BACK-END INTEGRATION: IMPLEMENTING E-COMMERCE IN THE INFORMATION MANAGEMENT SYSTEM OF DESASA HOME DECOR STORE

(Undergraduate Thesis)

By

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BANDAR LAMPUNG
2024

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As
One of the requirements to attain a
Bachelor's degree in Computer Science

Within

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On the Computer Science Bachelor's Program

FACULTY OF MATHEMATICS AND NATURAL SCIENCES
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ABSTRACT

BACK-END INTEGRATION: IMPLEMENTING E-COMMERCE IN THE INFORMATION MANAGEMENT SYSTEM OF DESASA HOME DECOR STORE

By

Dita Faradila

Desasa Home Decor is a store that specializes in selling various types of artificial flower home decorations. The utilization of information technology is essential in data management to ensure that inventory and transaction management are conducted swiftly and generate accurate reports. This research aims to integrate the information management system with the Shopee e-commerce platform for Desasa Home Decor. The system is designed to reduce the workload of employees and store owners, as well as improve transaction data management. This system is already integrated with the Shopee API to obtain product and transaction data. The development method used in this study is Extreme Programming, with data collected through interviews, analysis, and observation. The result of this research is the Desasa Home Decor management information system, which is integrated with Shopee e-Commerce. Black-Box testing concluded that the system operates as expected and planned, and the results of testing using OWASP ZAP did not reveal any high-risk levels.

Keywords: Desasa Home Decor, Information Management, API, Extreme Programming, Black-Box

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STATEMENT

I, the undersigned below:

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Hereby declare that my thesis entitled "Back-End Integration: Implementing E-Commerce in The Information Management System of Desasa Home Decor Store" is my own work and not the work of other. All writing contained in this thesis have adhered to thw academic writing regulations of Universitas Lampung. Should it be prooven in the future that my thesis is the result of plagiarism or created by someone else, I am prepared to face consequence, including the annulment of the degree I have received.

Bandar Lampung, July 15th 2024

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BIOGRAPHY

The author was born in Bandar Jaya on Sunday, October 21, 2001, as the second child out of two siblings, to Mr. Kus Hariyanto and Mrs. Sutini. Primary education was completed in 2014 at SD IT Bustanul Ulum. Subsequently, secondary education was completed in 2017 at SMP IT Bustanul Ulum, and higher secondary education was completed at SMA Negeri 1 Terbanggi Besar in 2020.

In 2020, the author enrolled as a student in the Computer Science Department at the University of Lampung through the SNMPTN entrance exam. During their studies, the author engaged in the following activities.

1. Participated in the Karya Wisata Ilmiah (KWI) organized by the Faculty of Mathematics and Natural Sciences (FMIPA) in 2020 at Sidorejo III Village, Terbanggi Subing District, Gunung Sugih, Central Lampung.
2. Served as a member of the Scientific Division of the Computer Science Student Association for the 2021/2022 term.
3. Held the position of Secretary of the Scientific Division of the Computer Science Student Association for the 2022/2023 term.
4. Acted as a teaching assistant for the Logic course in 2021.
5. Worked as a teaching assistant for the Operating Systems course in 2022.
6. Assisted with the Analysis and Design of Information Systems course in 2023.
7. Served as a teaching assistant for the Information Technology course in the Applied Biology Department in 2023.

8. Completed Fieldwork Practice (PKL) for the first period of 2023 at PT Great Giant Pineapple.
9. Participated in Kuliah Kerja Nyata (Kuliah Kerja Nyata) for the second period of 2023 in Suka Negeri Village, Bangun Rejo District, Central Lampung.

MOTTO

“Any obstacle is breakable.”

(Rose of Blackpink**)**

“If you enjoy doing something, its a hobby, but if you're forced to do it, then its task.”

(Kim Hanbin)

“Take the risk or lose the chance”

(Anonim)

DEDICATION

All praise and gratitude are due to Allah Subhanahu Wa Ta'ala, for His grace and blessings, which have enabled me to complete this thesis. Salawat and greetings are always sent to the Prophet Muhammad Shallallahu 'Alaihi Wasallam. I dedicate this thesis to:

My Parents
and
My Beloved Family

Who have always provided their support. Thank you for all the sacrifices made, the prayers continuously offered, and the attention given throughout my research.

The Computer Science Class of 2020
and My Beloved Alma Mater, the University of Lampung

I am profoundly thankful for their support and the impact they have made on my personal and academic development.

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All praise and gratitude are due to Allah Subhanahu Wa Ta'ala for His grace and blessings, which have enabled me to complete the thesis titled “Back-End Integration: Implementing E-Commerce in The Information Management System of Desasa Home Decor Store” to the best of my ability in order to obtain a Bachelor of Computer Science degree from the University of Lampung.

On this occasion, I have received much guidance, support, and prayers from various parties, and I would like to express my gratitude to:

1. Allah Subhanahu Wa Ta'ala for His grace, guidance, blessings, and health, which have enabled me to complete this research successfully.
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The researcher acknowledge that there are still many shortcomings in this thesis report due to limitations in my skills, knowledge, and experience. However, the ressearcher hope this thesis will be beneficial to those who read it.

Bandar Lampung, July 15th 2024

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I. INTRODUCTION

1.1 Background

The current information technology is advancing rapidly and becoming more sophisticated, especially in the business world. Business owners require information technology to manage and develop their businesses in order to compete with others in the business world. Currently, there are many home decor businesses that we encounter, leading to intense competition among stores. To enhance competitiveness, many business owners use e-commerce platforms such as Shopee. E-commerce is a process of buying and selling products electronically between consumers and from company to company, with computers serving as intermediaries in business transactions (Laudon and Traver, 2019).

Desasa Home Decor is a store that specializes in selling home decorations such as flower arrangements and wall ornaments, located in Bandar Lampung. In an effort to reach a broader market, Desasa Home Decor utilizes Shopee. However, transaction management on this platform is still carried out manually, resulting in a time-consuming and complex process. One of the challenges is in managing the sales figures. To calculate the total sales, employees and the owner must meticulously record all items sold through the e-commerce platform. This calculation includes shipping costs, product prices, discounts, and taxes. If any discrepancies occur, any errors in the calculations may result in losses for Desasa Home Decor store. Additionally, the store is unable to track their sales effectively due to the manual data management process.

The current data management system can be significantly improved by leveraging information system technology, thereby enhancing the performance of Desasa Home Decor store. The utilization of web-based information technology is considered more efficient, as employees and the owner can manage the history of products, finances, and other needs without the manual process of using books. Employees and the owner can simultaneously manage data on their respective gadgets and track sales figures from various e-commerce platforms by accessing the information system management website for Desasa Home Decor. In this system, employees and the owner can identify popular and less popular items, with data obtained through the integration of sales data from Shopee.

In the year 2022, under the research titled "Designing an Integrated Multichannel e-Commerce System Based on a Website at PT XYZ", solutions were proposed to address inconsistent stock information through data integration in the proposed system (Benedictus et al., 2022). However, the solution was limited to stock management only, lacking comprehensive data management. Thus, the solution provided by the researcher still requires further development.

Based on the aforementioned background, this research introduces an integrated management information system with Shopee, based on a website using CodeIgniter version 4 framework. The transition to digital data management aims to facilitate employees and owners by eliminating the need for manual data entry in books. This system will retrieve sales data conducted through Shopee. The management information system not only streamlines employee tasks but also reduces operational costs associated with purchasing books for data management. Furthermore, the system provides additional benefits, allowing Desasa Home Decor to track their sales more effectively, identify sales trends through sales analysis, make informed decisions based on sales analysis, manage supply data, and generate financial reports. Consequently, the owner of Desasa Home Decor can develop products, refine marketing strategies, and enhance the overall customer experience. Beyond proficient data management, the system also focuses on web appearance and fostering a positive user-system interaction. The analysis and implementation of the systems front-end are discussed in separate

research. A well-designed front-end is essential for the smooth exchange of data between various components, such as adding and removing products.

1.2 Problem Statement

Based on the background outlined above, the problem statements for this research are as follows how to develop the back-end of a management information system that can effectively manage data at Toko Desasa Home Decor, integrated with the Shopee e-Commerce platform, and reduce the workload for both employees and store owners?

1.3 Problem Limitations

Based on the background outlined above, this research is limited to:

1. The focus of this research is on the back-end development of an integrated management information system with e-commerce based on a website.
2. This system is exclusively designed for use by Desasa Home Decor Store.
3. The system is built in accordance with the requests and needs of Desasa Home Decor Store.

1.4 Research Objectives

Based on the background outlined above, the objective of this research is to build and implement the back-end of a management information system integrated with e-commerce based on a website for Desasa Home Decor Store.

1.5 Research Benefits

Based on the background outlined above, the benefits of this research are as follows:

1. Reducing the time and operational costs of the store.
2. Obtaining total sales from e-commerce within one management information system.

3. Easing the workload for employees and the owner of Desasa Home Decor Store.
4. Facilitating Desasa Home Decor Store in managing data and transaction reports.

II. REVIEW OF LITERATURE

2.1 Description of Theoretical Foundations

In this subsection, we will elucidate the theoretical foundation that serves as the cornerstone for understanding the relevant concepts in this research or study. This theoretical foundation plays a crucial role in providing a profound understanding of web-based applications, backend systems, and APIs.

