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Design of Unified Modeling Language Information System for Motorcycle Unit Selling and Buying Transactions using the Waterfall Method

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A B S T R A C T

This research aims to design an information system for buying and selling motorbike units using the Waterfall method. The information system for buying and selling motorbike units has an important role in supporting motorbike sales business activities, from ordering to the payment process. The design of this system was carried out by following the Waterfall method approach which consists of several stages, namely requirements analysis, system design, implementation, testing and maintenance. The needs analysis stage involves identifying business and system user needs, including required functions and system requirements. Next, system design is carried out by designing the structure, interface and transaction process flow using the notation and methods provided by the Waterfall method. In implementation, an information system for buying and selling motorbike units is developed based on the design that has been created. Then, testing is carried out to verify the success of the system in carrying out its functions and ensure conformity with the specified needs. After that, the system is ready for use and maintenance is carried out to maintain the performance and reliability of the system on an ongoing basis. By applying the Waterfall method in designing a motor unit buying and selling transaction information system, it is hoped that it can produce a system that is structured, has functions that suit business needs, and is tested overall. The Waterfall method also allows developers to have a clear understanding of each design stage before moving on to the next, thereby minimizing the risk of errors and deficiencies in the system.

INTRODUCTION

The development of information systems is currently very rapid so that many business activities are carried out with the help of technology, one of which is the sales business. Information systems can be used as advertising tools and are widely used in the corporate industry to package product information into websites. A website is a portal that can be accessed anytime and anywhere via the internet [1]. A website is a very useful tool for presenting products that you want to market to the wider community, then becomes a platform for buying and selling transactions in the form of goods or services and information known as e-commerce[2][3]. In the current technological era, the sales process is still manual, consumers have to come directly to the shop, then choose the product to buy or order, etc., so invoices for previous orders must be sent immediately to customers so they can be made immediately. Seeing the long process and the many problems that will be faced, it is necessary to design a motorbike unit sales information system using a UML (Unified Modeling Language) diagram design. UML is a standard language for describing, designing, and analyzing software systems. UML provides graphical notation describing various parts of a system to help developers thoroughly understand the system they are developing and ensure that business needs are met properly[4][5].

According to [6], in his research on Designing a Web-Based Sales Information System, he said: "Currently almost all operations use computerized information systems and use internet technology. The system design uses Unified Modeling

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Language (UML) which is implemented in the Hypertext Preprocessor (PHP) programming language, Hypertext Markup Language (HTML) uses Visual Studio Code, and the reference framework is CodeIgniter and the database uses MariaDB.

In Accordance With The Problems That Have Been Described, It Can Be Concluded That The Aim Of This Research Is To Design An Information System For Motorcycle Unit Selling And Buying Transactions In Order To Improve Service. The advantage of using the waterfall method in information system development is that the quality of the resulting system will be good because the implementation is carried out in stages.

A Sales System is a company solution that is based primarily on software that is used simultaneously to increase transactions, manage sales reports and data on the entry and exit of goods [7] Based on several journal excerpts above, the author concludes to design a UML sales information system for buying and selling motorbike units. By using the waterfall method, it is hoped that this system can provide many benefits, such as efficiency and productivity in the sales process, better accessibility and mobility, as well as ease in stock and sales management. Therefore, designing this sales information system can help improve the performance and effectiveness of a dealer or motorbike shop. Hardware based sales information systems lead to the overall growth and development of the company and prove to be an effective approach to business management.

METHOD

Figure 1. Waterfall [12]

The research method used in research to develop this system is the waterfall method. The steps of the waterfall method are described as follows:

1. Requirement Analysis and Definition At the Requirement Analysis and Definition stage, namely observing data, determining features, and creating system objectives through interviews with stakeholders in the company or related place. All steps are specified in detail and used as system qualifications. The results of the observation stage are then analyzed and used as material for developing a motorbike unit sales system [9].
2. System and Software Design At this stage, create a system design based on the system requirements that have previously been determined. At this stage the aim is to provide a system design that must be carried out, create an overview of the appearance and analysis of hardware and software requirements. The system design is designed using the Unified Modeling Language (UML) which consists of use case diagrams, class diagrams and activity diagrams[5].

