Extreme Programming for Developing List Complain Fiture Design on Griya Bayar System

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Abstract Technological developments greatly affect various things, such as companies. Many companies's process depend on technology and the most widely used are information systems. The information system that is widely accessed is the website. One of the companies is PT. Penkalis Sridanta usa a website on transaction process in PPOB Griya Bayar. However, there is a complex flow in complain list which is checking success or pending transaction process. They still use manual step and it's make it need a lot of time during the process. Therefore, this journal discusses the development of the Complain List feature design using the Extreme Programming software development method. This method is suitable because of its flexibility and fast processing. The design of the Complain List feature consists of several stages such as planning, design, coding and testing. In the planning stage, we discuss user stories and scheduling. In the design phase there are CRC, Usecase, ERD and UI Design. At the coding and testing stages, other research can be carried out and it is hoped that it can be developed into a real system that can be used in real time.

***Keywords*— Griya Bayar, Design, Agile, Extreme Programming.**

I. INTRODUCTION

The development of information technology has now entered all lines of human life. In this century, information technology is needed by all of aspect. This condition can be seen in education, government, industry, non-governmental organizations (NGOs), professional organizations, even in various scopes. These conditions indicate that the use of information technology is a primary need for mankind today [1]. These primary needs can be seen in the daily activities of everyone who uses information technology as a tool to solve the problems they face [2]. One of the uses of technology is the use of information systems. Information systems can be relied upon to solve various problems that occur to a person or company engaged in goods and services. Where the information system becomes an effective tool to serve data requests [3]. One of the uses of information technology is the use of websites. Many software development companies are competing as service providers to create applications that can be sold. One of the products that is currently booming in software development is a website. Websites are widely used because of their ease of access and flexibility. An easy and flexible process is something that everyone needs, one of which is the transaction process. Media transactions and payments also used website to facilitate the transaction process [4]. One service provider company provides a website to its vendors, where this website is used as a medium for transactions and payments. One of that companies that use a website as a medium for service transactions are PT. Penkalis Sridanta. PT Penkalis Sridanta is one of the PLN vendor companies engaged in the Payment Point Online Bank (PPOB). The website used in the service and transaction process is Griya Bayar.

Griya Bayar or PPOB Griya Bayar is an online bill payment counter business in collaboration with the Bank Tabungan Negara (BTN). PPOB stands for Payment Point Online Bank. The services provided by Griya Pay are PLN, PDAM, Telkom and Indihome Bills, FIF and BAF credit installments, motor vehicle taxes, train tickets, cellphone credit, OTO Finance, Mega WOM, TV and BPJS Kesehatan dan Ketenagakerjaan. Griya Bayar has a website called Griya Bayar Web Report. This website has various features to support transaction processes both from the agent and downline side as well as a help desk as a support system on the backend of the system. Several features can be displayed on the menu, including Home Features, Reports, Downline Balance or Quota, Quota Management, Administration, Commissions, Scanning, Bank, Change Password and Log out. These features can support the transaction process and to ensure that the transactions that occur are valid. However,

there are some process flows that are less practical and the solution is manual. One of these processes is pending processing when customers make payments. The flow of the pending process is still considered less flexible and inaccurate because it requires a complex and long sequence. Therefore, a complaint list feature was made to simplify the process. The function of the complain list feature is to make it easier for agents, downlines and help desks to see whether the transactions made are successful or pending. If the transaction is successful, the transaction is successful, but if the transaction is pending it will be checked by the help desk. The list feature is accessed by three types of users, namely agents, downlines and help desks. To design a feature list, a software design method is needed. Another problem is that this list feature will be needed in a short time, because transactions in the service sector continue to run all the time. For this reason, a software development concept is needed in the complaint list design process.

To develop a design feature on a website, it takes steps that are carried out carefully and planned. So a system development methodology is needed to planning all of system development in accordance with the cases encountered in system development. The system development methodology is a framework that becomes the basis for software design and development with the aim of producing applications that meet the business needs of an organization [5]. The agile development approach has been introduced as an attempt to make software engineering flexible and efficient. Agile software development is a software development methodology based on iterative development, where the requirements of each stage and the solutions offered are developed with an organized collaborative approach between teams. One type of the agile development method that is used to suit development needs is extreme programming (XP). XP is a software engineering development that can be used for system development with unclear requirements or very fast changes to requirements [4]. Therefore, the XP method is very suitable to be used to develop a list feature design on the Griya Pay website. XP is also flexible and can be updated periodically. And this is very important in the process of developing the Griya Pay website, because the website can be accessed directly and must often experience changes or additional features. Therefore, the software development method that is considered suitable for this problem is Extreme Programming [6].