2.1.1 Web-Based Application

A web-based application is an application that can be accessed using a web browser over the internet, offering the advantage that it can be easily accessed by users without the need for installation (Ovan et al., 2020). Web-based applications can be accessed using browsers such as Chrome, Firefox, Safari, or Internet Explorer through a URL address.

2.1.2 Back-end

The back-end is a part of the application that operates on the server side. It is responsible for directly interacting with the database, particularly in tasks related to data manipulation such as storing, retrieving, updating, and deleting data (Mufti Prasetiyo, et al. 2023). The back-end typically handles all

types of processes that are not directly related to users, such as servers and databases (Pangestika & Dirgahayu, 2020). Programming languages used by a back-end developer include PHP, HTML, JavaScript, and others.

The purpose of the back-end is to provide support to the front-end so that the system can operate as desired (Salsabila, 2022). A back-end developer is essential in the development of systems or applications that involve continuously changing data. The following are the skills that a back-end developer must possess:

1. Programming Language

   A back-end developer must understand and possess expertise in back-end programming languages such as Java, Python, PHP, C++, HTML, and others.

2. Database Management

   In addition to programming languages, a back-end developer should possess skills in database design, query optimization, and data management using database management systems such as MySQL, PostgreSQL, MongoDB, or Oracle.

3. Framework

   Experienced in utilizing back-end frameworks such as Spring (Java), Django (Python), Ruby on Rails (Ruby), Codeigniter (PHP), or Express (Node.js)

4. Communication Skills

   Communication skill is capable of effectively communicating with team members, both verbally and in writing, to ensure accuracy in system development.

5. Problem-Solving Abilities

2.1.3 Information System

A management information system is a unit of interconnected components that collect (or retrieve), process, store, and distribute information to support decision-making and control within an organization

(Frisdayanti, 2019). Thus, information systems refer to a system within an organization that integrates the needs of daily transaction management, supports operational functions, managerial aspects, and strategic activities of the organization by providing the necessary reports.

2.1.4 Management Information System

Management Information System is a comprehensive and coordinated set of information subsystems that are rationally integrated, capable of transforming data into information through various means to enhance productivity in alignment with the manager's style and nature based on established quality criteria (Wijoyo et al., 2021).

Management Information System is a computer-based system that provides information to a number of users with similar needs. This information depicts aspects of the past, present, and potential future of the company or one of its major systems. The forms of this information involve periodic reports, special reports, and results from mathematical models. Managers and non-managers within the company use this information output when making decisions to address the challenges they face.

2.1.5 API (Application Programming Interface)

An Application Programming Interface (API) is an interface created by system developers, allowing some or all system functions to be programmatically accessed (Afriyansyah et al., 2021). With the presence of this API, it makes it easier for programmers to 'deconstruct' a software, which can then be developed or integrated with other software. API can be considered as a connector between applications, allowing programmers to use system functions. This process is managed through the operating system.

In this study, Shopee API is utilized to retrieve sales data from Desasa Home Decor seller account. The initial step involves registering as a developer, after which Shopee will review the registered profile. The verification or audit process takes a considerable amount of time, in this

research case, it took 14 days. Upon receiving an email confirming the profile verification, the next step is to create an app and subsequently test it in the Sandbox environment.

Figure 1. API Call Flow

2.1.6 Framework Codeigniter 4

The CodeIgniter framework is a PHP framework that can expedite software development for creating web-based applications (Sofiani & Nurhidayat, 2019). It comes equipped with libraries and helpers to facilitate the development process. CodeIgniter is an open-source web application framework for building dynamic PHP applications. It functions as a PHP framework with the MVC (Model, View, and Controller) model. Aside from being lightweight and fast, CodeIgniter also boasts comprehensive documentation along with examples of code implementation (Aisyiyah Yogyakarta University, 2020).

2.1.7 PHP (Hypertext Preprocessor) Programming Language

PHP (Hypertext Preprocessor) is an open-source programming language commonly used to build dynamic and interactive web applications. PHP can be combined with other programming languages such as HTML, CSS, and JavaScript to create dynamic web pages. PHP is a server-side embedded script language, meaning that all syntax and program commands you write will be executed entirely by the server but can be included in regular HTML pages (Fadila et al., 2019).

2.1.8 Extreme Programming Method

Extreme Programming (XP) is a methodology employed in software development aimed at improving the quality of software in response to changes and customer requirements (Ariyanti et al., 2020). The stages of the XP method can be observed in Figure 2.

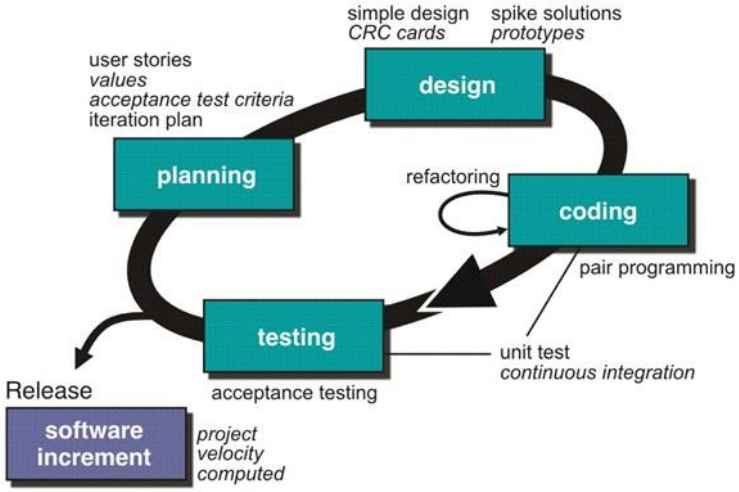


Figure 2. XP Method (Ariyanti et al., 2020)

Here is an explanation for each stage in the extreme programming method.

1. Planning

The first stage in the Extreme Programming method is planning. In this phase, the development team meets with the client to discuss the system desired by the client. Subsequently, the development team will begin to identify the problems to be solved, determine the system requirements, and outline the implementation of the system.

a. User Stories

User Stories are descriptions of the output, features and functions that will be produced by the software being developed. The results of User Stories are tables that entertain several users involved in the project.

b. Values

The value is used as a measure of the extent to which the need is considered important.

c. Acceptance Test Criteria

Acceptance Criteria are conditions that must be met by the development team to produce a product according to the user needs identified during the interview.

d. Iteration Plan

Iteration planning refers to planning for short iterative software development cycles known as iterations.

2. Design

The second stage is design. Good design brings logic and structure into the system, helping to avoid unnecessary complexity and redundancy. The design stage includes system design, CRC cards, database design, and architecture. CRC Cards are used to describe the classes in the system, as well as the responsibilities, behavior, and collaboration between classes. The modeling of systems and architecture used is Unified Modeling Language (UML), and the database design is done using Entity-Relationship Diagrams (ERD).

3. Coding

The third stage is coding or implementing the previously created design using a programming language. The programming language utilized in this system is PHP, and it employs the MySQL database.

4. Testing

The final stage of extreme programming is testing. This testing aims to identify any errors that occur when the system is in use and to determine whether the system created meets the customer's requirements.

2.1.9 UML (Unified Modeling Language)

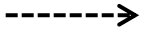
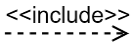
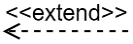
UML (Unified Modeling Language) is one of the language standards widely used in the industrial world to define requirements, conduct analysis and design, as well as depict architecture in object-oriented programming (Putra and Andriani, 2019). UML serves as a supportive tool for creating software or systems, facilitating developers in planning, illustrating, and

documenting the system before the implementation process takes place (Salsabila, 2023).

1. Use Case Diagram

Use Case Diagram is a modeling technique for the behavior of the information system to be created (Putra & Andriani, 2019). The use case operates by describing typical interactions between a user of a system and the system itself through a narrative of how the system is used. Utilizing a use case diagram can assist developers in detailing system requirements, communicating information about the system to clients, and determining the parties that will use the system and the functions that the system can perform. An explanation of the symbols found in the use case diagram can be seen in Table 1.

Table 1. Use Case Diagram (Sumirat et al,. 2023)

No.	Symbol	Name	Description
1.		Actor	Roles utilized by users to interact with the system or system users.
2.		Use Case	Functionality provided by the system or actions to be performed by the system.
3.		Association	The link between actors and use cases or among different use cases.
4.		Generalization	The relationship between a general use case and a specialized use case.
5.		Include	The additional use case relationship serves as a prerequisite for the execution of the respective use case.
6.		Extend	The relationship of an additional use case to other use cases that can stand alone even without the additional use case.

2. Entity Relationship Diagram (ERD)

Entity-Relationship Diagram (ERD) is a graphic notation diagram used in the creation of databases that connects one data to another (Afifah et al., 2022). Here are the basic components of an ERD along with their explanations.

A. Relationship

In an ERD, a relationship represents the connection between two or more entities. Cardinality denotes the number of relationships between entities. The types of cardinality in an ERD are as follows:

1) One to One

One to One is a relationship that indicates a connection where one member of an entity can be associated with one member of another entity. For the example, each human being can only have one heart, and vice versa, one heart can only be owned by one human being.