The author explains previous research related to the author's research. Previous research is as follows: Mahardika, F., Mustofa, K., & Suseno, A. T. (2023). The success of a company in achieving sales targets is greatly influenced by good marketing. Company strategy is a directed form in the field of marketing. CV ICON TEKNO is committed to providing technology solutions and providing good customer support. web-based information system so that companies can process it to market goods according to consumer product needs [8]. Mahardika, F., & Marcos, H. (2017). Application of the Welch Powel Graph Algorithm in Course Scheduling and Case Study Assistant Schedules for the STMIK Amikom Purwokerto Assistant Forum. Scheduling is a routine job that is always done by assistants who join the assistant forum so that there are no clashes between lecture schedules and assistant schedules. The problem of scheduling lectures and assistants is very close to the problem of optimization [9].

Mahardika, F., Sandi, M., & Naufal, A. R. (2023). Implementation of a Dealer Management Information System for Web-Based Motorcycle Service Using Extreme Programming. Currently service stores have not been able to take advantage of developing technology for the automotive business where companies still use manual systems to serve consumers and

are inefficient. Providing satisfactory service alone is not enough because there is no timely and accurate information to consumers regarding the availability or availability of bicycle spare parts. Motorcycle [10]. Robani, A. M., Hadi, S., Nurdiawan, O., Dwilestari, G., & Suarna, N. (2021). Android-Based Used Motorcycle Sales Information System to Increase Sales in Mokascirebon. Com. From this problem, an idea emerged to increase motorbike sales by increasing the reach of promotional media on the Android platform and creating an Android-based computerized system that could speed up the company's internal work. In designing this application, the waterfall method is used, where the stages are gathering requirements, building and evaluating the waterfall, coding, testing, evaluating the system until finally the system can be used [11].

RESULTS AND DISCUSSION

Designer Unified Modelling Language

The Design of This Information System For Motorcycle Unit Selling And Buying Transactions Uses Uml (Unified Modeling Language) Modeling. The following is a list of UML used:

Use Case Diagram

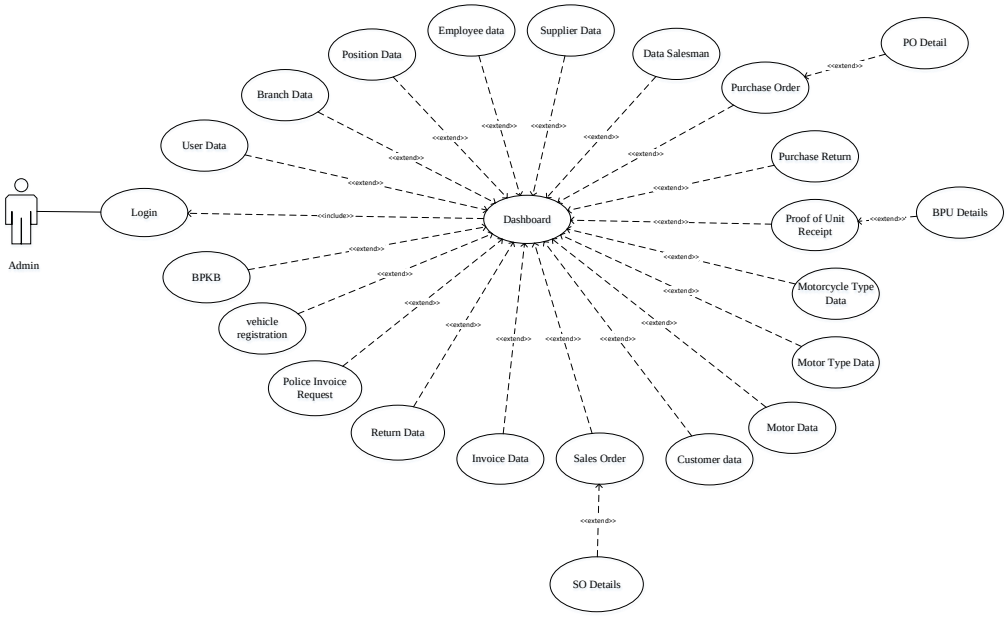

Figure 2. Admin Use Case Diagram

Based on the picture above, there is only one actor, namely the admin, who has 23 access rights: 1. login, 2. fill in user data (account access rights), 3. fill in branch data, 4. fill in position data, 5. fill in filling in employee data, 6. filling in supplier data, 7. filling in salesman data, 8. filling in purchase order data, 9. filling in detailed purchase order data, 10. filling in purchase return data, 11. filling in bpu data, 12. fill in detailed bpu data, 13. fill in motorbike type data, 14. fill in motorbike type data, 15. fill in motorbike data, 16. fill in customer data, 17. fill in sales order data, 18. fill in detailed sales order data, 19. fill in invoice data, 20. fill in return data, 21. fill in police invoice application data, 22. fill in vehicle registration data, 23. fill in bpkb data.

