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A Development of Hot and Cold Drink Flavor Stock Inventory System

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Abstract: Hot and cold coffee consumption remains a daily ritual for Malaysian. Bareezta Coffee is a small company that sells hot and cold drink flavor which only uses a manual system to manage the stock. Current system used is manual system that lack of security, ineffective stock control and not provide a report. The main objective of this project is to develop a computerized inventory system that manage the stock automatically. The methodology that been selected is prototyping because the developing process need a lot of user feedback. Using prototyping will increase the chances of top-quality product being produced and the chance of failure is low. After the development completed, the objective of this project has been achieved which is provide 8 module function with a better security, product management, stock control and provide an accurate data. Briefly, the project allows the users to easily manage the business product and stock.

Keywords: Management, Inventory System, Computerized System

1.   Introduction

Hot and cold coffee consumption remains a daily ritual for a sizable portion of Malaysians, but the growing desire for unique coffee experiences drives demand. This shift in preference is being fueled by an increase in the number of coffee shops. A coffee shop is simply an establishment that sells coffee. Coffee shops are now giving an enjoyment of coffee in a distinctive way, include Bareezta Coffee [1].

Bareezta Coffee is a small company that sells hot and cold drink flavor. As the company is a small business, it only uses a manual system that only manage the stock by write the details of the stocks manually. Also, to add, delete or edit the data, the employees need to do it one by one. Not only that, to check the availability or the expiry date of the stock, user need to review the document one by one. The current system that been used by Bareezta Coffee company also are lack of security because the data can be accessed by unauthorized user. Lastly, to generate the monthly report, the employees need to create the report manually by analyze the data from the document one by one.

The problem encountered from using the current system is there is no computerized system as the business is using manual system. Next, the problem is lack of security. As the system can be accessed by anyone that use the desktop, the data in current system that been used are not secure. Also, not providing a report feature. The organization need to do it manually by analyze one by one from the document. Lastly, the current system also does not provide the notification that show an expiry date product.

To solve the problem, the solution that will be proposed is by adding the security to the system by only allow authorized user to enter the system, provide the report automatically by the details that been saved from the system and adding a notification or product control features for employees to check the expire date of the products in the system. The aim of this project is to develop a desktop-based system called hot and cold drink flavor stock inventory system that more secure and provide a feature that can easily manage drink flavor stock.

This paper is organized into five section which the first part is an introduction that describe the context of this project. Second section describe the related work. In third section, the methodology is explained. The fourth section will discuss about result of implementation and testing and the last section is conclusion with some instructions for future employment is given.

2.   Related Work

The case study of this project is the inventory system of Bareezta Coffee. Hot and cold coffee consumption remains a daily ritual for a sizable portion of Malaysians, but the growing desire for unique coffee experiences drives demand. This leads to increasing the number of coffee shop. Coffee shops are now giving an enjoyment of coffee in a distinctive way, include Bareezta Coffee [1]. Not only does Bareezta Coffee sell coffee, but it also sells a variety of other drinks. Bareezta Coffee is a small company that sells hot and cold drink flavor. Bareezta Coffee uses a manual system that only manage the stock by write the details of the stocks manually. To do a product management, stock control, reorder process and produce a report, the staff need to do it manually which will take a lot of time. Not only that, the current system also is lack of security because the data can be accessed by unauthorized user.

The method that been used is Inventory control systems, such as inventory control apps, provide a variety of functions that assist businesses in managing various types of inventories. An inventory management system is a programmed that aids in the operation of a business. Inventory management is a difficult problem in supply chain management. Companies must keep inventories in warehouses to meet customer demand. However, these inventories incur holding costs, resulting in a frozen fund that can be lost. As a result, inventory management's task is to determine the number of inventories required to meet demand while avoiding overstocks [2]. Inventory system also is a system for managing a company's inventories, including purchasing, receiving, tracking, warehousing and storage, turnover, and reordering. Computerized inventory control systems allow the various functional subsystems of inventory management to be integrated into a single cohesive system [3]

Desktop software or applications can be viewed of as a local version of a service or web-based application that allows the user to interact with the application processing without having to connect directly to the web service [4]. In general, desktop applications are faster than web-based applications because they run independently on your computer and do not require a proper Internet connection. In this case, independence from the web yields a positive outcome [5].

Based on search that has been done, there is three existing system that can be compare with proposed system including BMO Inventory Management System, POS Market and Stock Card. Table 1 gives the comparison of the existing systems with the new one. In summary, there is some advantages from these three existing systems that can be apply to the proposed system to develop a better system to manage the inventory items at Bareezta Coffee.

