Inventory and Demand of Goods Android-based: Rest API Implementation on Information System

Imam Roqip
Yogyakarta University of Technology
Yogyakarta, Indonesia

Farida Ardiani
Yogyakarta University of Technology
Yogyakarta, Indonesia

ABSTRACT

Toko Sidoraya is a store that provides building and agricultural equipment or materials. "Low profit and high sales" is a strategy to increase sales volume by reducing the profit of unit goods, so that businesses can gain more profits [1]. The sales process in this shop is still manual so if there are many visitors and one of the visitors buys a lot of goods, the queue level will be high. Mobile apps is a highly competitive market and promotions is a way for apps to gain word-of-mouth [2] therefore, we designed a system that can manage goods to provide information about the inventory of goods so that customers can make requests in the form of input goods through the application. This application uses the PHP programming language, PHP is a powerful language to develop dynamic and interactive web applications [3]. One of the defining features of PHP is the ease for developers to connect and manipulate a database [3]. MySQL is an open-source database management system (DBMS) that runs under Windows and many versions of UNIX [4]. Therefore, the data and information in Toko Sidoraya will be displayed and stored centrally in the database.

General Terms

Android Studio, VS Code, Postman, MySQL, Laragon, Kotlin, PHP, CodeIgniter.

Keywords

Android, Rest API, Sidoraya Store, Item Request.

1. INTRODUCTION

The acceptance of e-commerce among consumers has stimulated the rise of virtual stores [5]. Toko Sidoraya, which has the availability of building and agricultural goods and equipment, aims to develop business through mobile applications as a medium of service to more optimal customers. Due to the rise in building construction, aesthetic and fire protection requirements and the development of new construction technologies [6]. The designed application will display several types of quality goods to meet various levels of increasing community needs.

Shopping style, known as the consumer decision-making style, is a mental orientation characterizing a consumer's approach to making choices [7]. In order for consumers to be interested in the products we have, then in conveying a product, we must include a complete description and the benefits of using the product so that consumers are sure to buy products in this application. In the era of a quality economy, more and more managers are focusing on the proactive management of product quality information disclosure, especially during major events [8] to promote products and applications that can facilitate consumers.

2. RESEARCH METHOD

This research is designed to perform the functions of its use.

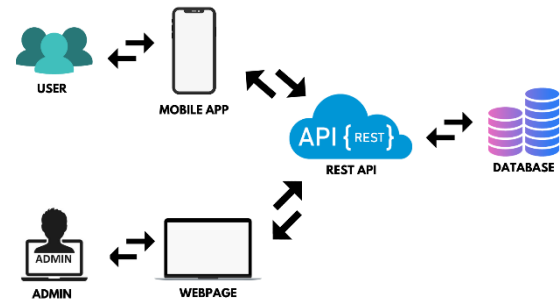This can be visualized in the architecture diagram in Figure 1.

Fig 1: Architecture Diagram

The system is used by users and admins. This system is used by users and admins. This system design uses Rest API as a data transfer medium. The Cell Collective REST API can be used to query the models, their annotations, and simulation data the Cell Collective modeling platform using a variety of programming languages [9]. We use MySQL as our data management system. Structured Query Language (SQL) functions such as table creation on a database server, data or figures insertion into the table and data selection via Graphical User Interface [10]. By utilizing these tools will help data base engineer in designing a good and normal data base [11].
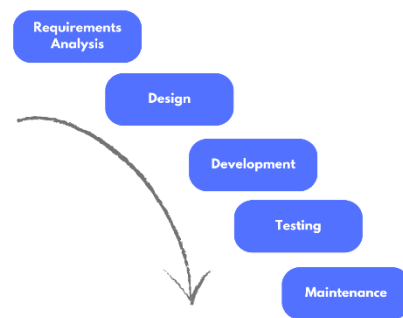

Fig 2: Waterfall Method

In recent years, software testing is becoming more popular and important in the software development industry [12]. The waterfall model is one of the SDLC models that is often used in the development of information systems or software used in the design of this system.

2.1 Data Collection Procedure

The data was obtained through 3 stages, namely the observation, literature study, and the interview stage.

2.1.1 Observation

We conducted observations at Toko Sidoraya to obtain

information related to the object of research. Any information obtained will be recorded as a form of data collection needed for application design.

