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DESIGN OF PARKING INFORMATION SYSTEM OF LABUHANBATU UNIVERSITY WE-BASED WATERFALL METHOD

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ABSTRACT

The rapid advancement of technology and the demands of information progress and the improvement of human life quality. With the rapid advancement of technology, productivity and work efficiency have increased. With so many companies utilizing increasing technology for productivity, one of them is that, because of the many drivers who park in the Parkir Place of Labuhanbatu University, technology is needed that can increase the effectiveness and efficiency of work in collecting motor vehicle data. This built application was created using tools such as VSC, MySQL, and XAMPP as a database with HTML and PHP programming languages and designed with simple flow and interface design using design methods including context diagram design, data flow diagram, database table structure, and other designs that explain the running flow of parking management applications at Labuhanbatu University Based WEB, so that it can be used easily by employees in speeding up time and analyzing energy.

1. Introduction

In the era of Information Technology as it is today which is all computerized technological developments make the need for fast, precise and accurate information is very necessary. [1]. Increased human needs will arouse technological development, while technological developments will also accelerate other needs. One example is the need for a parking space. [2]. Parking is the immovable state of a vehicle that is temporary because it is abandoned by the driver. [3].Information Systems is "a system that can be defined as a unit consisting of two or more components or subsystems that interact to achieve a goal. [4]. It can be seen from the campus activities of Labuhanbatu University that every day is very busy, so that the parking lot of Labuhanbatu University always seems full, crowded, and not neatly arranged. Because there is no system that can place the layout of motorcycles and cars that enter Labuhanbatu University in an orderly manner, the parking lot looks messy both in the main yard contained in the supervisory post, the main building, in front of the administrative room of FST, Law, and FKIP, in front of the Post-Graduate building of Labuhanbatu University, in front of the informatics management classroom, the law room, and the seminar room, as well as in front of Labuhanbatu University Hall. Sometimes, with a messy parking yard, the supervisors at Labuhanbatu University will be very overwhelmed if something happens to one of the vehicles in the parking lot. For example, the loss of one of the motorcycles or cars belonging to students or lecturers at Labuhanbatu

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University, the parking attendants, will be very difficult to find because of the absence of recorded parking data. In my observation, the area of the parking lot of Labuhanbatu University cannot be determined because there is no limit to the parking area on this campus. The existence of this information system is expected to facilitate the management process, present parking information at Labuhanbatu University, and make it easier for students and lecturers to get parking information at Labuhanbatu University. Therefore, for the successful implementation of management in parking management at Labuhanbatu University, they came up with the idea of creating an information system that can manage parking and provide information for students and lecturers at Labuhanbatu University. The system is developed on the Web, with tools such as Java, PHP, DBMS, and MySQL. In the development of this software we use the waterfall method to perform step by step in the completion of the design of the system to be built. [5]. Design is the process of developing new specifications based on the recommendations of system analysis results. [6]. The system approach method used in this research uses a structured approach method with tools used in the form of flow maps, context diagrams and data flow diagrams as process design tools. [7]. Blackbox Testing method is a stage method used to test a software by trying a program that has been created by entering data on each form to find out whether the program is running as needed or not. [8].

2. Research Methods

The waterfall method was applied to the creation of this software system. This model, which debuted about 1970 and is sometimes regarded as outdated, is the most widely used. [9]. Waterfall is a software development approach that provides a systematic and sequential software development process that starts at the system level and continues through analysis, design, coding, testing, and maintenance. [10].

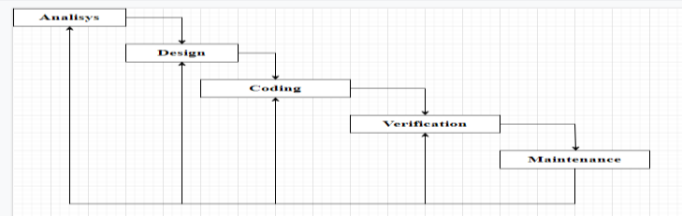


Figure 1. Research Methods

2.1 Analisys

The process of assessing existing problems stems from either the research methodology, where the findings of the study are analyzed, as well as how to organize the information, solve the problem through order to cope with it, and what technology is capable of handling and may be utilized to solve the issue.