Table 1: Comparison analysis among similar systems

System Features	BMO	POS	STOCKCARD	HOT AND COLD DRINK FLAVOR STOCK INVENTORY SYSTEM
Log in	Worker id and password	None	Worker id and password	Worker id and password
Pre-order process	Provide a preorder process.	Provide a preorder process.	None	Provide a preorder process through email.
Security	Provide authorization access	No authorization accesses	Provide authorization accesses	Provide authorization access
User privilege	Worker id and password	None	Worker id and password	Worker id and password
Platform	Desktop based application	Web and desktop-based application	Desktop based application	Desktop based application
Reorder alert notification	By creating invoice	Has the features	Do not have the features	Has the features

3. Methodology/Framework

To complete the project, the methodology that been selected to complete this project is prototyping. During the design phase, prototyping increases communication between users and designers which is admin and the employees because the purpose of developing this system is to make the users easier to use the system. Prototyping methodology allow the early feedback from the organization, to proceed the system development. By that, its increased chances of top-quality product being produced, and the chance of failure is low. Table 2 shows the table activity.

Table 2: Software Development Activity

Phase	Activity	Expected Outcome
Requirement	- Conduct a fact finding - List all the user requirements. - System planning - Problem statements - Objective of the project - Scope of the project	A) Project proposal B) System's requirement C)DFD/UML diagram D)ERD/ Class Diagram E) Flowchart
Quick Design	A simple system design is created based on the requirement that been collected from user and based on objectives and scope of the project. After system	A) System architecture

	design is created, the user will review it.	B) Database design (schema and data dictionaries) C)interface design
Build Prototype	• A prototype will be built after the design already been review by the user. User feedback will be implemented.	Prototype
User Evaluation	• The finish prototype will be review and user will give the feedback and opinion. List of weaknesses will be listed.	Feedback from organization
Refining prototype	• Based on feedback, system weakness that been listed will be fix and the developer will refine the prototype until it meets the user requirement.	Refining prototype
Implement and maintain	• User will give the feedback • The final system will be implemented. • The system will do a routine maintenance for minimizing downtime and prevent large-scale failure	Final system implemented and maintenance.

The system requirement is being collected after an interview has been conducted with the organization and users to gain organization opinion and experiences. The system's performance and effectiveness should improve because of the requirement. The function that represents the real-life review and assessment process is highlighted in the system requirement analysis. The system need was to consider and include the systematic process with clear communication [6]. Table 3 show the functional requirement and Table 4 shows the non-functional requirement of the system.

Table 3: Functional requirement

No	Modules	Functionalities
1	Login Module	The system should allow the user to enter the system by insert valid user id and password. The system should alert the user for invalid input. The system is required to authorize users to perform different functions within the system.
2	Registration module	The system should allow only administrator to do a registration. The system should show error when empty field is found. The user should show error if there is duplicate user id.
3	Product management	The system should allow users to view the product details.

The system should allow users to view the product details.
The system should allow users to edit the product details.
The system should allow users to delete the product details.

4	Supplier management	The system should allow the administrator and managers to add the supplier details. The system should allow the administrator and managers to view the supplier details. The system should allow the administrator and managers to edit the supplier details. The system should allow the administrator and managers to delete the supplier details.
5	Stock management	The system should allow the users to enter the good in quantity. The system should allow the users to enter the good out quantity. The system should allow the users to view the product that near expire date. The system should allow the users to view the product shortage.
6	Reorder module	The system should allow the managers to do reorder process.
7	Report module	The system should allow the users to view and print the sale report.

Table 4: Non-Functional requirement

No	Requirements	Descriptions
1	Security	Only administrator can make a registration for new user. Only administrator can view all user data. Users only can enter the system by using own user id and password. Administrator, managers, and employees can only see their own work scope that been set.
2	Performance	The system should be available 24 hours per day and 356 days per year. The interaction between users and system should not exceed 5 minutes.
3	Operational	The system should be user-friendly The system will be able to run on personal computer.