Activity Diagram

Login

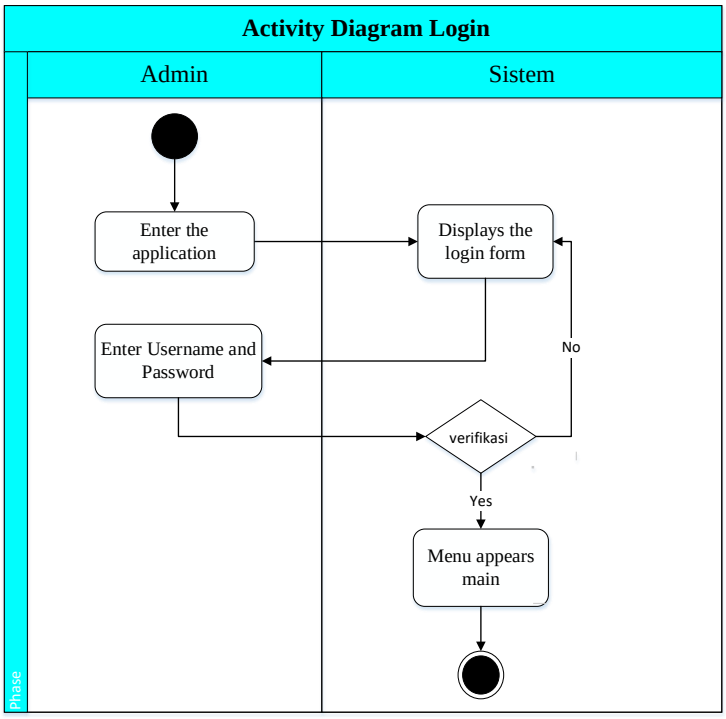

Figure 3. Login Activity Diagram

In the image above, the admin must log in first. To log in, you must fill in your username and password in the login form, then the system will verify the username and password, so you can access the main page and carry out the process of collecting motorbike buying and selling data starting from adding branch data, editing branch data, deleting branch data, and so on.

User

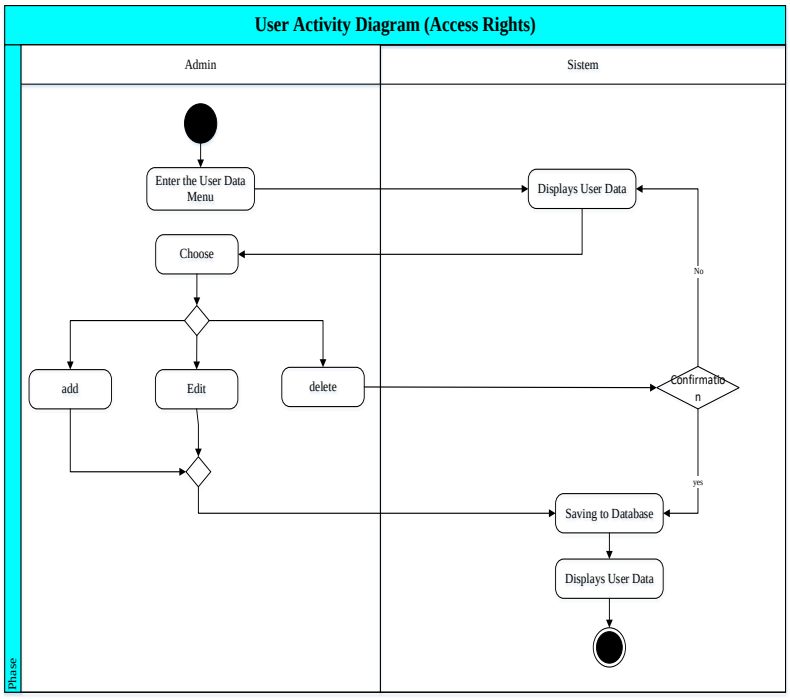

Figure 4. User Activity Diagram

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In the image above, after the admin logs in, the admin can create an account with website access rights in the user page menu.