2.1.2 Literature Study

We also collected the necessary data through scientific journals. The data collected is useful for gaining basic knowledge about the research topic.

2.1.3 Interview

We visited Sidoraya Store and met with sources or employees of the store to conduct direct interviews to ask permission and get complete data that is useful as research material.

2.2 System Design Logic

Logical system design using Data Flow Diagram and Entity Relationship Diagram. DFD has been constructed using [open-source software tools that provide users with different shapes and environments [13]. This step explains in the form of a system design that logically explains how the system will be designed by considering the data needed by the system.
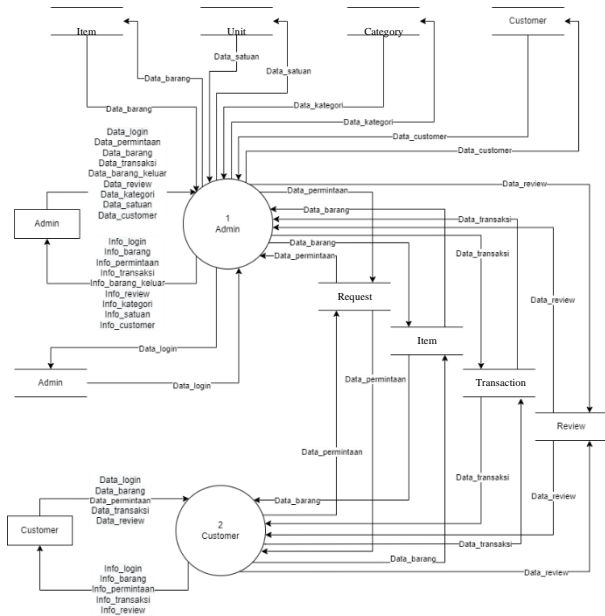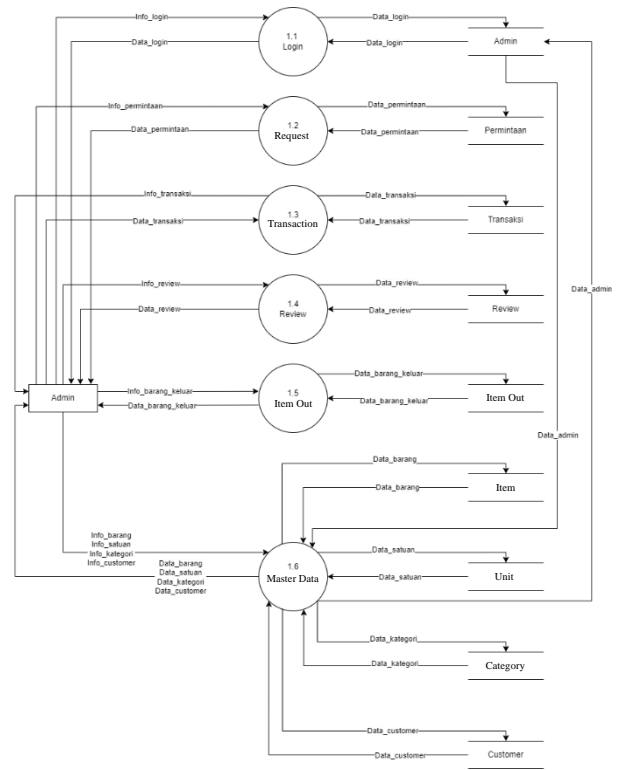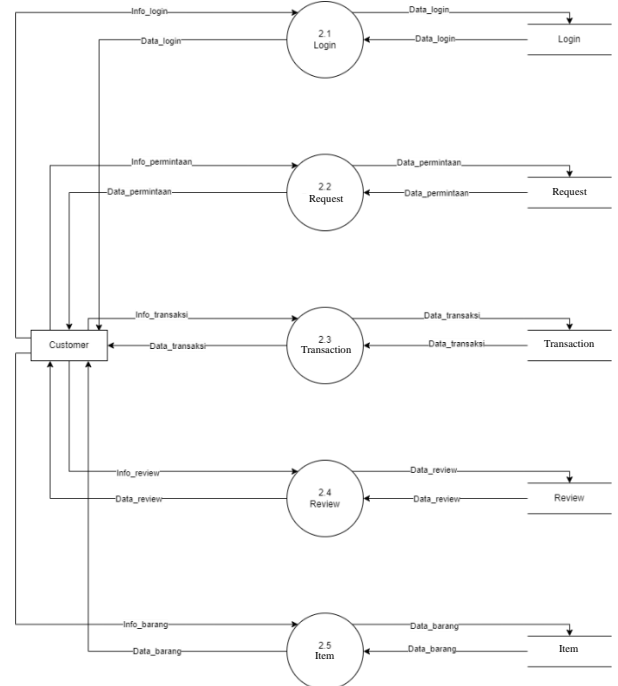