A UML diagram is a diagram based on the UML (Unified Modeling Language) that is used to visually represent a system along with its primary actors, roles, actions, objects, or classes to better understand, edit, maintain, or document system information. Figure 1 show the use case for inventory management system.
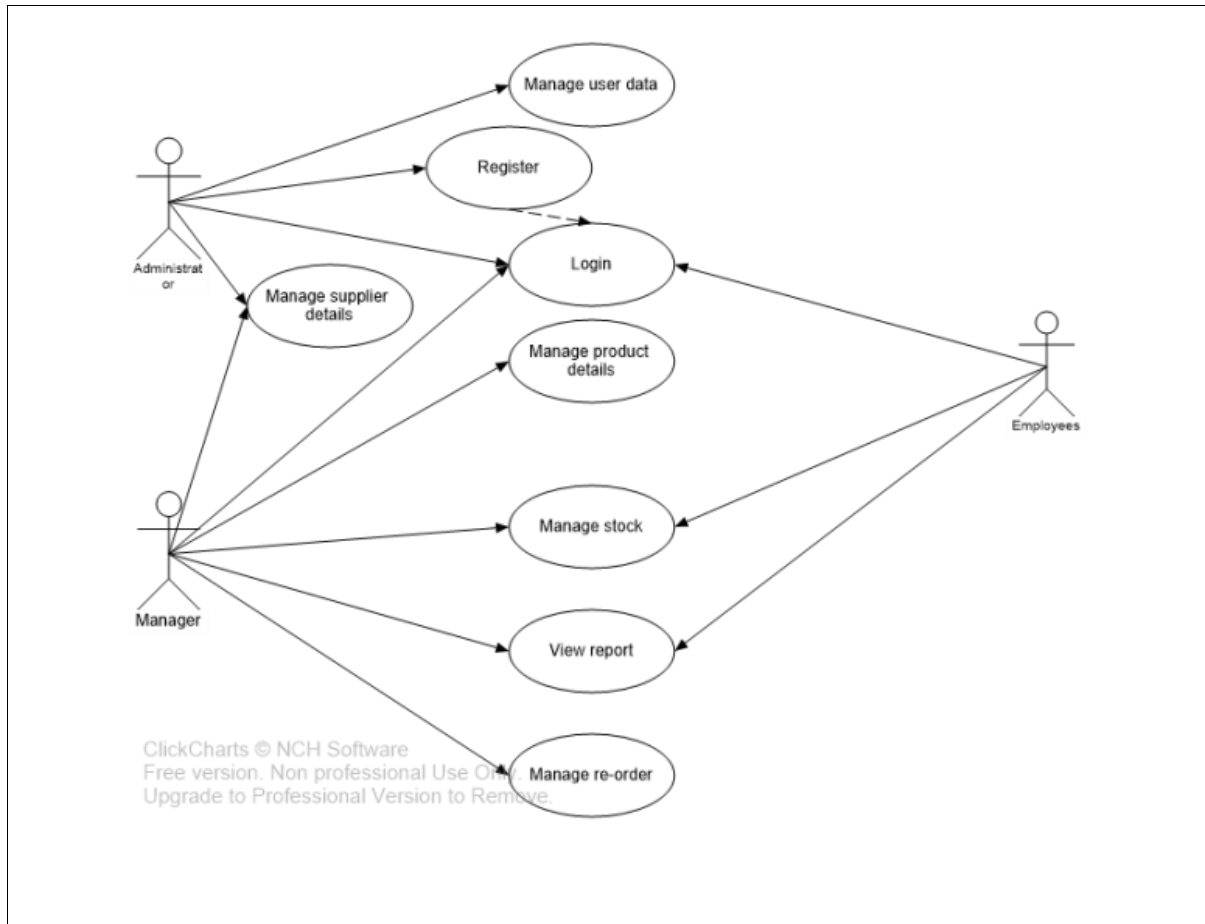
Figure 1: UML diagram

Inventory system class diagrams depict the structure of an inventory system, including classes, attributes, methods, and the relationships between items. Figure 2 shows the class diagram for Hot and Cold drink flavor inventory system.
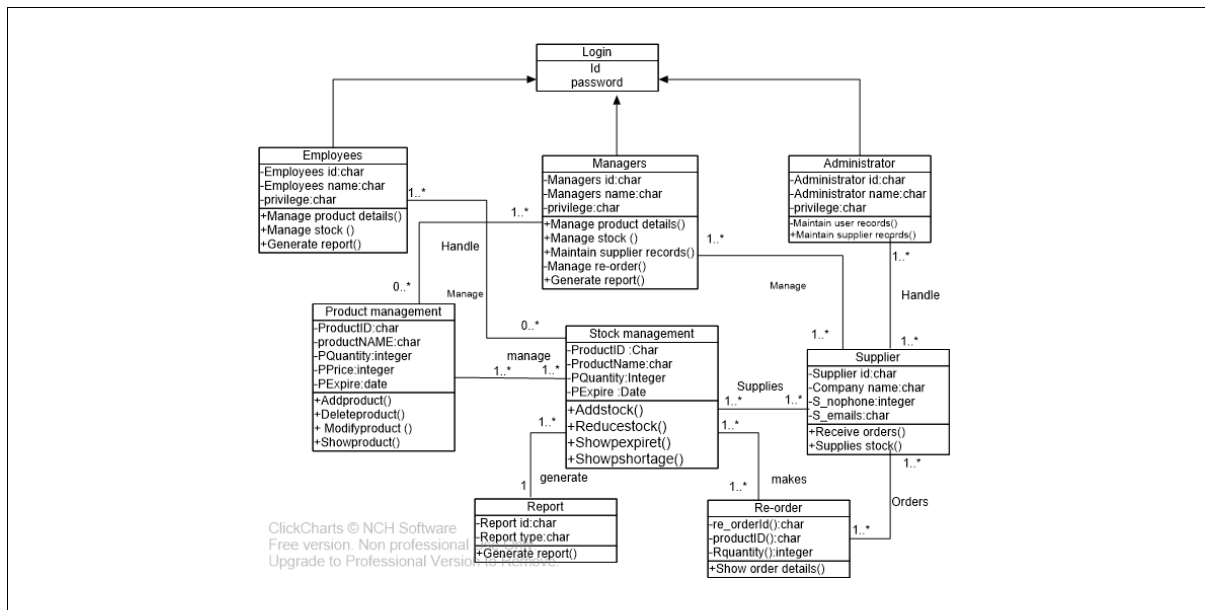
Figure 2: Class diagram for inventory system

