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Customer Service Information System Using Dynamic Priority Scheduling Algorithm At PT Sumatra Sistem Integrasi

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ABSTRACT

The development of information technology can make it easier to do various things, including the provision of services that use technology in providing information to customers who need and receive information. The service at PT Sumatera Sistem Integrasi is that the process of complaining about network disturbances from customers is still manual, so that customers still come directly to the company or by telephone to make complaints and prepare reports still in the form of ledgers and customers. queues are not yet systematic and integrated. Based on these problems, the authors built a website-based customer complaint application using the Dynamic Priority Scheduling algorithm as a queue priority. The Dynamic Priority Scheduling Algorithm is a dynamic approach to the priority scheduling algorithm. In the dynamic approach, this algorithm focuses on the process of determining the queue based on predetermined priority rules. With this application, it is hoped that it can simplify and improve the quality of service to customers optimally at PT Sumatra Sistem Integrasi.

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1. INTRODUCTION

The need for information is needed along with the rapid development of technology, especially the use of computer systems that penetrate in all fields. Therefore, every Human Resource (HR) must have the expertise, skills and ability to manage computer hardware or software. This will be an absolute necessity in the fast paced job competition[1]. PT Sumatra Sistem Integrasi (SSI) was established in 2013. SSI is a company engaged in the field of system integrator services and IP-based broadband internet access services (IP Based Networking), with an address at Jl. Taruma, No. 27 Medan, North Sumatra. Based on the results of observing the problems that exist at PT SSI, namely the process of complaining about customer network disturbances is still manual, so that customers still come to the company directly or by telephone to submit complaints and report preparation is still in the form of a ledger and priority customer queues are not yet systematic and integrated.

Based on these problems, a web-based system was created that can overcome problems in the complaint process and priority customer queues. To process queues of customer network disturbance complaints, the Dynamic Priority Scheduling algorithm is used. Dynamic Priority Scheduling is a dynamic approach to priority scheduling algorithms. In the dynamic approach, this algorithm focuses on the process of determining the queue based on predetermined priority rules[2]. This algorithm can be implemented preemptively or non-preemptively. If there is a new process with a higher priority than the current process, the current process will be terminated and redirected to the newly entered process. For non-preemptive processes, incoming processes cannot interrupt running processes, but are only placed at the front of the queue. Example If process P1 starts while P0 is running, it will get priority P1. In non-preemptive mode, if P1's priority is higher than P0's priority, the algorithm completes P0 and places P1 in the main queue until it is finished. if it has the same priority then first in first out (FIFO) as the solution[3]. To build this system using the PHP programming language and the database is PostgreSQL. PHP (Hypertext Preprocessor) is a server-side script added to HTML[4]. PostgreSQL (pronounced Post-Gres-Q-L) or postgres is an open source Object Relational Database Management System. PostgreSQL emphasizes extensibility, creativity, and compatibility[5].

2. RESEARCH METHOD

The research methodology used in conducting this research is as follows: Research and development (R&D) is a research methodology used to produce a particular product and test the effectiveness of that product[6]. This study used data collection methods based on Research and Development (R&D) procedures. the stages are as follows: research and data collection, planning, product development, initial trials, product revisions, due diligence, final product revisions, implementation.

RAD is a software process model that emphasizes short development life cycles. RAD is a fast adaptive version of the waterfall model that takes a component composition approach. RAD is a combination of various structural techniques along with prototyping techniques and conventional application development techniques to accelerate system/application development. From the understanding of the RAD concept, it can be seen that application development with the RAD method can be done in a relatively short time[7].

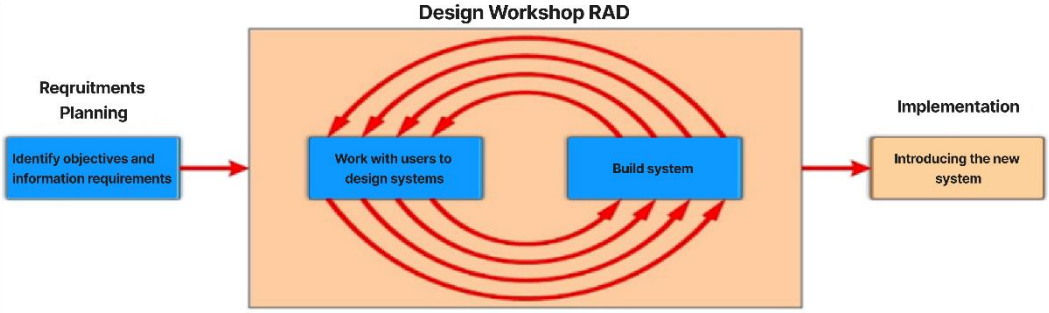

Figure 1 RAD Stages Process

The RAD stage consists of 3 stages which are structured and interdependent at each stage, namely: requirement planning, design workshop, and implementation[8].

1) Requirements Planning; In this phase, discussions are held to determine the needs of the application or system to be developed. This stage will also produce a system requirements document that includes the scope of the system, and has been agreed upon by all customer interests.
2) Design Workshop; At this stage, visualization of the system design to be built or the form of the system architectural framework is usually carried out. In this phase the author performs several stages namely Process Design using Unified Model Language (UML), Database Design, Interface Design
3) Implementation; At this stage a system that has been agreed upon, built, refined and then tested. The author uses Black Box Testing to carry out tests to find out whether the customer service information system is sufficient to ensure that errors do not occur during operation. And at this stage the system coding is based on the Requirements Planning and Workshop Design stages as well as the implementation of PHP and PostgreSQL.