Fig 3: DFD Level 1

Fig 4: DFD Level 2 Process 1

Fig 5: DFD Level 2 Process 2

Fig 6: DFD Level 3 Process 1

Fig 7: DFD Level 3 Process 2

Fig 8: DFD Level 3 Process 3

Fig 9: DFD Level 3 Process 4

The DFD above illustrates the components of a system, data flow including, origin, destination, and data storage. Then ERD is a database design that is interconnected between entities. Entity relationship diagram (ERD) is one of the main diagrammatic representations of a conceptual data model that reflects users' data requirements in a database system [14].

Fig 10: Entity Relationship Diagram

2.3 Physical Design

Table relation is the relationship between one table and another in a database system. The relational model and relational database management systems have been the de facto industry standard for organizing and managing data in most computer-integrated manufacturing environments [15]. The table relations in Figure 11 are used to combine data from one table with another by matching primary keys with foreign keys.

Fig 11: Table Relations

3. RESULT AND DISCUSSION

3.1 Assumptions

The development of this inventory and demand system is designed to work optimally. With this system design, it is expected that consumers will find it easier to access information and make requests to get goods quickly.

3.2 Hypothesis

This hypothesis is based on the assumptions obtained and proven in the research stage. So it is found that this research hypothesizes "Inventory and demand systems with Rest API can make it easier for Sidoraya Stores to manage goods and consumer queues that are more organized and optimal".

3.3 Feature

System analysis in this study includes evaluation and testing of the application of inventory and demand for goods developed to facilitate the process of inventory information and demand for goods online. This system is android-based and designed using the REST API. The flow of using the system can be explained through Figure 12 Flowmap which explains the system workflow from start to finish in full.
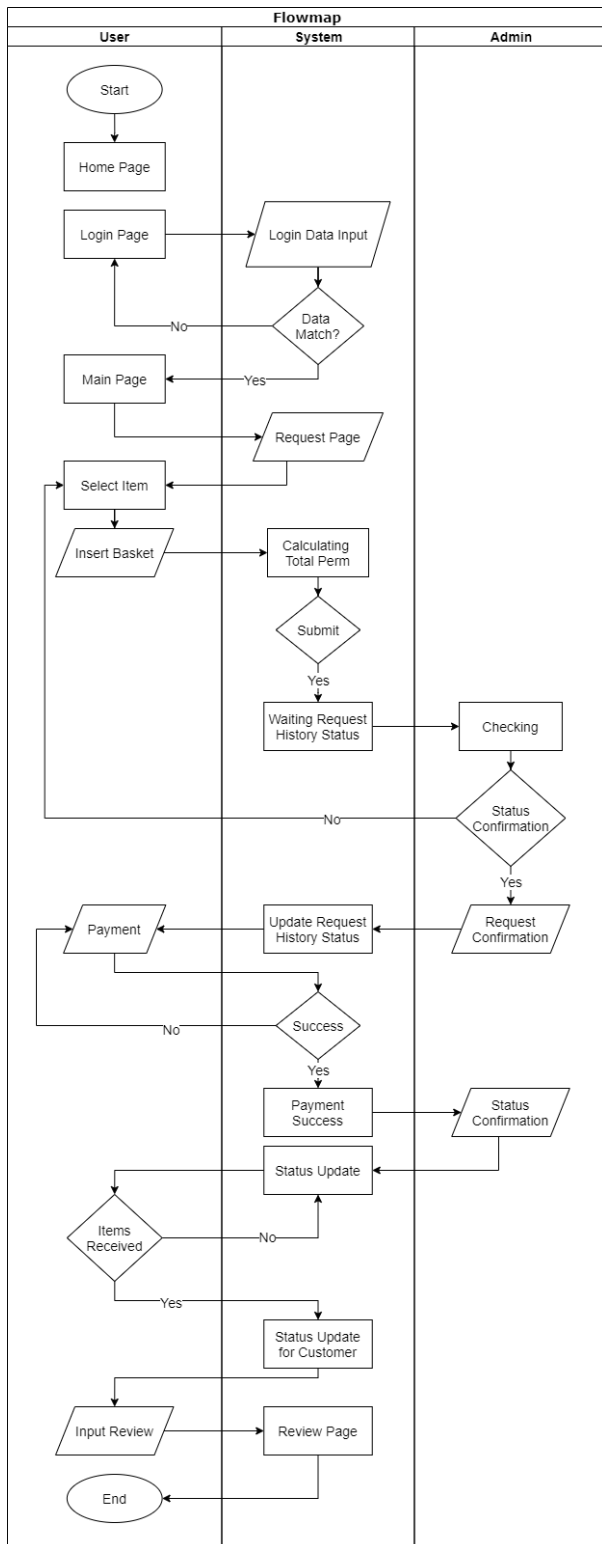
Fig 12: Flowmap

