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Bliese System: A web-based management system for small business

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Abstract: Most people start to get involved in the business world and manage their business manually which causes duplicated records, not tally stocks, and loss of manual records. This will also cause inconvenience for the business owner who does not own a management system. Thus, this project aims to develop a management system for small business which objectives are to design a management system, develop, implement, and perform alpha and beta testing for the developed The Bliese System. After a little research was done, the inventory system, web-based technology, and prototyping methodology are suitable to be implemented along with the development of this project. The implementation using PHP and MySQL has been done, and testing results show that the system is developed according to the objectives. The results from alpha and beta testing shows that the system is developed as expected and accepted by the owner and end-users. This system helps the owner of the company and users have a better system in keeping stocks and records updated and ease the process of purchasing and management. Although there are limitations figured out, improvisation can be done in future work such as including promotions in the main page to let the user know about current promotions, upgrading the cart to allow user to select which product in cart to be checked out, include more information about the owner's store in About Us page and include other payment methods such as Online Transfer, TouchnGo e-Wallet or payment a7-Eleven store. These improvements towards the system will eventually make the system more attractive, more flexible for other devices, and more user-friendly.

Keywords: Inventory, Web-Based, Prototype Methodology, Small Business Management System

1. Introduction

Most of the newbies in the business world handle their business manually without the use of a system, especially those who run a small business. Every day, staff, stock, and daily sales will be recorded. This will cause problems because staff records may be duplicated, stock records may not match existing stocks records, and daily sales records may be altered due to loss of track on specific

days. Business owners also need to manage the customers, products, suppliers, and agents. When all of the manual records are nowhere to be discovered during problems occur.

Therefore, The Bliese System is developed to make it easier for small business owners to manage their operation. This system can improve the current management system and make it easier for them to gather all of their business information in one place. In order to achieve this, few objectives have been set. They are:

- i. to design The Bliese System in a company using an object-oriented approach.
- ii. to develop and implement the system that will help the user to manage the business and interact with people of the business.
- iii. to perform alpha and beta testing on The Bliese System that has been built.

Amirudin 83 Enterprise becomes the case study for this project. The business was established in 2019 and was founded by Mr. Amirudin bin Othman. The business is called Bliese KL Sentul in conjunction with the founder who lives in the states of Kuala Lumpur. Mr. Amir works as an agent for the Bliese company. He started the business by selling Bliese Woodencap, a car air-freshener with 15 different types of fragrances. After getting profit from the sale of the car air-freshener, he started selling air-freshener for houses which are called Bliesematic Automatic Spray that comes with four different fragrances that will resolve the bad odor in the house. His position was raised from being an agent to stockist. From there, he managed to rent a store to keep the existing product stocks. When the company launched a new product, the body perfume that comes with 15 fragrances for men and 25 fragrances for women, he started selling the body perfume. With the sales and profits, he managed to be promoted once again from being a stockist to a master stockist.

2. Related Work

This part discusses the existing system that is similar to the system that is going to be developed. By studying the existing system, comparisons can be made with other systems, subsequently able to identify the advantages and disadvantages of the system. This can help in developing a new system. A summary table for the comparison between the developed system and a similar system will be shown after the description of the three-existing system.

2.1 Sales and Inventory Management System

According to [13], this inventory management are done to be run and used on a desktop. This is to ease people with no technical skills to operate the functions available in the system. There are a few features and functions that is develop in this system, which is log in, process sale, tracking inventory level, update database, and generate report.

From the phase of system testing, users are satisfied with the interface of the system where they strongly agree with the location of button, easy navigation and suitable font. Users are also satisfied with the effectiveness of the system as it is clear and easy to follow, detect stock easily and POS works well with less error. Users agree that the system benefits them as it is very useful and needed in their business life. Lastly for user acceptance, users satisfied with the generated report as it is very helpful and applicable for further decision. Testing is done on customer to gain feedbacks on how they are satisfied when using the system. Although there are less than five respondents that is neutral with the system, but most of them agree with the performance given by the system.

2.2 Web-based Online Inventory System

According to [14], this online inventory management are done to be run and used on the internet as the system has barcode reader platform designed in it. This system benefits user as it makes monitoring

current stocks, generating reports about products, and transforming product to be a stock become easier. There are a few features and functions that is develop in this system, which is Login, Data Master, Recapitulation Stock Inventory, Recapitulation Stock in Distribution, Inventory Reports on Masters and Divis, and Periode History.

This system is said to be an improvement and to develop a system that will help companies as it can be used not only in companies, but also in the industry or business. It is still the best system applied in companies, energy and cost can be reduced.

2.3 Retail Giant Inc.

According to [15], this web-based inventory management are done as it suits the requirement of small business. Other type of inventory management systems is not suit with the project proposed in the early phase. There are a few features and functions that is develop in this system, which is Login, Main Menu, Purchase Order, Receive Order, Transfer Stock, Miscellaneous Reports, Miscellaneous Maintenance and View Reorder Level.