A system flowchart is a useful presentation tool that demonstrates how the system's primary components interact and fit together. It is a generic tool that may be used to explain numerous processes and can be altered for a wide range of uses [7]. Figure 3 shows the flowchart for Hot and Cold drink flavor inventory system.
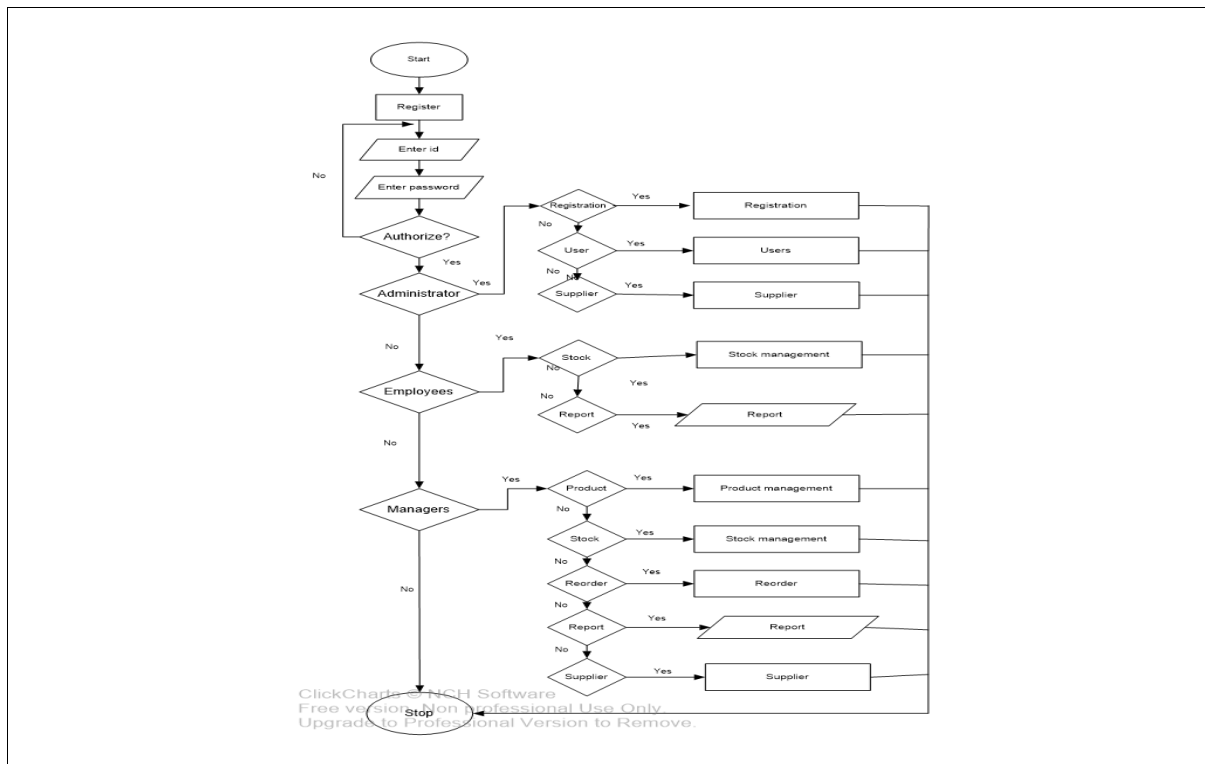

