

Factory Enterprise Resource Planning Management System
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ABSTRACT

This study aims to develop a Factory Enterprise Resource Planning (ERP) system. This system is designed to assist manufacturers in managing and facilitating large volumes of data searches, controlling, and monitoring raw material requests and shipments automatically, as well as displaying dashboards to monitor various requests and shipments, returns, email notifications, and the amount of raw material inventory. The problem to be solved in this research is how to implement a system in a factory that aims to collect raw material data so that irregularities, shortages and excess raw materials do not occur to reduce losses at the factory. The previous raw material data collection system still used the help of computer applications, namely Microsoft Excel. Searching for data manually takes a lot of time. Therefore, we need an information system that can overcome these problems. With this system, it is hoped that users can more easily carry out their tasks. The research method used is the Agile method, which involves iterative and collaborative software development. In previous research, it has been suggested that sales monitoring can be done by developing an interactive sales dashboard system that can display sales monitoring visualizations in a certain period. This can assist leaders in monitoring sales results and employee performance. In addition, the management of data on raw materials and factory sales currently still relies on monthly sales recap sheets sent to the General Manager. However, manual sales performance calculations using KPI calculations are often time-consuming and can result in errors. Therefore, the development of a system that can speed up the calculation process and ensure data accuracy is very important. In system development, the Agile methodology is used which involves the design, coding, implementation, and system quality evaluation stages. The design phase involves customizing the interface desired by the user into a technical design that is ready to be implemented by programmers. The development phase involves programming and testing the system. The implementation stage is the final stage in the design stage, where the system that has been created will be handed over to the user for use.

Keyword: *Monitoring, ERP, Raw materials, Javascript, Web based system, request raw materials, return raw materials, Factory.*

SUMMARY

FACTORY ENTERPRISE RESOURCE PLANNING MANAGEMENT SYSTEM, Dyah Ranu Purwaningrum, NIM E41191739, Year 2023, Information Technology, Jember State Polytechnic, Elly Antika, ST, M.Kom.(Supervisor 1) and Mrs. Nor Kamaliah Binti Khamis (Supervisor 2).

This study proposes the development of an ERP (Enterprise Resource Planning) Factory system which aims to assist manufacturers in managing large amounts of data, controlling, monitoring raw material requests and returns of raw materials, as well as displaying dashboards to monitor various activities of each admin.

This system replaces the previous raw material data collection system which still uses the help of computer applications, namely Microsoft Excel. In this system, there are 3 admins, namely the production admin who has the right to add production results, make requests for raw materials, and returns production raw materials, the warehouse admin has the right to add various kinds of raw materials needed by the production admin. In the production admin system and warehouse admin there is a roadmap that functions to view the status of raw material shipments, then the head admin has the right to add factory employee data, and print reports on requests and returns of factory raw materials. This system has the limitation of only facilitating factories in controlling or monitoring demand and delivery of raw materials automatically.

The success of this research will make it easier for users to develop systems for manufacturers to manage and facilitate searching of large amounts of data. Automatically control and monitor raw material requests and deliveries. To display dashboards to monitor multiple requests and deliveries, return notifications and road maps and raw material stock counts.

CHAPTER 1. INTRODUCTION

1.1 Background of the Project

The development of the needs of the Factory Resource Monitoring System Website is carried out to create an up-to-date and standardized information system that facilitates the needs of factories to increase expertise and technical skills in their respective fields of Regional Technology Development Sector.

Monitoring and evaluation of activities is a very important series in the development of factory technology. A factory can survive and achieve its goals if managed properly and has a plan as well Good raw material control in all fields especially in raw material monitoring. Factory requirement for apply such planning and control to prevent irregularities, deficiencies, and excess raw materials to reduce losses on factory.

The factory is a company engaged in the industrial sector. In monitoring the demand and delivery of raw materials. The factory does this by registering the goods to be shipped and the goods to be requisitioned using Microsoft Excel. However, the system that is running cannot run optimally well, this is because when the production section requires information on requests and delivery of production raw materials, the admin must open the existing Microsoft Excel to search for data one by one, the process takes a long time, so the system runs this is not going well. Experienced production admin.

Constraints in controlling production raw materials in production area because there is no system that can Monitoring demand and delivery of raw materials production automatically so that reports are generated not in accordance with the occurrence of transactions in the field.

1.2 Problem Statements

How to implement a system at a factory that aims to collect data on raw materials so that there are no irregularities, shortages, and excess of raw materials to reduce losses at the factory. The previous raw material data collection system still used computer application assistance, namely Microsoft Excel. But, when

searching for data, it takes a lot of time to search for data one by one, for that we need an information system that can overcome these problems. With this system is expected to facilitate users in doing the job. So, some of the problems related to this system are:

1. Difficulty to manage and searching for large amounts of data.
2. Difficulties in controlling or monitoring demand and delivery of raw materials automatically.
3. Difficulties to know stock in the warehouse several requests and returns of raw materials and delivery status as well as the amount of stock of raw materials.

1.3 Objective of the Project

The aims of this research are:

1. Develop systems for manufacturers to manage and facilitate search of large volumes of data.
2. Automatically control and monitor demand and delivery of raw materials.
3. To display dashboards stock in warehouse multiple requests and return raw material also roadmaps and raw material stock quantities.

1.4 Scope of the Project

1.4.1 User Scopes

- a. Users can login and logout on the system.
- b. Users can input raw materials into the system.
- c. Able to manage goods, WI (Warehouse issue), and travel documents.
- d. Can do delivery of raw materials.
- e. Can accept returns.
- f. Can make reports.

1.4.2 Admin Scopes

- a. Admin can do CRUD (create, read, update) data.
- b. Admin can make changes to appearance of the information system.

1.4.3 System Scopes

- a. There are login and logout features for users and admins.

- b. There is a data input feature to input raw materials.
- c. There is a display to show raw material requests.
- d. There is a feature for sending raw materials.
- e. There is a feature to view the activity history of raw materials.

1.5 Significance of the Project

In this project, the significance of this study includes:

- a. An information system capable of searching data in large amounts of data.
- b. An information system capable of controlling and monitoring demand and delivery of raw materials.

1.6 Assumptions and Limitations

1.6.1 Assumptions

Contributing to improving the quality of processing resources in factories, monitoring and managing registration data and monitoring product marketing so that the information produced is more effective and efficient.

1.6.2 Limitations

This website is only limited to facilitating factories in controlling or monitoring demand and delivery of raw materials automatically.

CHAPTER 2. LITERATURE REVIEW

2.1 Review of Current Situation

Monitoring can be used to assist in alerting the organization when problems occur and to help keep work on track (Suidah & Irvan Sidni, 2018). Monitoring aims to increase the effectiveness and efficiency of an activity implementation based on activity planning, monitoring also allows the organization to determine whether the resources it has are sufficient and have been used properly. Sales monitoring can also be carried out by developing an interactive sales dashboard system that is able to display visualization of monitoring sales within a certain period (Sulistiani, 2018), so that it can assist leaders in monitoring sales results and the performance of their employees (Zainal, 2012).

Data management of raw materials and factory sales so far is summarized in a sales recap sheet for each sales every month, then the sales data is submitted to the General Manager, after the General Manager receives the submission of sales results for each sales, the General Manager will calculate in writing using calculations KPI to directly determine the sales achievement of each salesperson and to determine the bonuses other than salary (incentives) received by each salesman in achieving sales targets, after the sales data is calculated by the General Manager after that the calculation results will be saved to the system, from that process there are obstacles such as first, by calculating written KPI scores, sales monitoring becomes ineffective due to the large amount of sales data that must be calculated in writing, causing nominal slippage in the calculations. Second, a dashboard is needed to support decision. In carrying out its business processes, factories in Indonesia have KPIs as standard. Among others Logistics (sales & rental of container office), and Maintenance & Repair. In processing Logistics and maintenance & repair processes, this company has used an application called COINS (Container Information System) and has used a MySQL database to store its data. However, there is no system to review the results of the maintenance & repair service process.

This causes the executives difficulties in making decisions to improve the maintenance & repair services. Therefore, an Executive Information System (SIE) is needed which has drill-down features and responsive web-based what-if analysis to help executives access SIE anywhere and anytime. In addition, this SIE also has an activity monitoring feature that can monitor loading, unloading and repair activities in real-time.

Developments in the field of information technology, especially internet technology, facilitate and assist various fields of work related to ease of access, distance, and time. Dissemination of information that previously tended to be done manually and relatively slowly, now can be done more quickly and efficiently. This affects many aspects of life, including companies ± companies and agencies, in carrying out their business processes. The impact of the rapid development of information technology has an impact on all fields, one of which is in the field of construction services or contractors. Facing this, companies often receive a project to develop the business so that it requires an information system to achieve the desired goals and objectives. The system or application that is built must be able to answer the company's needs. Therefore, it is important for companies, in building an information system to monitor and manage system development projects as well as possible to achieve company goals and objectives.

The process to ensure that data can be maintained for accuracy, clarity of information and knowing the accuracy of decision-making implementation to overcome problems that occur so that the process of data recapitulation and data reporting can run well is monitoring the data. Monitoring is carried out to find out and assess whether the reported data is in accordance with reality and to identify problems that arise so that they can be addressed immediately. Monitoring is carried out every month by the manager to ensure the appropriateness of data and clarity of information is well maintained to reduce problems that will occur and problems that do occur can be immediately resolved. Techniques in the monitoring process are carried out by examining data based on detailed device status.

2.2 Review of Related Literature

An information system can be defined as a system within an organization that is a combination of people, facilities, technology, important lines of communication, processes certain types of routine transactions, signals to management and others about important internal and external events and provides an informed base for intelligent decision making.

2.2.1 Monitoring System

Monitoring is the process of collecting and analyzing information based on indicators that have been set systematically and continuously about activities/programs so that corrective actions can be taken to further improve the program/activity. Monitoring is monitoring which can be described as awareness of what one wants to know, a high level of monitoring is done to be able to make measurements through time that show movement toward a goal or away from it. Monitoring will provide information about the status and trends that measurements and evaluations that are completed are repeated from time to time, monitoring is generally carried out for specific purposes, to examine the following processes of objects or to evaluate conditions or progress towards the objectives of management results for the effects of actions of several types between other actions to maintain ongoing management.

Monitoring is also referred to as the routine process of collecting data and measuring progress against program objectives. Monitor changes that focus on processes and outputs. Monitoring provides raw data to answer questions while evaluation is putting these data into use and thus providing added value. Evaluation is where learning occurs, questions need to be answered, recommendation need to be made, suggestions for improvement. However, without monitoring, evaluation would have no basis, no raw materials to work with, and limited to areas of speculation therefore Monitoring and Evaluation must go hand in hand. Monitoring has the objective of assessing whether the activities carried out are in accordance with the plan. Identify problems that arise so that they can be directly addressed and evaluate whether the work patterns and management used are appropriate to achieve activity objectives. Knowing the link between activities and objectives to obtain

measures of progress and adapting activities to a changing environment, without deviating from the objectives.