Table 1: Comparison of existing system

Features	Sales and Inventory Management System	Web-based Online Inventory System	Retail Giant Inc.	The Bliese System
Login	Yes	Yes	Yes	Yes
Registration for New Account	No	No	No	Yes
Admin View	Yes	Yes	Yes	Yes
User View	No	No	No	Yes
Inventories Update	Yes	Yes	Yes	Yes
Ordering Section	Yes	No	Yes	Yes
Generating Report	Yes	No	Yes	Yes
Usability platform	Desktop-based	Web-based	Web-based	Web-based

From Table 1, the similarities between all related work can be seen. Despite the similarities, they have their own unique functionality, which makes them different from other systems. Sales and Inventory Management System and Retail Giant Inc. include the ordering section and reports generating while Web-based Online Inventory System does not include those mentioned features. All of the related work does not include user view and registration for a new account. The Bliese System focus on having admin customer view, including the registration account for a new user, ordering section, and report generating section

3. Methodology/Framework

Prototype methodology is chosen for developing this project because of a few reasons. Firstly, this methodology involves the users throughout the development. Whenever there are errors, they can be detected at an early stage. Functionality can be examined, and there is any missing functionality, it can be identified, and this will lead to reducing the risk of failure. This methodology provides developers with a better understanding of the requirements of customers. Prototyping methodology encourages the developers to be innovative and flexible when designing the prototype. Satisfaction from the customer can be gained as they experienced using the prototype from the early phase until the final product.

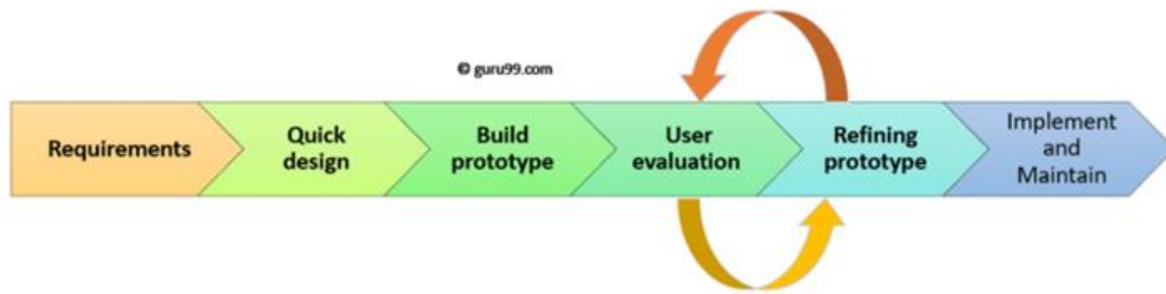


Figure 1: Prototyping model [17]

There are phases in gaining requirements in Prototype methodology, designing, implementing, and deploying the final product. The phases can be specified as requirement gathering and analysis, quick design, building the prototype, initial user evaluation, refining prototype, and implementing product and maintenance phase. The phases are shown in Figure 1. Table 2 below shows the tasks and output from the task which had finished within the time given.

Table 2: Software development activities and tasks

Phase	Task	Output
Requirement Gathering and Analysis	<ul style="list-style-type: none"> Meet with client to gather requirements of the system Determine the objectives, project schedule, activities, and output Determine the hardware and software that will be used in the project Determine the functional and non-functional requirement Analyse the requirement and list down according to prioritization 	<ul style="list-style-type: none"> Proposal Gantt Chart System Requirement Document
Quick Design	<ul style="list-style-type: none"> Develop the use case diagram, class diagram and sequence diagram Design the system with initial requirement gathered Design the database 	<ul style="list-style-type: none"> Use Case Diagram Class Diagram Sequence Diagram User interfaces design Database design
Build a Prototype	<ul style="list-style-type: none"> Implement the design into a prototype Implement the database design into a prototype 	<ul style="list-style-type: none"> Programming Code Prototype
Initial User Evaluation	<ul style="list-style-type: none"> Deploy the prototype to the client Perform testing on the prototype used. Get user feedbacks towards the prototype 	<ul style="list-style-type: none"> Feedback from client
Refining Prototype	<ul style="list-style-type: none"> Improve the prototype based on feedback from customer Repeat the evaluation phase until all requirements are met 	<ul style="list-style-type: none"> Final prototype
Implement Product and Maintain	<ul style="list-style-type: none"> Code and test the final prototype Document related information about the project Deploy the system to the client Perform maintenance 	<ul style="list-style-type: none"> Complete system System Report

4. Analysis and Design

4.1 System Analysis

The diagrams presented in this chapter are the use case diagram, activity diagram, and class diagram. The system requirements gathered is as following:

- i. User able to register an account
- ii. Admin and User able to login to the system
- iii. Admin able to manage product details
- iv. Admin and User able to view details of the product
- v. user able to purchase the product
- vi. Admin able to update the order status
- vii. User able to check order status
- viii. Admin able to manage user's information
- ix. User able to manage their information
- x. Admin able to generate the report

4.2 Use Case Diagram

There are five use cases related to admin to conduct in this project. Admin log into the system using registered information. Once login is successful, the admin can manage product details. For example, there is a newly promoted product to be included in the stock. The admin will input the information about the product into the system and manage the details at some other time. Then, the admin can view the details of the product created in the system. Next, the admin can update the order status for the user by updating the status of the purchase as well as deleting any canceled order by request. Admin can manage user's information such as creating user's information or updating user's information. Lastly, the admin can generate a report to analyze the future planning of the business. This can be referred to the Figure 2.

