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Implementation of an Object-Oriented Goods Inventory Application at PT XYZ

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Abstract

Effective and efficient inventory system management is very important in a company. PT XYZ is still doing manual recording in the process of managing its goods. The purpose of this research is to develop an inventory application to facilitate the management of goods and the preparation of reports. The method used in application development is Object-Oriented Programming (OOP) which can be done modularly and is easier to maintain. The data collection method is carried out by direct observation and study of relevant research literature. The application testing uses the Black Box method which has met expectations, menu features and objects run according to design. This research produces an inventory application that can make the inventory process at PT XYZ more effective based on test results which show that all application functions are running well.

Keywords

Inventory Apps, Object-Oriented Programming, Black Box Testing

Introduction

PT XYZ currently records manually the delivery and sales of goods and services, then input it into Microsoft Excel which often results in incorrect information. This can have an impact on the preparation of the company's monthly stock reports (Nugraha et al., 2018). In addition, using Excel requires a large storage space, so it is not efficient (Ahmad, 2020). To overcome this problem, an inventory application is needed that can facilitate stock management at PT XYZ. By using this application, companies will be able to minimize information errors (Pratiwi, 2020) and improve storage efficiency.

The website-based inventory system developed in this research can be a solution to the problems encountered. Equipped with the ability to manage detailed goods and accurate reports, this application is considered very useful for facilitating the management of goods (Nurhayati, 2018) at PT XYZ. The purpose of this research is to create a goods inventory application that can facilitate goods management and report generation at PT XYZ.

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In developing this application, an object-oriented method (OOP) is used, which is a software design system that organizes software as a collection of objects where data and operations can be applied to these objects (Sahputra, 2018). By implementing an OOP system, application development can be carried out in a modular manner and is easier to maintain (Yesputra & Hutahean, 2015). The developed application will use MySQL as a database management system, as well as implement the Laravel framework as a framework for the application. MySQL is known as an open-source database software, which is operated by users with SQL language (Subagia, 2018). Application testing will be carried out using the black box method. Black box testing involves observing data on the results of execution and evaluating software functionality separately (Rahmad & Setiady, 2014).

Methodology

In this research, the method used is Object Oriented Programming (OOP). This concept summarizes software development as a collection of objects that contain data, and the operations used on these objects (Sukamto & Shalahuddin, 2018). Object orientation in OOP programming aims to make it easier for program developers to carry out their tasks by referring to real life situations. The flow of this research is as in Figure 1:

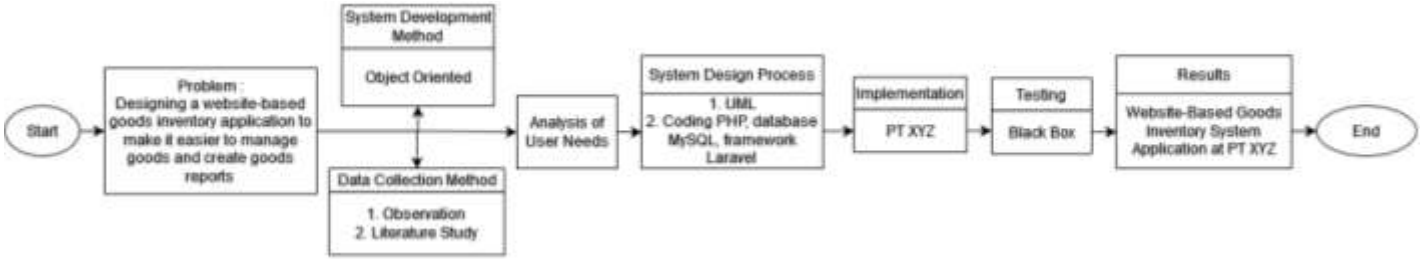

Figure 1. Research flow

1. Data Collection Method

The data collection techniques applied were observation and literature study. The observation part is carried out by observing directly at the research site in order to understand the actual situation that is taking place. The search for literature studies was carried out by exploring sources of reading material that were similar or relevant to the object of this research.

2. System Development Method

This research uses Object-Oriented Programming (OOP) as a system development method. OOP is an object-oriented system development approach. In OOP, all data and functions are organized as a collection of objects that interact to provide information to each other.