Dealer Branch

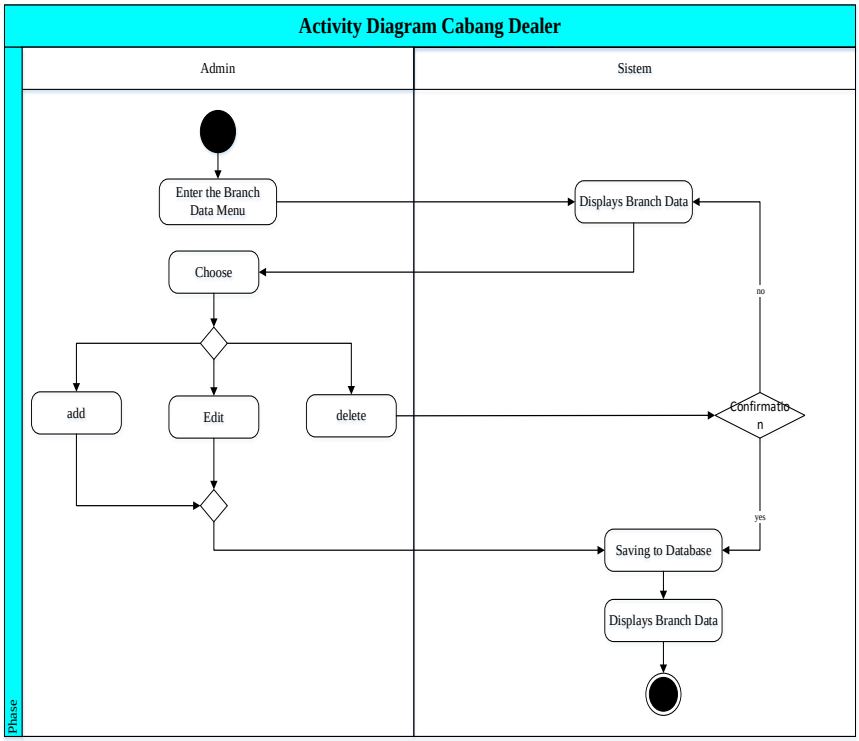

Figure 5. Dealer Branch Activity Diagram

In the picture above, to fill in dealer branch data, you can access it on the branch page menu, then the admin fills in the form available on the branch page, after everything is filled in the system will send the data to the database.

Position

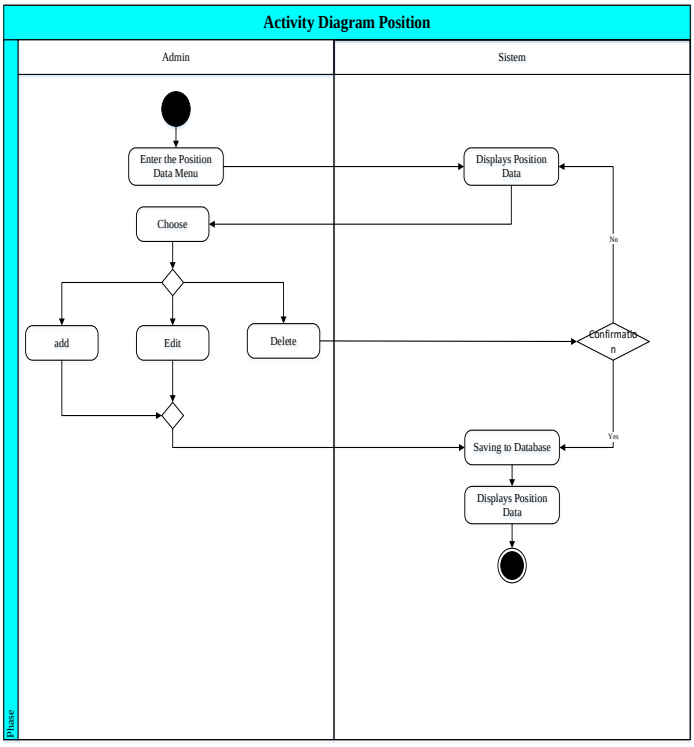

Figure 6. Activity Diagram for Positions

In the picture above, to fill in job data, you can access it on the job page menu, then the admin fills in the form available on the job page, after everything is filled in the system will send the data to the database.