2.3 Review of Related Products

This Project Monitoring Information System application has several menus that can be used by Admin includes user management menu, company menu, project menu, job details, job descriptions, progress, project photos, project reports and print documentation as well as comment fields used to interact between system users. In this system the admin has full access rights in adding data, changing and delete. This Project Monitoring Information System application has several menus that can be used by Executors including work details, progress input, project photos, and print documentation and columns comments used to interact between system users. In this system Executor has the task of inputting project development data and uploading pictures of the projects they are working on.

2.3.1 Login Page

The main login form will come out if the user runs the program. This main login form works for all users choose access according to their position. In the menu provided for login administrator, executor login and leader login.

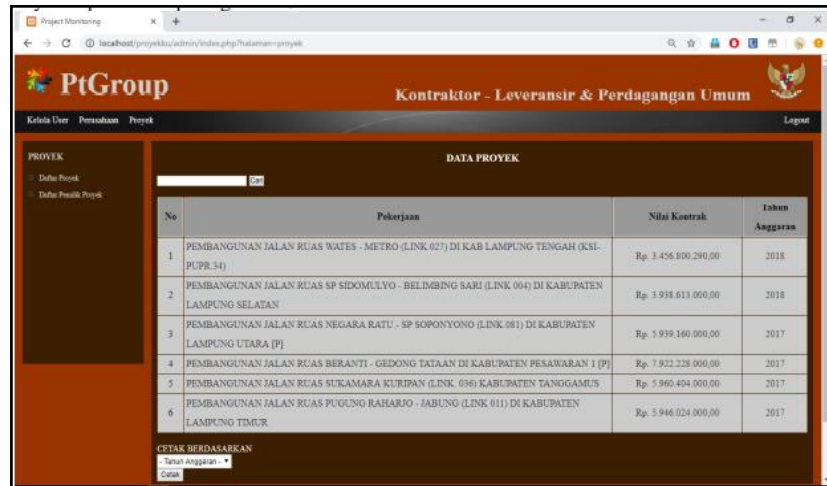


Figure 2. 1 Login

2.3.2 Project Page

Project menu form is a form that displays all the work in the program.

Forms The project menu can be seen in Figure below.

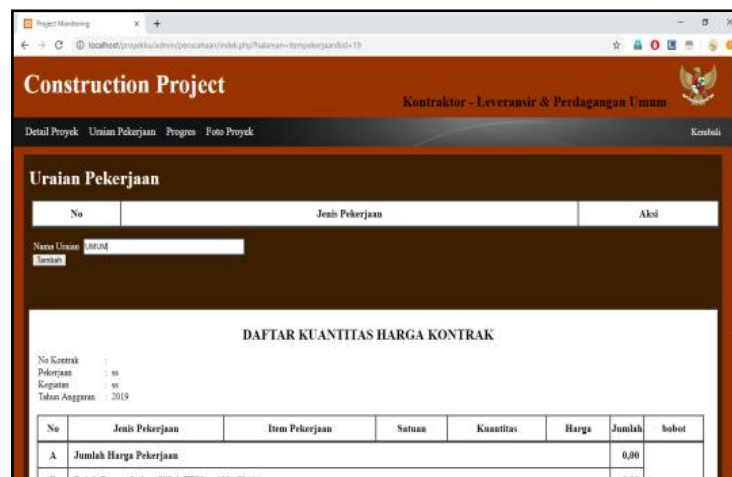


No	Pekerjaan	Nilai Kontrak	Tahun Anggaran
1	PEMBANGUNAN JALAN RUIAS WATES - METRO (LINK.027) DI KAB LAMPUNG TENGAH (KSI-PUPR.34)	Rp. 3.456.800.290,00	2018
2	PEMBANGUNAN JALAN RUIAS SP SIDOMULYO - BELIMBING SARI (LINK.004) DI KABUPATEN LAMPUNG SELATAN	Rp. 3.938.613.000,00	2018
3	PEMBANGUNAN JALAN RUIAS NEGARA RATU - SP SOPONYONO (LINK.081) DI KABUPATEN LAMPUNG UTARA (P)	Rp. 5.939.160.000,00	2017
4	PEMBANGUNAN JALAN RUIAS BERANTI - GEDONG TATAAN DI KABUPATEN PESAWARAN 1 (P)	Rp. 7.922.228.000,00	2017
5	PEMBANGUNAN JALAN RUIAS SUKAMARA KURIPAN (LINK. 036) KABUPATEN TANGGAMUS	Rp. 5.960.404.000,00	2017
6	PEMBANGUNAN JALAN RUIAS PUUNGUN RAHARJO - JABUNG (LINK.011) DI KABUPATEN LAMPUNG TIMUR	Rp. 5.946.024.000,00	2017

Figure 2. 2 Project Page

2.3.3 Job Description Page

The job description menu form is the first step taken by the admin in inputting the plan work. The work plan is obtained from the contract agreed upon by the contractor and the agency involved deliver the project. The type of data taken from the contract is a list of price quantities. The following is an example of Figure 4 price quantity list:



No	Jenis Pekerjaan	Item Pekerjaan	Satuan	Kuantitas	Harga	Jumlah	bobot
A	Jumlah Harga Pekerjaan					0,00	

Figure 2. 3 Description Page

2.3.4 Report Print Page

Monthly report menu form, functions to show monthly recap and also detail each week. To be able to enter the monthly report the admin needs to click the "View Monthly Report" link available in the top left corner. Monthly Report Pages can be seen in Figure as follows:

No	Jenis Pekerjaan	Jumlah Pekerjaan	Satuan	Kuantitas Rencana	Beban Rencana	Jan Minggu 1		Jan Minggu 2		Jan Minggu 3		Jan Minggu 4		Realisasi Bulan Ini		Realisasi 5-4 Bulan Ini	
						Kuantitas	Beban(%)	Kuantitas	Beban(%)	Kuantitas	Beban(%)	Kuantitas	Beban(%)	Kuantitas	Beban(%)	Kuantitas	Beban(%)
1	MOBILISASI	MOBILISASI	L3	1,000	1,600	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
2	MOBILISASI	MOBILISASI	L3	1,000	0,379	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
3	DRADABAR	GALIAN INTAK SELOKAT	S2	96,000	0,379	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
4	PERKERJAAN TAHAN	PERKERJAAN BASSA DARI	S2	387,200	0,880	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
5	PERKERJAAN TAHAN	PERKERJAAN BANGUN JALAN	S4	6,600,000	0,880	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
6	PERKERJAAN BERBUTIR	PERKERJAAN BERBUTIR	S4	98,800	0,782	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
7	PERKERJAAN BERBUTIR	PERKERJAAN BERBUTIR	S2	818,400	0,888	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
8	PERKERJAAN BERBUTIR	PERKERJAAN BETON SELUD	S4	1,084,000	0,572	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
9	PERKERJAAN BERBUTIR	LAIN FONDASI BANGUN BETON	S4	540,000	15,922	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
10	STRUKTUR	PAKANGKAI BATU	S4	411,400	5,719	-	-	-	-	-	-	-	-	0,000	0,000	0,000	0,000
Total					100,000		0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Figure 2. 4 Print Page

2.3.5 Product Comparison

Table 2. 1 Product Comparison

No	System Name	Feature
1.	Monitoring Information System	Have 3 admins, No need register, Login, display form, input planning, report.
2.	Factory Enterprise Resource Planning Management System	Have 3 admins, no need register, Login, Dashboard, input product, input raw material, retur, report.

CHAPTER 3. METHODOLOGY

3.1 Research Methodology

The initial stage carried out in this study was to determine the problem to be studied. After determining the problem to be studied, the next step is to determine the objectives to be achieved in this study. After that, collecting data by means of interviews, literature review, and documentation. The next stage is to design the system and display, which includes Use case Diagrams, Activity Diagrams, Class Diagrams and Sequence Diagrams (Pressman, 2012). The stages of designing this system can contribute to providing an overview regarding the flow of information and the stages that are being processed in the system. The design system that is planned to be made is intended to find the stages so that in the formation of the proposed system it can be more focused and neater, so that if an error occurs in the system that has been formed, it can be quickly found and fixed more easily. The next stage is coding using the PHP programming language and will be tested using a Black box and a Software Tester. The last stage is the researcher implements the system to the user.

3.2 Development Methodology

System design is designing or designing a good system, which contains operational steps in data processing and procedures to support system operation. Agile is a short-term system development method that requires quick adaptation to keep up with developments. The agile method in its use is able to make decisions in software changes in accordance with the sales conditions being the target, the results of software using this agile method will be more flexible and efficient. Because the software will always be updated following current developments. The stages in the development of a web-based executive information system with the code igniter framework using agile methods can be seen in following chart:

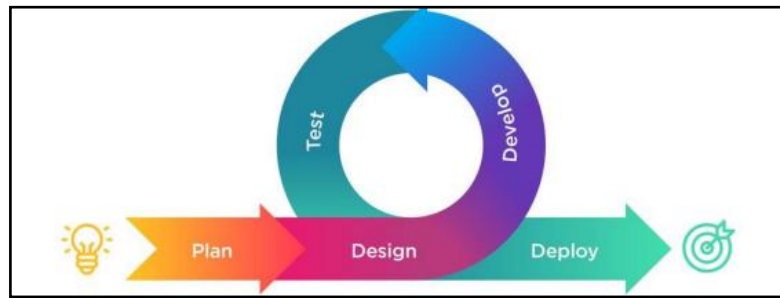


Figure 3. 1 Agile Method

The research material needed in this case concerns information systems. According to Turban et al (2005) a system is a collection of objects such as people, resources, concepts and procedures that are intended to perform an identifiable function or to serve a purpose. An information system is a system that collects, processes, stores, analyzes, and disseminates information for a specific purpose (Turban et al, 2005: 60). The information system is a solution to organizational and managerial problems, by utilizing information technology to anticipate challenges from the environment. Referring to Turban et al (2005) there are 6 types of system structures, namely:

1. Input is an element that enters the system.
2. Processes are all the elements needed to convert or transform inputs into outputs.
3. Output is the final product or consequence that exists in the system,
4. Feedback is the flow of information from component outputs to decision makers regarding output or system performance, based on outputs, decision makers may decide to modify inputs, processes, or both.
5. The system environment consists of several elements that are outside, in that they are not inputs, outputs or processes. However, they affect system performance and achievement of system goals.
6. Boundaries can be physical and non-physical. The limits of a system are determined by narrowing the scope of the system to facilitate analysis.
7. Information system components consist of hardware, programs, data, procedures, people.