There are six use cases related to the user in this project. First, users will create an account and log into the system using the information registered. Once login is successful, the user can view the details of each product available in the store. Users can purchase a product by ordering the amount of product needed and includes the receipt of payment if they pay by transfer. Then, the user will be able to check their order's status, either it is received, preparing, or completed. Lastly, the user can view and update their registered information in the profile.

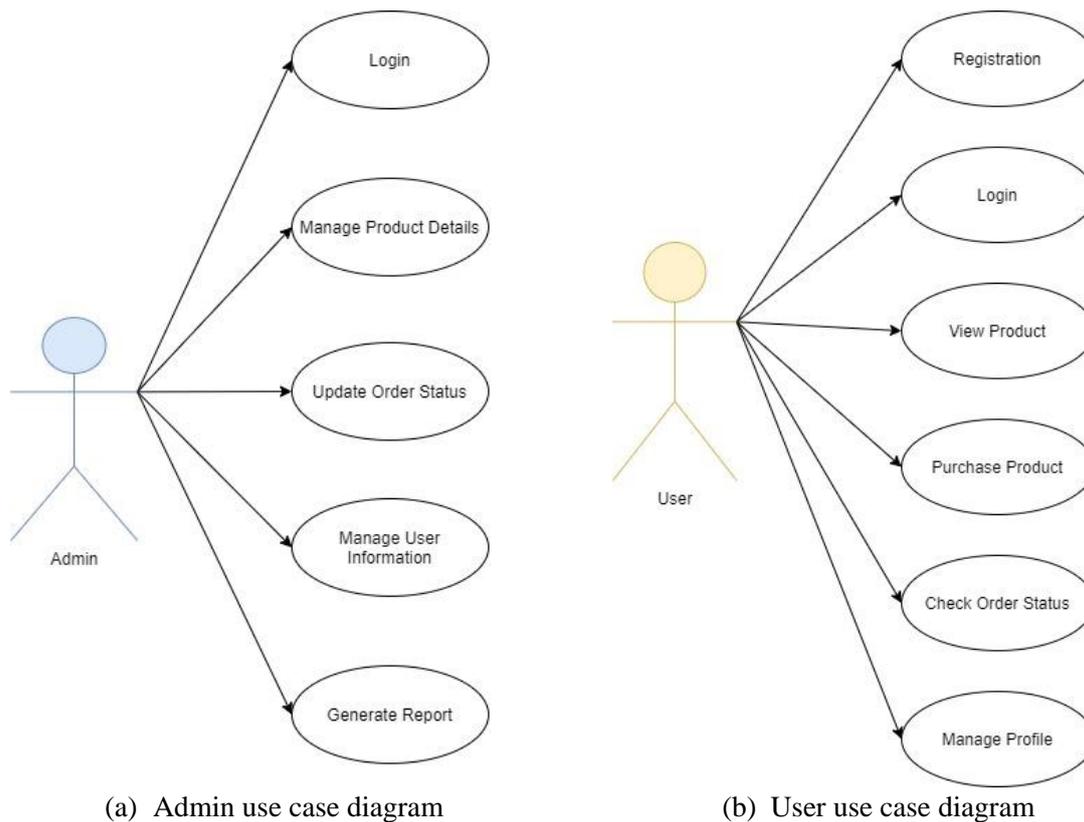


Figure 2: System use case

4.3 Class Diagram

According to [23], a class diagram has the purpose of various categories such as code, design, and dialogue. For the code category, a class diagram is used to document the existing program code. For the design category, the class diagram is used to create software designs that model the solution, in other way documenting the non-existing program code. For the dialogue category, a class diagram is used to design the software and create a dialogue to be understood by other team members in a changeable process that is being implemented in the program code. The class diagram contains shapes that represent a specific meaning. Figure 4.3 in Appendix A shows the class diagram for this system.

4.4 Hardware and Software Specification

The hardware and software used are listed out in the Table 3 and 4 below:

Table 3: List of hardware

Hardware Requirements	Description
Computer	Lenovo IdeaPad S340-14IIL
Processor	Intel® Core™ i5-10305G1 CPU @ 1.00GHz 1.19 GHz
Random Access Memory (RAM)	4.00 GB
Solid State Drive (SDD)	256GB
Hard Disk Drive (HDD)	4GB DIMM DDR4-2666
Peripheral Devices	Mouse, Keyboard

Table 4: List of software

Software Requirements	Description
Operating System	Windows 10
Programming platform	Microsoft Visual Studio 2019
Web Browser	Google Chrome, Microsoft Edge
Database	MySQL
Documentation	Microsoft Word
Gantt Chart	TeamGantt

4.5 System Design

After requirements are successfully analyzed, the project will move to the design phase. In this part, both the user interface and database are designed to visualize The Bliese System that will be developed before moving to the implementation phase. Thus, designing the system requires two parts, user interface design and database design.