3. RESULTS AND DISCUSSION

3.1. System Planning

1) System Analysis

a. Running System

The flowmap below is the process carried out by customers when they want to make complaints about network disturbance problems.

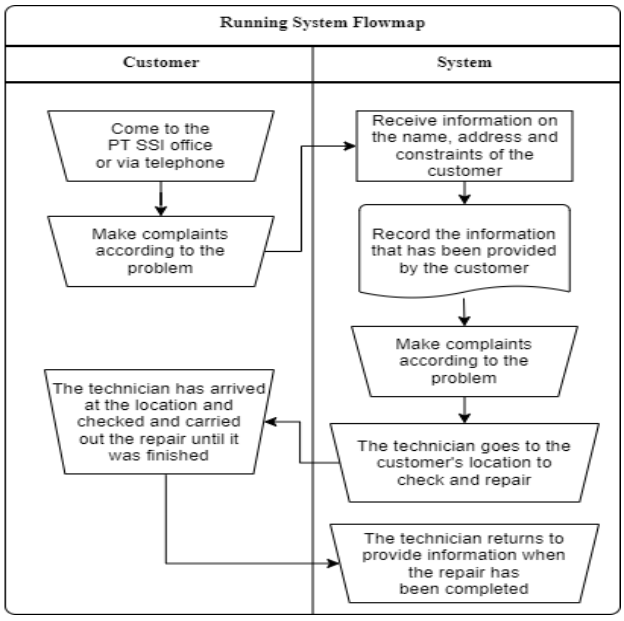

Figure 2 Running System Analysis

b. Proposal System

Below are the activities that will be carried out by the admin and the customer when they want to make a complaint.

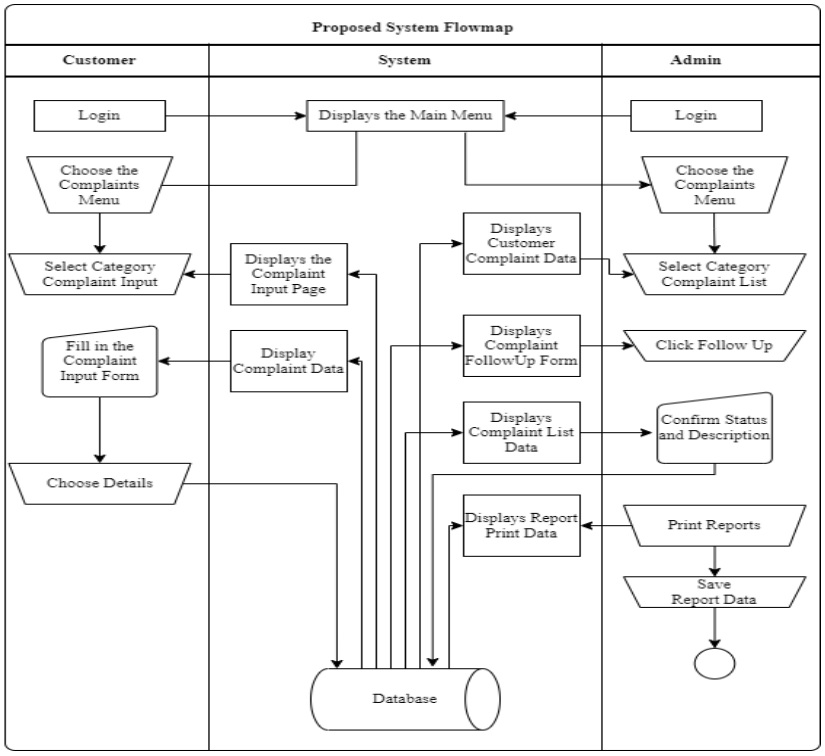

Figure 3 Proposed System Analysis

2) UML (Unified Modeling Language)

The Unified Modeling Language (UML) is a standard specification language used to document, define, and build software. UML is an object-oriented system development methodology as well as a system development support tool. The Unified Modeling Language (UML) is a language based on graphics or images for visualizing, specifying, writing, and documenting OO (Object-Oriented) based software systems. UML itself also provides a standard for writing system sketches that include business process concepts, writing classes in certain programming languages, database schemas, and components needed in system software[9]. In other words, just as a building architect creates plans to be used by a construction company, software architects create UML diagrams to help software developers build software[10].

a. Use Case Diagram

Use Case Diagrams are used to perform specific tasks that describe business processes according to the system itself, use case diagrams are used to explain functions that administrators can use[11]. In the image below, an actor role is the customer and admin.

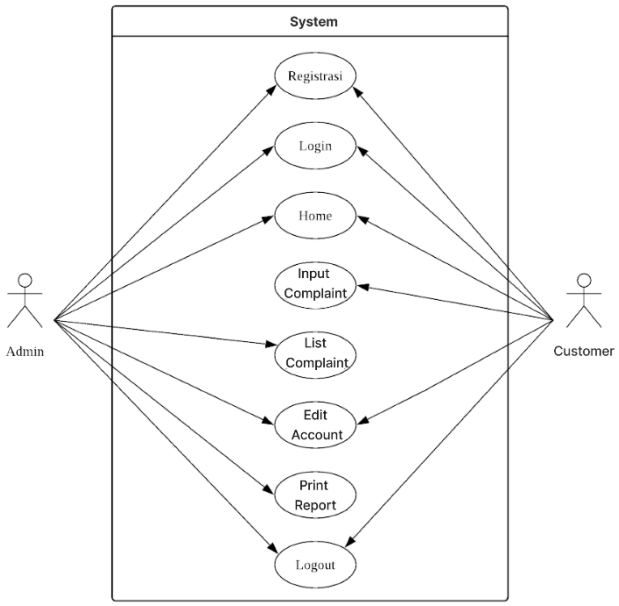

Figure 4 Use Case Diagram

b. Activity Diagram

Activity diagrams describe the flow of activities within the system being designed, how each flow begins, the decisions that can occur, and how they end. Activity diagrams can also describe parallel processes that can occur in several executions[12].