Figure 3: Flowchart for inventory system

An architecture diagram is a system diagram used to abstract the overall structure of a software system as well as the relationships, restrictions, and boundaries between components. It is a significant

tool since it provides an overall view of the software system's physical deployment as well as its evolution plan. Figure 4 shows the system architecture of the system.
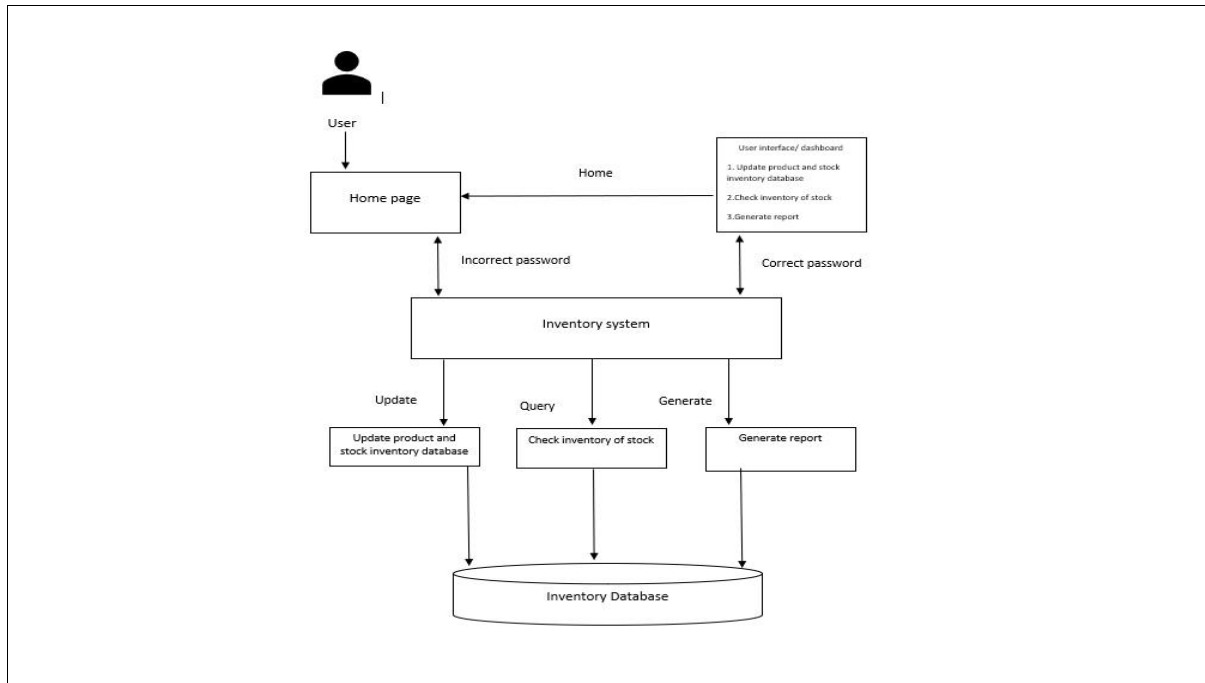

Figure 4: System Architecture

The database schema describes the entities that hold the different data in the database. The database schema for this system is listed in the following:

i)user (id, password, email, privilege)

ii)product_management (id, item_name,product_code, brand, supplierid)

iii)Stock (id, item_id, quantity, timestamp, type, expire_date)

iv)supplier (id,name, contact,address, Email)

An interface design is vital part of almost all computer systems. Interface design used to address and convey user need in the diagram. Figure 5 shows the login module for Hot and Cold Drink Flavor Inventory Management System. The login page allows the users to login to the system with authorization and identify user privilege. Figure 6 shows the registration for new user module interface. This registration module only can be use by admin to register the user by enter the id, password, name, and privilege.
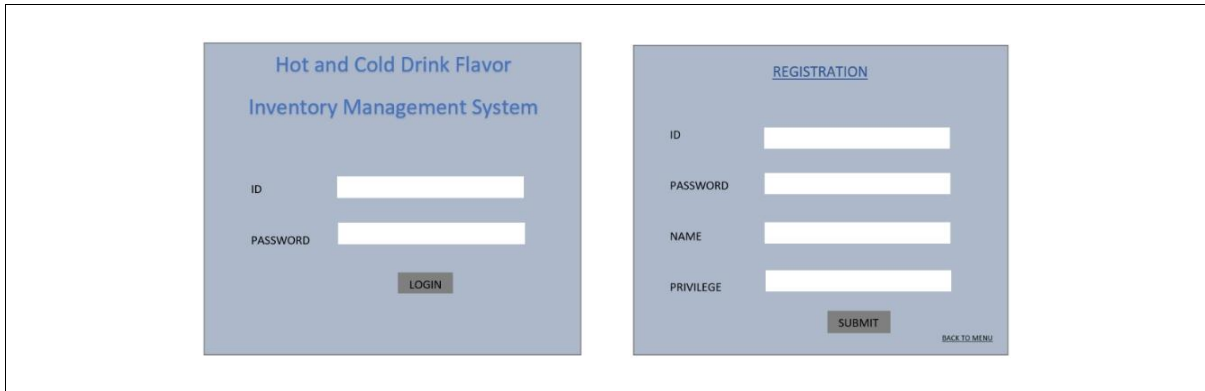
Figure 5: Login interface   **Figure 6: Registration interface**