3.2.1 Requirements Phases

The first stage of investigation describes the functional requirements of the system in the context of the problem identified. At this stage the author collects any data related to the system and collects data by interviewing the leadership directly, then making observations or observing research objects from data processing to reporting processes. And the Library study stage collects information or data related to the system through e-books or journal articles.

3.2.2 Design Phases

Design is the stage for adjusting the user's desired interface into a technical design that is ready to be designed or implemented to become a system by programmers.

3.2.3 Development and Coding Phases

At this stage the design needs to be implemented or implemented to become a software. At the development stage, the program coding will continue to produce a system like the previous design stage.

3.2.4 Integration and Testing Phases

Test is the stage where the system or program has been tested using the black box method. From the results of the output whether it is in accordance with what was planned. If an error occurs, it will be returned to the develop stage to repair the system.

3.2.5 Implementation and Deployment Phases

At this stage, the system has been created and is ready to be used for processing admin staff. Deployment is the final stage of the design stage, namely the stage to see the quality of the system being made, if the system does not experience errors or deficiencies, the system will be immediately handed over to the user to be ready for use.

3.2.6 Review Phases

After all previous stages of development have been completed, the authors review the progress made in finalizing the requirements. The author introduces the author's ideas to solve the problems that arose during the previous phase. And users who have used the system are asked to provide feedback regarding the features and functions in the system whether they are running well or may have found some bugs or problems so they can be fixed in the future.

3.3 Tools and Hardware

The device requirements used in this Website-Based Factory Resource Monitoring System. In its application the research needs are divided into the following:

3.3.1 Hardware Requirements

The hardware that we use to develop website applications is a personal computer. The specifications of this laptop include the need for supporting hardware as a means of support in the form of a Personal Computer with the following specifications:

ROG STRIX G531GD:

- Intel Core i7-9750H hexa-core processor 2.6GHz Turbo Boost up to 4.5GHz.
- Memory RAM 8GB DDR4 2666MHz 64-bit
- Graphics Intel UHD Graphics 630 and Nvidia GeForce GTX 1050 VRAM 4GB GDDR5.

3.3.2 Software Requirements

The software that will be used in the design and implementation of the system is as follows:

1. MySQL is used as Database.

MySQL is a database management system (database management) using the well-known basic SQL (Structured Query Language) commands. This multi-user and multi-channel MySQL database management system (DBMS) has

been used by more than 6 million users worldwide.

2. Visual Studio Code application as a coding program.

Visual Studio Code (abbreviated as Visual Studio Code) is source-code editing software made by Microsoft for Linux, mac OS, and Windows. Visual Studio Code provides features such as syntax highlighting, code completion, code excerpts, code refactoring, debugging, and Git.

3. The programming languages used are Code Igniter 3, HTML, PHP, Draw.io is used to create Use Case diagrams, Activity Diagrams, sequence diagrams, class diagrams, and interface mockups.
4. Microsoft Word Office is used as a report generator.

3.4 Project Schedule

Projects require a lot of project management skills and the main thing about project management is that it helps us manage projects effectively, allowing us to solve problems faster. Each phase of project development needs to maximize its time to prevent the project from being completed and to produce the best results from the allotted time, so a project management Gantt chart is created to estimate each week for each phase of its tasks that require complete as shown in the following table:

3.5 Flowchart

3.5.1 Admin

Before entering into the system, the user must log in by entering the username and password. After that the system will display the home menu which has 3 menus that can be accessed, namely the goods management menu, the warehouse issue management menu, and the travel documents management menu (requests and shipments).

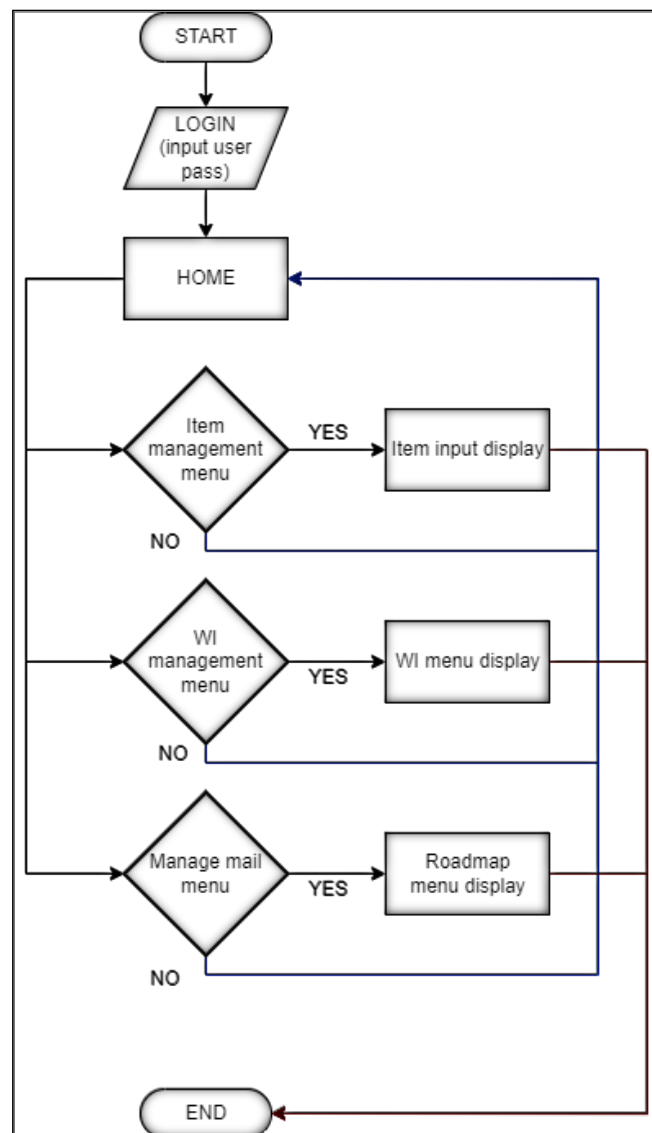


Figure 3. 2 Flowchart Admin

3.5.2 Production

Production users can also access the system. The user logs in and the system displays a home menu which has three menus that can be accessed, namely the goods management menu, the warehouse issue management menu, and the TTB management menu.

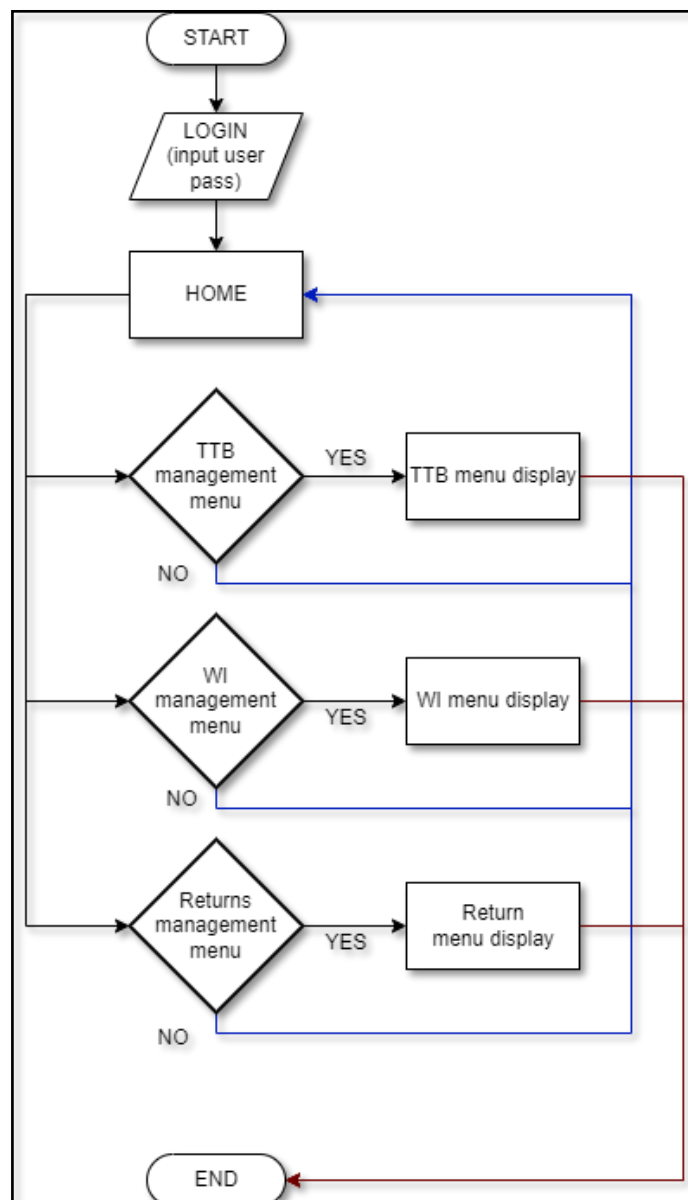


Figure 3. 3 Flowchart Production

3.6 List of User Requirements

A user requirement specification is a list of requirements that defines what the user is currently doing with the information system. In this study, users must log in to be able to access the features of the system. There are 2 actors in the information system, namely users and production. Both have the same access because they have almost the same interests. Here is a list of user requirements namely:

Table 3. 2 List of User Requirements

No	List of Requirements	Use Cases
1.	Admin	Can perform raw material data management Can make deliveries and view request for raw materials Able to manage travel permits
2.	Production	Can access the features of request and delivery of raw materials In accessing the travel permit management feature Able to manage TTB

3.7 Design Diagrams

3.7.1 Use Case Diagrams

The use case diagram illustrates that functionality expected from a system. A Use Case represents an interaction between actor and system.