The explanation in the picture below is regarding the login process, when the customer logs in the first time the customer enters the login page, if the customer does not have an account then the customer is instructed to register first, if he has already registered then the customer can login. If already logged in, the customer is displayed on the main menu page.

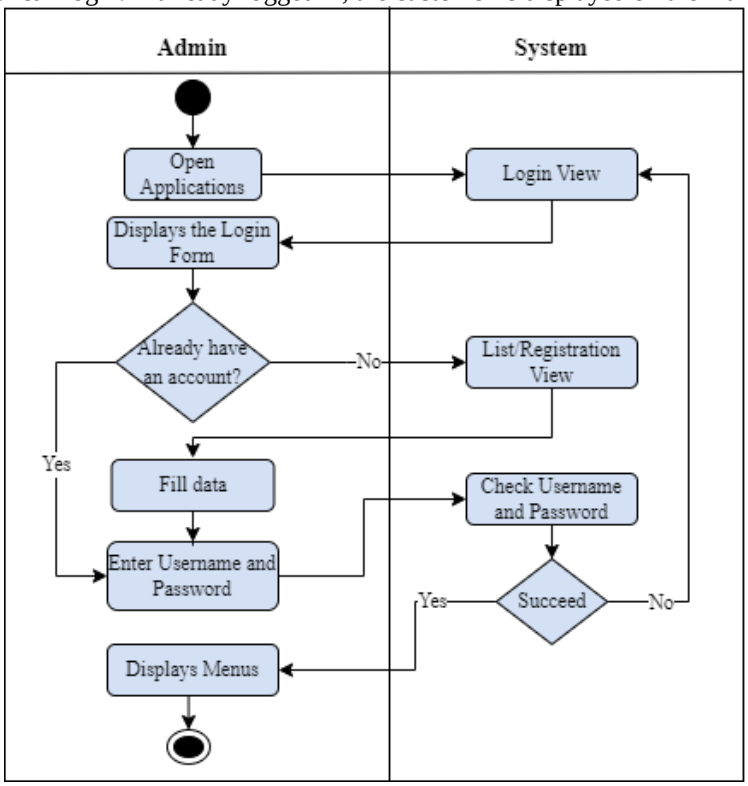

Figure 5 Activity Diagram Registration and Login (Customer)

The explanation in the image below is regarding the process of inputting complaints, when a customer enters the complaint input page, the customer is instructed to fill out a complaint form. If so, the customer is shown a complaint data page which has been filled in by the customer via the complaint form. Then the customer selects the details to check the status conformation from the admin.

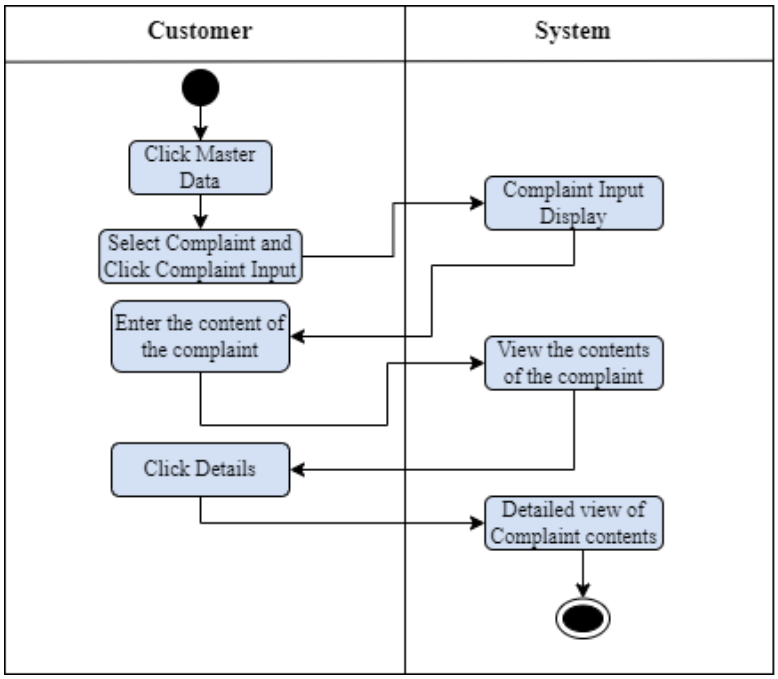

Figure 6 Activity Diagram Input Complaints (Customers)

The explanation in the image below is regarding the process of confirming status, when the admin enters the complaint list, a list of complaints page is displayed that has been inputted by the customer. Then the admin chooses to follow up to perform status confirmation and input information, if it has been saved then the admin will be displayed back to the complaint list page.