Employee

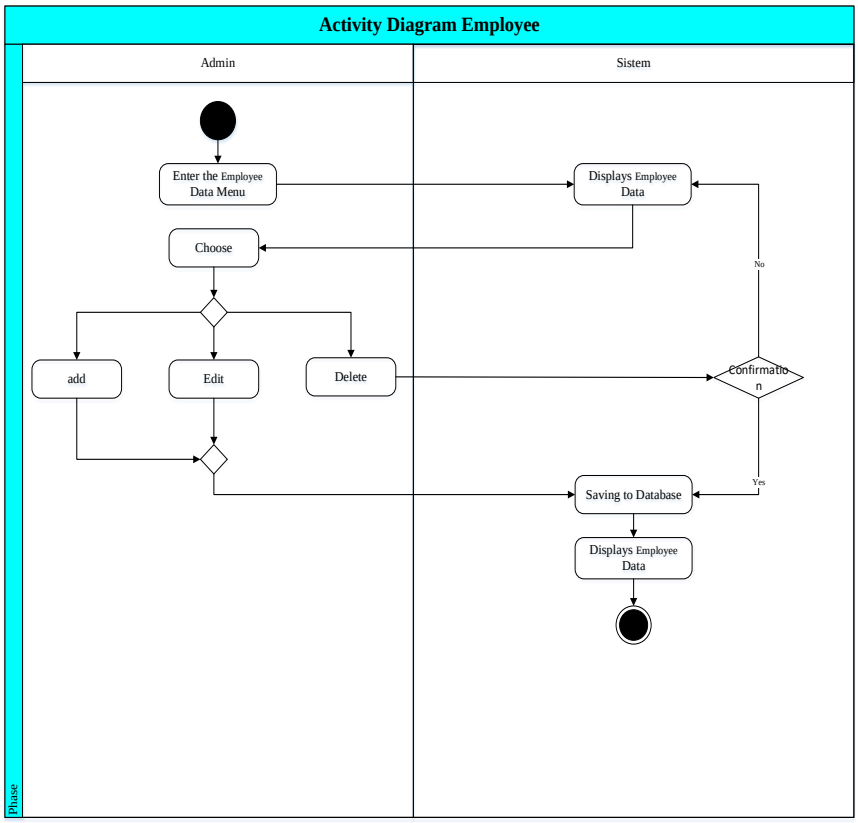

Figure 7. Employee Activity Diagram

In the picture above, to fill in employee data, you can access it on the employee page menu, then the admin fills in the form available on the employee page, after everything is filled in the system will send the data to the database.

Squence Diagram

Login

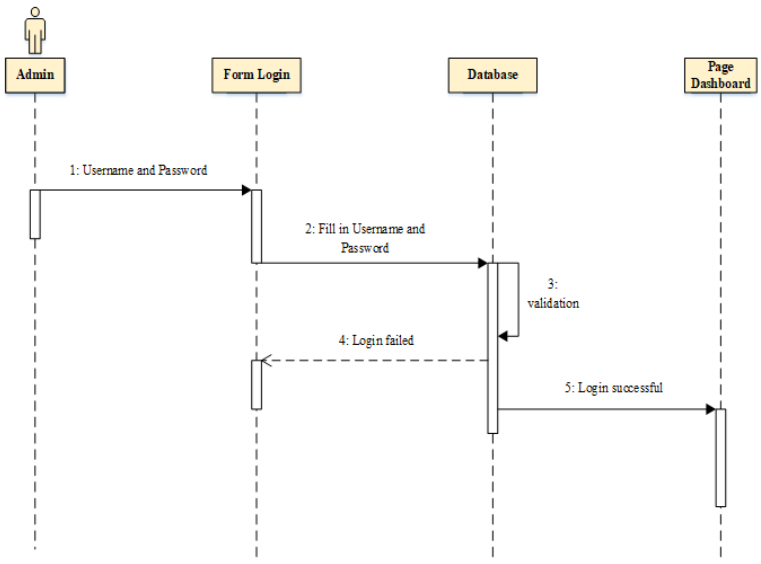

Figure 8. Login Sequence Diagram

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In the sequence diagram image above, the admin must log in first, so he can access the dashboard page.