Figure 3. One to One Cardinality

2) One to Many / Many to One

One to Many or Many to One is a cardinality that indicates that one member can be related to several members of another entity. For the example, relationship between students and extracurricular activities. The foreign key in a one to many relationship is placed in an entity that has many relationships with other entities.

Figure 4. One to Many / Many to One Cardinality

3) Many to Many

Many to Many is a cardinality that indicates that multiple members of one entity can be related to multiple members of another entity. For example, the relationship between students and subjects. The foreign key in a many to many relationship is placed in an intermediate table that connects two entitiesthat have many relationships with other entities.

Figure 5. Many to Many Cardinality

B. Attribute

The second component of an Entity-Relationship Diagram (ERD) is attributes. Attributes are elements of an entity that serve to describe the characteristics of that entity. Attributes consist of two types: identifier and descriptor. The identifier or key is the primary determinant of the entity and must be unique from one another. The descriptor functions to detail the characteristics of non-unique aspects of the entity.

C. Entity

Entity is a collection of objects uniquely identified or distinct from one another. Entities are represented by rectangular shapes.

2.1.10 Class Responsibility Collaboration (CRC) Card

The CRC Card is a tool used to define the behavior and responsibilities of each class, as well as the collaboration between those classes. Creating CRC Cards involves interaction between analysts and users. Each individual is asked to explain the logic needed to fulfill a responsibility, along with the necessary information they may lack. Other classes that possess the required information will become collaborators for that behavior (Rosa & Shalahuddin, 2019).

2.1.11 Black Box Testing

According to Wahyudi et al. (2016) in their research article titled "Expert System E-Tourism at the Tourism Office of D.I.Y Using Forward Chaining Method," Black Box Testing is a method utilized to test software without focusing on the software's internal details. The Black Box Testing process involves experimenting with the program's features that have been

developed. Testing is conducted to ascertain whether the program operates as desired or not (Febriyanti et al., 2021).

2.1.12 OWASP ZAP

According to Hristovski and Kotevski (2021), OWASP ZAP is an open-source tool used for penetration testing within the framework of the OWASP (Open Web Application Security Project). The ZAP scanning process is known as spidering. When the "attack" button is pressed, ZAP will crawl the system using its spider feature, scanning all encountered pages, and then testing all pages, functionalities, and parameters to find vulnerabilities. The scan results are categorized by risk level using color codes: red indicates high risk, orange medium, yellow low, blue informational, and green positive. ZAP is easy to use for both beginners and experienced security professionals. With an active community and extensive documentation available, ZAP has become a popular tool for securing web applications.

In OWASP ZAP, alert levels are used to categorize vulnerabilities based on their severity and impact on system security. A High alert signifies critical vulnerabilities that have the potential to cause significant damage to systems or compromise sensitive data. These vulnerabilities demand immediate attention and prioritized remediation efforts to mitigate risks effectively. On the other hand, Medium alerts denote significant vulnerabilities that, while not as severe as High alerts, still require prompt action to prevent potential exploitation. Low alerts indicate vulnerabilities with minimal impact, necessitating remediation but with lower urgency compared to higher-level alerts. Lastly, Informational alerts provide non-critical insights or best practices that contribute to overall security awareness but do not require immediate remediation actions. Understanding and addressing alerts at each level ensures comprehensive security management and protection against potential threats.

2.1.13 Database

Database is a collection of information stored in a computer that can be systematically examined, processed, or manipulated using computer programs. The term 'database' encompasses a warehouse or storage location, while 'data' refers to the facts that have been collected. By leveraging a database, users can store information in a different location and retrieve it when needed. A Database consists of multiple tables connected through specific relations or relationships (Gunawan et al., 2023).

2.1.14 Normalization Process

Normalization refers to the process of structuring a database with the aim of reducing ambiguity. The normalization process starts from the simplest level, known as the first normal form (1NF), and progresses to stricter levels, such as 5NF. Typically, normalization is only applied up to the 3NF or BCNF level because these levels are sufficient to produce tables of good quality (Suryadi, 2019). The following are the forms of normalization:

1. First Normal Form (1NF)
2. Second Normal Form (2NF)
3. Third Normal Form (3NF)
4. Boyce-Codd Normal Form (BCNF)
5. Fourth Normal Form (4NF)
6. Fifth Normal Form (5NF)
7. Domain-Key Normal Form (DKNF)
8. Sixth Normal Form (6NF)

However, in practice in the industry, the most common forms of normalization consist of around five forms. Theoretically, normalization of a relation can reach the level of 5NF, which includes 1NF, 2NF, 3NF/BCNF, 4NF, and 5NF. However, in practice, a relation in a database is considered good if it has reached 3NF (the third normal form) (Suryadi, 2019).

2.1.15 Data Dictionary

Data dictionary is an explanation of the information regarding the data and requirements present in a database. The use of a data dictionary is crucial for developers because through it, they can understand the structure of data usage, identify input and output data, and prevent the use of redundant data. With a data dictionary, developers can organize all the data used by software (Utomo & Suryana, 2022). Data dictionary is an explanation of the movement of data within a system (Haryanto & Argadila, 2019).

2.2 Previous Research

This research is inseparable from previous research which aims to support this research. The following is a table of similarities and differences between previous research journals and current research which can be seen in table 2.

Table 2. Similarities and Differences of Previous Research

No	Name, Year & Title	Result, Similarities & Differences
1.	Ardiansah et al., (2022) with title "Rancang Bangun Aplikasi Pelaporan Keuangan Berbasis Open Api Dari E-Commerce"	This research has successfully implemented the use of API for interactive and real-time data exchange between Shopee store accounts and Shopee's data center. The connected data can be presented within a financial reporting information system that allows for further intensive development. The similarity between Ardiansah et al research and the current study lies in the utilization of Shopee API to generate financial reports. The difference is that this system only focuses on sales information, so this research added other features such as product data management and others.

Table 2. Similarities and Differences of Previous Research (Continuous)

No	Name, Year & Title	Result, Similarities & Differences
2.	(Yesa et al., 2022) with title "Perancangan Sistem Terintegrasi Multichannel e-Commerce Berbasis Website pada PT XYZ"	This research successfully developed a multichannel e-commerce integrated system with an Effort Expectancy score of 98.6% during the User Acceptance Testing (UAT). The similarity between this research and the study by Yesa et al. lies in the development of an integrated system with Shopee and the utilization of User Acceptance Testing (UAT) as part of the evaluation process, The difference is that in Yesa et al's research there were 3 user roles, while in this study there were only 2 user roles.
3.	(Mubaroq et al., 2023) with title "Integrasi Website Pemasaran Multi-Channel Untuk Industri Pakaian (Studi Kasus: Signature Store)"	Mubaroq research successfully developed a website that is integrated with Signature Store's website and social media. The similarity between the current research and Mubaroq et al. study lies in the integration with Shopee. In this study, Mubaroq et al. faced challenges in realizing the integration of the system built with Shopee. The system was developed using the Laravel framework, and in the current research, the CodeIgniter 4 framework will be utilizie

III. RESEARCH METHODOLOGY

3.1 Time and Location of the Research

The research was conducted in the odd semester of the academic year 2023/2024 at the Computer Science Building, Department of Computer Science, Faculty of Mathematics and Natural Sciences, University of Lampung, and at Desasa Home Decor Store located at Jl. Gajah Mada Gg.Punai, No. 17, Bandar Lampung City.

3.2 Research Phases

The research process consists of three main parts: data collection, system development, and report writing. The stages of the research process can be seen in Figure 6.

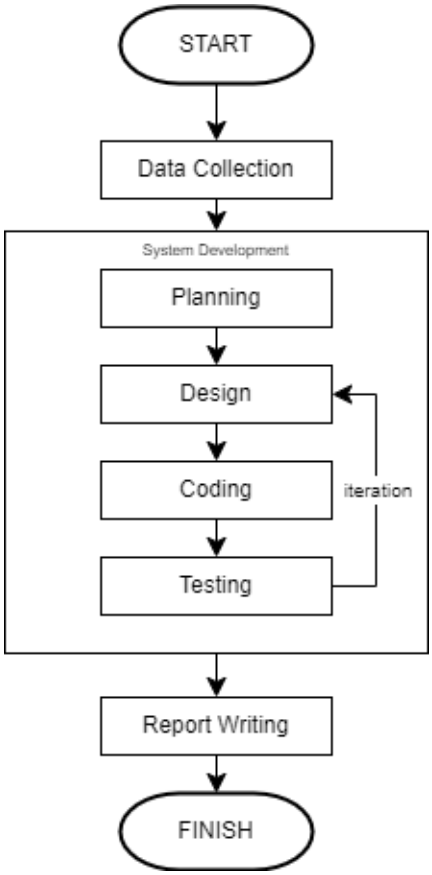


Figure 6. Stages of Research

3.2.1 The Data Collection Stage

The data collection stage is obtained through interviews, literature reviews, and observations. Data collection is conducted to understand the workflow processes that occur at Desasa Home Decor Store and to comprehend the theories applied in this research. The stages of data collection are as follows.

1. Interview

The interview method is employed to gather information from the owner of Desasa Home Decor store. This interview process is conducted to understand how the data recording process is carried out by the store's employees and owner. The obtained information includes both written and verbal data, such as sales and products of Desasa Home Decor store, as well as the requirements for creating a store management information system.