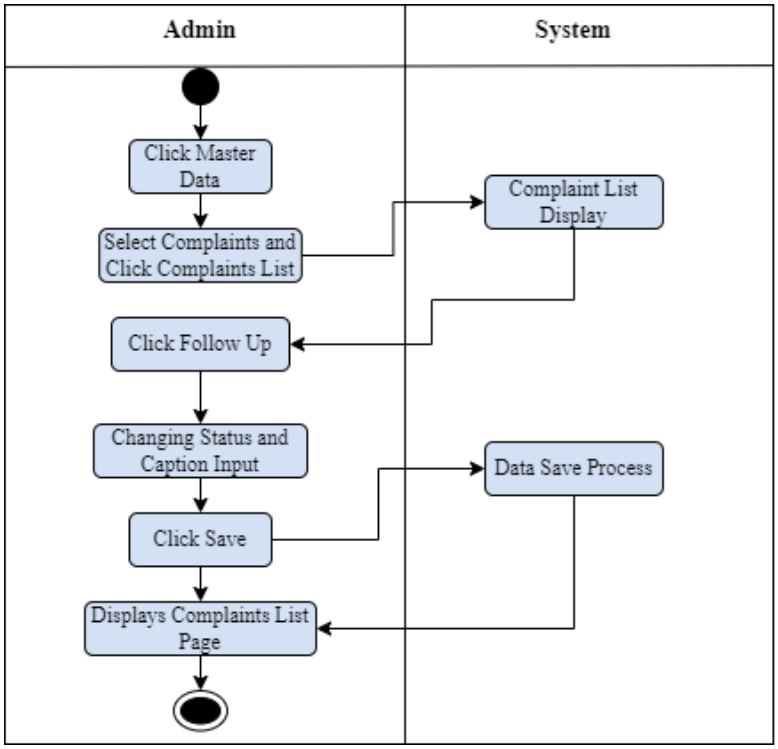

Figure 7 Complaint List Activity Diagram (Admin)

The explanation in the picture below is about the process of editing an account, when a customer enters an edit account, an edit account info page is displayed to change customer data. Then change the account data then select the update button. Then the system performs the process of updating the customer account data, then the system displays the updated account data edit page.

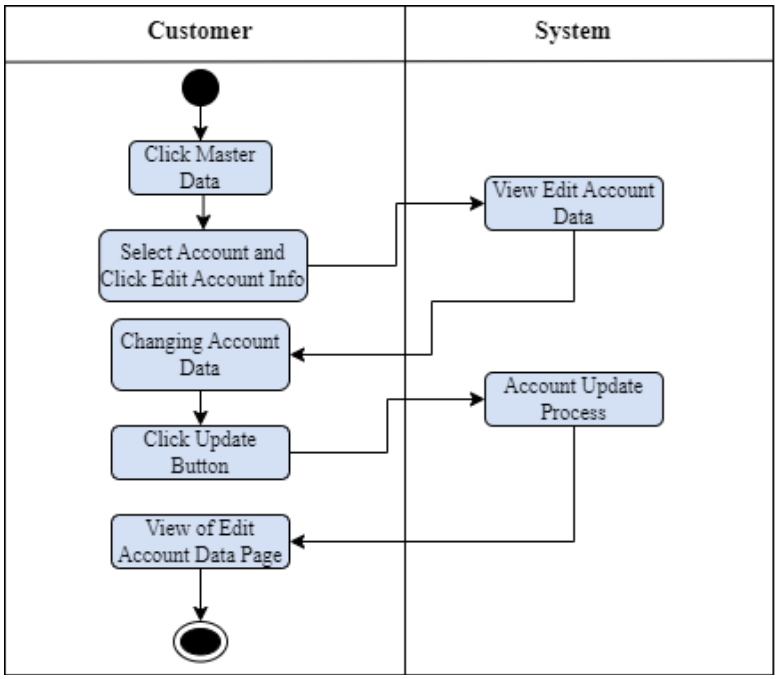

Figure 8 Activity Diagram Edit Account (Customer)

The explanation of the image below is about the process of printing a report.

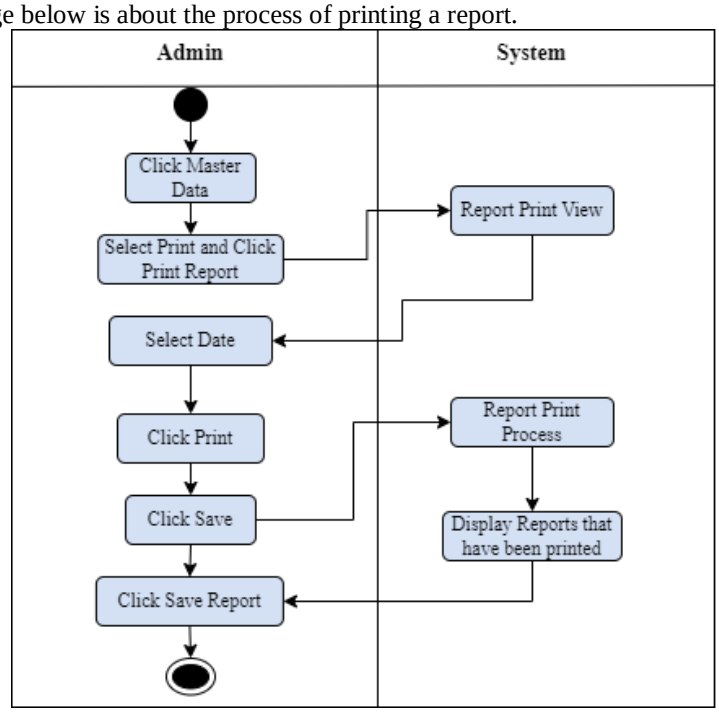

Figure 9 Activity Diagram Print Report (Admin)

c. Sequence Diagram

Sequence Diagram explains that sequence diagrams describe the behavior of objects in use cases by estimating the lifetime of objects and messages sent and received between objects[13].