User

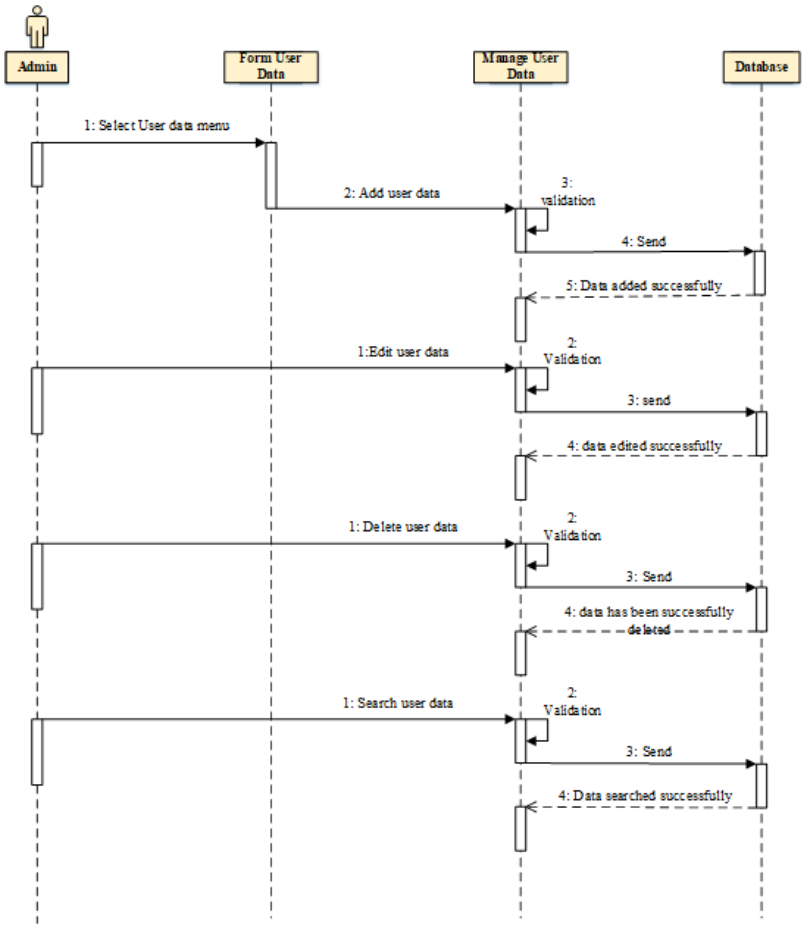

Figure 9. User Sequence Diagram

In the sequence diagram image above, admins can add, edit and delete account data for other website access rights.

Branch

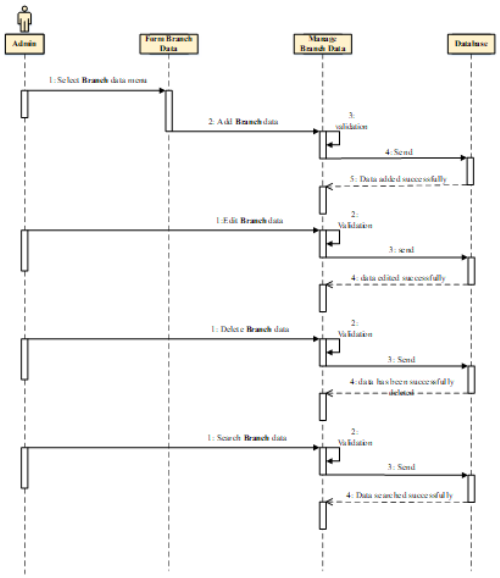

Figure 10. Branch Sequence Diagram

In the sequence diagram image above, the admin can add, edit and delete dealer branch data.