2. Literature Review

The literature review method is conducted by seeking information from sources such as books, journals, and theses used as references in compiling the Internship Report, which is certainly related to the topic under investigation.

3. Observation

The observation method is carried out by directly observing Desasa Home Decor Store. The observation method involves observing how the order and product data collection process takes place.

3.2.2 The Stages of System Development

The next stage is system development using the Extreme Programming (XP) method. The stages carried out in the Extreme Programming method include planning, design, coding, and testing.

1. Planning

The planning stage is carried out to identify issues, analyze system requirements, and determine the implementation of developing a system. The following is an explanation of the stages conducted in the planning section.

A. User Stories, Acceptance Criteria, and Value

User stories are obtained from interviews and observations. The interview was conducted by Ms. Karina Adityas with the owner of Desasa Home Decor store on Monday, December 4th, 2023.

Table 3. User Stories, Acceptance Criteria, and Value

No	User Stories	Acceptance Criteria	value
1	As an employee and owner, I would like to track sales that occur on both Shopee and our physical store.	There is a table of sales data that occurred both on Shopee and in the offline store.	10
2	Additionally, as an employee and	There is a cashier/purchase	9

Table 3. User Stories, Acceptance Criteria, and Value (Continued)

No	User Stories	Acceptance Criteria	Value
	owner, I aim to digitize customer records in the offline store for ease of search and management.	form at the offline store.	
3.	As an employee and owner, I want to be able to manage supply data easily for efficient record-keeping.	There are forms to add, update, and delete supplies.	8
4.	As an employee and owner, I want to be able to manage product data for easy record-keeping.	There are forms to add, update, and delete products.	8
5.	As the owner, I want to be able to manage financial data for easy record-keeping.	There are forms to add, update, and delete products	8
6.	As an employee and owner, I would like to view financial and sales charts.	There are financial and sales charts available on the dashboard page	7

B. Iteration Plan

At this stage, an iteration plan is determined based on the user stories that have been created at the previous stage. The following is the iteration plan which can be seen in table 4.

Table 4. Iteration Plan

Iteration	Functional	Acceptance Criteria	Value
1	Can view transaction data offline store	Successfully displaying the transaction data	10
	Can add transaction data offline store	Successfully add transaction data	10
2	Can make link authentication for Shopee API	Successfully get authentication link	10
	Can get token Shopee API	Successfully get token Shopee API	10

Table 4. Iteration Plan (Continued)

Iteration	Functional	Acceptance Criteria	Value
2	Can get refresh token Shopee API	Successfully get new token Shopee API success	10
	Can get Product data from Shopee API	Successfully get Product data from Shopee API	10
	Can get Order data from Shopee API	Successfully get Order data from Shopee API	10
3	Can view product Shopee data	Successfully displaying the product Shopee data	9
	Can view Order/ Transaction Shopee data	Successfully displaying the Order/Transaction Shopee data	9
4	Can view raw material's data	Successfully displaying the raw material data	8
	Can add raw material's data	Successfully adding the raw material data	8
	Can edit raw material's data	Successfully edit raw material data	8
	Can delete raw material's data	Successfully delete raw material data	8
5	Can add incoming goods data	Successfully add incoming goods data	8
	Can edit incoming goods data	Successfully edit incoming goods data	8
	Can delete incoming goods data	Successfully delete incoming goods data	8
	Can add outcoming goods data	Successfully add outcoming goods data	8
	Can edit outcoming goods data	Successfully edit outcoming goods data	8
	Can delete outcoming goods data	Successfully delete outcoming goods data	8

Table 4. Iteration Plan (Continued)

Iteration	Functional	Acceptance Criteria	Value
6	Can view product data	Successfully displaying the product data	8
	Can add product data	Successfully add product data	8
	Can edit product data	Successfully edit product data	8
	Can delete product data	Successfully delete data	8
7	Can view financial report	Successfully displaying financial report	8
	Can add outcome/expense data	Successfully add outcome /expense data	8
	Can edit outcome/expense data	Successfully edit outcome/expense data	8
	Can delete outcome/expense data	Successfully delete outcome/expense data	8
	Can download the financial report	Successfully downloading the financial report	8
8	Can view financial and sales chart on dashboard page	successfully displays sales and financial charts	7
9	Can login	Successfully login and direct to dashboard page	7
	Can Logout	Successfully logout and direct to login page	7

C. Functional Requirements

Functional requirements are specifications or descriptions that define the functions that a software system must possess to meet user needs. Functional requirements are derived from user stories, acceptance criteria, values, and iteration plans.. The following are the functional requirements for the management information system at Desasa Home Decor Store:

Table 5. Functional Requirements

Employee	1. Can log in to the system 2. Can access the homepage 3. Can access the supply page 4. Can view raw material data 5. Can manage raw material data 6. Can access the product page 7. Can access the transaction page 8. Can add incoming goods data 9. Can delete incoming goods data 10. Can edit incoming goods data 11. Can add outcoming goods data 12. Can delete outcoming goods data 13. Can edit outcoming goods data 14. Can add product data 15. Can delete product data 16. Can edit product data 17. Can add transaction data
Owner	1. Can log in to the system 2. Can access the homepage 3. Can access the supply page 4. Can view raw material data 5. Can manage raw material data 6. Can access the product page 7. Can access the financial page 8. Can access the transaction page 9. Can add incoming goods data 10. Can delete incoming goods data

Table 5. Functional Requirements (Continuous)

Owner	11. Can edit incoming goods data 12. Can add outcoming goods data 13. Can delete outcoming goods 14. Can edit outcoming goods data 15. Can add product data 16. Can delete product data 17. Can edit product data 18. Can add transaction data 19. The store owner can add financial data. 20. The store owner can delete financial data. 21. The store owner can edit financial data. 22. Can download transaction data 23. Can download financial data

D. Non-Fungsional Needs

Non-functional needs are used as the precondition for the function that has been built to operate properly. The Non-functional Requirements for the menu ordering system at Desasa Home Decor Store are as follows.

1) Security Requirements

System security requirements created requires employees and owners through the login process using usernames and also passwords to access its parts.

2) Hardware Requirements

The hardware requirements are used as prerequisites for ensuring that the built functions can operate effectively. The hardware requirements in this system include the following.

a. Laptop or PC

b. Printer

3) Software Requirements

The software requirements are used as prerequisites for ensuring that the built functions can operate effectively. The software requirement in this system include the following.

a. Windows System Operation (Free)
b. Web Browser Chrome or Microsoft Edge to run the system (Free)
c. Internet Connection

2. Design

The results obtained at the design stage are CRC, user interface design, ERD diagrams, and use cases.

A. CRC

CRC (Class Responsibility Collaborator) in Extreme Programming (XP) is a tool used to represent classes, responsibilities and collaborators in the system being built. Each card represents a class in the system and contains information about the responsibilities of the class and associated collaborators. CRC cards are used to assist development teams in designing systems collaboratively and ensure that each class has clear and well-defined responsibilities. This research consisted of 9 classes which can be seen in Figure 7.

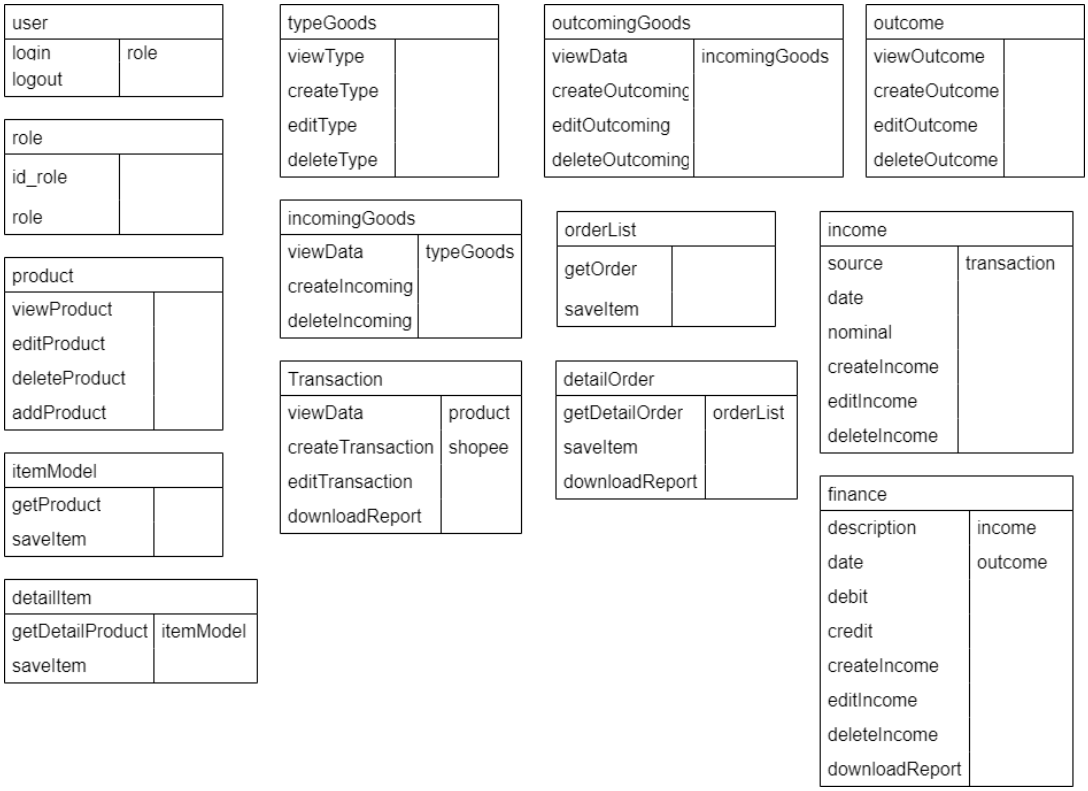


Figure 7. CRC Card

B. Use Case

After the analysis of the system's functional needs is done, the functional requirements are described in the use case diagram. Use case diagrams facilitate the visualization of the processes that the system can perform. Use case diagram can be seen in Figure 8.

