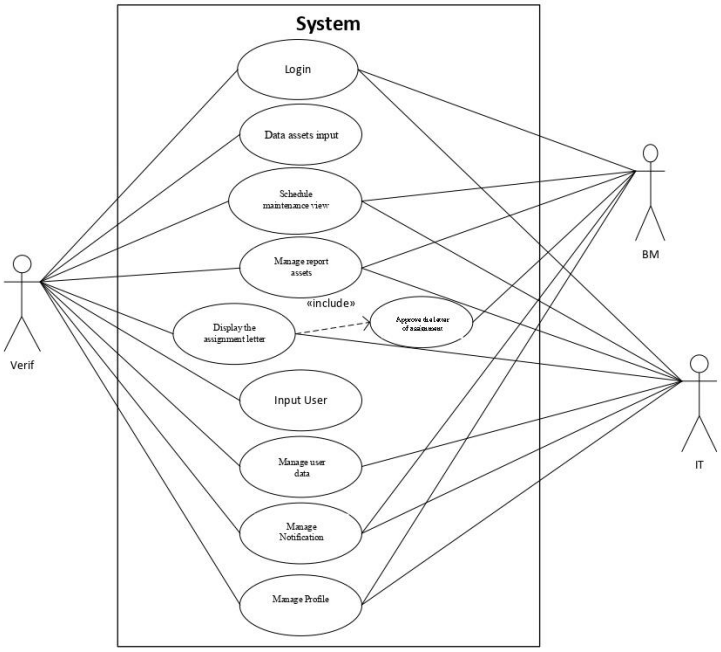

Fig. 1 Use Case of the proposed system Monitoring Maintenance Asset

Proposed System Analysis Result Procedure

From the results of the existing analysis, the maintenance monitoring system that should be carried out at one of the Jakarta branch offices of the government bank is as follows:

Asset data input procedure

Verify enters new asset data using the asset maintenance monitoring system through the Asset Data Input Menu, which is then stored in the Asset Data Report.

Procedure for Making a Letter of Duty

Verify makes a task letter through the Asset Data Report Menu, where in the Asset Data report menu, there is an Action button to change the asset maintenance status from Good to corrupt. After the data is successfully saved, the data will enter the Notification menu. In the Notification Menu, Job Status is changed by Verify from Corrupt to Waiting; waiting here is waiting for Approval from BM before the task letter is sent to IT.

Task Letter Approval Request Procedure

After the BM enters the system, the BM will get a notification requesting approval of the Job Status which is still "Waiting" to be changed to "Repair" After the Job Status has been changed to "Repair," then automatically, the Task Letter will be sent through the system to the IT User.

Procedure for receiving the Job Letter from the Branch to IT

When IT gets a Notification through the Schedule Maintenance Menu on the system Dashboard, IT can see the details of the task letter in the Task Letter Report menu. In the Task Letter Report Menu is a Print Letter Function containing details of the requested Asset repair work. IT will immediately go to one of the Jakarta branch government bank offices according to the scheduled date stated in the Task Letter to repair the Asset in question.

Procedure for requesting Approval of the completed Task Letter from IT to BM

After IT has completed all the work following the Task Letter, IT will request Approval to BM through the Notification Menu. In the notification menu, there is a Job status that must be changed by IT from "Repair" to "Waiting Approve."

Procedure for sending Approval from BM to IT after the work is done

BM will get an Approval request notification after it completes the work through the Notification menu. In the notification menu, BM must change the job status from "Waiting to Approve" to "Good."

RESULT AND DISCUSSION

System Implementation

This system implementation will explain the implementation of the system application using several functions consisting of the implementation space, coding, and interface of the system application. The following are the PC (Personal Computer) specifications needed when designing this asset maintenance monitoring system is made and operated:

Hardware:
Computer Type: Personal Computer (PC)
Processor: AMD C-Series type, Speed 1.0 GHz, Cache 1MB
RAM: 2 GB DDR3 PC – 10600
Monitor: LED backlight display type, Resolution:1366 x 768 Pxl
Software:
Web Server: MySQL
Browser: Google Chrome
Program: PHP

Database Implementation in this subchapter will explain the application system's database implementation (Nugroho, 2011) using XAMPP. Several functions will be created consisting of the application system's implementation scope. Open XAMPP until the display is as follows.