The image below explains the process of registering data that will be used to log in. The diagram starts with input data, then the system validates whether it has completed the form correctly. If the validation is correct, the system requests data to the database and if the validation is wrong, the system displays a message to complete the data form.

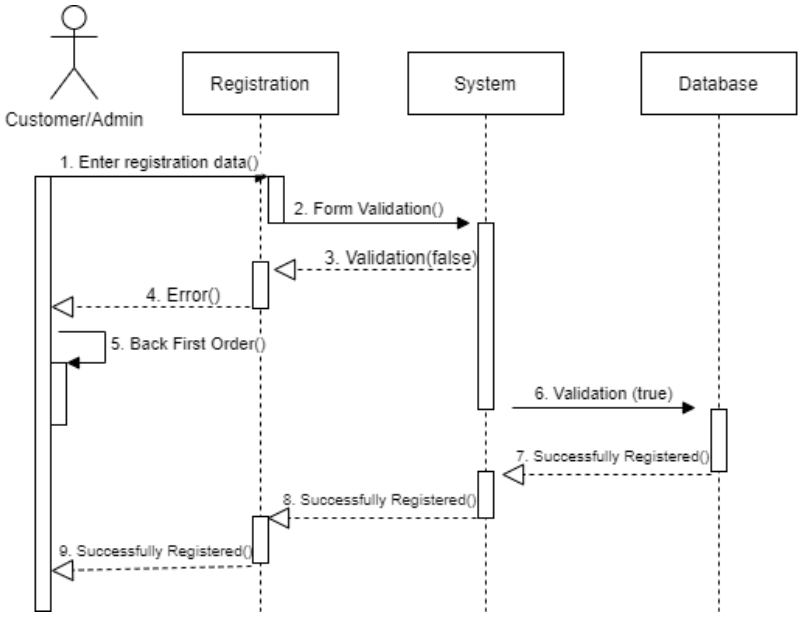

Figure 10 Sequence Diagram Registration (Customer and Admin)

The image below explains the login process carried out by the admin and the customer starting from inputting the username and password, then the system validates whether the username and password entered are correct. If the validation is correct, the system requests data to the database and if the validation is incorrect, the system displays the wrong username and password message.

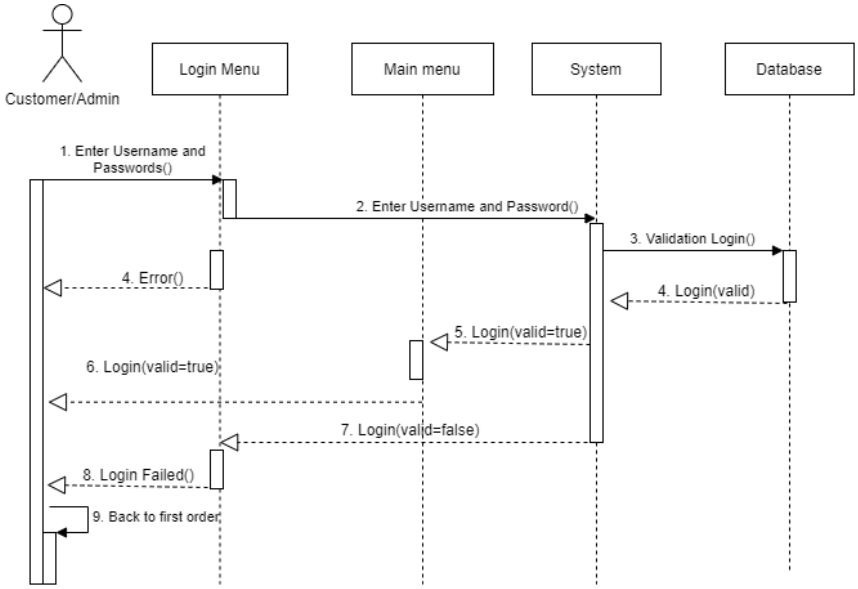

Figure 11 Login Sequence Diagram (Customer and Admin)

The image below explains the process of inputting a complaint, which enters the complaint input form menu, then the system displays the complaint input page. Then the customer inputs the complaint data and the system sends the data to the database then displays the complaint data. Then select details and the system displays detailed complaint information.