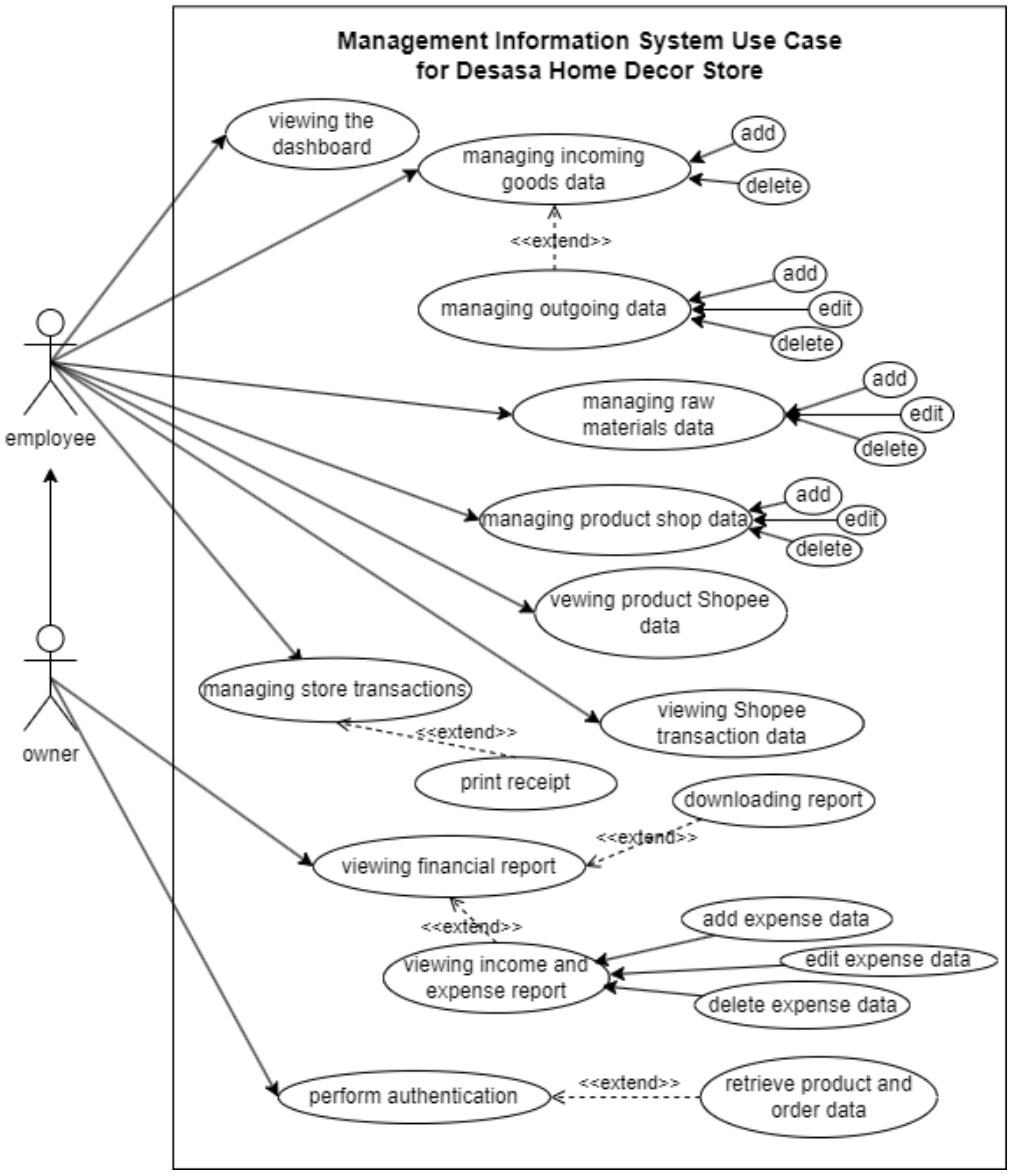


Figure 8. Use Case Diagram Management Information
Desasa Home Decor

Users in this system are employees and owners. Each user has its own activity.

1) Employees

Employees have access to view the main page containing graphs of orders that have occurred over a certain period of time, bestsellers, and inputs obtained by the store. In addition, employees can also manage product data, supply and also transactions in the store as well as Shopee.

In the process of data management, employees may update, delete, and delete data.

2) Owner

The owner has access to the same features as the employee. However, the owner has additional features of knowing the inputs and expenditures in the store. The owner can also add, delete, and edit the input and expenditure data.

C. ERD

To explain how system data can be grouped into a database entity with its relationship, an entity relationship diagram (ERD) can be used. The data on Shopee's integrated management information system can be seen in Figure 9.