Figure 7, 8 and 9 shows the user dashboard module interface. As all user has their own role and privilege, the dashboard has been divided by three based on their roles.
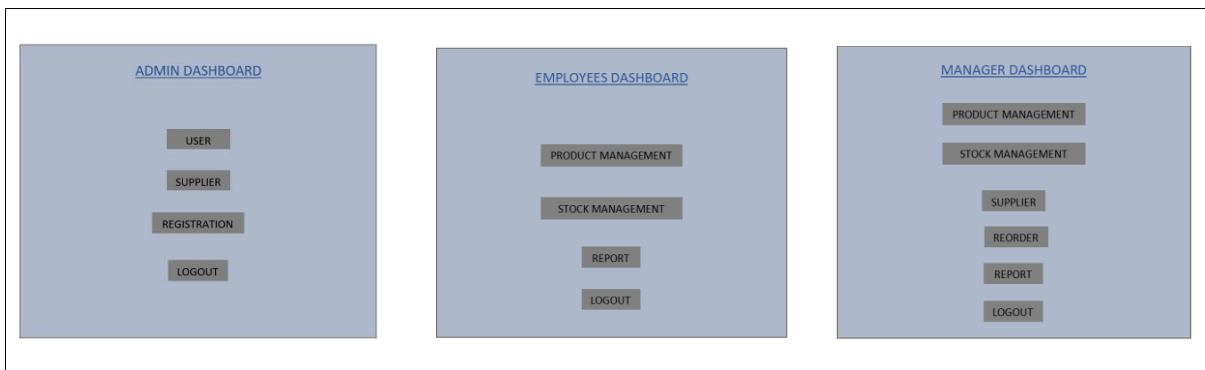

Figure 7: Employees dashboard   **Figure 8: Managers dashboard**   **Figure 9: Admin dashboard**

4.   Results and Discussion

The results and discussion section presents data and analysis of the study. This section can be organized based on the stated objectives, the chronological timeline, different case groupings, different experimental configurations, or any logical order as deemed appropriate. Implementation Phase means the time during which a project is constructed or implemented. Implementation phase includes the testing, inspection, adjustment, correction and certification of facilities and systems to ensure that the project performs as specified. The testing phase aims to massively reduce downtime and the probability of system failures by increasing the efficiency and effectiveness of the system that been developed.

Figure 1 until 5 show the interface of system that been implemented in the system. There is login, user, product, stock and product control page.
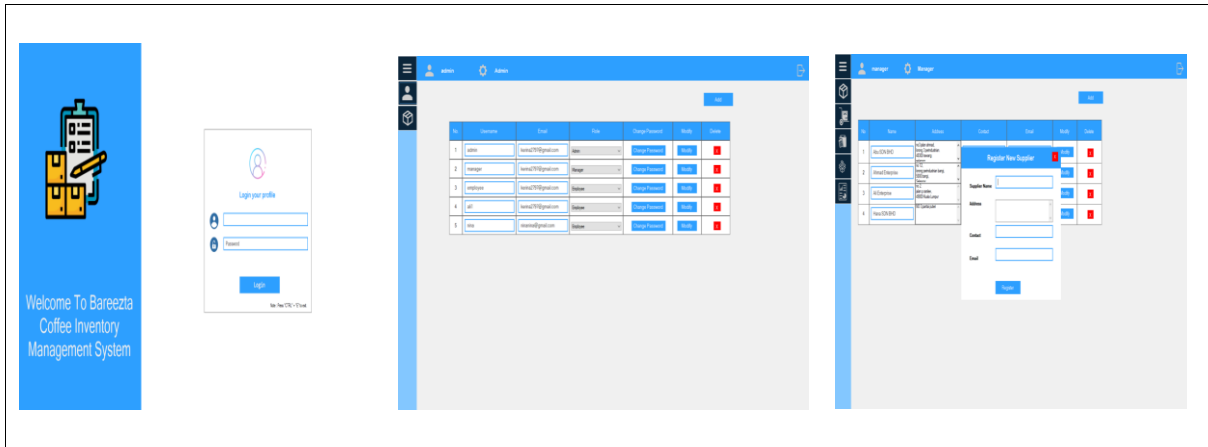
Figure 1: login page   **Figure 2: User management page**   **Figure 3: Manage product page**
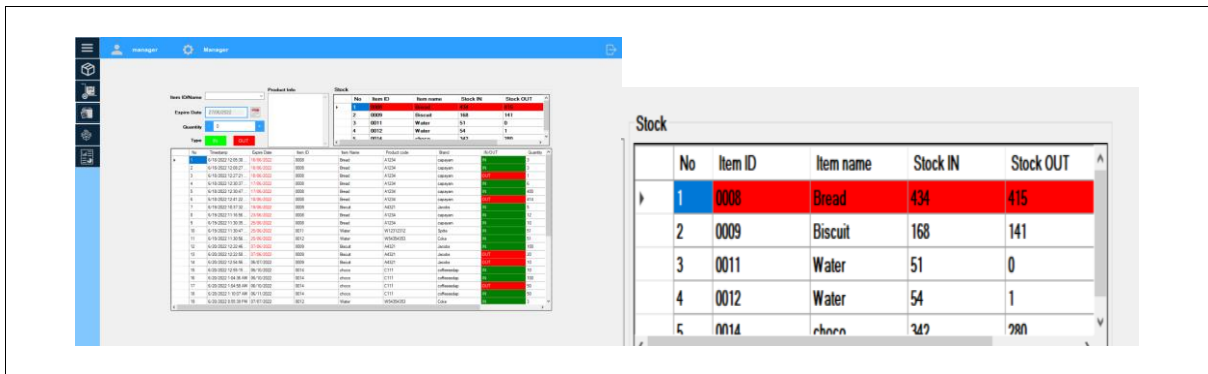
Figure 5: Stock management page   **Figure 6: Product Control page**