Position

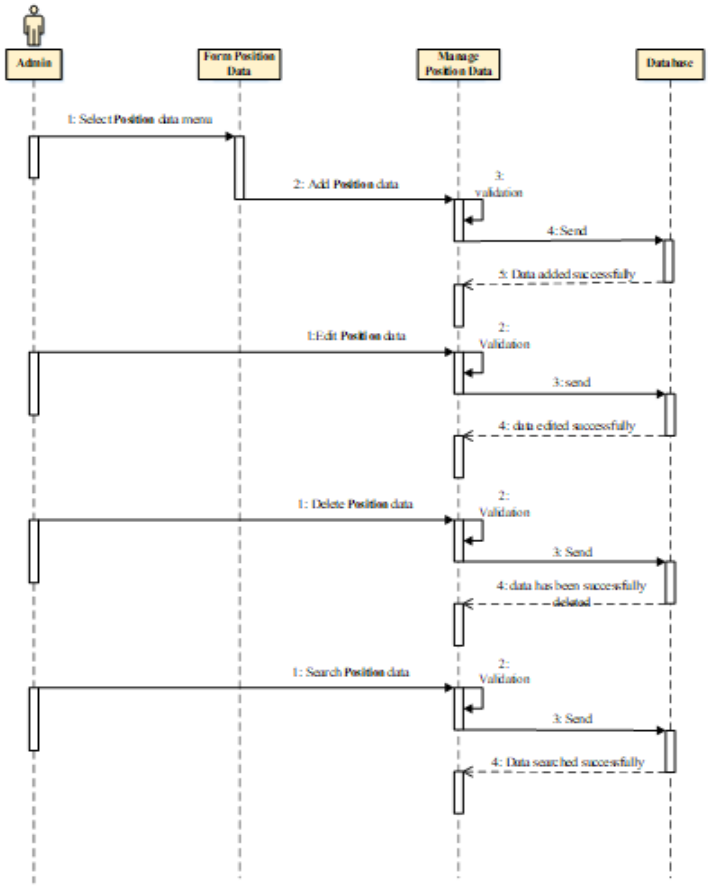

Figure 11. Position Diagram Sequence

In the sequence diagram image above, admins can add, edit and delete position data for employees.