5. Implementation and Testing

In this section, the analysis and design of the application are implemented. When the implementation is done, the project must be tested to ensure the system runs smoothly and all the requirements are satisfied. The results of the system are produced as expected.

5.1 Implementation

This part shows the implementation of interface and database design into the system. The interface implementation can be referred to Figure 3, 4 and 5. The database implementation can be referred to Appendix B.

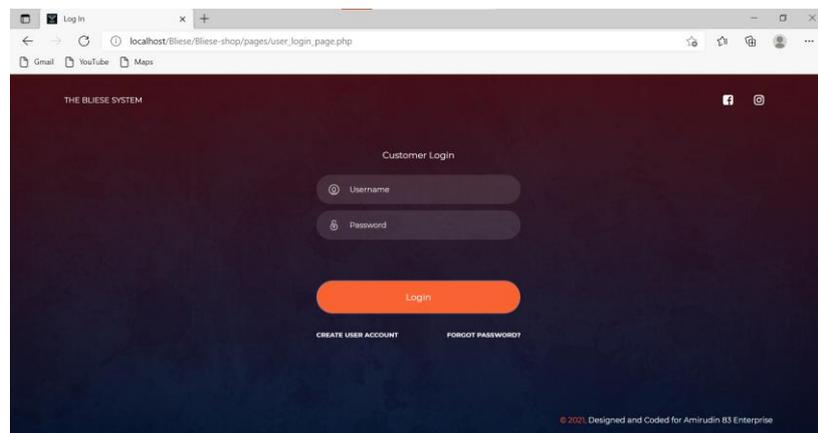


Figure 3: Login Page for User

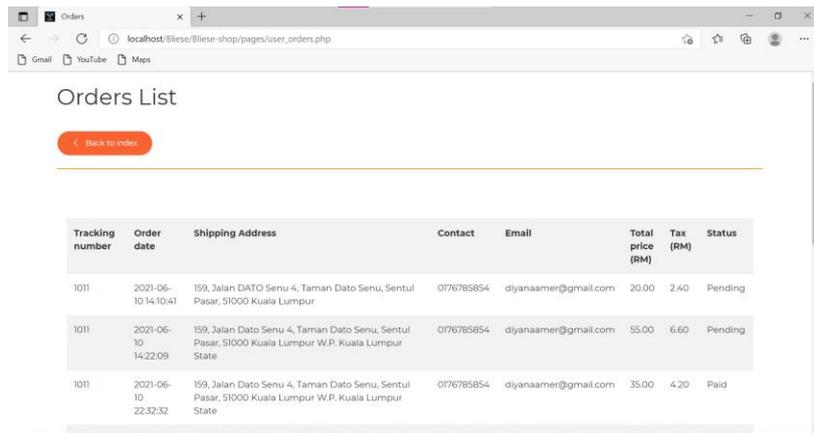


Figure 4: Order Status Page

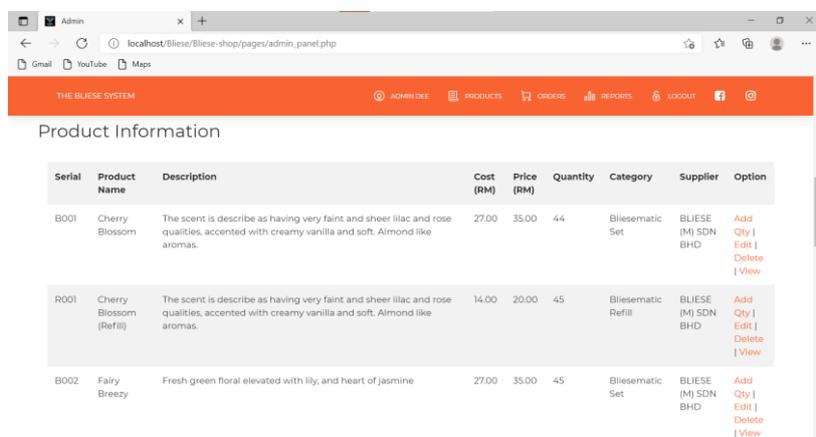


Figure 5: Product Information Page

5.2 Testing

Testing is important in every project and system as it verifies that the project or system is ready to be released. Testing is done after implementation is complete. This is to ensure that all requirements are satisfied, and functions are correctly working according to interface design. The Bliese System is implemented with an interface that allows users to directly interact with it. Table 5 below describes the test case summary for each function and tested by the input specification described.