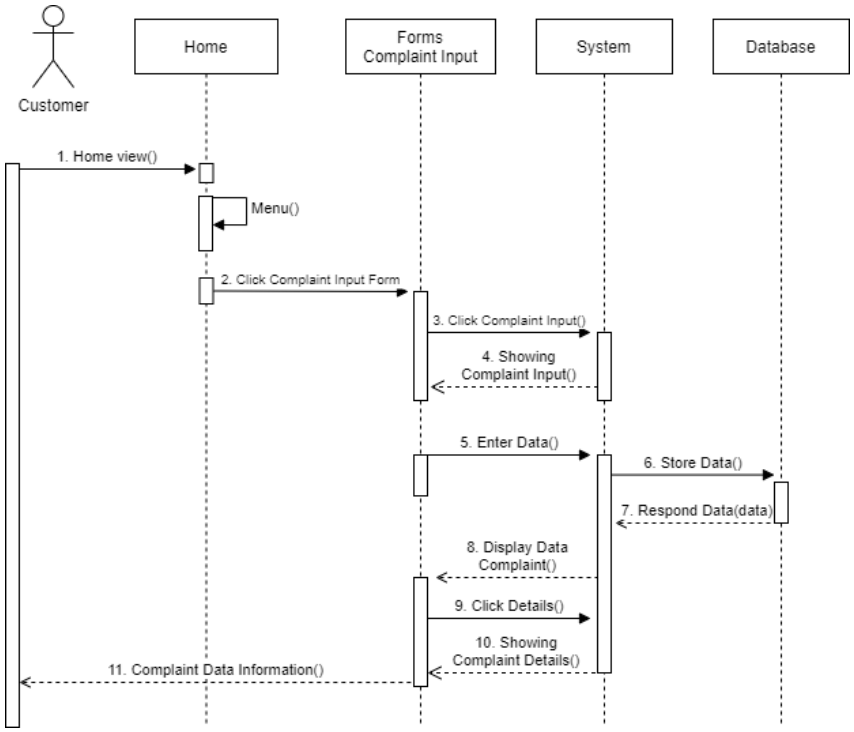

Figure 12 Complaint Input Sequence Diagram (Customer)

The image below explains the list of complaints where to enter the complaint list form menu and select follow up then the system displays the follow up complaint page. Then the admin confirms the status and information, then the system sends data to the database, then the system displays a list of complaints that have been followed up.

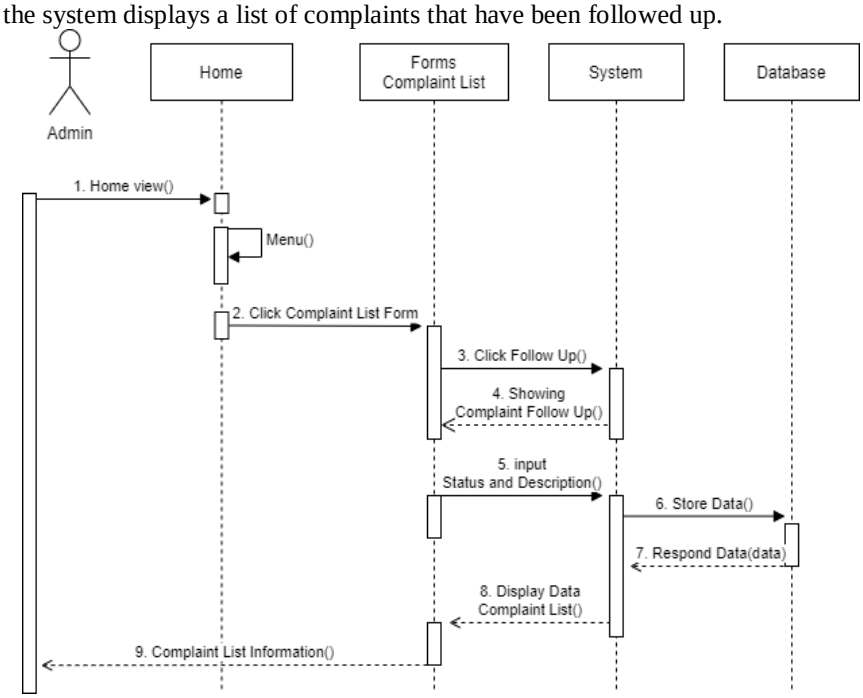

Figure 13 Complaint List Sequence Diagram (Admin)

The image below explains the process of editing an account where you enter the edit account form menu and change user account data, then select update, the system will store data to the database so that the database sends a response to the system, so the system displays updated data.

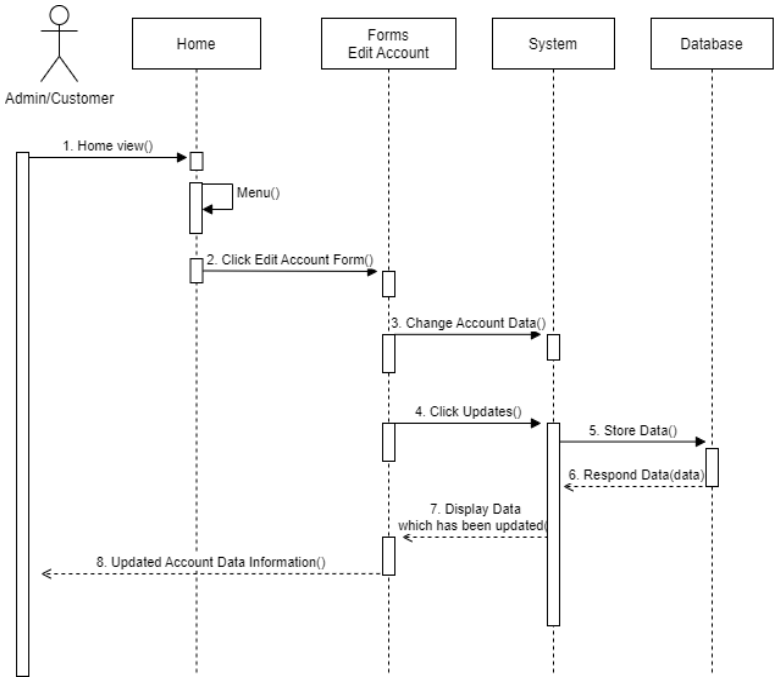

Figure 14 Sequence Diagram Edit Account Data (Admin and Customer)

The image below explains the process of printing a report, which is entered into the print report form menu. Select the date you want to print, then the system displays a print report page. Then select print, then the system requests data to the database. Then the system displays a print report, then select save to save the report data.