4.1 Test Cases

Test Cases has been conducted to hot and cold drink flavor stock inventory system to make sure the function has met the requirement stated. Test cases plays an important role in testing process and is main area of research on the topic of software testing. Good test cases reduce the likelihood of system failure and ensure the system's quality. The test case has been conducted by inserting the input and ensure the output that been produce is meet the requirements. Table 5 show the test cases that been conducted.

Table 5: List of test cases

No.	Test Cases	Description	Result
Login Module			
1.	User Login (Administrator)	The system should allow the administrator to login into the system using registered id and password.	Success
2.	User Login (Administrator)	The system should allow only authorized administrator to login into the system.	Success
3.	User Login (Administrator)	The system should notify the users that use a wrong id and password to login into the system.	Success
4.	User Login (Administrator)	The system should open a administrator page after the login process successful.	Success
5.	User Login (Managers)	The system should allow the managers to login into the system using registered id and password.	Success
6.	User Login (Managers)	The system should allow only authorized managers to login into the system.	Success
7.	User Login (Managers)	The system should notify the users that use a wrong id and password to login into the system.	Success
8.	User Login (Managers)	The system should open a manager page after the login process successful.	Success
9.	User Login (Employees)	The system should allow the employees to login into the system using registered id and password	Success
10.	User Login (Employees)	The system should allow only authorized employees to login into the system.	Success
11.	User Login (Employees)	The system should notify the users that use a wrong id and password to login into the system.	Success
12.	User Login (Employees)	The system should open a employee page after the login process successful.	Success
User Management Module			
1.	Administrator access	The system should allow only administrator to do a registration.	Success
2.	Administrator access	The system should show error if there is duplicate user id.	Success
3.	Administrator access	The system should show error when empty field is found.	Success
Supplier management Module			
1	Administrator and managers access	The system should allow the administrator and managers to add the supplier details.	Success
2	Administrator and managers access	The system should allow the administrator and managers to view the supplier details.	Success
3	Administrator and managers access	The system should allow the administrator and managers to edit the supplier details.	Success
4	Administrator and managers access	The system should allow the administrator and managers to delete the supplier details.	Success
Product management module			
1.	Managers access	The system should allow managers to view the product details.	Success
1.	Managers access	The system should allow managers to add the product details.	Success
2.	Managers access	The system should allow users to edit the product details.	Success

3.	Managers access		The system should allow users to delete the product details.	Success
Stock management module				
1.	Managers	and	The system should allow the users to enter the good	Success
	employees' access		in quantity.	
2.	Managers	and	The system should allow the users to enter the good	Success
	employees' access		out quantity.	
3.	Managers access		The system should allow the managers to view the product that near expire date.	Success
4.	Managers access		The system should allow the managers to view the product shortage.	Success
Reorder module				
1.	Managers access		The system should allow the managers to do reorder process	Success
Report module				
1.	Managers	and	The system should allow the users to view and print	Success
	employees' access		the daily report based on stockout.	

4.2 User Acceptance Testing

In software development, the user acceptance test (UAT) is the last stage of testing. The software system can be released for operational use once the test results meet the acceptance criteria. This paper first compares the different testing phases of software development in terms of important testing elements to highlight the uniqueness of UAT relative to the other test phases. Then, it will describe several approaches for acceptance test. The new strategy uses the individuals of the organization for testing purposes, includes a well-defined acceptance criterion, and satisfies the test requirements [8].