3.4 Run an Experiment

Android is the most commonly used mobile operating system. On one hand, developers use Android application development framework to develop Android apps, and they leverage the application programming interfaces (APIs) in the framework to access Android stack functionality on mobile devices [16]. This implementation is the process of implementing the system based on the results of the analysis

and design that has been done in the previous chapter. The implementation sub-chapter will explain the process of implementing the Kotlin programming language using the Android Studio IDE software for Android application development. Kotlin is an open-source programming language released in 2011 that is very popular and also compatible with Java. Many pieces of evidence are available in the literature underlining that Kotlin is gaining traction among Android software developers [17]. The latter are going through a transition in which the Android ecosystem is moving from the usage of Java as the official language for developing apps, to the adoption of Kotlin as the first choice supported by Google [18].

3.5 Implementations

Implementation aims to realize a system that can be used by users in accordance with the design that has been made. The final result at the implementation stage is the Sidoraya Shop android application system that can be used by consumers to make requests regarding the supply of goods.

3.5.1 Splashscreen and Start Page

The splashscreen page is the opening display when the user opens the application. After that it will display the start page to continue the login process.
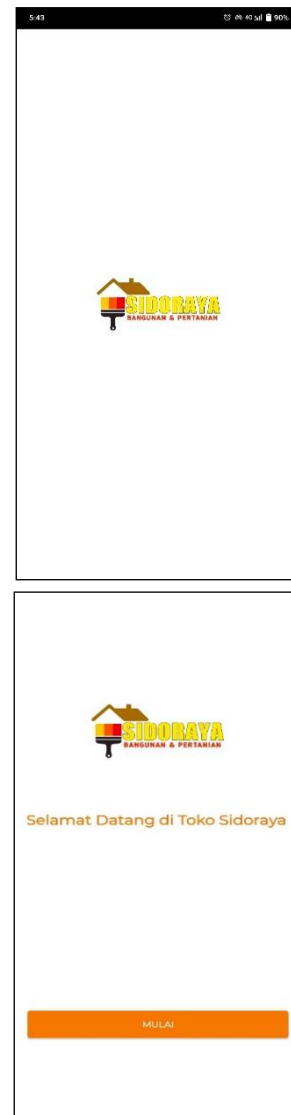