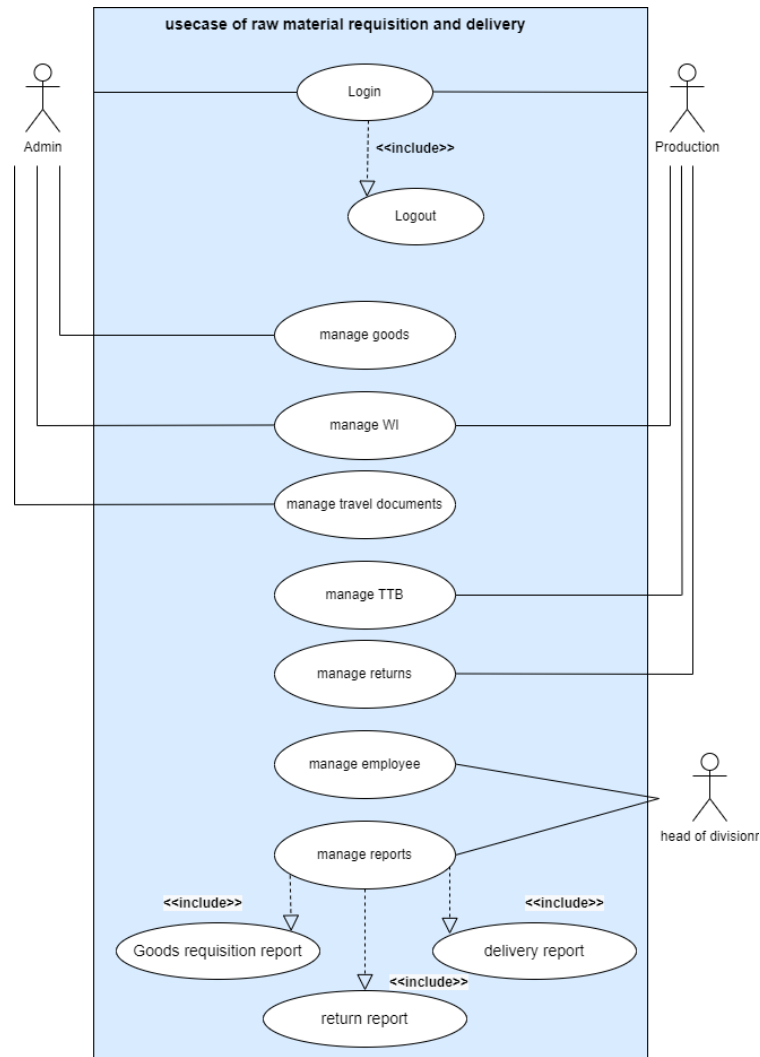


Figure 3. 4 Use Case Diagrams

There are some actors who are involved in the system. Among them are administrators, production and head of division.

Table 3. 3 Description

No.	Actor	Head of division
1.	Head of division	Actors who have the right to can insert and delete user.
2.	Production and Warehouse admin	Actors can enter system to use the system.

3.7.2 Class Diagram

Class diagram is a static structure diagram that states the structure or architecture of the system by providing classes, system attributes and methods as well as relationships between entities. In figure 3.4, the class diagram mentions details to make people understand the flow of the system.

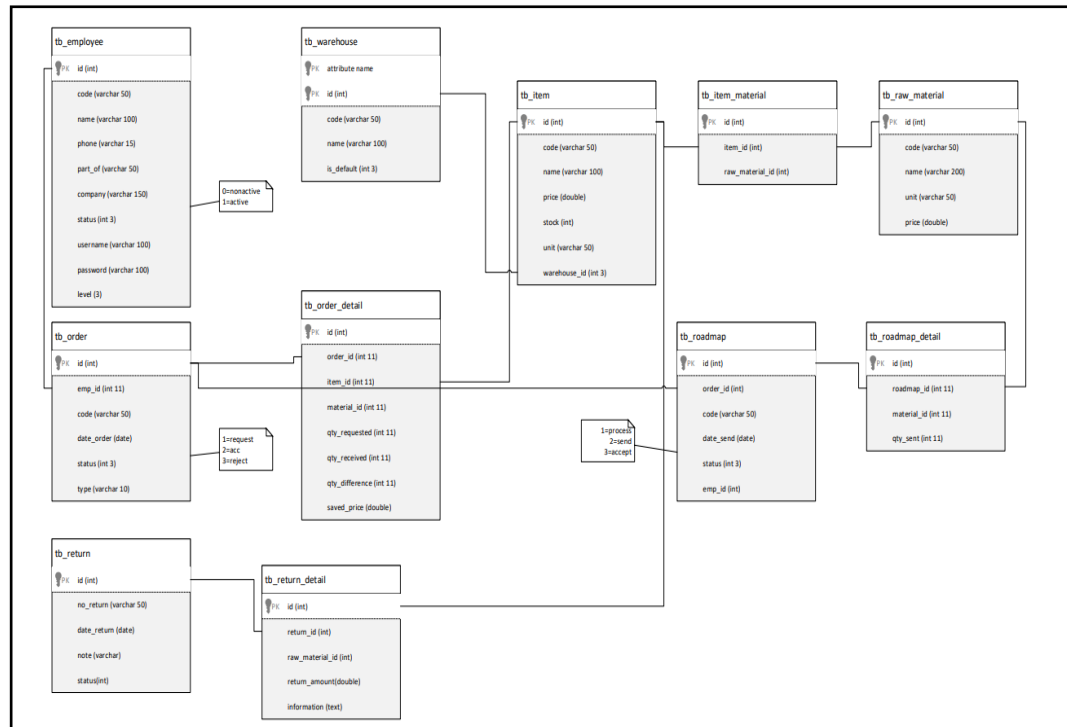


Figure 3. 5 Class Diagram

3.7.3 Activity Diagrams

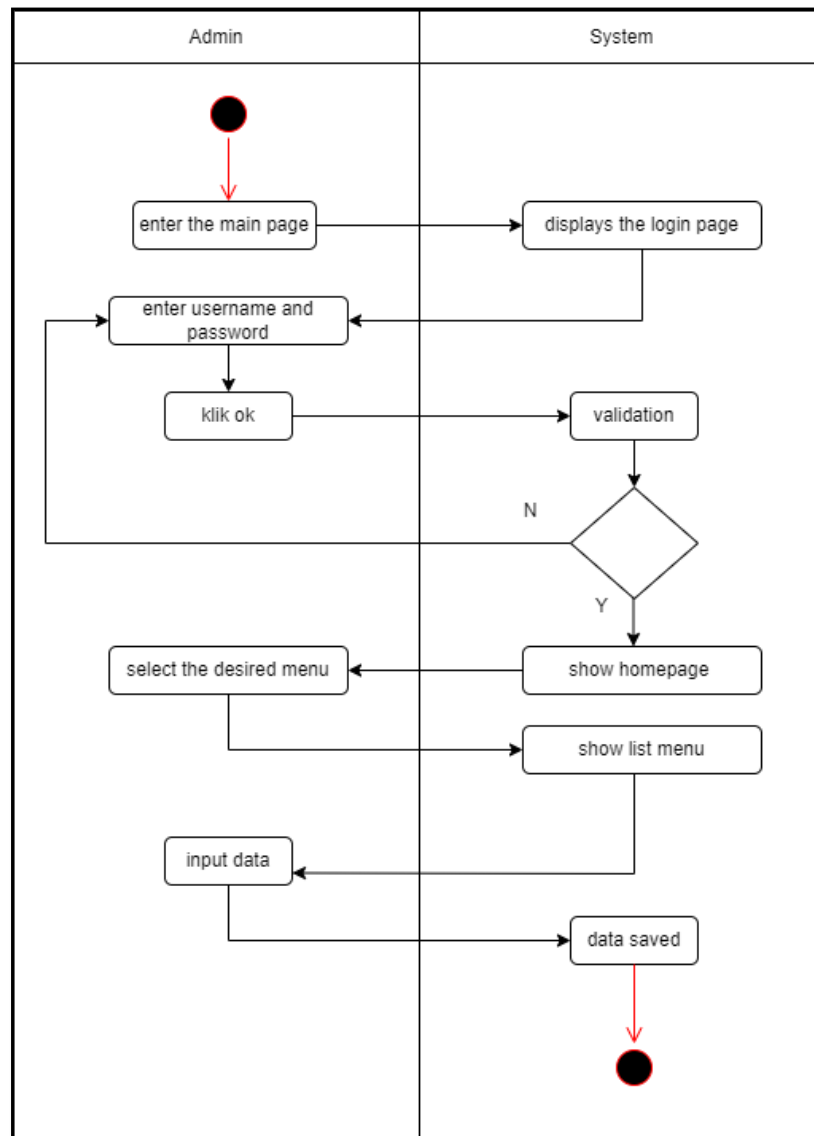


Figure 3. 6 Activity Diagram

Admin performs login activity before entering the request monitoring system and delivery of production raw materials, namely by entering username and password according to their respective access rights. If the username and password are valid then a user has managed to enter the home page of the monitoring system application request and delivery of production raw materials. However, if invalid user username and password will get failed message.

3.7.4 Sequence Diagram

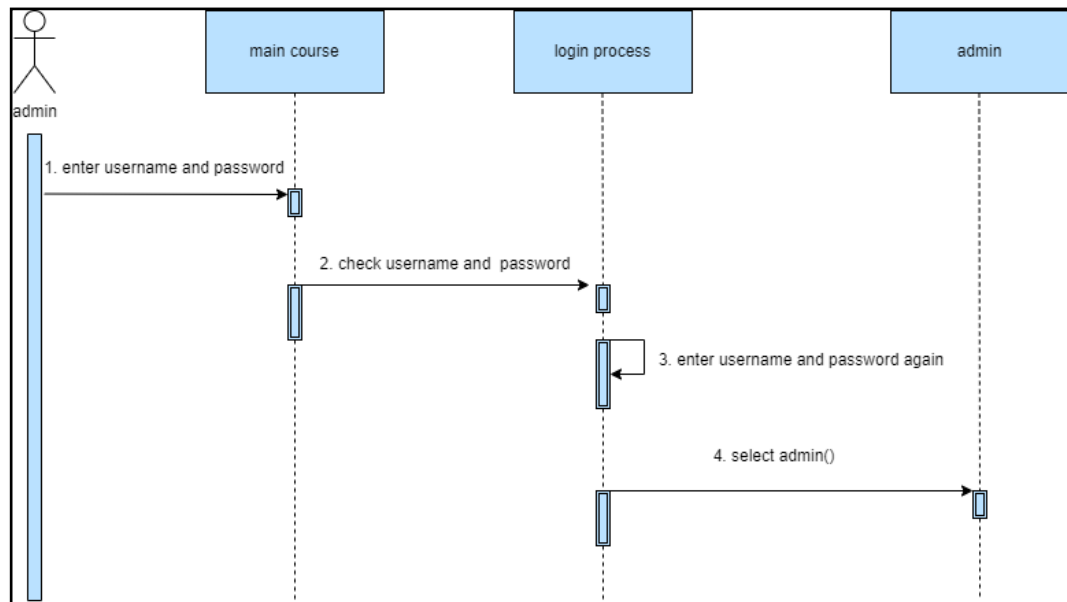


Figure 3. 7 Sequence Diagram

3.8 Interface Design

User interface (UI) design focuses on what the user is likely to need to do and ensures that the interface has easily accessible elements. The user interface is a representation of the software or the user's business. This is displayed in the form of images, sounds, colors, and text. As seen in the image below, is the prototype for the website application:

3.8.1 Login

On the login menu there are 2 columns, namely username and password which must be input to access the system.