2.2 Design

The system analysis' findings are poured through into form of a design. Database design, interface, and output are all part of the design process. Before coding, this design phase can take the form of following visualizations that must be evaluated for quality.

2.3 Coding

The design outputs then were entered into the coding phase, where they have been encoded or transformed into computer-readable code, and the program is finally evaluated to find and eliminate any existing mistakes. As a result, the software performs as planned.

2.4 Verification
The next step is to implement the software after it has been tested and found to be functional.

2.5 Maintenance
The maintenance stage involves operations such as error correction, software completeness, refining, and protection of environment modifications that exist in the field

3. Result and Discussion

3.1 Analisys
3.1.1 Observation
Data is gathered by undertaking a direct examination of the system involved in the problem. Many students, for example, are stubborn or unconcerned about parking motorbikes and cars. Based on the data collected, the author conducted a study on the area of the ULB parking lot, specifically for motorbikes ranging to as many as 100 units more or less every day and cars ranging from as many as 50 units more or less every day. As a result, supervisors or officers are obliged to monitor the state of parking, which appears to be still unkempt. Many supervisors are regularly surprised to discover vehicle keys and even cell phones left in the vehicle.

3.1.2 Literatul Studies
By collecting data based on facts from sources with issues, the design system is created. There are 6 active officers and supervisors at Labuhanbatu University. This Literature Review is based on data from a live interview with one of the supervisors and parking police at Parkir Labuhanbatu University, who provided information based on what they have seen and experienced on a daily basis.

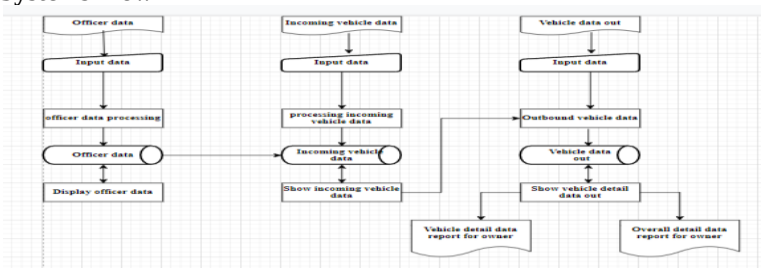
3.1.4 Information Systems Flow


Figure 2. Information System Flow

Information System Flow is a tool used in designing a system. [11]. For example, the officer might enter car data into a system that allows the vehicle owner to request entry into the parking lot. The officer then executes the process of discharging the number of arriving vehicles, and at the end of the procedure, the system displays a departure report as well as parking fines to the vehicle owner.

3.1.5 Context Diagram
It's a tool for explaining how analysis works. Context diagrams are diagrams that show how a process works and how a system works. The Context Digram is the highest level (Top Level) of the DFD, and it describes all system inputs and outputs. The Context Diagram will show you how slow the system is. A symbol to represent an external entity, a symbol to represent data flow, and a symbol to represent a process are all used

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in the Context Diagram. There is just one process in context diagrams. In most context diagrams, processes are not numbered. In the context diagram, there is no store.[12].

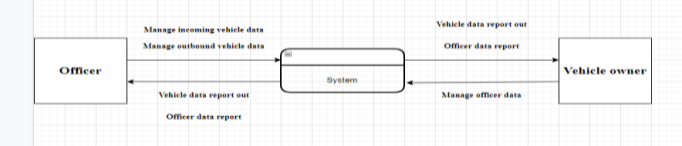

Figure 3. Context Diagram System

Vehicles enter the ULB parking system through the Context Diagram, which generates an output, Transactions, as well as explanations for other entities, based on the results of the following inputs.

3.1.6 Data Flow Diagram

A data flow diagram (DFD) is a diagram that uses notations to depict the movement of system data and is extremely useful in understanding the system logically, thoroughly, and clearly. DFD is a tool for describing or explaining a system's functioning process. [13]. Physical DFD (Physical Data Flow Diagram) and logical DFD (Logical Data Flow Diagram) are the two types of DFD (Logical Data Flow Diagram). Physical DFDs focus on how the system's processes are applied, whereas DFD logic focuses on what processes are contained in the system. DFDs are frequently used to describe an existing system or a new system that will be logically built without considering the physical environment in which the data flows or will be kept.