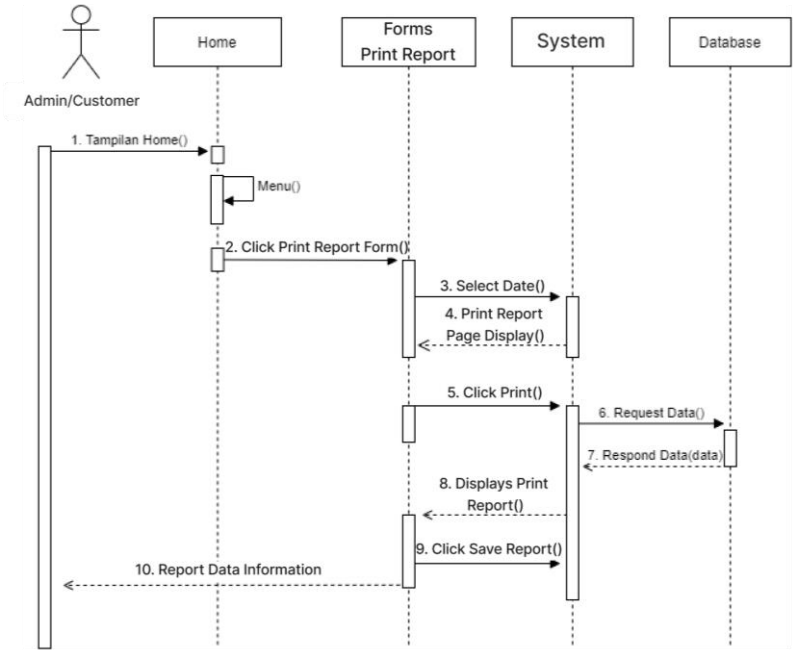

Figure 15 Sequence Diagram Print Report (Admin)

d. Class Diagram

Class is a description of a group of objects with similar characteristics, behavior and relationships. You can use class diagrams to get a global view of a system. This is reflected in the classes that have something to do with each other[14].

3.2. System Implementation

This login display is the initial display when the program is run, serves as the input username and password when you want to log in.

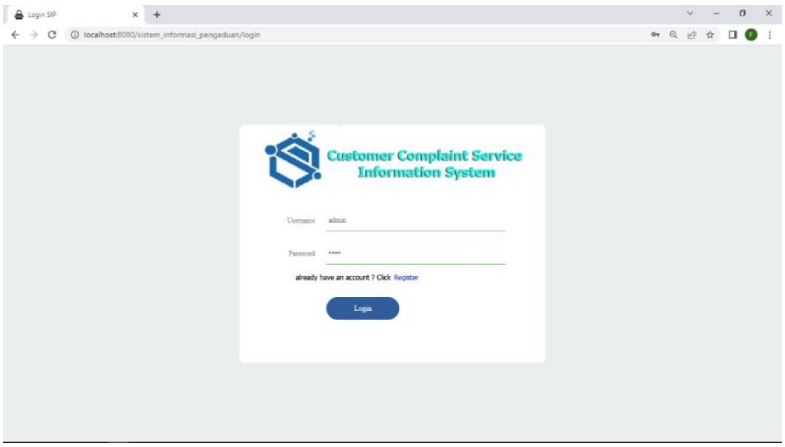

Figure 16 Login Menu Display

This view is an account registration display that functions to login and customer account data.

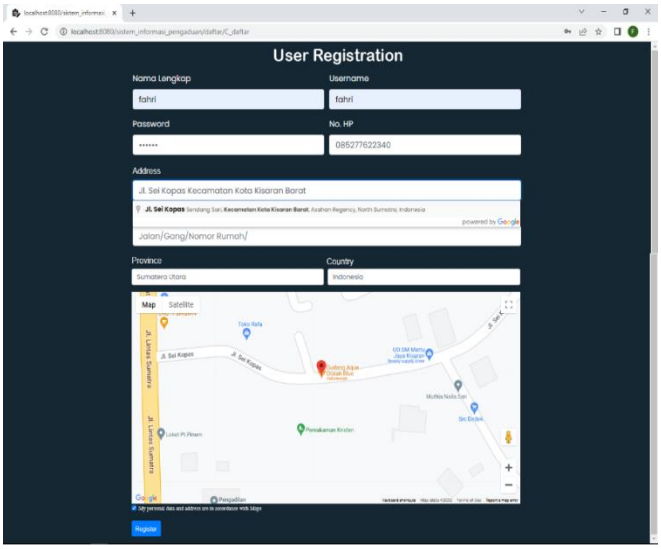

Figure 17 Registration Menu Display

This view is the main menu display which functions to display the main menu and categories which include input complaints and edit account info.

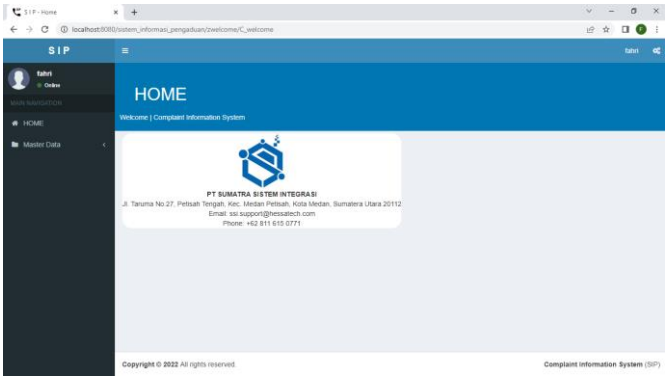

Figure 18 Home Menu display

This view is a page view for inputting complaints and for viewing data that has been input from input complaints. This view also displays the queue number and status that has been followed up.