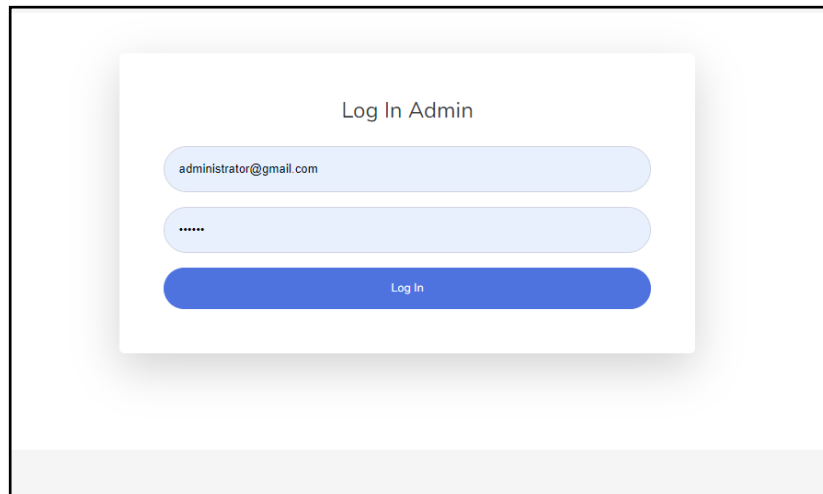


Figure 3. 8 Login

3.8.2 Home

On the home menu there is a welcome page that contains information on each feature function, then on the home menu there is also a sidebar containing a profile photo and 4 buttons, namely item management, warehouse issue, manage email, and logout. Item Management menu to manage raw materials, Warehouse Issue Management menu to manage raw material shipments, Manage Email menu to manage outgoing mail, Logout feature to exit the information system.

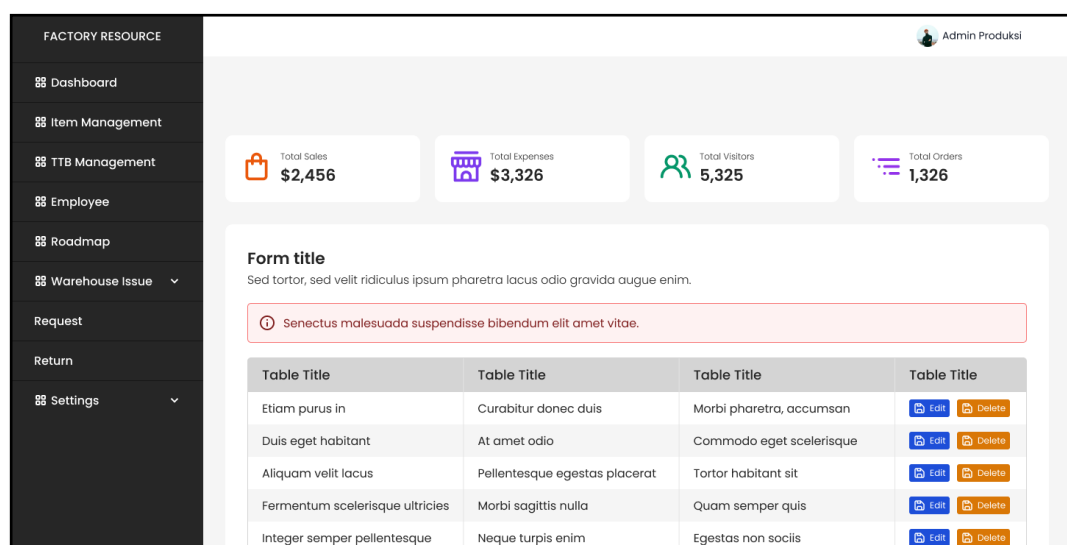


Figure 3. 9 Home

3.8.3 Data input

The item management menu is a feature for adding goods or raw materials to the system. In the system there is a data input form, namely item code, item name, item stock, and price after that there is a submit button to enter data while reset is to reset the form fields. Then on the right is the result of the input in the form of a table consisting of columns for number, name, code, stock, and action which contains 3 buttons namely detail to view item details, edit to edit items, and delete to delete items.

The screenshot displays the 'Item Material' management interface. On the left is a dark sidebar menu with options: Dashboard, Item Management, TTB Management, Employee, Warehouse Issue, Request, Return, Datagrid, and Settings. The main content area is titled 'Item Material' and features an 'Input Data' form with a 'Warehouse' dropdown menu (currently showing 'Main Warehouse') and 'Save' and 'Done' buttons. Below the form is a 'Detail Material for Items' section containing a table with 2 entries. The table has columns for 'No', 'Code', 'Name', and 'Action'. The entries are as follows:

No	Code	Name	Action
1	MTR-2378	Gandum2	[Delete Icon]
2	MTR-2378	Gandum2	[Delete Icon]

Below the table, it indicates 'Showing 1 to 2 of 2 entries' and includes 'Prev', '1', and 'Next' navigation buttons. A search bar is also present above the table.

Figure 3. 10 Data Input

3.8.4 Request

On this page is a page for managing requests and delivery of raw materials. On the right there is a dialog box that contains notifications if there is a request. Then on the right is a dialog box for sending. There are 2 buttons in the dialog box on the right, namely details to view details of requests for raw materials, and an action that has 2 buttons, namely send for the process of sending raw materials or reject for refusing to send raw materials for certain reasons.

FACTORY RESOURCE Admin Produk1

Add Request

Input Data

Code: REQ-002 Order Date: 2023-01-15

Applicant: Admin Production - PT ABC Note: Urgent

[Next](#)

Detail Items

Detail Item

[Add Material](#)

Show 10 entries Search:

No	Name	Qty Requested	Aksi
1	Gandum2		

Showing 1 to 1 of 1 entries [Prev](#) [Next](#)

[Save](#) [Back](#)

Figure 3. 11 Request

3.8.5 Return

In this menu the admin can return raw materials, by adding data, then adding raw materials, selecting, and saving to save data. if the status has been received by the warehouse, there is no action.

FACTORY RESOURCE Admin Produk1

Return

[Add](#)

Code	Date Order	Status
REQ-001	2023-03-10	Rejected
REQ-002	2023-03-11	Accepted
REQ-002	2023-03-12	Submitted

« 1 »

Figure 3. 12 Return

CHAPTER 4. FINDING AND CONCLUSION

This chapter focuses on the consequences of the findings resulting from all the information that has been gathered through the research methodology described in the previous chapter. In addition, this chapter also discusses system testing conducted to evaluate how well the system is running, as well as identify and ensure that there are no errors that may occur.

4.1 Project Testing

In this section, the system testing process will be explained in detail. Various types of tests that have been carried out, such as functional testing, integration testing, and performance testing, will be explained properly. An explanation of the test methods used, the test scenarios created, and the results of each test will be presented. The purpose of the testing phase is to assess and test the project's stated needs, features, and expectations prior to delivery to ensure that the project meets the initial requirements indicated in the specification paper.

4.2 Unit Testing

Unit testing, often known as developer testing, focuses on testing small bits of code created by developers, such as classes. This test is very important to ensure that the parts that have been created work as they should, and the program runs correctly when integrated with additional elements. This form of testing assists website management by ensuring that modifications do not accidentally affect other parts of the system. Unit testing describes the process of unit testing and system testing that is carried out after testing the previous system.

Unit tests aim to examine each component of the system in isolation, while system tests involve testing the system. The results of the unit test and system test will be evaluated to ensure that the system is running properly and meets the requirements that have been set. Unit testing describes the process of unit testing and system testing that is carried out after testing the previous system. Unit tests aim to examine each component of the system in isolation, while system tests involve testing the system. The results of the unit test and system test will be

evaluated to ensure that the system is running properly and meets the requirements that have been set.

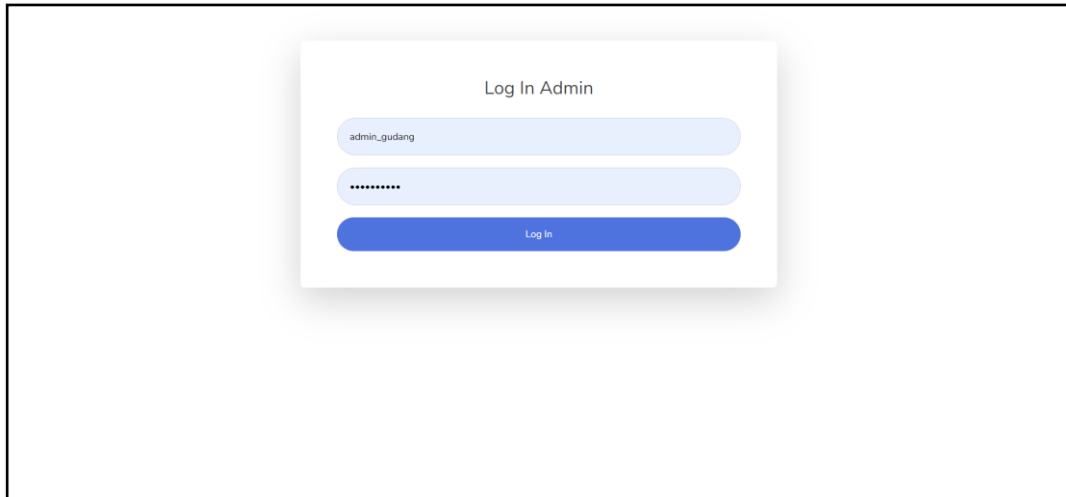


Figure 4. 1 Login

Table 4. 1 Test Case 1

Test Case 1	
Test Data	Login view
Module Testing	Login page
Objective	To perform the test, the user enters a username and password
Expected Result	If the username and password are registered, a successful login pop up will appear and enter the dashboard page
Actual Result	As expected
Conclusion	The login page works as expected