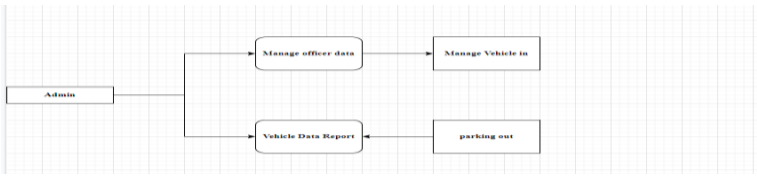

Figure 4. Data Flow Diagram Level 0 Admin

The level 0 admin procedure in running the system is explained in the Data flow diagram, which includes managing officer data, receiving vehicles, vehicle data reporting, and parking out.

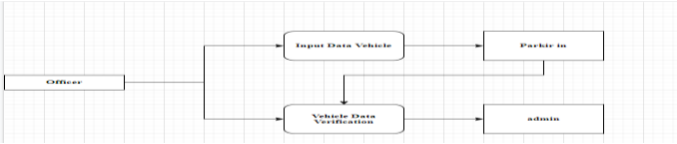

Figure 5. Officer Level 0 Data Flow Diagram

The officer explains that process of the officer inputting or documenting the arriving car, then driving to the parking lot and checking the vehicle data with the admin in the level 0 flow diagram data.

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3.1.7 Entity Relational Diagram (ERD)

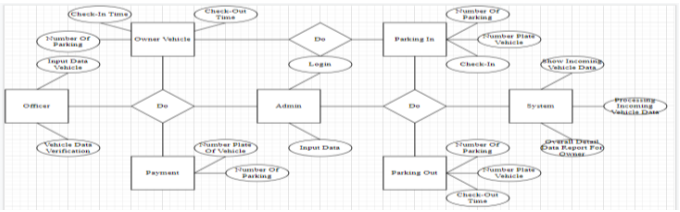

Figure 6. Entity Relational Diagram (ERD)

The Entity Relationship Diagram (ERD) is a visual representation of the relationship between data storage and data relationships.. [14]. The Entity Relationship Diagram (ERD) was developed to represent the data structure and relationships between car park rent information systems, as well as to describe the important tables used to store and process data in databases at Labuhanbatu University's parking system.

3.2 Design

At the design or design stage to design the application as follows:

3.2.1 Login Page design

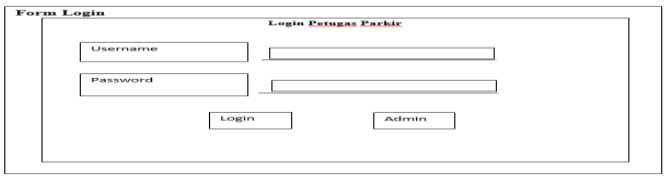

Figure 7. Sign-up Page

The parking attendant login text is located at the top of the login page, as shown in this design. A form, Username, and Password are underneath it, followed by a Login Button and an Admin button.

3.2.2 Login page

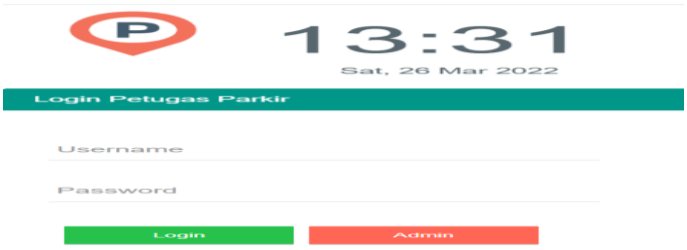

Figure 8. Login page

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3.2.3 Login Design When Correct

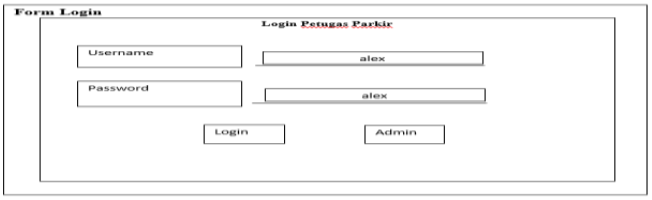

Figure 9. Login Design When Correct

Figure 10. Explaining to enter the login form is to fill in the Username with "Alex" and Password with "Alex". If the Username or Login Password is correct then we will be taken to the Main page.