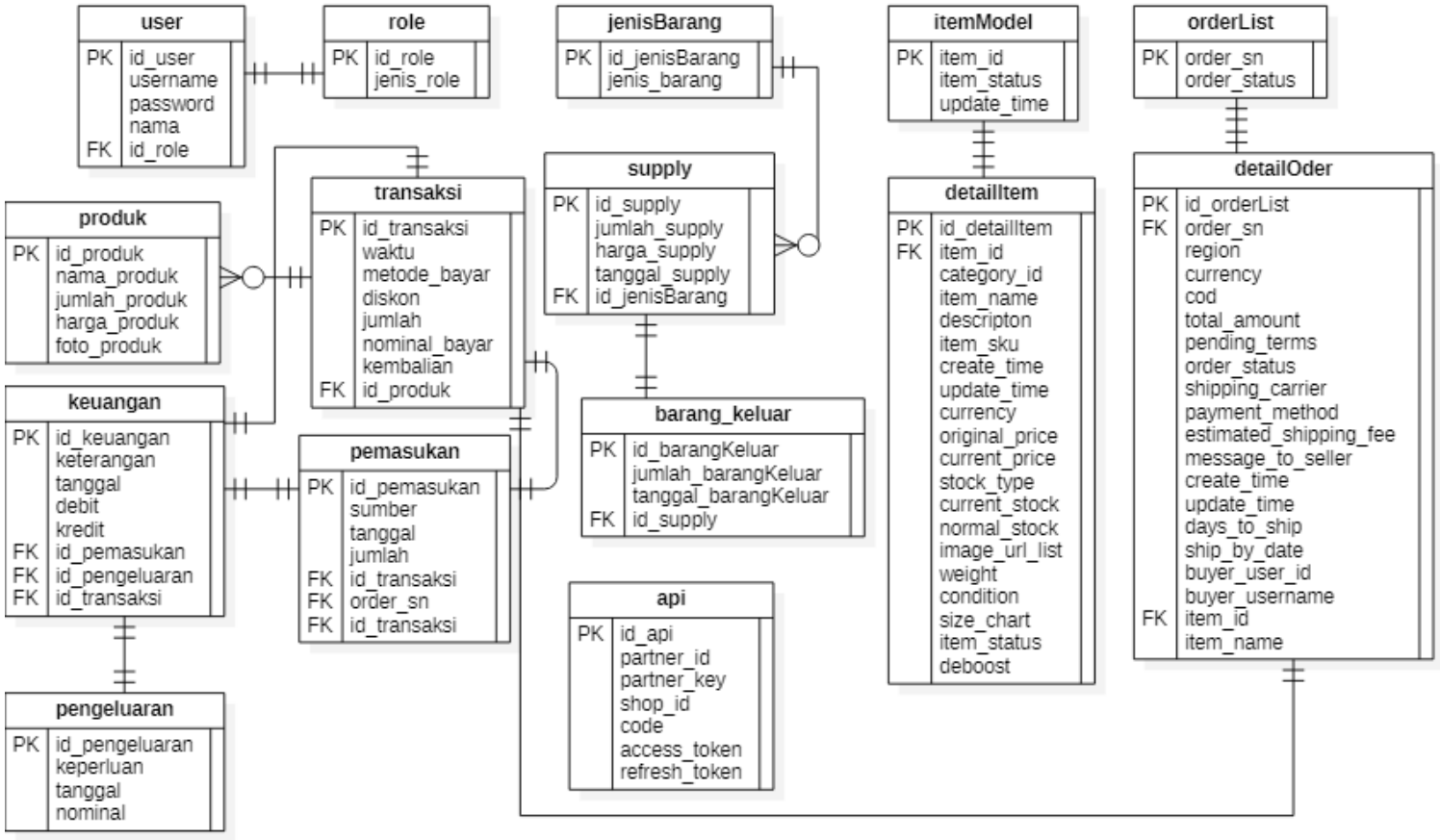

user
PK id_user
username
password
nama
FK id_role
role
PK id_role
jenis_role
jenisBarang
PK id_jenisBarang
jenis_barang
itemModel
PK item_id
item_status
update_time
orderList
PK order_sn
order_status
produk
PK id_produk
nama_produk
jumlah_produk
harga_produk
foto_produk
transaksi
PK id_transaksi
waktu
metode_bayar
diskon
jumlah
nominal_bayar
kembalian
FK id_produk
supply
PK id_supply
jumlah_supply
harga_supply
tanggal_supply
FK id_jenisBarang
detailItem
PK id_detailItem
FK item_id
category_id
item_name
descripton
item_sku
create_time
update_time
currency
original_price
current_price
stock_type
current_stock
normal_stock
image_url_list
weight
condition
size_chart
item_status
deboost
detailOder
PK id_orderList
FK order_sn
region
currency
cod
total_amount
pending_terms
order_status
shipping_carrier
payment_method
estimated_shipping_fee
message_to_seller
create_time
update_time
days_to_ship
ship_by_date
buyer_user_id
buyer_username
FK item_id
item_name
keuangan
PK id_keuangan
keterangan
tanggal
debit
kredit
FK id_pemasukan
FK id_pengeluaran
FK id_transaksi
pemasukan
PK id_pemasukan
sumber
tanggal
jumlah
FK id_transaksi
FK order_sn
FK id_transaksi
barang_keluar
PK id_barangKeluar
jumlah_barangKeluar
tanggal_barangKeluar
FK id_supply
api
PK id_api
partner_id
partner_key
shop_id
code
access_token
refresh_token
pengeluaran
PK id_pengeluaran
keperluan
tanggal
nominal

Figure 9. ERD

D. Normalization Process

The normalization process is delineated in the form of tables, which are then analyzed based on specific requirements into multiple levels. If a table does not meet certain requirements, it is necessary to decompose the table into several simpler tables until it reaches an optimal form.

1) Unnormalization Form

Unnormalization form is meant for tables whose form is still abnormal or still contains duplication and various formats.

Table 6. Unnormalization Transaction Table

id_trans	id_produk	waktu	metode	diskon	namaProduk	harga	hargaAkhir
11	01	1/1/2023	Tunai	10000	Tulip	165000	155000
12	02	2/1/2023	Tunai	10000	Melati	150000	140000
	01	4/1/2023	Kartu	15000	Tulip	165000	150000

Table 7. Unnormalization Financial Table

id_financial	id_pemasukan	id_pengeluaran	keterangan	debit	kredit	tanggal
1	111		Shopee	100000		1/1/2023
2		112	Alat toko		10000	2/1/2023
	111	4/1/2023	Toko	150000		4/1/2023

2) First Normal Form (1NF)

Here is table 8, 9, 10, and 11 which represents the 1NF of the transaction table, where each row and column already contains individual data.

Table 8. 1NF formTransaction Table

id_trans	id_produk	waktu	metode	diskon	namaProduk	harga	hargaAkhir
11	01	1/1/2023	Tunai	10000	Tulip	165000	155000
12	02	2/1/2023	Tunai	10000	Melati	150000	140000
12	01	4/1/2023	Kartu	15000	Tulip	165000	150000

Table 9. 1NF form Financial Table

id_financial	id_pemasukan	id_pengeluaran	keterangan	debit	kredit	tanggal
1	111	-	Shopee	100000	-	1/1/2023
2	-	112	Alat toko	-	10000	2/1/2023
2	111	4/1/2023	Toko	150000		4/1/2023

Table 10. 1NF form User Table

id_user	username	password	nama	id_role	jenis_role
101	dita	dita21	Dita Faradila	1	owner
102	karina	karinaaa	Karina Adityas	1	owner
103	faradila	faa.radila	Faradila Dita	2	karyawan
104	adityas	aaa.dityas	Adityas Karina	2	karyawan

Table 11. 1NF form Outcoming Goods Table

id_out	jumlah	tgl_out	id_in	nominal	id_jenis	jenis_barang
001	2	12/02/2024	010	Rp 20.000	1111	bunga
002	1	13/02/2024	010	Rp 10.000	1111	bunga
003	4	15/02/2024	020	Rp 75.000	1112	pot

3) Second Normal Form (2NF)

The tables below are examples of 3NF tables that eliminate remaining anomalies.

Table 12. 2NF form Financial Table

id_pemasukan	id_pengeluaran	keterangan	debit	kredit	tanggal
111	-	Shopee	100000	-	1/1/2023
-	112	Alat toko	-	10000	2/1/2023
111	4/1/2023	Toko	150000		4/1/2023

Table 13. 2NF form Outcoming Goods Table

id_in	nominal	id_jenis	jenis_barang
010	Rp 20.000	1111	bunga
020	Rp 75.000	1112	pot

4) Third Normal Form (3NF)

The third normal form (3NF) is a level of database normalization aimed at eliminating redundancy and dependency issues that persist in tables even after they have been normalized to the second normal form (2NF). The following is the normal form of the third stage which can be seen in Table 14.

Table 14.Third Normal Form DesasaTable

User Table			
Id_user	**username**	**password**	**nama**
101	dita	dita21	Dita Faradila
102	karina	karinaaa	Karina Adityas
103	faradila	faa.radila	Faradila Dita
104	adityas	aaa.dityas	Adityas Karina

Role Table	
id_role	**jenis_role**
1	Owner
2	Karyawan

Goods Type Table	
id_jenisBarang	**jenis_barang**
1111	bunga
1112	pot

Incoming Goods Table			
id_barangMasu	**jumlah**	**nominal**	**tanggal**
010	5	50.000	10/02/2024
020	4	75.000	12/02/2024

Outcoming Goods Table			
id_BK	**jumlah**	**nominal**	**tanggal_keluar**
001	2	20.000	12/02/2024
002	1	10.000	15/02/2024
003	4	75.000	15/02/2024

Transaction Table			
id_transaksi	**waktu**	**metode**	**diskon**
11	1/1/2023	Tunai	10%
12	2/1/2023	Tunai	10%

Product Table				
id_product	**nama_produk**	**jumlah_produk**	**harga_produk**	**foto_produk**
01	Tulip	2	Rp 165.000	Tulip.png
02	Melati	3	Rp 150.000	Melati.png

Income Table			
id_income	**sumber**	**tanggal**	**jumlah**
111	Shopee	01/01/2024	Rp 100.000

Outcome Table			
id_outcome	**keperluan**	**tanggal**	**jumlah**
112	Alat Toko	02/01/2024	Rp 100.000

Finance Table				
id_keuangan	**keterangan**	**tanggal**	**debit**	**Kredit**
1	Shopee	01/01/2024	Rp 100.000	

E. Data Dictionary

The term data dictionary refers to a collection of definitions and descriptions that explain each data element used in a database or information system represented by an ERD. The data dictionary for this system is as follows.

1) Entity User Data Dictionary

The user entity data dictionary describes each data attribute present in the user entity. The user entity data dictionary can be viewed in Table 15.

Table 15. Entity User Data Dictionary

Field	Type Data	Size	Description
id_user	integer	20	Primary key table user
username	varchar	15	Username for user login
password	varchar	8	Password for user login
nama	varchar	100	Username for the system
id_role	integer	5	User code for access within the system

2) Entity Role Data Dictionary

Entity role data dictionary describes each data attribute within the entity role. The data dictionary for the entity role can be found in Table 16.

Table 16. Entity Role Data Dictionary

Field	Type Data	Size	Description
id_role	integer	20	Primary key tabel role
jenis	varchar	15	Type of access for system users/

3) Entity Product Data Dictionary

Entity product data dictionary describes each data attribute within the entity product. The data dictionary for the entity product can be found in Table 17.

Table 17. Entity Product Data Dictionary

Field	Type Data	Size	Description
id_produk	integer	20	Primary key tabel product
nama_produk	varchar	15	Product name
jumlah_produk	integer	10	Quantity of product
harga_produk	varchar	25	Product prices
foto_produk	varchar	100	Photos of product

4) Entity Data Dictionary for Incoming Goods

The incoming goods entity data dictionary describes each data attribute present in the incoming goods entity. The data dictionary for the incoming goods entity can be found in Table 18.

Table 18. Entity Data Dictionary for Incoming Goods

Field	Type Data	Size	Description
id_supply	integer	20	Primary key in-coming goods table
id_jenisBarang	integer	10	Unique key Incoming goods table
jumlah_supply	varchar	10	Quantity of incoming goods
harga_supply	varchar	25	Incoming goods price
tanggal_supply	date		Date of addition of incoming goods data

5) Entity Data Dictionary for Outcoming Goods

The outcoming goods entity data dictionary describes each data attribute present in the outcoming goods entity. The data dictionary for the outcoming goods entity can be found in Table 19.

Table 19. Entity Data Dictionary for Outcoming Goods

Field	Type Data	Size	Description
id_BK	integer	20	Primary key out-coming goods
nama_BK	varchar	30	Outcoming goods name
jumlah_BK	varchar	10	Quantity of outcoming goods
harga_BK	varchar	25	Price of outcoming goods
tanggal_BK	date		Date of addition of outcoming goods data

6) Entity Income Data Dictionary

The income entity data dictionary describes each data attribute present in the income entity. The income entity data dictionary can be referred to in Table 20.