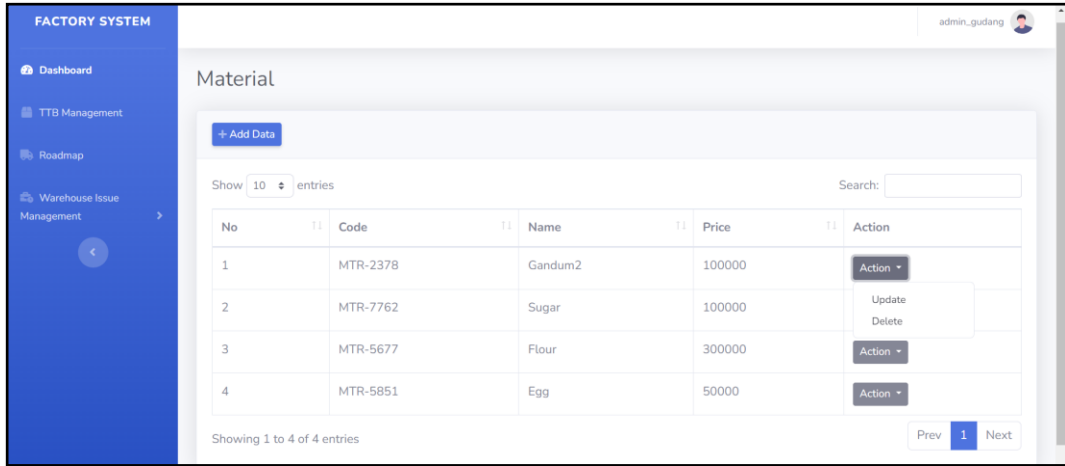


Figure 4. 2 TTB Management

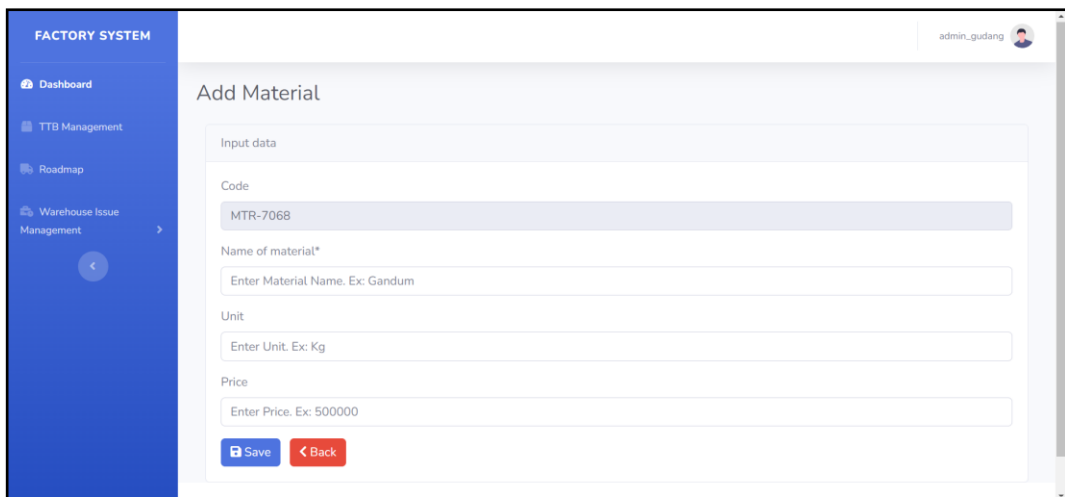


Figure 4. 3 Add Material Management

Table 4. 2 Test Case 2

Test Case 2	
Test Data	CRUD material data on the warehouse admin user page
Module Testing	TTB Management

Objective	Warehouse admin can add, edit and delete material data
Expected Result	<ol style="list-style-type: none"> 1. The user enters the TTB Management menu then the system will display a list of material data 2. The user clicks the add button then fills out the form and submits. If the submit is successful, a successful popup will appear and redirect to the material list page. If it fails, a failed popup will appear and remain on the add material page. 3. The user clicks the update button then redirects to the edit data page. The user edits the material data then clicks submit. If the submit is successful, a successful popup will appear and redirect to the material list page. If it fails, a failed popup will appear and remain on the edit material page. 4. The user clicks the delete button then a delete confirmation popup appears. If the user confirms the delete then the data will be deleted and reload the datatable.
Actual Result	As expected
Conclusion	The TTB Management module works as expected

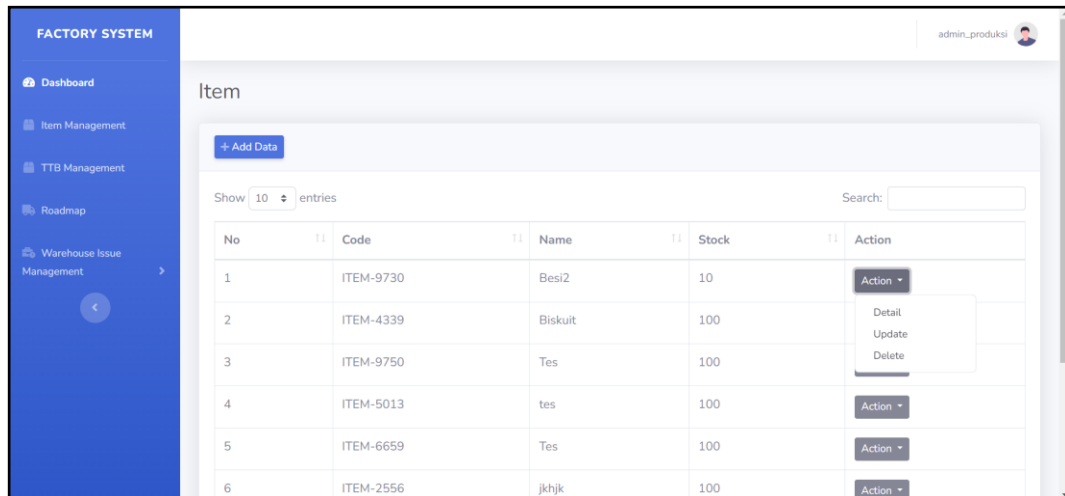
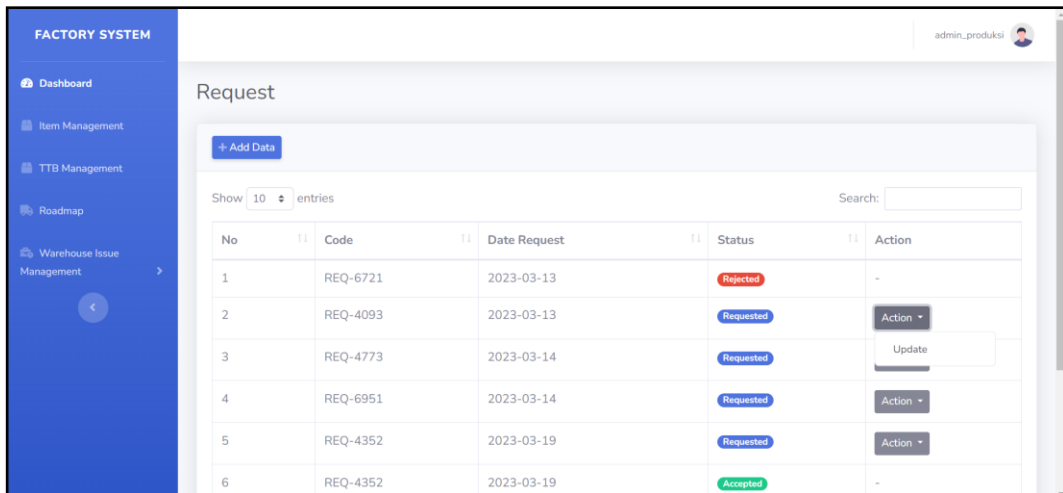


Figure 4. 4 Item Management

Table 4. 3 Test Case 3

Test Case 3	
Test Data	CRUD item data on the production admin user page
Module Testing	Item Management
Objective	Production admin can add data, edit data, view details, and delete item data
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Item Management menu then the system will display a list of data items 2. The user clicks the add button then fills out the form and submits. If the submit is successful a successful popup will appear and redirect to the list item page. If it fails, a failed popup will appear and remain on the add item page. 3. The user clicks the update button then redirects to the edit data page. The user edits the item data then clicks submit. If the submit is successful, the data will be updated and a

	<p>successful popup will appear and redirect to the list item page. If it fails, a failed popup will appear and remain on the edit item page.</p> <p>4. The user clicks the detail button then redirects to the data detail page. The system displays item detail data.</p> <p>5. The user clicks the delete button then a delete confirmation popup appears. If the user confirms the delete then the data will be deleted and reload the datatable.</p>
Actual Result	As expected
Conclusion	The Item Management module works as expected



The screenshot displays the 'Request' module within the 'FACTORY SYSTEM' dashboard. The interface includes a sidebar with navigation options: Dashboard, Item Management, TTB Management, Roadmap, and Warehouse Issue Management. The main content area shows a table of requests with the following data:

No	Code	Date Request	Status	Action
1	REQ-6721	2023-03-13	Rejected	-
2	REQ-4093	2023-03-13	Requested	Action
3	REQ-4773	2023-03-14	Requested	Update
4	REQ-6951	2023-03-14	Requested	Action
5	REQ-4352	2023-03-19	Requested	Action
6	REQ-4352	2023-03-19	Accepted	-

Figure 4. 5 Request

Table 4. 4 Test Case 4

Test Case 4	
Test Data	Request menu on the production admin user page
Module Testing	Request
Objective	The production admin can see the list of requests, add requests, edit request data if the warehouse admin has not processed it
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Request menu then the system will display a list of request data 2. Users make requests by clicking the add button then filling out the form and submitting. If the submit is successful the data will be stored in the database and a successful popup appears then redirect to the list request page. If it fails, a failed popup will appear and remain on the add request page. 3. Users can update data if the data has not been processed by the warehouse admin by clicking the update button then redirecting to the edit data page. The user edits the data then clicks submit. If the submit is successful, the data will be updated and a successful popup will appear and redirect to the request list page. If it fails, a failed popup will appear and remain on the edit page.
Actual Result	As expected
Conclusion	The Request module works as expected

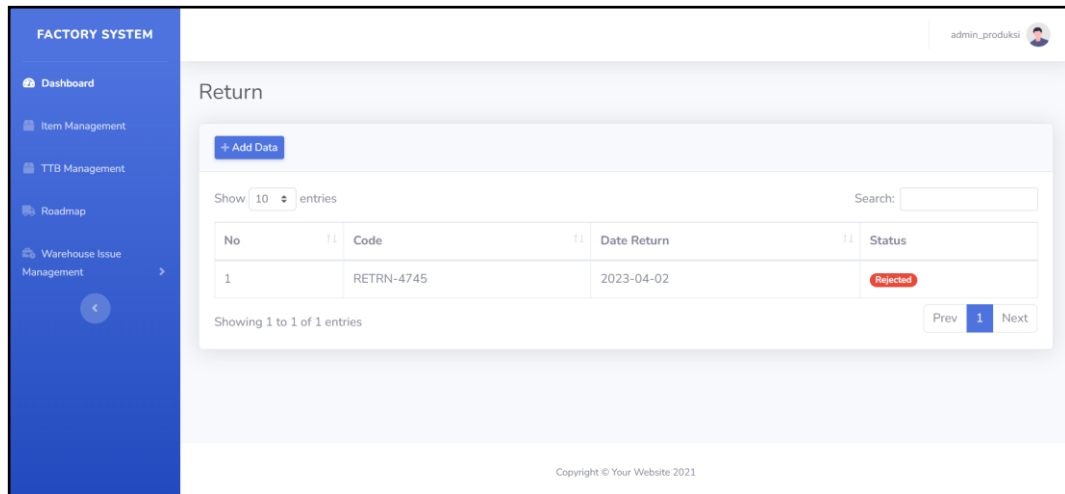


Figure 4. 6 Return

Table 4. 5 Test Case 5

Test Case 5	
Test Data	Menu Return on the production admin user page
Module Testing	Return
Objective	The production admin can see the list of returns and add returns.
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Return menu then the system will display a list of return data 2. Users make returns by clicking the add button then filling out the form and submitting. If the submit is successful the data will be stored in the database and a successful popup will appear then redirect to the list return page. If it fails, a failed popup will appear and remain on the add page.
Actual Result	As expected
Conclusion	The Return module works as expected