Hot & cold drink flavor stock inventory system end users consists of the workers which is system administrator, shop managers and shop employees. A survey has been conducted to get the feedback from the end users about the implemented system in the working environment. Based on the survey that been conducted, the overall feedback from end users is satisfied with the implemented system in the working environment. The survey conducted question and result are shown on appendix a.
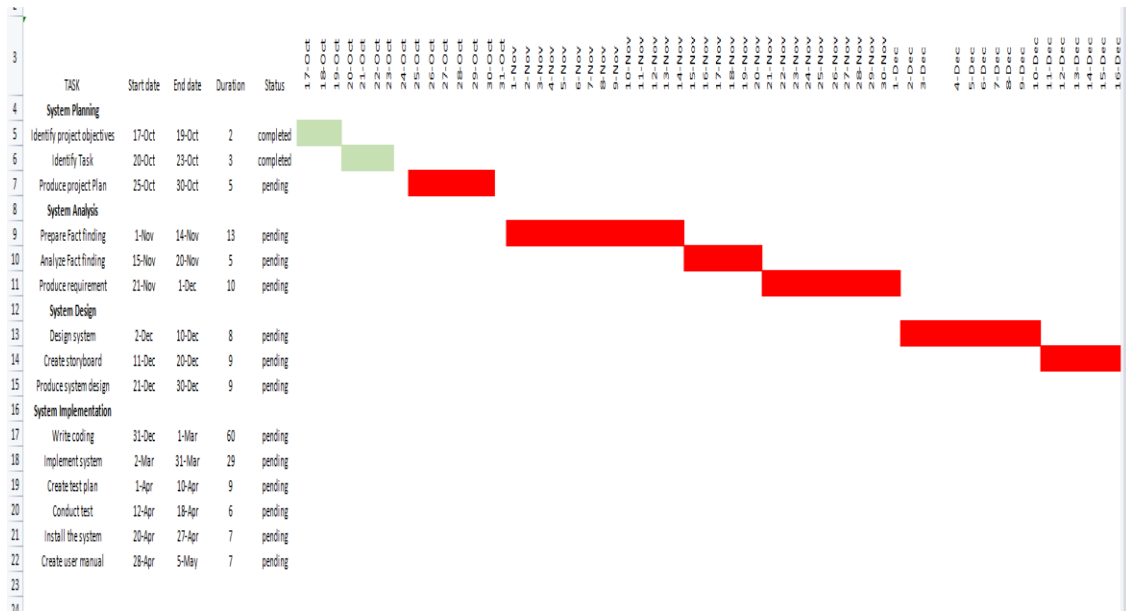
5.   Conclusion

To conclude this chapter, the project is relevant to the objectives set. The project report, the designing, implementation, and development of hot and cold drink flavour stock inventory system is completed on time. The designed system includes all the necessary components for a small business. All the system's functions are performing as expected, according to the report's requirements. The programming language C# must be used to develop this system. There is knowledge to be gained by using these languages, such as learning the implementation of these languages and learning how to implement these languages. Despite its flaws, the firm will benefit greatly from the implementation of this system.

Acknowledgment

Appendix

Appendix A

|	TASK	Start date	End date	Duration	Status
4	**System Planning**				
5	Identify project objectives	17-Oct	19-Oct	2	completed
6	Identify Task	20-Oct	23-Oct	3	completed
7	Produce project Plan	25-Oct	30-Oct	5	pending
8	**System Analysis**				
9	Prepare Fact finding	1-Nov	14-Nov	13	pending
10	Analyze Fact finding	15-Nov	20-Nov	5	pending
11	Produce requirement	21-Nov	1-Dec	10	pending
12	**System Design**				
13	Design system	2-Dec	10-Dec	8	pending
14	Create storyboard	11-Dec	20-Dec	9	pending
15	Produce system design	21-Dec	30-Dec	9	pending
16	**System Implementation**				
17	Write coding	31-Dec	1-Mar	60	pending
18	Implement system	2-Mar	31-Mar	29	pending
19	Create test plan	1-Apr	10-Apr	9	pending
20	Conduct test	12-Apr	18-Apr	6	pending
21	Install the system	20-Apr	27-Apr	7	pending
22	Create user manual	28-Apr	5-May	7	pending

The inventory system helping Bareezta coffee shop employees in quickly storing data.
20 responses

This system has the potential to be useful in the future.
20 responses
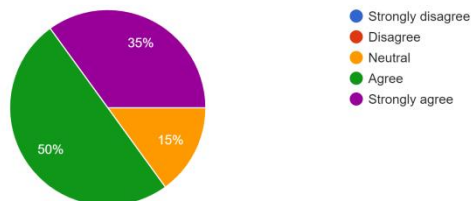
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