Based on these problems, this journal will discuss the design of the Complain List feature using a Software Development method. Software Development Method that used in this case is Extreme Programming. It is choiced because this method is very compatible for the case of adding the Griya Pay Complain List feature. In addition, Extreme Programming has not too many stages, so it is very suitable for systems that can periodically update their features.

II. EXTREME PROGRAMMING

Extreme Programming (XP) is known as the technical how to method or how a technical team develops software efficiently through various principles and practical software development techniques. XP is the basis for how the team works on a daily basis [7]. Extreme programming is a development method derived from agile development. Agile development is a development technique that can be done quickly or in the sense of meeting the needs of software or information systems that involve users with the aim of minimizing development errors. Agile development methods are defined in four values commonly called the Agile Alliance's Manifesto, including interaction and personnel, functional software, collaboration with clients and response to changes [8]. Extreme programming development method with a main focus on a team with a technical how-to that adheres to the principles of agile methodology which consists of prioritizing customer satisfaction, being open when there are changes, providing work regularly, developers and clients working together, providing motivation personal team members, making effective and efficient ways of gathering information, prioritizing project progress, maintaining sustainable relationships between sponsors, developers and users, paying more attention to technical matters, making things as simple as possible, generating architecture, requirements, and designs from their own team and trying to do work effectively and regularly [9]. The XP method can be applied with a short application development time and is suitable for the use of software development. XP offers stages in a short time and repeats for different parts according to the focus to be achieved. In XP there are iterations that can be done repeatedly as needed [10]. Extreme Programming is the development of the XP Life Cycle, in Extreme Programming there are four phases, namely, Planning, Design, Coding and Testing [3].

A. XP Value

XP is a dynamic method that can be seen from its four values and these four are the basics needed on XP. Kent Beck states that an individual's shortterm goals often clash with longterm social goals. Therefore, values are made into rules, punishments, and rewards. The four values are Communication, Simplicity, Feedback and Courage [1].

B. XP Phase

Figure 1 shows the phases of the XP method. XP consists of 4 phases, namely planning, design, coding and testing.

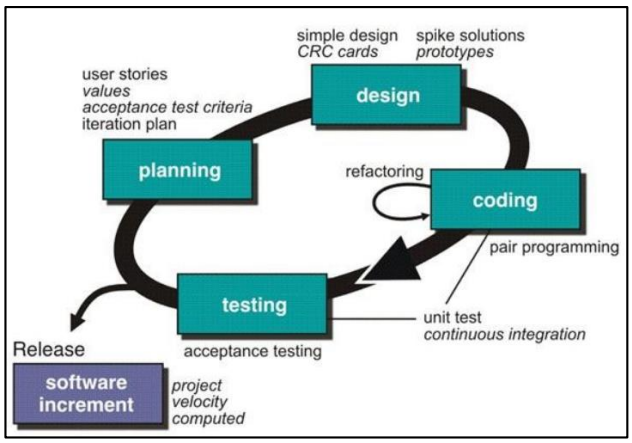


Figure 1. XP *Life Cycle*

Based on Figure 1, the phases in the extreme programming (XP) system development methodology are as follows [7]:

1) Planning is the first stage, this stage determines the overall functionality that will be developed in the system. Furthermore, at this stage the identification of the output (output), the features that exist in the application, the function of the application made, as well as the application development flow. Planning stage begins with understanding the business context of the application, defining the output, features that exist in the application, the function of the application created, and the application development flow. It can be said that this stage determines the overall functionality that will be developed in the system and user stories. The planning stage is oriented to the exploration stage. This phase will estimate business requirements, user requirements, and system requirements. This stage will also produce a schedule that describes the implementation time of the system development plan.
2) Design is the second stage, this stage emphasizes on simple application design, the tool for designing at this stage can use CRC (Class Responsibility Collaborator). CRC maps the classes to be built in use case diagrams, class diagrams and activity diagrams. At the stage of focusing on simple application design, the tool for designing at this stage can use CRC (Class Responsibility Collaborator). CRC maps the classes to be built in use case diagrams, ERD and UI.
3) Coding is the third stage, at this stage coding is carried out based on the design and analysis that has been done previously. Coding is the translation of a design into a language that can be recognized by a computer. In this study, the application is divided into two, namely for the front-end and back-end. The back-end coding uses the PHP programming language with the Notepad++ compailer and MySQL database while the front-end uses the visual code IDE. Coding or coding is the translation of the design in a programming language that is recognized by the computer. Coding can also use the PHP programming language with the Sublime Text 3 compiler.
4) Testing is the fourth stage, this stage is the process of testing the system that has been built by conducting trials with several parameters. The system that has been built must be tested first in order to find errors. The test use black box testing, where this test is carried out for problems in the function and appearance of the interface when the program is run by the user. The system that has been built must be tested first in order to find errors. In this study, usability testing is used, where testing is carried out to find out whether users can learn and use the product to achieve its goals and how satisfied the user is with the use of the application and its usefulness.

III. Result and Discussion

The design of the Griya Bayar website complaint list feature design, here are the results of each stage that has been carried out.

A. Planning

Planning activities begin by conducting an audit on the Griya Pay Website, it aims to collect information about the needs of the system to be built so that the context of the system to be built can be known. The results of the system audit are then compiled in the form of a functional requirements analysis. Functional requirements are needed to find out what processes can be carried out by the system, as well as who can use the system that was built. And from the audit process and system analysis, a problem was obtained, namely the complaint process. The current complaint process is still convoluted and takes a long time, because there is no platform to check whether a transaction is successful and pending in one container that can be accessed by agents, downlines and helpdesk. The current process is still manual, where the agent contacts the helpdesk using text or telephone to check whether the transaction has been successful or pending. This takes a long time, while any transaction processing must be done quickly. Therefore, a complaint list feature design was made, where agents, downlines and helpdesk can see and monitor directly and can be checked directly on the system without any manual process anymore. For the design of the scheduling complaint list, it can be seen in Table I.

TABLE I
IMPLEMENTATION SCHEDULE

Document Name	User Application Function			
Application Name	Complain List Design Fiture			
Client Name	Griya Bayar PT Penkalis Sridanta			
Activity	Application Function			
Implementation	20 November 2021 until 20 December 2022			
No	Application Design			
1.	Design scheduling during 1 mounth			
	Week 1	Week 2	Week 3	Week 4
	Audit the system and found the problem	Planning how to fix the problem	Make the design system to solve the problem	Make a report as a documentation of the problem

B. Design

In the XP system development method, the system design is carried out using the Class Responsibility Collaborator

(CRC). CRC aims to build classes that will be used. The following is the CRC design that was developed in the system and can be seen in Table II.

TABLE II
APPLICATION FUNCTION CRC

Document Name	User Application Function
Application Name	Complain List Design Fiture
Client Name	Griya Bayar PT Penkalis Sridanta
Activity	Application Function
Implementation	20 November 2021 until 20 December 2022
No	Application Design
1.	The functions of developing the Complain List Feature Design are: 1) make it easier for agents, downlines and help desks to see whether the transactions made are successful or pending. 2) maximize the flow of the system so that the transaction process is not complicated.

The complain list feature is designed by usecase diagram. It's described textually in the form of a use case scenario which aims to explain the interaction between actors and the system, then illustrated in the form of a use case diagram to describe the context of the system being developed. Use case diagrams describe the expected functionality of a system. The use case diagram design can be seen in Figure 2.