Table 20. Entity Income Data Dictionary

Field	Type Data	Size	Description
id_pemasukan	integer	20	Primary key income table
sumber	varchar	20	Source of income
jumlah	varchar	25	Incoming money
tanggal	date		Date of addition of income data
id_transaksi	integer	10	Unique Key of income data
order_sn	integer	10	Unique Key of income data
id_transaksi	integer	10	Unique Key of income data

7) Entity Outcome Data Dictionary

The income entity data dictionary describes each data attribute present in the income entity. The income entity data dictionary can be referred to in Table 21.

Table 21. Entity Outcome Data Dictionary

Field	Type Data	Size	Description
id_ pengeluaran	integer	20	Primary key outcome table
keperluan	varchar	20	Financial needs
nominal	varchar	25	Amount of money spent
tanggal	Date		Date of addition of outcome

8) Transaction Data Dictionary

The transaction entity data dictionary describes each data attribute present in the transaction entity. The transaction entity data dictionary can be referred to in Table 22.

Table 22. Transaction Data Dictionary

Field	Type Data	Size	Description
id_transaksi	integer	5	Primary key transaction table
waktu	datetime		Time of purchase
metode_bayar	varchar	25	Buyer's payment method
id_product	integer	20	Unique key of the transaction table
diskon	varchar	25	Discount transaction
nominal	varchar	25	the total amount of money that must be paid by the customer
jumlah	integer	11	the total number of products purchased by the customer
nominal_bayar	varchar	25	The amount of money given by the customer
kembalian	Varchar	25	the amount of change that must be given to the customer by the store

9) itemModel Data Dictionary

The data dictionary for the itemModel entity describes each data attribute present in the itemModel entity in e-commerce. The itemModel data is obtained from the Shopee API. The itemModel entity data dictionary can be referred to in Table 23.

Table 23. itemModel Data Dictionary

Field	Type Data	Size	Description
item_id	integer	10	Primary Key of itemModel
item_status	varchar	20	Enumerated type that defines the current status of the item.
update_time	timestamp		The update time of item

10) detailItem Data Dictionary

The data dictionary for the detailItem entity describes each data attribute present in the itemModel entity in e-commerce. The detailItem data is obtained from the Shopee API. The itemModel entity data dictionary can be referred to in Table 24.

Table 24. detailItem Data Dictionary

Field	Type Data	Size	Description
item_id	integer	10	Primary Key of itemModel
category_id	integer	11	Shopee's unique identifier for a category.
item_name	varchar	255	Name of the item in local language.
description	varchar	2000	Description information of the Product
item_sku	varchar	10	An item SKU is an identifier defined by a seller
create_time	varchar	25	Timestamp that indicates the date and time that the item was created.
update_time	varchar	25	Timestamp that indicates the last time that there was a change in value of the item, such as price/stock change.
currency	varchar	10	The three-digit code representing the currency unit used for the item in Shopee Listings.
original_price	varchar	25	The original price of the product
current_price	varchar	25	The current price of the product
stock_type	varchar	25	The stock type
current_stock	integer	11	Current available inventory
normal_stock	integer	11	The stock set by the seller
image_url_list	varchar	1000	List of image url
weight	varchar	25	The weight of this item, the unit is KG
condition	varchar	25	Is it second-hand
size_chart	varchar	25	Url of size chart image
item_status	varchar	25	Enumerated type that defines the current status of the item
deboost	varchar	25	If deboost is true, means that the item's search ranking is lowered.
total_available_stock	integer	11	Total available stock of the Product
total_reserved_stock	integer	11	Total reserved stock of the Product

Table 24. detailItem Data Dictionary (Continuous)

Field	Type Data	Size	Description
sale	integer	11	The sales volume of Product
views	integer	11	The page view of Product
likes	integer	11	The collection number of Product
rating_star	float		The rating star scores of this item
comment_count	integer	11	Count of comments for the Product

11) orderList Data Dictionary

The data dictionary for the orderList entity describes each data attribute present in the itemModel entity in e-commerce. The orderList data is obtained from the Shopee API. The itemModel entity data dictionary can be referred to in Table 25.

Table 25. orderList Data Dictionary

Field	Type Data	Size	Description
order_sn	varchar	30	Primary Key for the orderList table
order_status	varchar	30	The order_status filter for retriveing orders and each one only every request.

12) E-Commerce Transaction Data Dictionary

The e-commerce transaction entity data dictionary describes each data attribute present in the e-commerce transaction entity. The e-commerce transaction entity data dictionary can be referred to in Table 26.

Table 26. detailOrder Data Dictionary

Field	Type Data	Size	Description
order_id			Primary key for the order on e-commerce transaction
order_status			Order status

Table 26. detailOrder Data Dictionary (Continuous)

Field	Type Data	Size	Description
transaction_id			Unique key for the transaction
item_id			Unique key for the product
item_name			Product name
item_quantity			Quantity of the product
item_price			Prices of the product
total_amount			Total purchase amount for the order
buyer_username			Buyer's username

13) Goods Type Data Dictionary

The goods type entity data dictionary describes each data attribute present in the goods type entity. The goods type entity data dictionary can be referred to in Table 27.

Table 27. Goods Type Data Dictionary

Field	Type Data	Size	Description
id_jenisBarang	integer	5	Primary key goods type table
jenis_barang	varchar	25	Types of raw materials for production

14) Financial Data Dictionary

The financial entity data dictionary describes each data attribute present in the financial entity. The financial entity data dictionary can be referred to in Table 28.

Table 28. Financial Data Dictionary

Field	Type Data	Size	Description
id_keuangan	integer	5	Primary key financial table
keterangan	varchar	25	Money requirement statement
tanggal	date		Data entry date
debit	varchar	25	Incoming amount of money

Table 28. Financial Data Dictionary (Continuous)

Field	Type Data	Size	Description
kredit	varchar	25	Outcoming amount of money
id_pemasukan	integer	11	Unique Key for financial table
id_pengeluaran	integer	11	Unique Key for financial table
id_transaksi	integer	11	Unique Key for financial table

3. Encoding

Build an integrated management information system with Shopee at Desasa Home Decor store using codeigniter 4 framework using PHP programming language. The encoding in this study is divided into two parts, the back-end and the front-end. On the Front-end part developed by Karina Adityas. The Back-end is used to function the appearance that has been created by the Karina Adityas so that all the features on the system can be used properly.

4. Testing

Testing is the final stage in the extreme programming method. The system testing phase is a critical step that involves the user in evaluating the developed system. The main objective of this testing is to ensure that each feature operates optimally. In the context of this research, the testing phase is conducted using the Black Box Testing method. This approach focuses on testing the functionality of the system, determining whether the system functions effectively or not.

a) Employee And Owner Test Scenarios

The scenario for the employee and owner testing stages can be seen in table 29.

Table 29. Black Box Testing Scenarios

No.	Test Class	Test Case	Expected Result
1.	Login	Entering the username and password, then clicking the "Login" button	The controller validates credentials against the user table in the database and returns a token upon success
		Entering an incorrect username and/or pw	The controller queries the user table in the database, fails validation, and returns an error message
2.	Supply Menu	Filling in all fields on the add incoming goods form	The data is successfully saved
		Clearing the fields in the add incoming goods form	The data was not saved successfully, and an error message will be displayed to the user.
		Clicking the eye icon (details) on the incoming goods table	Detail incoming goods data delivered to user
		Filling in all fields on the add outcoming goods form	The data is successfully saved in database
		Clearing the fields in the add outcoming goods form	The data was not saved successfully
		Filling in all fields on the edit outgoing goods data form.	Data successfully saved and redirected back to the Supply page.
		Pressing the trash 'delete' icon on the outgoing goods table.	Data successfully deleted and redirected back to the Supply page.

Table 29. Black-Box Testing (Continuos)

No.	Test Class	Test Case	Expected Result
3.	Raw Material Menu	Clicking the Raw Material menu	The raw material data is retrieved from the database and displayed to the user.
		Filling in all fields on the add raw material form	The data is successfully saved and then redirected to the Raw Material page
		Clearing the fields in the add raw material form	The data was not saved successfully
		Filling in all fields on the edit raw material form	The data is successfully saved and then redirected to the Raw Material page
		Clicking the trash icon	Data successfully deleted and redirected back to the Raw Materials page.
4.	Product Store Menu	Filling in all fields on the edit photo modal page.	Data successfully saved and redirected back to the Store Products page.
		Clearing the stock quantity field. Data was not successfully saved.	Data was not successfully saved. An error message appears on the Products page.
		Filling the product photo field with a file format other than JPG, JPEG, and PNG.	The data was not successfully saved, and an error message appears.
		Clicking trash (delete) button	Data successfully deleted
5.	Product Shopee Menu	Accessing Product Shopee menu	The Shopee product data is sent to the user.
		Clicking th eye button (detail)	The Shopee Product detail data is deliver to user

Table 29. Black-Box Testing (Continuos)