Table 5: Test case summary

No	Module	Test Cases	Expected Output	Actual Output
1	Registration	Fill up every field	Registration success	Success
		Fill up only one field	Registration unsuccessful	Success
		Fill up only three field	Registration unsuccessful	Success
		Fill up only five field	Registration unsuccessful	Success
		Fill up only seven field	Registration unsuccessful	Success

Table 5: Test case summary (cont)

No	Module	Test Cases	Expected Output	Actual Output
2	Login	Create account with no information	Registration unsuccessful	Success
		Enter correct username and password	Success login	Success
		Enter correct username and wrong password	Unsuccessful login	Success
		Enter wrong username and correct password	Unsuccessful login	Success
		Enter wrong username and wrong password	Unsuccessful login	Success
		Login without entering username and password	Unsuccessful login	Success
3	Manage Product Details	Add positive quantity into specific product	Add available quantity	Success
		Add negative quantity into specific product	Subtract available quantity	Success
		Update product details	Display updated product	Success
		Delete product from the list	Deleted data is not displayed	Success
		View product details	Display product details	Success
4	View Product	'View Details' button	Display product details	Success
		Click 'Next' on images' carousel	Display next image	Success
5	Purchase Product	Click 'Add to Cart' button	Display quantity modal	Success
		Enter quantity to purchase	Only quantity available can be selected	Success
		Click 'Add to Cart' in modal	Data shown in shopping cart	Success
		Click 'Close' button in modal	Close the modal	Success
		Click 'Update Quantity' in shopping cart	Display updated quantity	Success
		Click 'Remove' button	Deleted data is not displayed	Success
		Click 'Check Out' button	System asks for shipping address	Success
		Click 'Submit' button	Direct to receipt page	Success
		View receipt after purchase	Display correct information based of purchase	Success
6	Check Order Status	View order made previously	Display correct order data and updated status	Success
7	Update Purchase Status	View order made by users	Display accurate information	Success

Update status of order Display updated status Success

Table 5: Test case summary (cont)

No	Module	Test Cases	Expected Output	Actual Output
8	Manage User Information	Update information	Display updated information of supplier and admin	Success
		Delete information	Deleted data is not displayed	Success
		Click 'Add' button	Redirect to add new supplier/admin page	Success
		Add information	Display newly registered supplier and admin information	Success
		View information	Display the details correctly	Success
		View user's information	List of users registered displayed	Success
9	Generate Report	View reports of users, products, and orders	Display information accurately	Success
		Click 'Print' button	Print the updated report	Success

Beta testing user acceptance testing is done towards the system to ensure that the requirements are satisfied by the owner before the system is launched for the use of end-user. It is also done to get feedbacks from end-user in order to improve the system in the future. Figure 6, 7, 8 and 9 below show the summary of feedbacks gained from owner and end-user through Google Form. User acceptance testing done with admin consists of three responses which