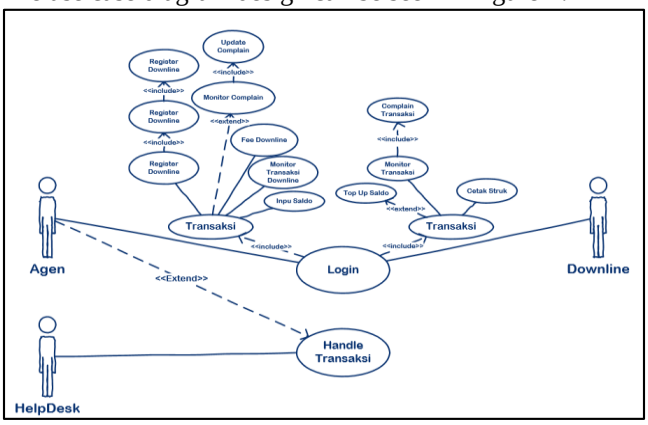


Figure 2. Usecase Fiture of Complain List

Figure 2 shows the usecase of Complain List feature. In the Complain List feature design, there are three users, Agent, Help Desk and Downline. There are several actions that can be performed by the three users. Agents can log in, after logging in, agents can process transactions, where there are balance input activities, monitor downline transactions, find out downline fees, monitor complaints and update complaints, and register downlines. While on the downline side, a login process can be carried out, after logging in the downline can make transactions where in the downline transaction process can print receipts, monitor transactions and make transaction complaints and top up balances. And the helpdesk side, transaction handle actions can be carried out. This transaction handling process will later be carried out on the complaint list feature where the helpdesk is the third person who can check whether the transaction was successful or pending and sends the information to the agent so that it will be able to update the complaint list.

The design of the relationship between the data in the presence system database is done by using the Entity Relationship Diagram (ERD)[11]. ERD is the basis of building a database in the presence system [12]. In this case the ERD shows there are four entity that describe the complain list. Each entity consists of many atributes. It shown in Figure 3.

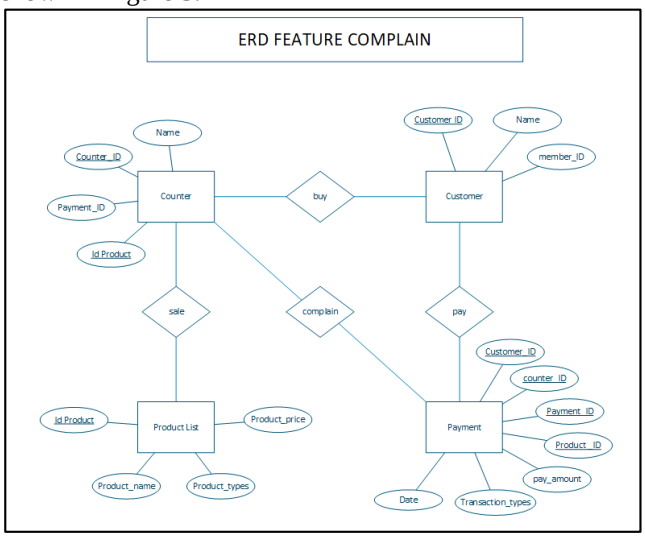
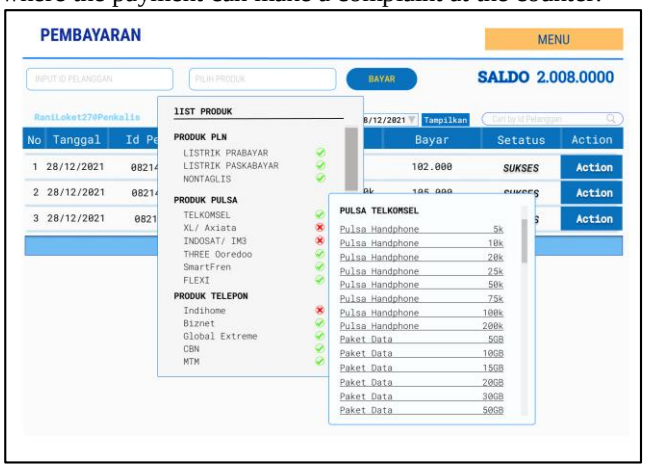


Figure 3. ERD of Complain List

Figure 3 is an ERD of the Complain List feature, there are four entities, namely counters, customers, payments and product lists. Counter is a counter entity, where the attributes of the counter are name, counterID, PaymentID and ProductID. The next entity is Customers, where there are several attributes including CustomersID, name and memberID. The next entity is ProductList, where there are attributes IDProduct, ProductPrice, ProductTypes and ProductName. And the last entity is Payment, where there are attributes CustomersID, counterID, PaymentID, IDProduct, PayAmount, TransactionType and Date. There are four processes on the ERD Complain List, including buy, pay, sale and complain. The buying process, where customers can buy products at counter. Next is the sale process where the counter can sell its products. The pay process is where the customer can pay for the product purchased at payment and the last is the complaint process, where the payment can make a complaint at the counter.