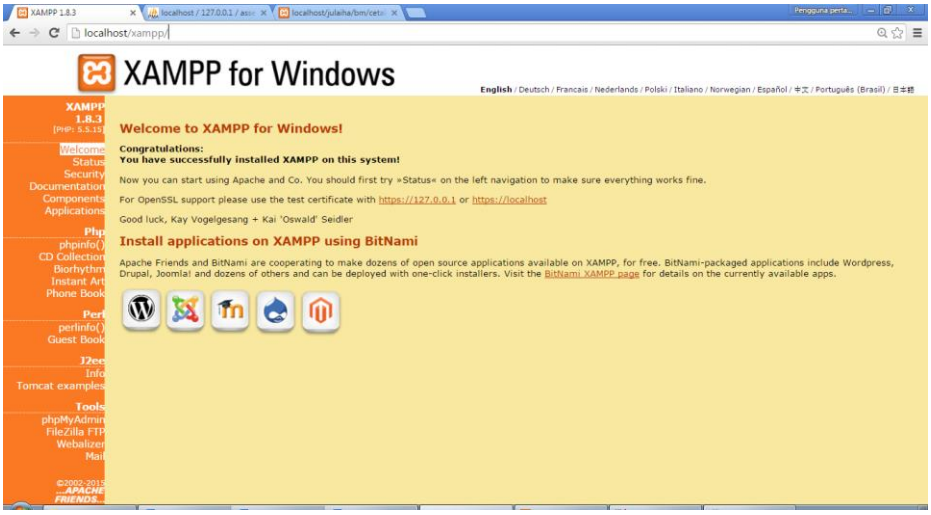

Fig. 2 XAMPP Local Host Display

Program Implementation

The following is the implementation of the program following the previously designed screen design, among others.

Login Menu Display

To run on localhost, the initial interface is displayed by typing in the browser box http://localhost/julaiha/index.php. The name julaiha indicates that all application files are stored in the julaiha folder which is placed in the htdocs folder. The username used to log into the Jakarta Branch Asset Monitoring System is by using a special code for the three parts that will be logged in, including:

Verify (Verifier) = 1261977

BM (Branch Manager/Branch Head) = 1261927

IT = 1261915

Main Page Menu Display

The Main Page of the existing asset maintenance monitoring system is in the form of a Maintenance Schedule menu dashboard, where on the dashboard, there is a list of all asset schedules that will and are being carried out maintenance by IT.

Settings Menu Display - User Data

In the User Data Report Menu, a whole list of usernames can enter the application. Deleting a username can only be done by the Verifier section by clicking the Delete action or edit buttons to make data changes.

Settings Menu Display - Edit User Data

The following is a display of the User Data edit menu; this menu contains information about the user to be edited.

Task Letter Menu Display - Task Letter Report and Notification

This Task Letter Report menu contains all Asset maintenance work requested by the verifier to IT.

Task Letter Input Form from the Notification option menu

The Branch Manager uses this Task Letter Input Form to change the Work Status of the Asset to be repaired; the Branch Manager must change the Work Status from Waiting to Repair, and IT will be able to receive a Task Letter requesting the repair of the Asset in the branch.

Testing Method

The test method is carried out to ascertain whether the system is as expected. The method used for this test is Blackbox, which tests software in terms of functional specifications without testing the design and program code. Testing is intended to determine whether the software's functions, inputs, and outputs match the required specifications.

Blackbox testing is done by creating test cases that try test cases that try all functions by using the software to determine whether it is per the required specifications (Pressman & Maxim, 2015).

Test Scenario

Test scenarios are needed to determine whether the application is under the specifications and functioning correctly or not. The test scenario is carried out by selecting each option in the application. Then testing is done by pressing the button on the form page of the application, whether the button is following the usefulness and expected.

Table 1.Test Scenario

No	Display	Test	Status	Test scenario	Expected Result	Test result
1	Menu Login	Login to the system	Open the login menu	Enter username and password	The main page will open	Successfully open the main page
2	Menu Schedule Maintenance	Review the Maintenance Schedule that will be carried out by IT.	The menu has a list of Maintenance Schedules	Open the Schedule Maintenance menu and view the list of asset maintenance schedules that will be maintained by IT.	Maintenance schedule data is successfully reviewed and the resulting data is updated by the Verifier.	Successfully open the maintenance schedule to see maintenance assets that will and are being done by IT.
3	Menu Input Data Asset	Open the Asset Data Input form and also input new assets into the system as well as edit the assets if there are changes according to the conditions in the	Perform the input process by filling in all available fields	Inputting Asset data into all columns that have been provided	All filling fields run according to their functions and if there are form fields that have not been filled in, the asset data cannot be saved.	Successfully input the Asset Data form and the functions of all columns run as needed.