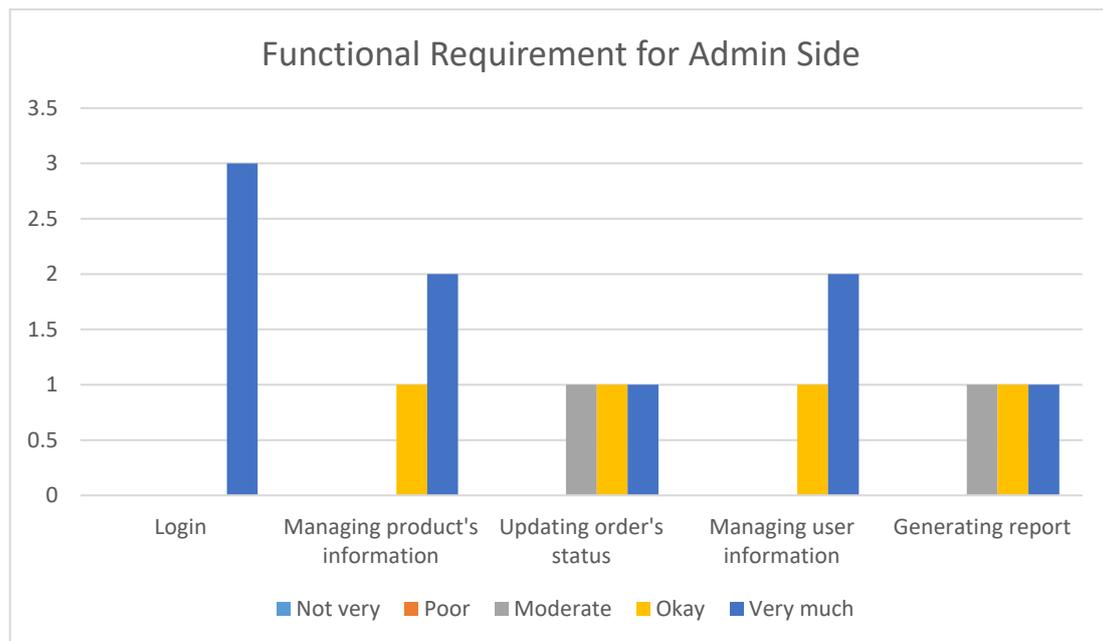


Figure 6: Results of Functional Requirement for Admin Side

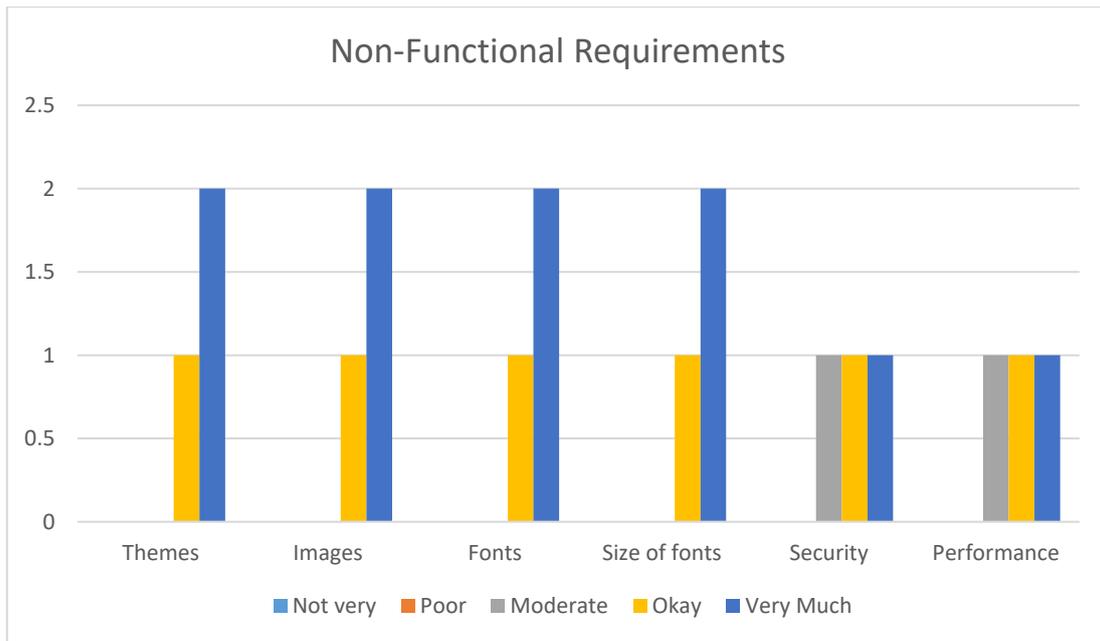


Figure 7: Results by Admin for Non-Functional Requirements

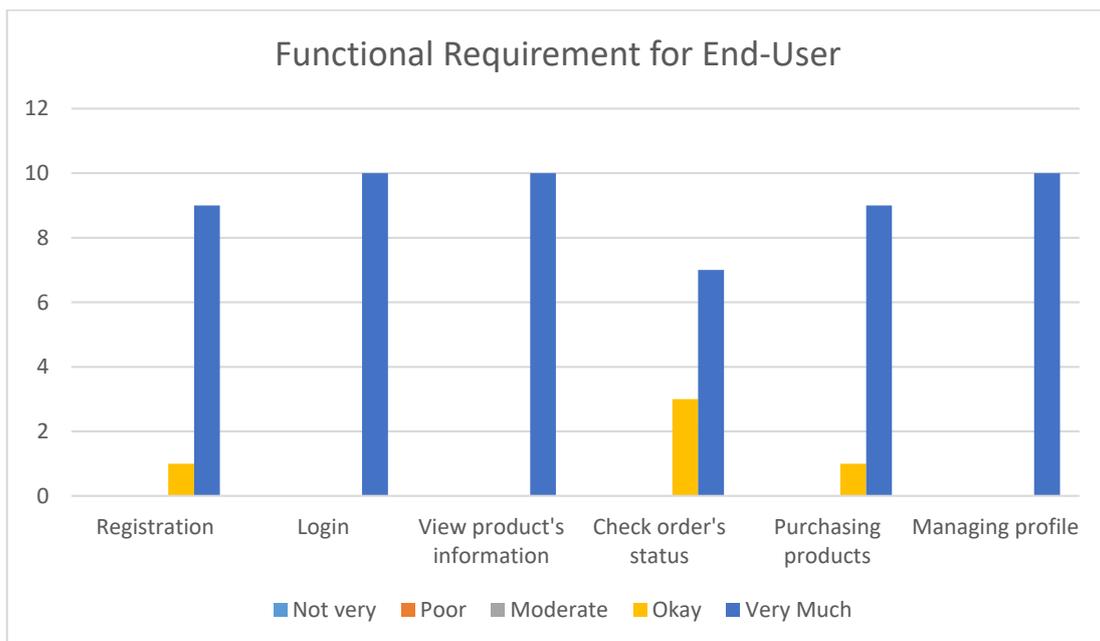


Figure 8: Results by User for Functional Requirement for User Side

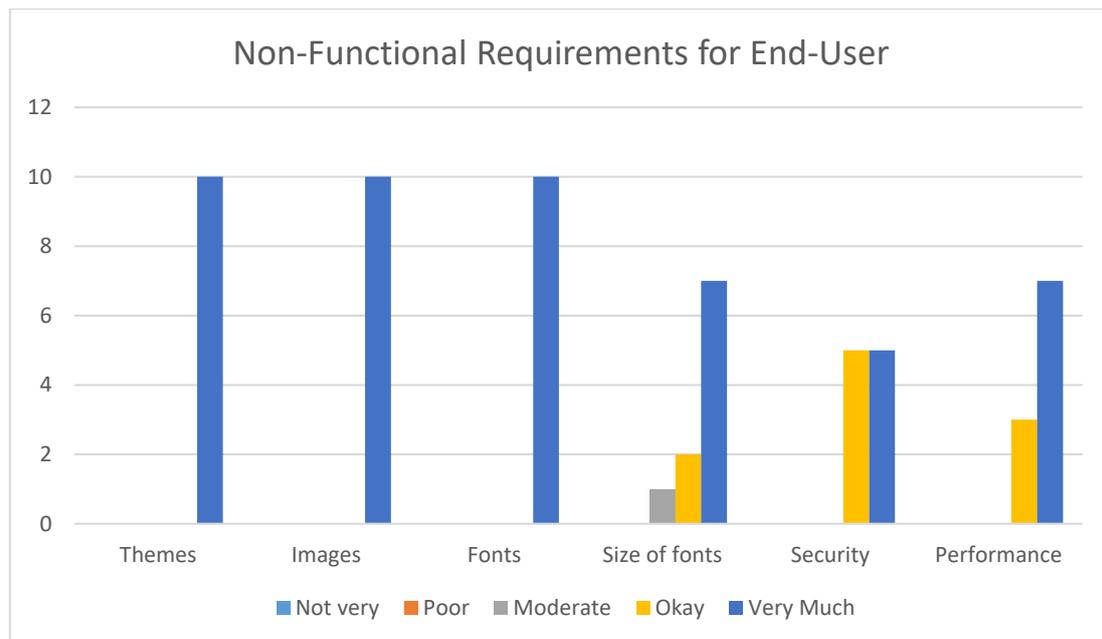


Figure 9: Results by User for Non-Functional Requirements for User Side

6. Conclusion

In conclusion, this application helps the owner of the business to manage the business better. In introduction section, the problem statements are listed that leads to the purpose and objectives of developing this system. The target users are set and the scopes are explained. In literature review section, researches and comparisons are made in order to gain knowledge and more understanding about how the system works. The method, technology and methodology are studied and the inventory management, web-based technology, and prototyping methodology are used in order for this system to work. In analysis and design section, the system requirement is described in use case, activity and class diagram. The Bliese System is successfully developed using HTML and PHP language for the user interface and back-end programming and connecting to MySQL database. Alpha testing is done and proven to achieve the objectives and scopes of the projects when all test cases are as expected output. This system is tested to ensure that it satisfies the project's requirements and check all the functions and modules whether they worked smoothly as expected. Although there are limitations figured out, improvisation can be done in future work. Improvisation such as including promotions in the main page to let the user know about current promotions, upgrading the cart to allow user to select which product in cart to be checked out, include more information about the owner's store in About Us page and include other payment methods such as Online Transfer, TouchnGo e-Wallet or payment a7-Eleven store. These improvements towards the system will eventually make the system more attractive, more flexible for other devices, and more user-friendly.

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Appendix A

Analysis (Use Case and Class Diagram)