Fiture 4. Counter input menu UI design

Figure 4 is UI design on the counter input menu design. On this page the counter will serve customers in all types of Biller payments Online Bills. In making a counter

transaction, you must prepare a balance in advance or make a deposit to make a transaction to top up the balance, the counter must deposit money to the agent for the amount of the transaction or exceed it, the agent will top up the balance to add to the counter the amount that was deposited. In Figure 4 the counter must enter the Customer Number as the billing identity, after entering the Customer Number the counter will select the product to be transacted, such as Electricity Account Bills, PDAM Bills, Internet Service Bills, Health Insurance and as for purchasing products such as Electricity Credit, HP Credit, Packages Cellular data, Game Vouchers and many more Billers that can be transacted, according to bills or products from Customer Numbers.

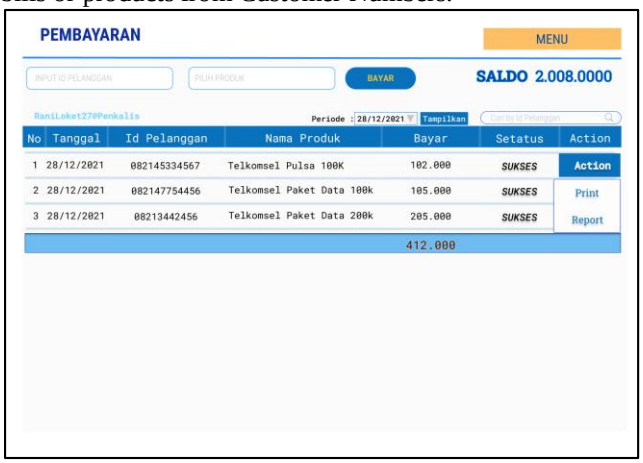


Figure 5. Counter list input UI design

Figure 5 is the UI design on the counter list input design menu. After the counter has successfully transacted a product with a bill or product purchase according to the customer number, the counter can see the transactions that have been made on the same page, to make it easier for the counter to see whether the transaction was successful or not. In the Transaction List shown in Figure 5, the counter can run two Actions such as Print and Report, where the function of the Print is to print transaction receipts or Shopping Receipts, because receipts are an important component in every transaction. Action Report here is a function that makes it easier for the counter to report transactions that have failed, successful status but are still pending, when the counter does a Report it will directly move the reported transaction into the Complaint List.

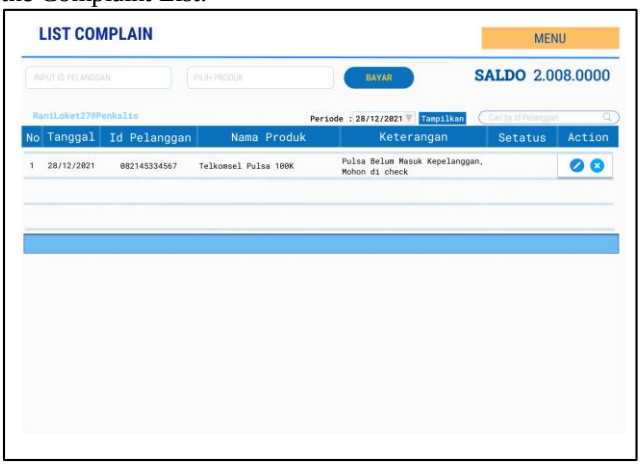


Figure 6. Complain list counter menu UI design

Figure 6 is the UI design on the menu design of the complain list counter. On the complaint list the counter can separate problematic transactions from those that have been successful, making it easier for the counter to remember problematic transaction data. On this page the counter can perform Action edit and delete, Action edit itself serves as a means of counter to insert information to customer data that has been successfully transferred to the complaint list, while Action delete serves to delete customer data that has been successful, which is of course confirmed. from the Agent or from the customer.