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Class Diagram

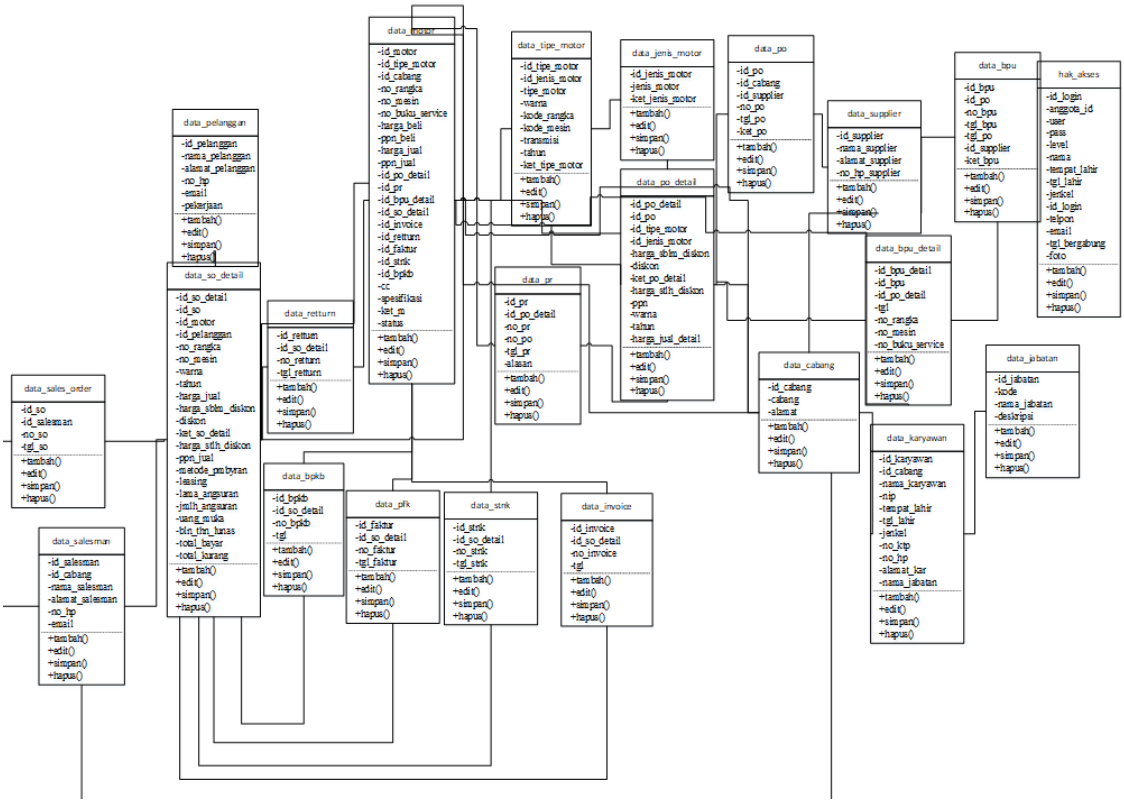

Figure 12. Class Diagram

Class Diagrams are visuals of the program system structure in the groups that are formed

Desain logic

Desain Logic Login

Figure 13. Logic Login Design

The login form design has two columns, namely Username and Password. The admin must enter the account correctly to successfully enter the next page, namely the Dashboard.

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Desain Logic Dashboard

Figure 14. Logic Dashboard Design

In the dashboard display design there are several page menus that display information on the amount of user data, branches and other data.

Desain Logic User

Figure 15. User Logic Design

Based on the display design above, to display user data, on this page the admin can add, edit and delete employee data.

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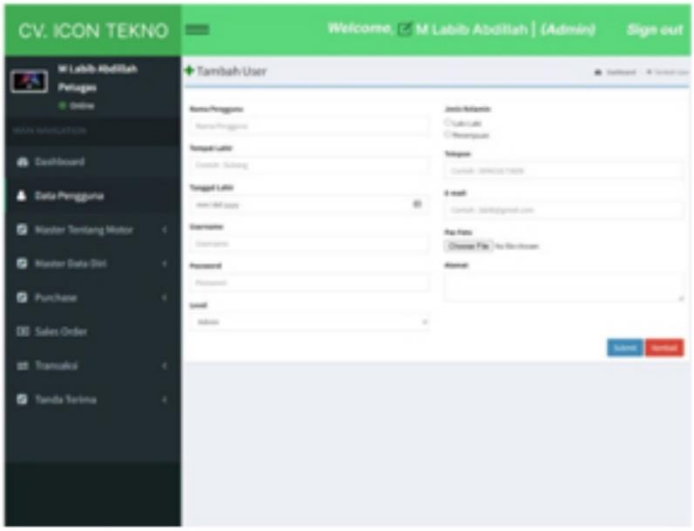

Figure 16. Logic Design for Adding User Data

UML Testing and Design Using Black Box Testing

UML and Design testing aims to ensure that the UML and Design that have been created are well accepted and detect problems that exist or arise from the UML and Design of motor unit sales information. Testing is carried out using the Black Box Testing method on the features or functions available in this information system . The following table is an explanation of UML testing and design of motorbike unit sales information:

Table 1. Uml testing and Design Using Black Box Testing

No	Testing Scenarios	expected results	Test result
1.	Fill in the wrong username and fill in the correct password then press the Login button	The system refuses login access and displays the message: Login failed check email/password.	According to expectations
2.	Empty all Login data contents, then press the Login button.	The system refuses login access and displays a message: please fill in this column	According to expectations
No	**Testing Scenarios**	**expected results**	**Test result**
3.	Fill in the correct username and password then press the Login button	You can log in and continue to the dashboard menu	According to expectations
4.	Input data in the motorbike type menu, and motorbike type	Can submit and data is saved	According to expectations
5.	Edit data in the motorbike type menu, and motorbike type	Can be edited and can be saved again	According to expectations
6.	Delete data on the motorbike type menu, and motorbike type	Deleted data is lost	According to expectations

CONCLUSION

Conclusion Based on the results and discussion in this report, conclusions can be drawn, namely: a) With the existence of a web-based Sales information system to provide admin convenience in storing and processing data to facilitate operational performance. b) Makes it easier for admins to provide sales and inventory reports to minimize errors and provide data accurately and quickly.

Suggestions Based on the design of the information system for buying and selling motorbike units that has been created, suggestions for developing this system can be given as follows: a. The security level of this information system needs to be increased because there are sales transactions. It is necessary to back up data regularly to reduce the risk of permanent data loss. b. When entering all data, accuracy is required to avoid errors that occur while the data entry process is in progress. c. The information system for buying and selling motorbike units still uses a website, so system security is still weak and needs security improvements

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