No	Display	Test	Status	Test scenario	Expected Result	Test result
		branch.				
4	Asset Report Menu	The Asset report menu contains all branch Asset data inputted into the Asset input form.	View all asset data reports and send repair request notifications to IT through the system if there are assets that need to be repaired.	View asset data report	Export asset data into excel, search for asset data based on the data needed and also view all asset data in the Jakarta branch.	Successfully view all Asset Report data and the "Search" function can function as needed and the resulting report can be exported into excel form
5	Task Letter Report Menu	The Task Letter report menu contains all branch asset maintenance task letter data inputted into the Asset input form.	View all Task Order reports and review the status of asset repairs.	View the Task letter report	Perform the process of exporting asset data into excel, searching for assignment letter data based on the data needed and also reviewing all asset data in the Jakarta branch.	Successfully view the data of all Task Letter Reports and the "Search" function can run as needed and the resulting report can be exported to excel.
6	Menu Input User	Open the Input form User and also input a new User to enter the system as well as edit the user	Perform the input process by filling in all available fields	Inputting User data into all fields that have been provided	All filling fields run according to their functions and if there are form fields that have not been filled	Successfully input the User Input form and the functions of all columns run as needed.

No	Display	Test	Status	Test scenario	Expected Result	Test result
					in, the user data cannot be saved.	
7	Menu Data User	The User Data menu contains all user data used to enter the system.	View all User Data that can enter the system and can also make changes to user data as needed.	View a list of all User data	Search for user data based on the data needed and also view all asset data in the Jakarta branch.	Successfully view all User Data and all button functions can run as expected and the resulting report can be exported to excel.
8	Menu Log Out	The process of exiting the system	exit the maintenance system	click the Log Out button	Exit the system	Successfully exit the asset maintenance system
9	Menu Notification	The menu displays asset repair task letter data for IT and there is a job status action from the asset repair.	View all asset notifications that have been damaged, assets that will be repaired and assets that are being repaired.	View Asset repair notification	Notification that there are assets that must be repaired and also requests for approval before the task letter is sent to IT.	Successfully displayed notification of assets requested by Verifiers for maintenance to IT.
10	Menu Profile	The profile menu displays the User currently used in the system	View profiles that are currently logged in and can also make changes to user data as needed.	View the current user	The current user can be seen by the user who is currently logged in.	Successfully display the User being used and also successfully change the user profile column used according

No	Display	Test	Status	Test scenario	Expected Result	Test result
						to needs

Analysis of Test Results

After conducting a thorough test of the menu in the application, it can be concluded that the test has shown the output results (Output) with a process that follows the design of this application program. Furthermore, the test results show that this program can function correctly and by the needs because the test scenario has proved it. The test results that have been obtained can be analyzed as follows:A login page, which makes the main menu in the application by controlling the sub-menu.The main page that connects interfaces can operate adequately.Menus with forms for inputting data can be stored in the proper database.Schedule Maintenance Menu, Asset Data Input, Asset Report, Task Letter Report, Settings, User Data Input, User Data List, Log Out, Notification Menu, and Profile Menu have menu buttons that can run according to the design and the needs.The output results contained in the Asset Reports menu, Task Letter Report, User Data, Asset repair notification, and Letter of Assignment on the letterhead of one of the Jakarta branch government bank offices can be printed under the desired system design.

CONCLUSION

Based on the discussion that has been done, several conclusions can be drawn about the Asset Maintenance Monitoring Application at one of the Jakarta branch offices of government banks, including this Asset Maintenance Monitoring Application can make the efficiency of the section that handles asset data in the branch (From five (5) users to three (3) users). This Maintenance Monitoring Application produces all Asset reports that will be stored into a single unit of information that is more easily, quickly, and precisely known by the Branch Manager because the resulting report is a website-based Asset report. This Asset Maintenance Monitoring Application produces a website-based Task Letter Report for the IT department to perform Asset Maintenance at the branch

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