3. System Design Process

UML (Unified Modeling Language) is the main modeling language in object-oriented software development. In the development process, UML forms a Use Case Diagram. Use cases function to explain what the system does and explain the elements involved, without describing how it works (Sari & Utami, 2021). Use case diagrams are used to identify system functionality (use cases), system users (actors), and the relationship between users and system functionality.

To implement the application, the author uses the Laravel framework with a MySQL database for data storage. Laravel is a PHP-based framework that is used to optimize the development process

of a website. This framework has the advantage of simplicity, both in writing code and appearance (Mulianto & Sediyono, 2023). Laravel is a framework used in the back end of the system (Laravel, 2020). MySQL is a database management system that is very reliable and has sufficient stability to be used as a data storage medium (Noviantoro et al., 2022).

4. Implementation

The implementation of the system is referred to as the implementation stage, which is the time when the application is ready to run in its actual state. At this stage, the effectiveness of the new system will be revealed, including all the advantages and disadvantages of the application program. The application will be implemented at PT XYZ as the object of this research.

5. Testing

In a software development cycle, testing is an essential stage and must be carried out. This research uses the black box method. Black box testing is carried out by considering specific aspects of the application, such as the website interface, available features, and suitability to the user's expected business needs (Febriyanti et al., 2021).

Results and Discussion

A. Identification of problems

In manually recording inventory of goods at PT XYZ, problems were discovered which caused the data and information management process to be ineffective, namely:

1. Data Inaccuracy. This is because the data management process is still carried out by humans, so it is prone to errors, for example recording the wrong number of items.
2. Data Loss. This is because the data is still being recapitulated using a simple Microsoft Excel application which can get corrupted at any time. In addition, data is stored separately in several files, so it sometimes confuses the data manager.

B. User requirement analysis

The results of identifying user requirement in this study are:

1. Users need a structured and organized goods recording system that can be accessed by employees anytime and anywhere.
2. Users need an inventory application with an attractive appearance, responsive and compatible.

C. Application design

To solve PT XYZ's problems, the authors designed an application using the Unified Modeling Language (UML). In this way, authors can obtain clear guidance in the development process. The UML elements used in this research are cases and class diagrams.

Use Case Diagrams are used to describe interactions between actors and systems as shown in Figure 2:

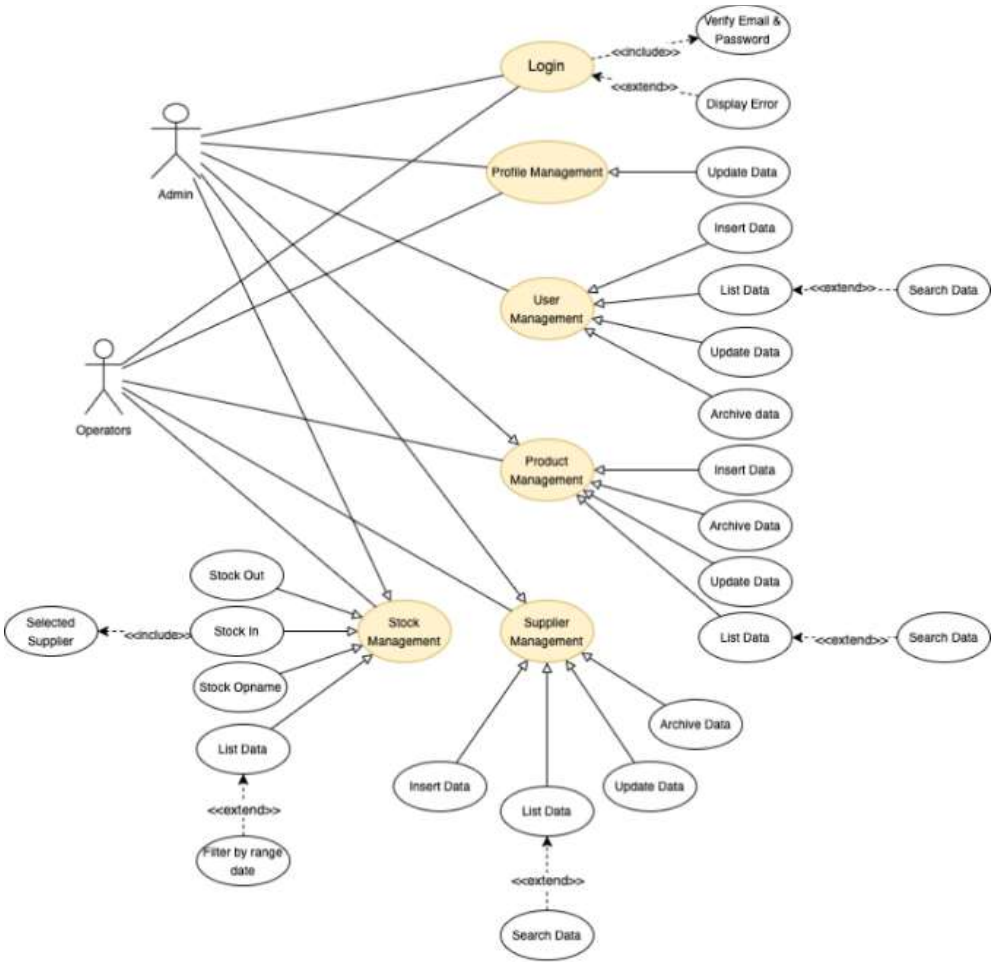

Figure 2. Use case diagram

Next, the author designed a class diagram to describe the data contained in the application as in Figure 3:

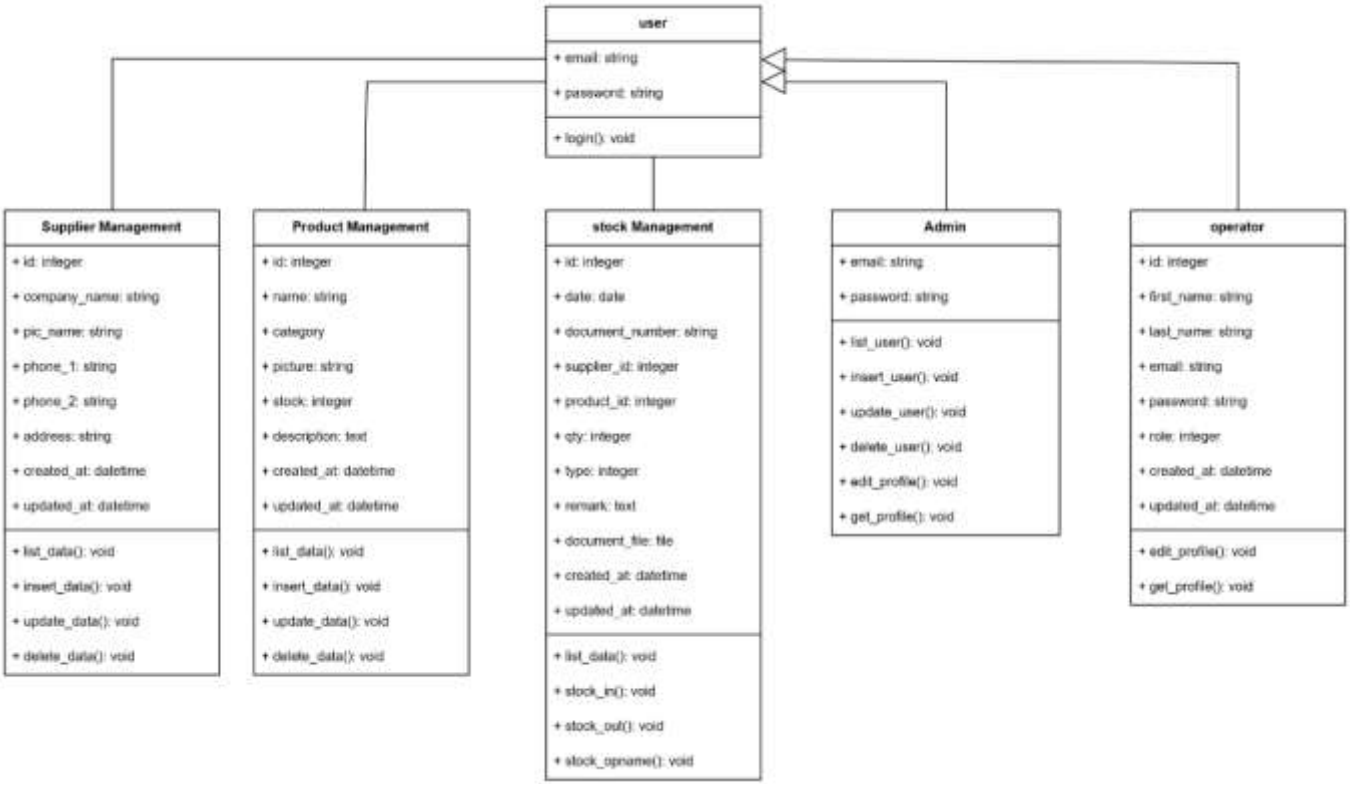

Figure 3. Class diagram

D. Implementation

In the next stage, the author implements the application with program code according to the system structure and database that have been previously designed. The author creates lines of code using the PHP programming language and utilizes the MySQL database as shown in Figure 4:

class StockController extends Controller.php ×

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```
1   class StockController extends Controller
2   {
3       protected $date;
4       protected $document_number;
5       protected $supplier_id;
6       protected $product_id;
7       protected $qty;
8       protected $type;
9       protected $remark;
10      protected $document_file;
11  >   function list() {···
18      }
19      public function stock_in_store(Request $request)
20  >   {···
53      }
54      public function stock_out_store(Request $request)
55  >   {···
88      }
89      public function stock_opname_store(Request $request)
90  >   {···
123     }
124 }
```

Figure 4. Program Implementation

The development of the PT XYZ inventory application in this research produces a user interface display according to user requirements. Some examples of these displays are shown in Figure 5:

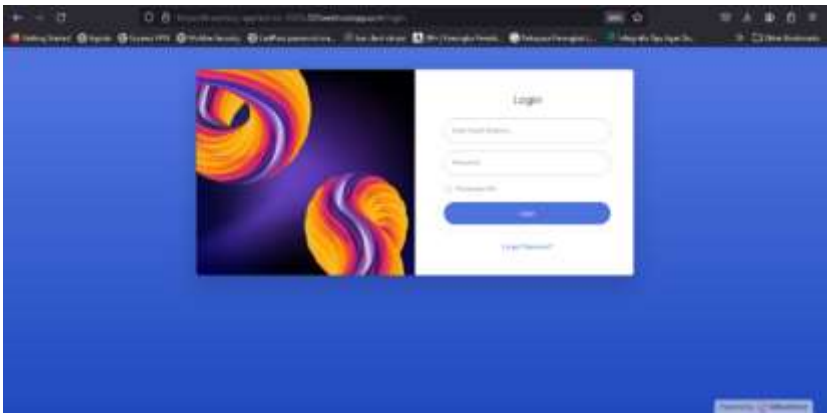

Figure 5. User interface display

E. Testing

The testing of the application was carried out using the Blackbox method to evaluate the functionality and reliability of the inventory application (Qadafi & Wahyudi, 2020). The test results show that all application functions have been running well. Some of the test cases tested are as shown in Figure 5:

Table 1. Application testing using blackbox method

ID Test	Scenario	Expected result	Result	Remarks
1	Login to the application by entering your email and password correctly, then click "Login"	The user will successfully log in to the application	The user successfully log in to the application	Success
2	Display data on stock items by clicking the "Stock Management" menu	The system will display the page "List of Stock History"	The system displays the page "List of Stock History"	Success
3	Add goods by clicking the insert button on the "List of Products" page then input the item data	The system will save the goods data to the database	The system saves the goods data to the database	Success

Several similar previous studies have been carried out, such as the Application of the SDLC Waterfall Method in a Desktop-Based Goods Inventory Information System by Wahyu Nugraha et al. The result of this research is a desktop-based goods inventory application using the VB.NET programming language with SDLC Waterfall development method. The second research by Arini Dwi Pratiwi, with the title "Design of Goods Inventory Application at PT Kartika Graha Indonesia Based on Java Netbeans". The result of this research is a goods inventory application based on Java Netbeans. In this research, a website-based, object-oriented goods inventory application was produced using the PHP programming language.

Conclusion

Based on the research, it was concluded that implementation of an object-oriented inventory application can help PT XYZ in managing inventory data effectively. The Object-Oriented Programming (OOP) method helps develop applications in this research because it allows adding objects, classes and functions efficiently. Application testing is carried out using the black box method where menu features and objects work according to design. So, this inventory application is highly recommended for use by PT XYZ.

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