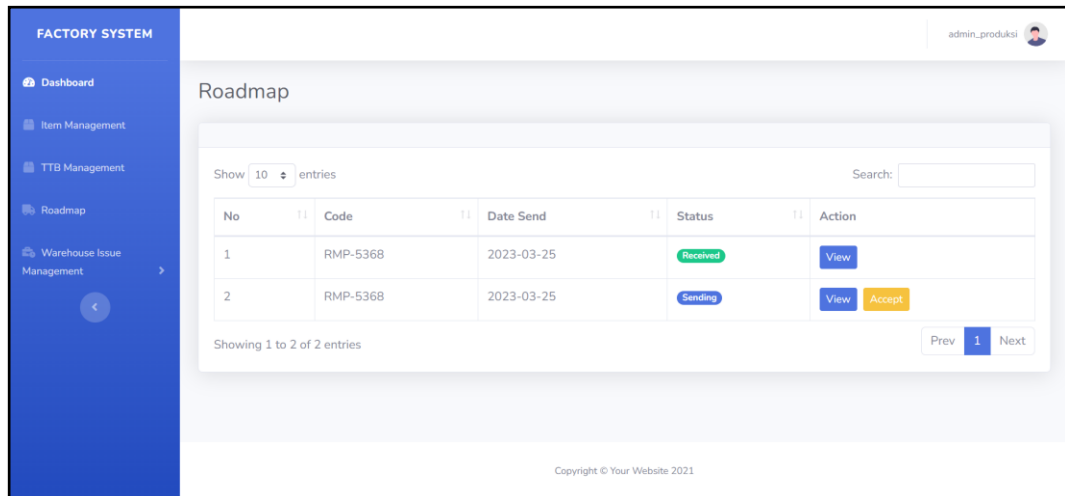


Figure 4. 7 Roadmap

Table 4. 6 Test Case 6

Test Case 6	
Test Data	Roadmap menu on the production admin user page
Module Testing	Roadmap
Objective	The production admin can see the roadmap list, view and receive goods from the roadmap.
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Roadmap menu then the system displays a list of roadmap data 2. The user sees the roadmap details by clicking the view button then the system displays the roadmap details. 3. The user receives material from the roadmap by clicking accept then entering the qty received. Then click save and qty received on the order details will increase then a popup will appear.
Actual Result	As expected
Conclusion	The Roadmap module works as expected

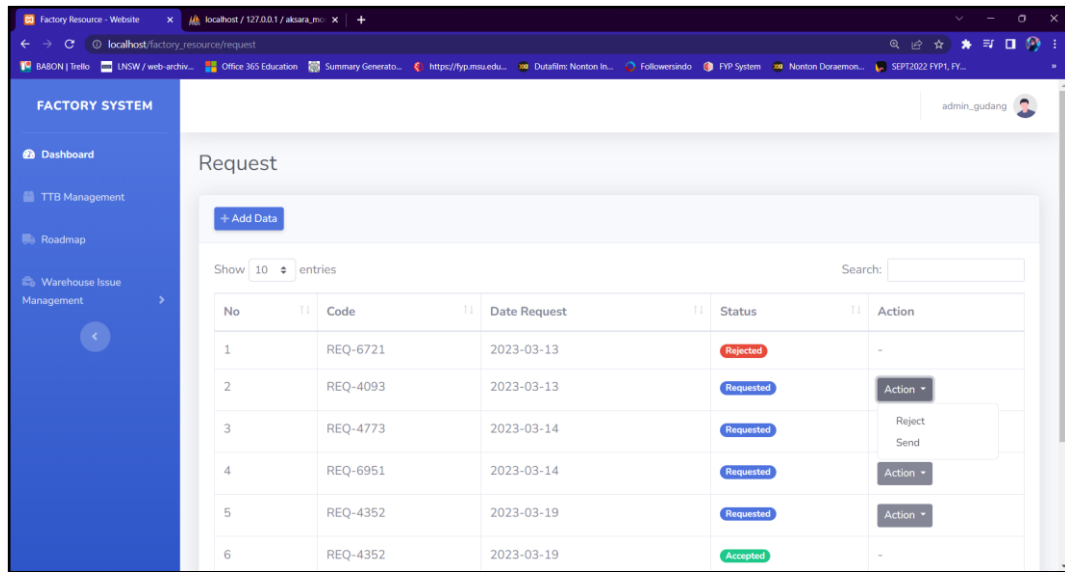


Figure 4. 8 Request Menu

Table 4. 7 Test Case 7

Test Case 7	
Test Data	Request menu on the warehouse admin user page
Module Testing	Request
Objective	The warehouse admin can view the list of requests, accept requests or reject requests.
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Request menu then the system will display a list of request data. 2. The user rejects the request by clicking reject then the request status will change to rejected. 3. The user accepts the request by clicking send then entering the request details. User changes status and enters qty sent amount. If the process is successful, the status will change and the qty sent will be filled. After successfully receiving the request, the system automatically creates a roadmap.

Actual Result	As expected
Conclusion	The Request module works as expected

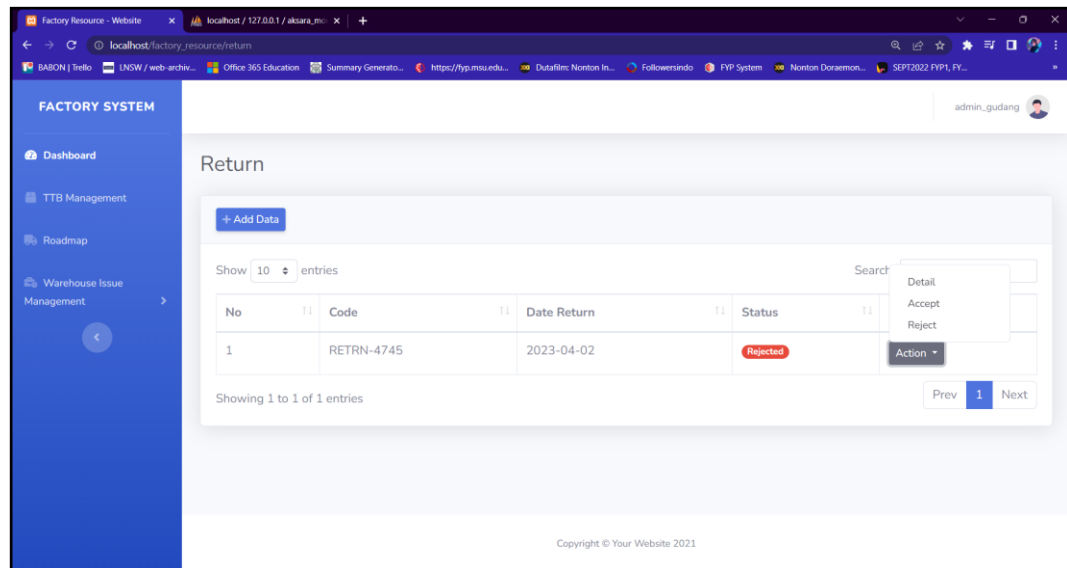


Figure 4. 9 Return Menu

Table 4. 8 Test Case 8

Test Case 8	
Test Data	Menu Return on the warehouse admin user page
Module Testing	Return
Objective	Warehouse admin can view list returns, view details, accept returns or reject returns.
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Return menu then the system will display a list of return data. 2. Users see details by clicking on details and the system will display return details. 3. The user rejects the return by clicking reject then the return status will change to rejected. 4. The user receives a return by clicking accept then the status changes to accepted.

Actual Result	As expected
Conclusion	The Return module works as expected

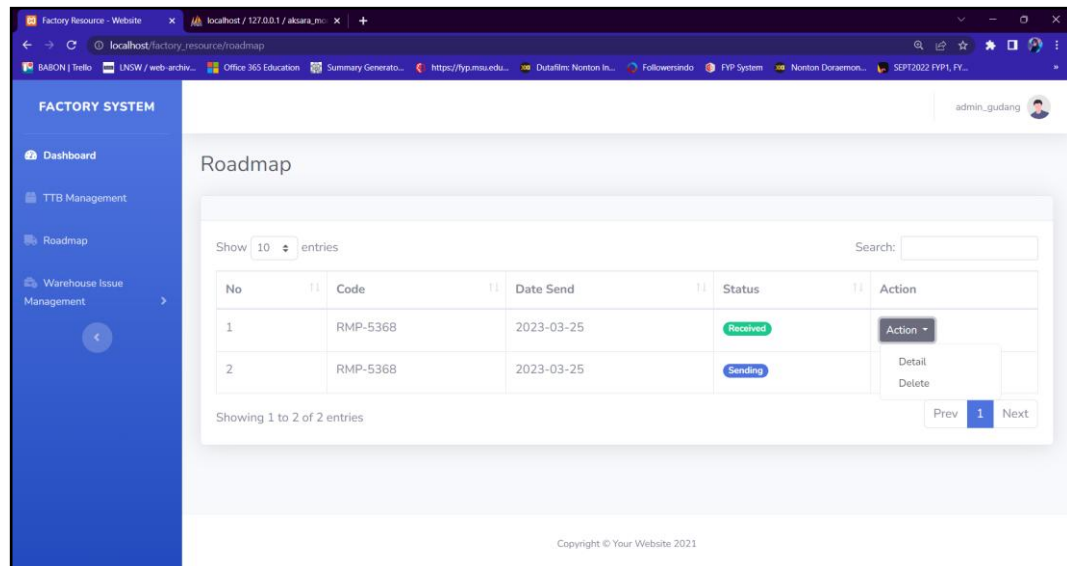


Figure 4. 10 Roadmap

Table 4. 9 Test Case 9

Test Case 9	
Test Data	Roadmap menu on the warehouse admin user page
Module Testing	Roadmap
Objective	The warehouse admin can view the roadmap list, view details, update the roadmap.
Expected Result	<ol style="list-style-type: none"> 1. The user enters the Roadmap menu then the system displays a list of roadmap data. 2. Users see details by clicking on details and the system will display a detailed roadmap. 3. The user updates the roadmap to change the status by clicking update then entering the update page then clicking save. If successful,

	the data will be updated and a popup will appear.
Actual Result	As expected
Conclusion	The roadmap module works as expected

4.3 System Test

The overall website testing phase is called system testing and is part of the software testing cycle. System testing used to determine whether the entire system meets that standard given. System testing helps in functional approval and verification, technical, and non-functional application requirements.