Figure 10. After Login View

3.2.4 Login Design when Wrong

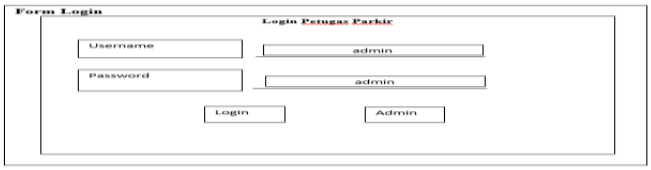

Figure 11. Login Design when Wrong

If the Username and password are incorrect then on the screen will be displayed the wrong Username and password.

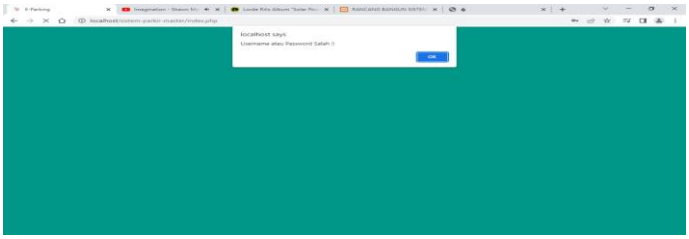

Figure 12. View If username and Password are incorrect

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3.2.5 Login Page View

Figure 13. Login Page View

The Login Page view is the first view that appears when the app is launched. This login menu appears to include a username and password that must be entered in order to access the system. To log in, type alex as the username and alex as the password. If the system is correct, it will appear in the system's main menu; if it is incorrect, it will return to the login page view.

3.2.6 Main Menu View

Figure 14. Main Menu View

After logging in, the home menu appears on the start page. There are various possibilities for system operations in this primary menu, including the parking entry form, which has three menus: Vehicle License Plates, Vehicle Brands, and Vehicle Types. Meanwhile, there is simply a Code menu for the car that will exit the parking lot for the Parking Exit Form.

3.2.7 Main Menu view includes a parked vehicle

Figure 15. Main Menu view includes a parked vehicle

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3.2.8 Vehicle List Menu View

Figure 16. Vehicle List Menu View

Vehicle List Menu View about managing Vehicle Owner data such as Number of Motorcycles, Number of Cars, and Number of Trucks/ More. Below it there is also a list of vehicles that have been inputted or have parked at Labuhanbatu University. In this Form there is a Code Menu, Vehicle Plate, type, brand, and Vehicle Entry Hours. And there is also a History menu for vehicles that have come out of Labuhanbatu University.

3.2.9 Parking card display after the vehicle enters after input to the system

Figure 17. Parking card

3.3 Coding

Implementing the design into software is a major undertaking. Using the php and MySQL programming languages, as well as the required application, Visual Studio Code, the author generates program code in this step. HTML (Hypertext Markup Language) is a programming language used to create web pages that can be accessed by typing a set of basic syntax or tags into a file.[15]. PHP is a server-side scripting language that works in conjunction with HTML to produce dynamic web pages. The term "server-side scripting" refers to the fact that the syntax and instructions provided are totally processed on the server yet are still contained in the HTML content. [16].

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Figure 18. Example of a parking application script

3.4 Verification

The BlackBox testing method is used at this point to do the testing. In application system research, testing is carried out to detect flaws or defects. The goal of testing is to determine whether or not application frameworks meet the design objectives of the application system.

TABLE 1
BLACK BOX TESTING

Unit Test	Test Description	Model Testing	Test Results
Menu Login	Verify Email dan Password	Black Box	Valid
Main Menu Page	Entering the data for the Vehicle	Black Box	Valid
Out Code	Input out code	Black Box	Valid
List vehicle	Show the delist	Black Box	Valid

3.5 Maintenance

The final stage in the Waterfall method. where the software is ready, run and maintenance is carried out to correct errors that have not been found in the previous step.

4. Conclusion

You can assist Labuhanbatu University by using this application's Parking Attendant. According on the findings of this study, the proposed approach can be utilized to simplify and eliminate errors in existing parking systems. The suggested parking information system can assist in the effective management of transaction data for parking income computations. The suggested parking information system can make it easier to store parking data. Because the presence of a parking information system with a storage system and a database can decrease the incidence of errors during the report generation process, making parking reports can be done easily and quickly.

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