Fig 13: Splashscreen and Start Page

3.5.2 Login and Home Page

The login page displays the username and password data input form. The login page aims to allow customers to enter the application. Then after a successful login, a home page will appear that displays the main menu such as requests, reviews, history, and about the application.
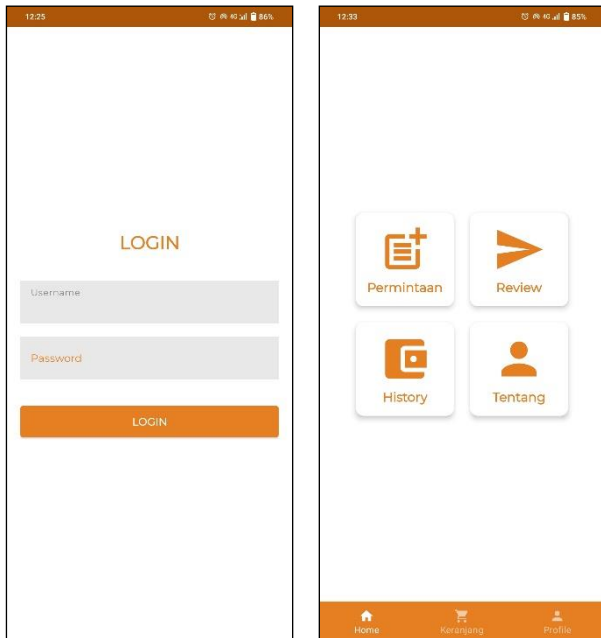

Fig 14: Login and Home Page

3.5.3 Request and Request Detail Page

The request page displays several items available in the store that can later be inputted by customers. Then the request detail page displays details of the item after the user clicks on one of the items such as the image, item name, item brand, item stock and the customer can input the number of requests after pressing the add item button.
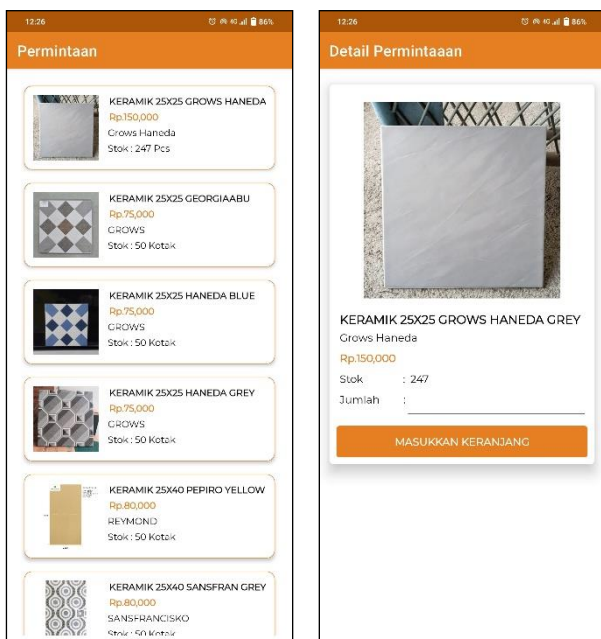

Fig 15: Request and Request Detail Page

3.5.4 Basket and History Page

The cart page displays a set of item data that has been inputted previously by the customer, the customer can also delete items if there is an error in inputting. If the item in the cart page is correct, then the customer can add a request that is sent to the store (admin / employee) so that the request process can be confirmed. Then on this history page will display information related to the status of the item request that is being processed.
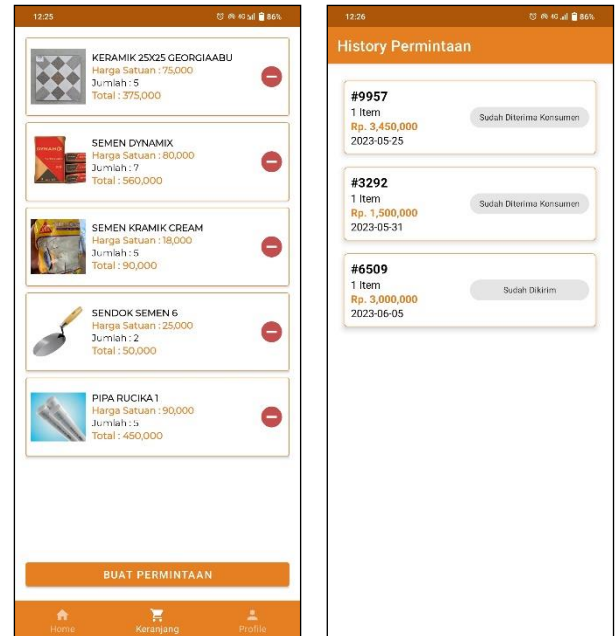