No.	Test Class	Test Case	Expected Result
		Searching bar	The requested data is sent to the user.
6.	Finance Menu	Accessing Finance menu	The Finance data is delivered to user
		Clicking download button	The financial report has been successfully downloaded.
		Pressing the financial details button on the financial page	The financial detail data successfully delivered to user
7.	Income and Outcome Menu	Clicking the eye icon (detail) on the income table	The Income detail data successfully delivered to user.
		Clicking the eye icon (detail) on the expense table	The Outcome detail data successfully delivered to user.
		Clicking the pencil button (edit)	The selected expenditure data has been successfully displayed to the user.
		Clicking the trash button (delete)	The expense data has been successfully deleted
8.	Transaction Menu	Accessing Transaction Menu	The transaction data successfully delivered to user
		Typing a keyword in the search bar	The requested data is delivered to the user.
		Pressing the eye icon (detail) on the Shopee transaction table	The Shopee Transaction detail data successfully delivered to user based on the id_transaction
		Pressing the eye icon (detail) on the store	The Store Transaction detail data successfully

Table 29. Black-Box Testing (Continuos)

No.	Test Class	Test Case	Expected Result
		transaction table	delivered to user based on the id_transaction
8.	Transaction Menu	Pressing the print button on the store transaction detail page	The purchase receipt has been successfully downloaded.
9.	Authenticate Menu	Clicking “Authenticate Shop” button	Redirecting to the Shopee login page.
		Filling in the 'Shop ID' and 'Code' fields, then pressing the 'Get Token' button.	The token and refresh_token data have been successfully saved to the database.
		Filling in the 'Shop ID' and 'Code' fields, then pressing the “Get New Token” button.	Successfully obtained a new token and refresh_token and saved them to the database.
		Filling in the 'Shop ID' and 'Token' fields, then pressing the 'Get Product' button.	The product data from Shopee is successfully retrieved and saved into the database, then redirected back to the authentication page.
		Filling in the 'Shop ID' and 'Token' fields, then pressing the 'Get Order’ button.	The order data from Shopee is successfully retrieved and saved into the database, then redirected back to the authentication page.
10.	Logout	Clicking the Logout button	The user successfully logs out of the system and is redirected to the login page.

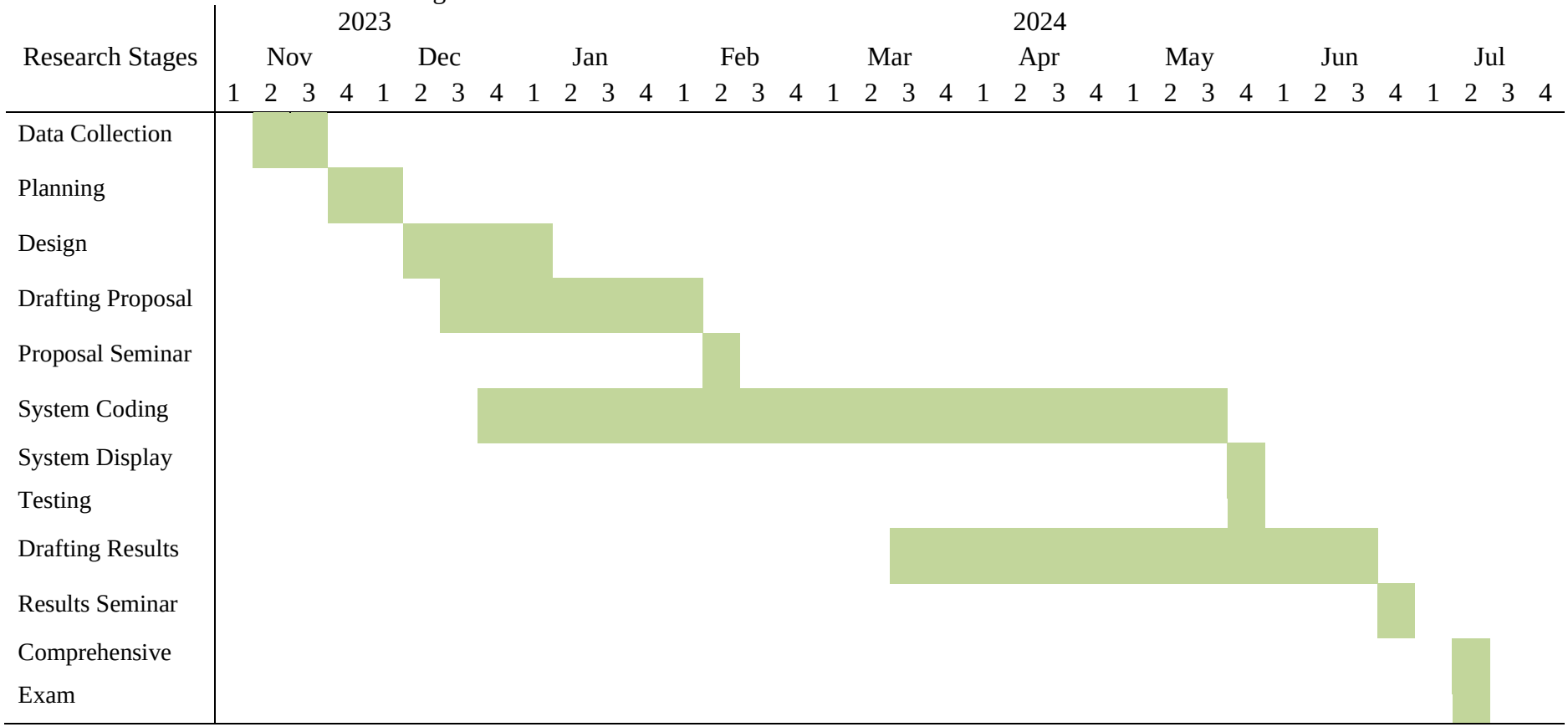
b) Selection of Respondents

In this phase, testing is conducted by selecting respondents who will be involved in testing the integrated management information system with e-commerce, namely the store owner and employees.

3.2.3 Report Writing Stage

The purpose of the reporting phase is to provide information about the research that has been carried out as well as complete documentation of the activity. This research report will make it easier for the reader to understand what has been done and be a source of reference for future research. Here is the research flowchart found in Table 30.

Table 30. Timeline of Research Stages



V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Based on the results and discussions above, the conclusions of this study are as follows:

1. The back-end of the management information system for Toko Desasa Home Decor has been successfully developed. It is integrated with the Shopee e-commerce platform and built using the CodeIgniter 4 framework. This system aims to reduce the workload for both employees and store owners.
2. The back-end of this system has been tested using Black-Box testing and Owasp Zap. According to the results of Black-Box testing, the system operates as expected. Security testing results identified several security vulnerabilities. The security of the management information system at Desasa Home Décor has 5 medium-level vulnerabilities, 6 low-level vulnerabilities, and 7 informational issues.

5.2 Recommendations

Based on the implementation results of the developed system, the following recommendations are made in this study:

1. This system can be further developed to manage Shopee data exclusively through this system.

2. Enhance or improve the security of the system.
3. Enhance or improve the Product feature to ensure integration between the store's products and Shopee's products.

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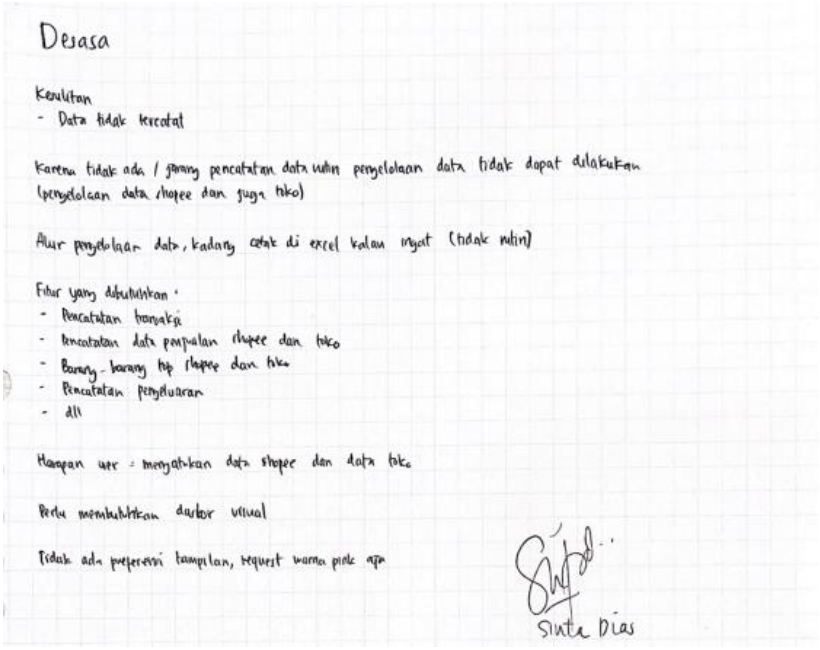
ATTACHMENT



Desasa

Kendala
- Data tidak tercatat

Karena tidak ada / gaada pencatatan data rutin pengelolaan data tidak dapat dilakukan (pengelolaan data shopee dan juga toko)

Alur pengelolaan data, kadang catat di excel kalau inget (tidak rutin)

Fitur yang dibutuhkan :
- Pencatatan transaksi
- Pencatatan data pembelian shopee dan toko
- Barang - barang top shopee dan toko
- Pencatatan pengeluaran
- dll

Harapan user : menyatukan data shopee dan data toko

Perlu memberikan diskon virtual

Tidak ada preferensi tampilan, request warna pink aja

Sinta Dias

Figure 1. Interview Results with the Potential User (Owner of Desasa)

Figure 2. Production process of Desasa Home Decor