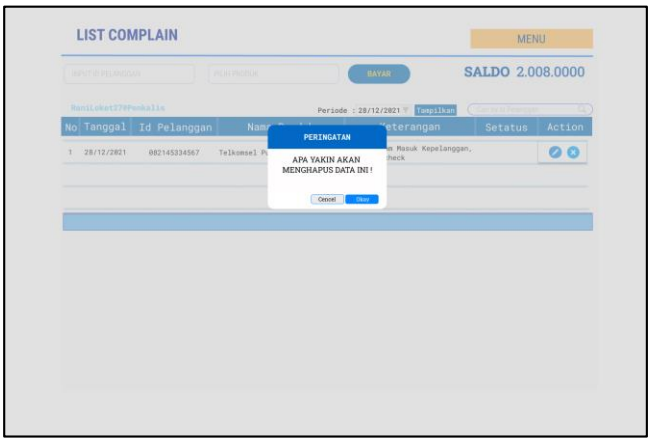


Figure 7. Delete menu list complain UI design

Figure 7 is the UI design on the menu design delete menu list complaint, there are the process of how to delete Action. Delete will not immediately delete data, this will be confirmed again to the counter whether it is sure and correct to delete the data from the complain list, to minimize an instant human error occurs or accidentally presses the delete action.

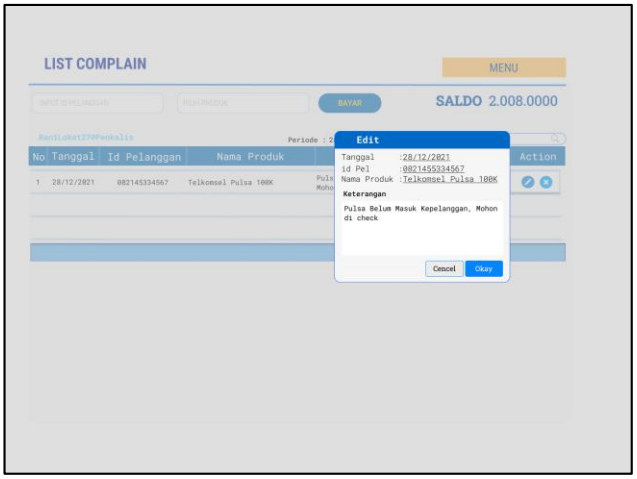


Figure 8. Edit menu list complain UI design

Figure 8 is the UI design on the menu design edit menu list complain, on Action edit when pressed it will bring up a new form, in this edit form the counter can add information data whose function is to explain the problems that occur in the Customer Number transaction, in the edit form the counter does not change the data that has been transacted, such as transaction date, Customer ID or Customer Number and Product Name that has been transacted, because in order to keep the data original in accordance with the transaction counter

C. Coding

Because the project created is a design from the Complain List feature, it is possible to develop it using the Java programming language and CI framework for the frontend display and for the backend the MySQL database can be used for the coding process.

D. Testing

When the actual system has been created, it can be tested based on usability testing. Usability is one aspect of software quality based on the types of audit frameworks either COBIT or ISO. ISO is a model used to evaluate software quality with the aim of providing standard standards in software projects. In the usability aspect, there are 4 subcriteria, namely understandbility, learnability, operability and attractiveness. Of the 4 sub-criteria there are 10 questions in the form of a questionnaire. The questionnaire was made using the Guttman scale, where certain statements are more extreme than other statements or in other words there are only two answers, namely agree and disagree. Questionnaires were distributed to several respondents [5]. It's able to prevent non-conformities at work stages and initiate improvements[13]. Where later the results of the questionnaire can help developers in developing a better system and audits to evaluate, assess capabilities and make a recommendation for manage information technology better [14]. The point is increasing the effectiveness of internal audits can make the improvemnet of the system and it is one of XP advantages [15].

IV. CONCLUSION

Based on the explanation above, it can be concluded that the design of the complaint list feature on the Griya Bayar website can be developed using the Extreme Programming software development method. This is considered suitable because Extreme Programming requires a relatively short time in the process and is in accordance with what is needed at Griya Bayar, because the transaction process that occurs must be resolved quickly. In developing the design of the complaint list feature on the Griya Bayar website using the XP method, there are four phases, namely planning, design, coding and testing. In the planning stage, we discuss user stories and scheduling. In the design phase there are CRC, Usecase, ERD and UI Design. At the coding and testing stages, other research can be carried out and it is hoped that it can be developed into a real system that can be used in real time.

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