Fig 16: Basket and History Page

3.5.5 Request Detail History and Payment Page

The request detail history page displays the image, item name, item price, number of requests, and total price of items that have been inputted by the customer. If the item has arrived, the customer can confirm that the item has been received and can fill in a review of the item in the transaction process. Then the payment page will display the total payment to be paid. The payment process will be directed through several types of transactions such as bank, credit card, e-wallet, etc.
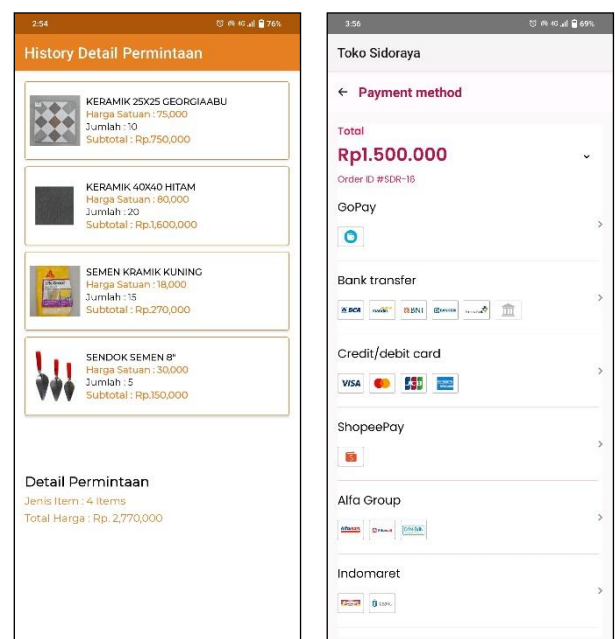

Fig 17: Request Detail History and Payment Page

3.5.6 Input Review and History Review Page

The Input Review page can be used by customers to rate the application or item when the transaction process has been completed. Then this Review History page displays some of the previously filled review history.
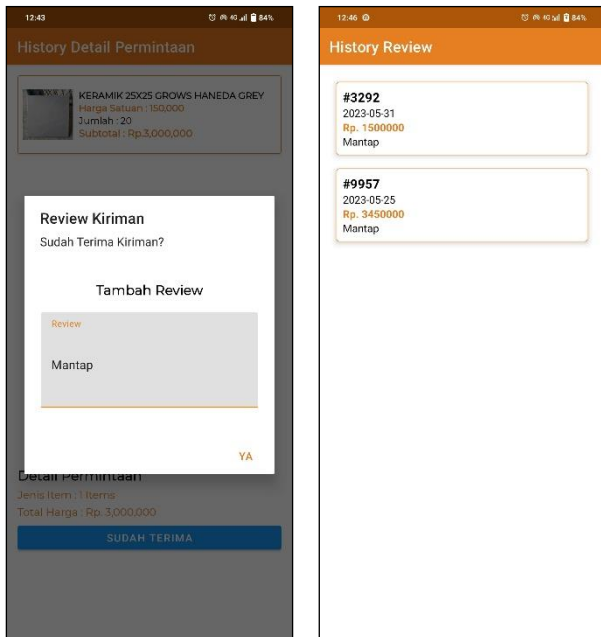

Fig 18: Input Review and History Review Page

3.5.7 Profile and About Page

The Profile page displays customer account personal data information such as photos, full names, and usernames. Then there is also a Log Out button if the customer wants to exit the application account. Then this About page contains complete information about the application used at Toko Sidoraya.
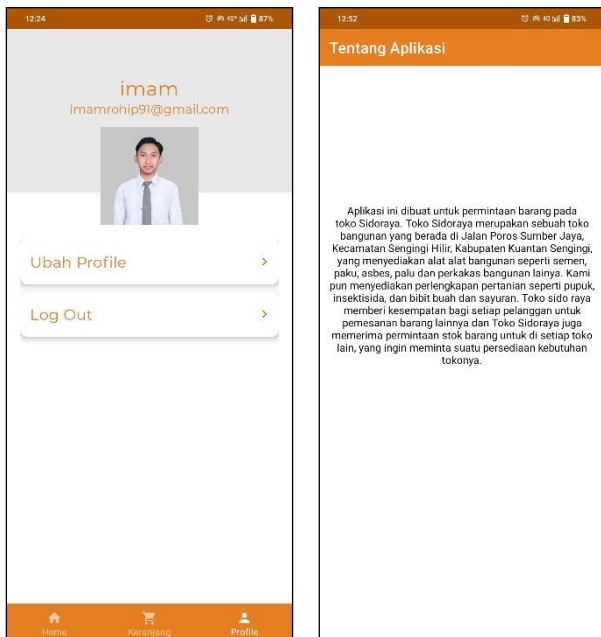