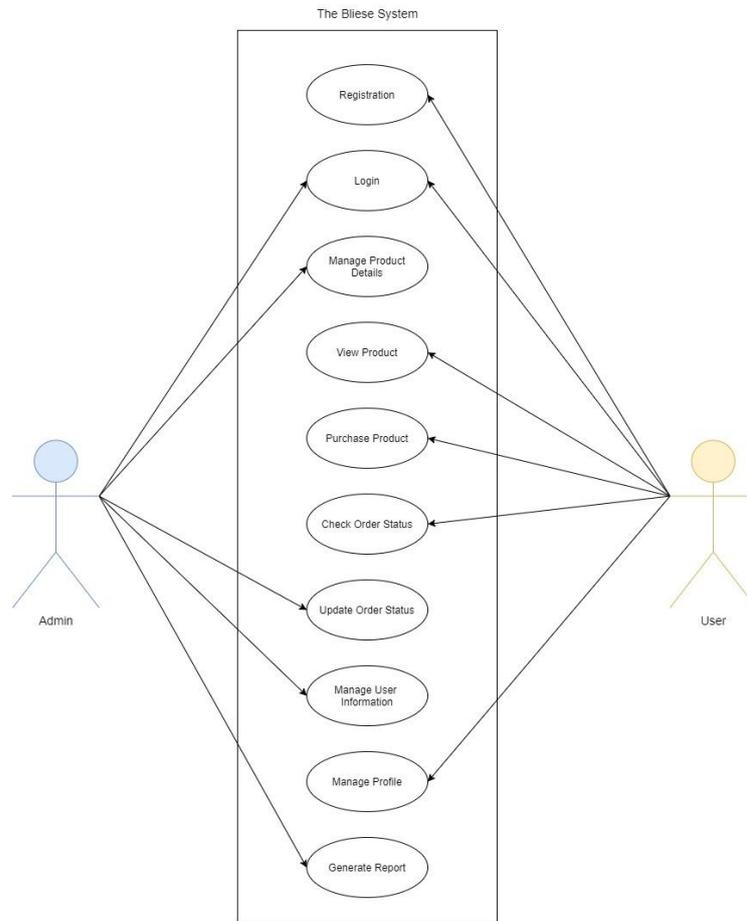


Figure 10: Use Case Diagram

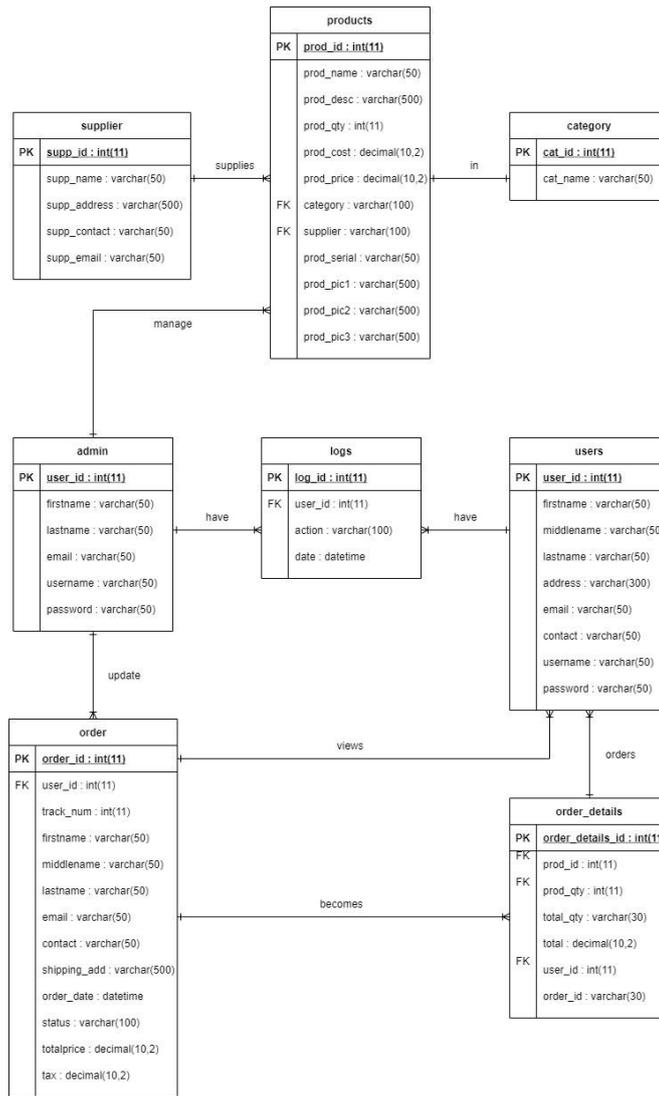


Figure 11: Class Diagram

Appendix B

Database Implementation

Showing rows 0 - 1 (2 total, Query took 0.0008 seconds.)

SELECT * FROM `admin`

	user_id	firstname	lastname	email	username	password
	3	admin	admin	admin@admin.com	admin	admin
	4	Dee	Amer	admin@gmail.com	dydy	a1Bz20yqelm8m1wqjld925fa86084bd0300fd7fd05dd97

Figure 12: Table admin

Showing rows 0 - 5 (5 total. Query took 0.0016 seconds.)

```
SELECT * FROM `order`
```

order_id	user_id	track_num	firstname	middlename	lastname	email	contact	shipping_add	order_date	status	totalprice	tax
2	1	1011	Dyana	Shahrul	Amer	dyanaamer@gmail.com	0176785654	159, Jalan DATO Senu 4, Taman Dato Senu, Sentul Pa.	2021-06-10 14:10:41	Pending	20.00	2.40
3	1	1011	Dyana	Shahrul	Amer	dyanaamer@gmail.com	0176785654	159, Jalan Dato Senu 4, Taman Dato Senu, Sentul Pa.	2021-06-10 14:22:09	Pending	55.00	6.60
4	1	1011	Dyana	Shahrul	Amer	dyanaamer@gmail.com	0176785654	159, Jalan Dato Senu 4, Taman Dato Senu, Sentul Pa.	2021-06-10 22:32:32	Paid	35.00	4.20
5	1	1011	Dyana	Shahrul	Amer	dyanaamer@gmail.com	0176785654	159, Jalan Dato Senu 4, Taman Dato Senu, Sentul Pa.	2021-06-11 15:05:59	Shipped Out	35.00	4.20
9	12	2212	Nur Dyana	Shahrul	Amer	dyanaamer@gmail.com	0123456789	Taman Dato Senu WP Kuala Lumpur State	2021-06-12 17:13:37	Pending	35.00	4.20

Figure 13: Table order

Showing rows 0 - 1 (2 total. Query took 0.0017 seconds.)

```
SELECT * FROM `users`
```

user_id	firstname	middlename	lastname	address	email	contact	username	password
1	Dyana	Shahrul	Amer	159, Jalan Dato Senu 4, Taman Dato Senu, Sentul Pa.	dyanaamer@gmail.com	0176785654	dyana	a1Bz20ydyqelm8m1wqj85361788da64de67033119452683136
12	Nur Dyana	Shahrul	Amer	Taman Dato Senu	dyanaamer@gmail.com	0123456789	dyana	a1Bz20ydyqelm8m1wqj7a4a502549f9c9e4608eaa5c1d87498

Figure 14: Table users

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