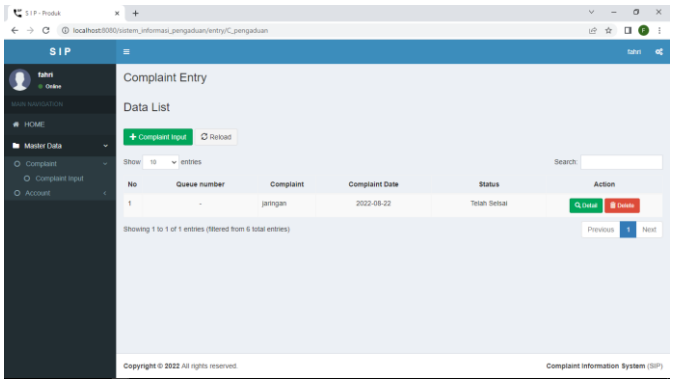

Figure 19 Display Complaint Input Page and Complaint Data

This display is a complaint follow-up display data that functions to view the problems and details of the customer's problems as well as confirm status and information.

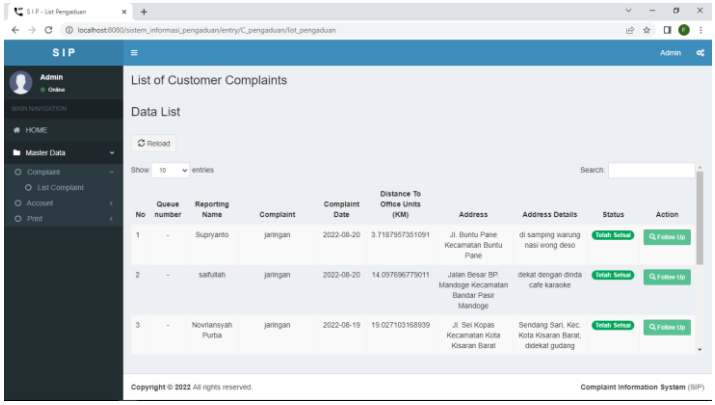

Figure 19 Display Of Customer Data That Will Be Follow Up

This view is the edit user data display which functions to change data, if later the customer wants to change the data info.

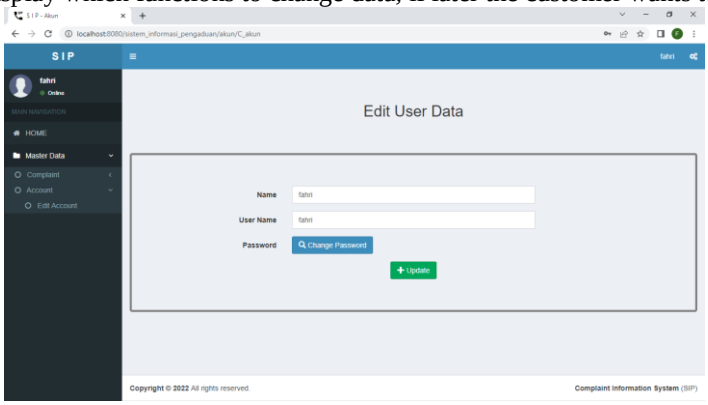

Figure 21 User Data Edit view

This view is a print report display that functions to print customer report data that makes complaints.

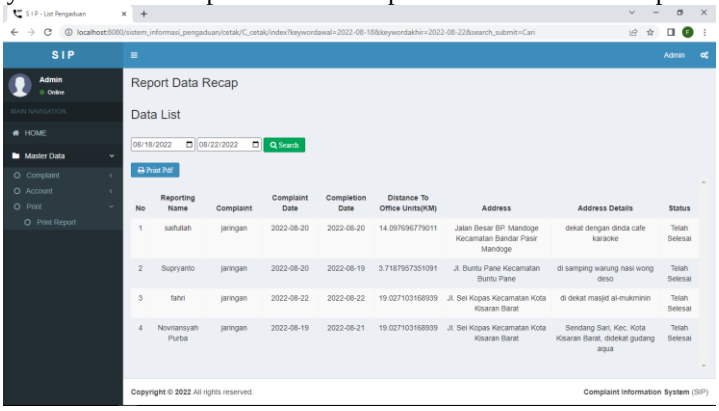

Figure 2 Print Report

3.3. System Testing

in testing the customer service system using the dynamic priority scheduling algorithm using the black box testing method and this test was tested by the main director of PT Sumatra System Integration. Black box testing is software quality testing that focuses on software functionality. Black box testing aims to detect faulty functions, interface errors, data structure errors, performance errors, initialization and termination errors[15]. The following are the results of the tests carried out:

Table 1. Test Result

No	Indicator	Test Result
1	Login Menu Display	Succeed
2	Registration Menu Display	Succeed
3	Home Menu display	Succeed
4	Display Complaint Input Page and Complaint Data	Succeed
5	Display Of Customer Data That Will Be Follow Up	Succeed
6	User Data Edit view	Succeed
7	Print Report	Succeed

4. CONCLUSION

Based on the discussion above, the authors conclude that implementing the Dynamic Priority Scheduling algorithm can make it easier for customers and companies to determine customer priorities based on the shortest distance automatically by the system. Then with the application of this customer complaint service information system it can make it easier for customers to make complaints and make it easier for companies to receive complaints and make customer complaint data reports more effective and efficient. For testing based on Black Box Testing conducted by PT Sumatra Sistem Integrasi that the results of the application system that has been made run according to the conditions agreed upon by the customer and the company. Based on the due diligence on users, it is very feasible to apply to PT Sumatra Sistem Integrasi in providing customer network disturbance complaint services.

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