Table 4. 10 System Test

Function	Result	Status
Login	Objective: The user enters the system with the registered username and password Outcome: Able to meet objective requirements	Success
Item management	Objective: Production users can perform CRUD item data Outcome: Able to meet objective requirements	Success
TTB management	Objective: 1. Warehouse users can perform CRUD material data	Success

	<p>2. Production users can see the material list</p> <p>Outcome: Able to meet objective requirements</p>	
Request	<p>Objective:</p> <ol style="list-style-type: none"> 1. Production users make requests and update requests 2. Warehouse users can view, accept or reject requests <p>Outcome: Able to meet objective requirements</p>	Success
Return	<p>Objective:</p> <ol style="list-style-type: none"> 1. Production admin can make returns 2. Warehouse admin can accept or reject returns <p>Outcome: Able to meet objective requirements</p>	Success
Roadmap	<p>Objective:</p> <ol style="list-style-type: none"> 1. The production admin can view details and receive data sent by the warehouse admin via the roadmap 	Success

	<p>2. Warehouse admin can update and view roadmap details</p> <p>Outcome: Able to meet objective requirements</p>	
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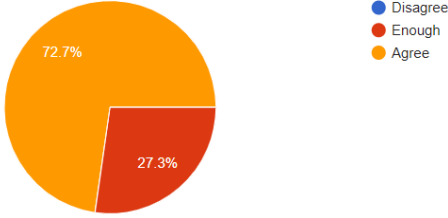
4.4 User Acceptance Testing

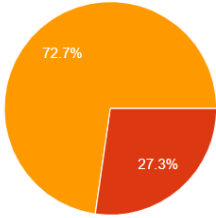
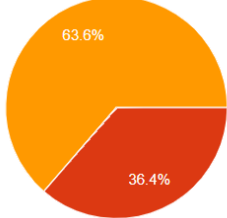
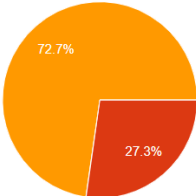
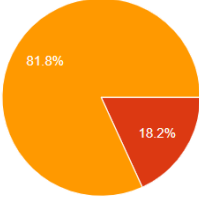
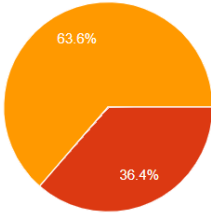
In testing user acceptance testing, users are given the opportunity to use the system and are encouraged to answer questions in the form of a questionnaire with criteria ratings contained in the table.

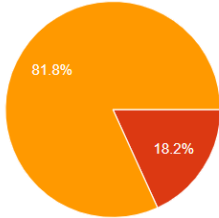
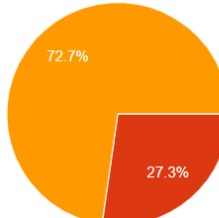
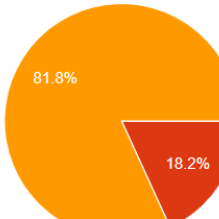
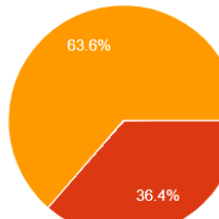
Table 4. 11 User Rating Weight

Value weight	Information
1	Disagree
3	Enough
5	Agree

Table 4. 12 Questionnaire questions and Graphs

No.	Question	Graphs
1.	Does the system have clear and comprehensive documentation?	
2.	Is the system performing well and responsive?	

		 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
3.	Can the system be integrated with other systems used in the company?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
4.	Does the system have features to manage and track factory raw materials?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
5.	Is the system able to manage and add product data properly?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
6.	Does the system have features that enable effective inventory management?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
7.	Does the system provide complete and accurate reports on	

	requests and returns for raw materials?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
8.	Does the system efficiently manage products, requests and returns of raw materials?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
9.	Does the system provide relevant and accurate information regarding raw material stocks?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree
10.	Is the system user interface (UI) easy to understand and intuitive?	 <ul style="list-style-type: none"> ● Disagree ● Enough ● Agree

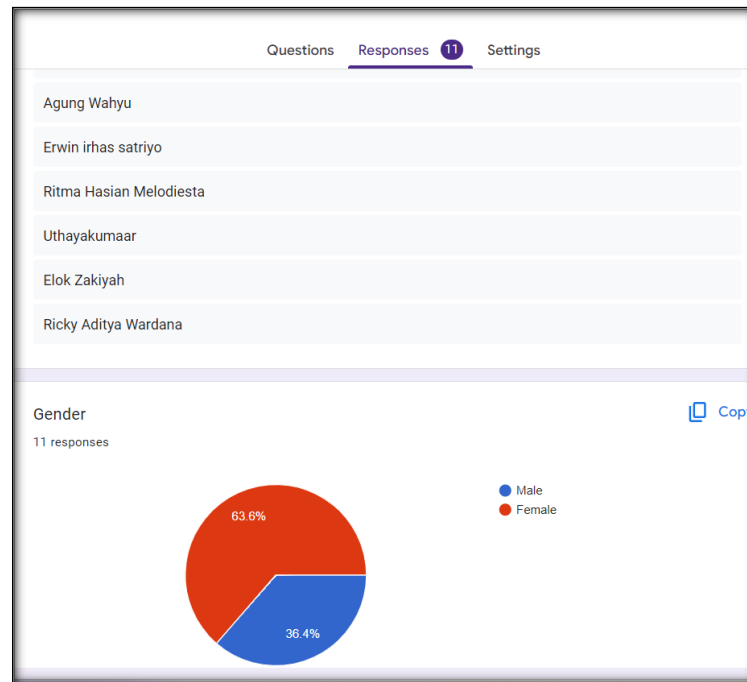


Figure 4. 11 Questionnaire

In the picture above is the name of the user who uses the application and fills in the user acceptance testing questionnaire.

Table 4. 13 Responden Result

No.	Question	Respondent Value			Weight
		Disagree x 1	Enough x 3	Agree x 5	
1.	Does the system have clear and comprehensive documentation?		3x3 = 9	8x5 = 40	49
2.	Is the system performing well and responsive?		3x3 = 9	8x5 = 40	49

3.	Can the system be integrated with other systems used in the company?		$4 \times 3 = 12$	$7 \times 5 = 35$	47
4.	Does the system have features to manage and track factory raw materials?		$3 \times 3 = 9$	$8 \times 5 = 40$	49
5.	Is the system able to manage and add product data properly?		$2 \times 3 = 6$	$9 \times 5 = 45$	51
6.	Does the system have features that enable effective inventory management?		$4 \times 3 = 12$	$7 \times 5 = 35$	47
7.	Does the system provide complete and accurate reports on requests and returns for raw materials?		$2 \times 3 = 6$	$9 \times 5 = 45$	51
8.	Does the system efficiently manage products, requests and		$3 \times 3 = 9$	$8 \times 5 = 40$	49

	returns of raw materials?				
9.	Does the system provide relevant and accurate information regarding raw material stocks?		2x3 = 6	9x5 = 45	51
10.	Is the system user interface (UI) easy to understand and intuitive?		4x3 = 12	7x5 = 35	49

In the table of respondents, the results are the results that have been multiplied by the weight in the user rating weight table. Data on tables this is then used to calculate the percentage value. The following is the average value formula:

$$\text{Average value} = \frac{\text{The total weight of the respondents value}}{\text{Total respondents}}$$

After getting the average value, it is necessary to calculate the percentage of questions that are carried out to get the results of the quality of the system to be suitable for use by users.

$$\text{Percentage} = \frac{\text{Average value}}{\text{maximum weight}} \times 100\%$$

Table 4. 14 Result percentage of questions

No.	Average value	Percentage	information
1.	49/11 = 4.45	4.45/5*100% = 89%	Percentage of questions number 1
2.	49/11 = 4.45	4.45/5*100% = 89%	Percentage of questions number 2

3.	$47/11 = 4.27$	$4.27/5 * 100\% = 85.4\%$	Percentage of questions number 3
4.	$49/11 = 4.45$	$4.45/5 * 100\% = 89\%$	Percentage of questions number 4
5.	$51/11 = 4.63$	$4.63/5 * 100\% = 92.6\%$	Percentage of questions number 5
6.	$47/11 = 4.27$	$4.27/5 * 100\% = 85.4\%$	Percentage of questions number 6
7.	$51/11 = 4.63$	$4.63/5 * 100\% = 92.6\%$	Percentage of questions number 7
8.	$49/11 = 4.45$	$4.45/5 * 100\% = 89\%$	Percentage of questions number 8
9.	$51/11 = 4.63$	$4.63/5 * 100\% = 92.6\%$	Percentage of questions number 9
10.	$49/11 = 4.45$	$4.45/5 * 100\% = 89\%$	Percentage of questions number 10

The table above shows the percentage of user acceptance test questions, it can be concluded that the average percentage is 89%. Based on the results of the total percentage, then the application is very good based on the criteria Interpretation of the scores contained in the table below.

Table 4. 15 Score Interpretation Criteria

Percentage	Information
0% - 20%	Not very good
21% - 40%	Not good
41% - 60%	Pretty good
61% - 80%	Good
81% - 100%	Very good

After performing the calculations on the test, the analysis obtained in the user acceptance testing test can be concluded that:

1. Content or information content shown on the website is in accordance with need.
2. Drafting menu and the contents of each - each menu on the website already neat and appropriate.
3. Election the colors on the website already look comfortable by user.
4. From the side operational information systems can provide convenience for users.
5. System can accessed according to user permissions.
6. Appropriate questions with user needs.

CHAPTER 5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The purpose of this website is to make it easier for users to develop systems for manufacturers to manage and facilitate searching of large amounts of data. Automatically control and monitor raw material requests and deliveries. To display dashboards to monitor multiple requests and deliveries, return notifications and road maps and raw material stock counts. This website is designed and implemented using the programming language CodeIgniter, PHP, HTML and Visual Studio Code. By making this website, it is hoped that it can provide convenience in a factory in producing goods and raw materials.

5.2 Recommendation

The results obtained from this study are not perfect, but in general the system can run well because it can perform CRUD, request raw materials, return raw materials and road maps. This project has been described previously. Therefore, to improve, the development project can be done by adding a sales admin.