Fig 19: Profile and About Page

3.6 Discussion of Result

The application that has been built will then be tested to get the results of the system analysis that has been designed. Testing will be carried out using the whitebox method on several modules. White-box test generation is a technique used for automatically selecting test inputs using only the code under test [19]. It is the detailed investigation of internal logic and structure of the code. In white box testing it is necessary for a tester to have full knowledge of source code [20]. If the output does not meet the requirements, the code will be recompiled and checked again until it reaches the expected target. In this research, the author will test the application with parameters that cause the application to run normally and abnormally. Application testing can help improve application quality, help find bugs, reduce development costs, and get user satisfaction because the application has been thoroughly tested. The results of application testing are described in several sections which include the login, request, basket, payment, and review modules.

3.6.1 Login Module

Customers must enter a username and password that matches the data in the database. The application will display a message output on the TextView in the form of "Login failed, Check username and password again", if the authentication process is wrong. Then, if the authentication status is correct, the application will move the page to the main page.

Scenario Name : Customer Authentication

Input Data : Username and Password

Table 1. Login Module

Testing Scenario	Estimated Results	Result	Parameters
Enter the username and password according to the data in the database.	Valid, the page reaches the main view.	Correct	Normal
Username and password inputs do not match the data in the database.	Invalid, resulting in the text display output "Login failed, Check username and password again".	Correct	Abnormal

3.6.2 Request Module

On the Request Detail Page, it displays the image, item name, item brand, item stock and the customer can input the number of requests after pressing the add item button. The application will provide a warning or notification on the quantity of goods form in the form of "The number of items cannot be empty!!", if the quantity of goods form is not filled or empty. Then, the input process will display the request results that appear on the Basket Page.

Scenario Name : Add Item

Input Data : Total

Table 2. Request Module

Testing Scenario	Estimated Results	Result	Parameters
Add quantity data	Valid, can display the request	Correct	Normal
No Add quantity data or leave quantity form blank	Invalid, cannot display the request "Item quantity cannot be empty!!"	Correct	Abnormal

3.6.3 Basket Module

The basket module consists of a list of items that have been inputted from the request module, which functions to display a list of items that can later be managed by customers in the basket. Customers can delete the list of items that have been inputted, if the items listed are appropriate then the customer can directly make a request. Then, the addition process displays the results of requests that appear on the history page with the status "waiting".

Scenario Name : Adding Requests

Input Data : Quantity and Item

Table 3. Basket Module

Testing Scenario	Estimated Results	Result	Parameters
Add Quantity and Item data	Valid, can display the request	Correct	Normal
No Add Quantity and Item data or leave the quantity form blank	Invalid, cannot display the request	Correct	Abnormal

3.6.4 Payment Module

The payment module consists of a list of banks, credit cards, e-wallets, and via other payments, which function to make the payment process. Then, the transaction process if successful will display the result history status "Paid" and if it fails, the status "Approved - Awaiting Payment" appears on the page.

Scenario Name : Transaction Process

Input Data : Total Price

Table 4. Payment Module

Testing Scenario	Estimated Results	Result	Parameters
First payment attempt	Valid, successful payment	Correct	Normal
Second payment attempt, if first payment was interrupted	Invalid, payment failed	Correct	Abnormal

3.6.5 Review Module

The Review module functions to input the process of requesting goods that have been made by customers. Then, the input process will display the review results that appear on the Review History Page.

Scenario Name : Adding Reviews

Input Data : Review

Table 5. Review Module

Testing Scenario	Estimated Results	Result	Parameters
Add review data	Valid, can display reviews	Correct	Normal
No Add review data or leave the amount form blank	Invalid, cannot display reviews	Correct	Abnormal

4. CONCLUSION

The design of this goods and inventory request application can be used by Sidoraya Shop customers, this application aims to help and facilitate customers in making requests and getting inventory information through online mobile applications.

With this application, business activities become more effective and efficient because it helps employees in managing customer data, goods and preventing queues that accumulate.

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